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Automation Impact Study of Army Training Management II: Extension of Sampling and Collection of Installation Resource Data

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EXECUTIVE SUMMARY

This automation impact study of Army training management (TM) was performed for the Army Development and Employment Agency (ADEA) and the Combined Arms Training Activity (CATA) by the Battelle Human Affairs Research Centers and the Pacific Northwest Laboratory. The primary objective of the study was to provide the Army with information concerning the potential costs and savings associated with automating the TM process. This study expands the sample of units surveyed in Phase I of the automation impact effort (Sanquist et al., 1988), and presents data concerning installation resource management in relation to TM.

The structured interview employed in Phase I was adapted to a self-administered survey. The data collected were compatible with that of Phase I, and both were combined for analysis. Three U.S. sites, one reserve division, one National Guard division, and one unit in the active component outside the continental U.S. (OCONUS) (referred to in this report as forward deployed) were surveyed. The total sample size was 459, of which 337 respondents contributed the most detailed data.

Data concerning how training managers spend their time indicated that U.S. active units spend substantially more time on TM than forward deployed or reserve units. This finding, in conjunction with data indicating that the U.S. active component spends more time on guidance type tasks than other TM tasks, reinforces the conclusion from Phase I that TM is event-driven in U.S. active units.

In U.S. active units, the largest proportion of time spent on TM by individual training managers is at the brigade level. This contrasts with the forward deployed units, which show the least amount of time spent at that echelon, with the largest proportion of time spent at battalion levels. Finally, in reserve units, the largest amount of time is spent by personnel at the division and above levels. These results indicate that TM automation may require different solutions for these three types of units.

Computation of costs and savings associated with automation, based on workload reduction factors from industrial studies, permits estimates of the financial impact of automating TM. Across all types of units, the annual

cost savings in labor avoidance are estimated to be \$218 million $\pm$ 25 million. The savings in personnel time spent on TM would be 5242 man years. This would provide additional time for training, thus yielding a higher level of force readiness.

The cost savings estimates also suggest that automating specific aspects of TM would account for a large percentage of the savings. For example, the TM tasks associated with determining training requirements, such as developing the METL or a training program, when automated, would account for \$83 million in annual savings, or 38% of the total. Similarly, the company level savings amount to 43% and 50% of the savings for the U.S. active and forward deployed components, respectively.

Analysis of the cost effectiveness of various automation scenarios indicates that automation to the company level, without purchasing new equipment, would yield \$1486 million in life cycle savings over the current system. However, data concerning the utilization of existing computer systems for TM purposes suggests that such an alternative is not plausible. Instead, new equipment and software specific to TM functions should be considered; this scenario would yield \$1293 million in life cycle savings when automation is carried to the company level. For the new equipment scenario, the initial investment could be recovered in the first year on the basis of labor avoidance savings.

The major conclusions that can be drawn based on this analysis are:

- Estimated savings are greatest for the reserve component, followed by U.S. active and forward deployed components, yielding a total potential cost savings of \$218 $\pm$ 25 million annually in labor avoidance;
- The cost savings will be concentrated at the Co level for the active component and at the Bn level for the reserve component;
- Priority for automation should be given to the Training Requirements tasks, i.e., identifying unit missions, goals and METL, developing training objectives, tasks and programs, and determining training requirements; this should be followed by Guidance, Resources and Scheduling;
- Emphasis for automation should be placed on Procedural Work,

since the majority of savings are estimated to occur in this area;

- Consideration should be given to new equipment and software solutions, since existing equipment is used for TM only 14% of the time;
- TM automation solutions should link installation resource management offices to units, provide waiting list and alternate resource functions, and generally should more closely link long-range plans to the execution of training events.

Assessment of the effectiveness of installation resource management indicated a disparity between long range plans, and the execution of training events. The most tangible example is the area of ammunition management, in which units overforecast their requirements, resulting in 39% of the ammunition that is drawn being returned unused. This results in a variety of "system" costs, including inventory and re-processing. A cost analysis based on the price of ammunition alone, without the overhead of processing, indicated that as much as \$321 million is overdrawn on an annual basis.

The data point to alternative TM solutions for the three types of units (U.S. active, forward deployed, and reserve) examined in the present study. However, there are a number of general features that would be common across any automated TM system. The current study greatly broadened the portrait of TM obtained in Phase I, and can be considered a representative sampling of TM as it is now conducted throughout the active and reserve components of the Army. As such, the data contained in this report provide the basis for approaches to TM automation.

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1.0 INTRODUCTION

The effectiveness of Army training ultimately depends on the effectiveness of planning unit training events. Army Field Manual 25-100 specifies the processes that, when practiced, should lead to effective training management (TM). In essence, TM is the process of developing training programs to meet specific unit mission requirements. Effective TM, and hence effective training, will result in units that have a higher level of readiness to meet their missions. In addition to training, readiness depends on a variety of other factors including equipment and supplies on hand, equipment condition, and personnel. This report presents an extension of a previous study (Sanquist et al., 1988) of the impacts of automating TM, and describes the costs and potential benefits associated with manual and computer-based TM systems.

The report is composed of six chapters. The first chapter provides background information and summarizes the methods and results of the Phase I study. Chapter 2 describes the survey methodology employed; the results of the survey and their statistical analyses are presented in Chapter 3. The fourth chapter builds upon the data of Chapter 3 to portray the quantitative costs and benefits associated with various manual and automated approaches to TM. Chapter 5 discusses the results of data collected from installation resource management offices at the sites surveyed; the purpose of these data is to represent the costs associated with specific aspects of training, e.g., ammunition and ranges. The sixth chapter summarizes the results, compares them to the Phase I study, and draws general conclusions regarding the impact of automating the processes of TM.

1.1 OBJECTIVES

The primary objective of this analysis is to provide Army decision makers with an assessment of the impact of automation on the costs of conducting TM. The results of this study are applicable to automating TM as well as management information systems (MIS) in general. Thus, a secondary objective is to present information on the processes of Army organizational interaction that will be useful in designing objective automated systems.

Since Army MISs will need to meet the requirements of a geographically dispersed, multi-echelon structure with varying missions, a wide-ranging requirements analysis is necessary. This can best be achieved through a comprehensive study of the functions of individuals, organizational elements, and information use. Studies of such a scale are rare, due to the scope of investigation required. Instead, studies oriented toward defining MIS requirements tend to focus on single classes of workers, or single organizational levels. By providing an organizationally comprehensive analysis of current system functions and costs, designers of MISs can tailor their solutions. Additionally, if system implementation is based on cost reduction, a phased introduction strategy can balance expenditures on new equipment and training with cost savings.

1.2 BACKGROUND

Automated TM is a concept that was originally explored by work at the Army Research Institute (Hiller, 1982). This work resulted in the design of a system known as the Advanced Technology Unit and Training Management System (ATUTMS). ATUTMS was subsequently expanded to become the Integrated Training Management System (ITMS), which is intended to provide a test-bed for evaluating the concept of automating TM. The current study is intended to provide data concerning the Army wide financial impact of automating TM.

Phase I of this study (Sanquist et al., 1988) addressed two primary questions: (1) does the actual practice of TM follow doctrine, and (2) what are the costs and economic savings that will result from the introduction of automation? Data to answer these questions were collected in structured interviews of training managers at Ft. Lewis, WA, within the 9 ID(MTZ) (see the Phase I report, Sanquist et al., 1988, for details).

Data concerning the practice of TM in relation to doctrine indicated that while training managers generally follow the doctrinally prescribed processes, there are specific inefficiencies and inadequacies. For example, few units reported analyzing tasks in terms of wartime missions, or using previous training results to determine current training requirements. Rather, training appears to be planned within the focus of available resources and time, reflecting the event-driven nature of the process. These types of

problems reflect fundamental difficulties that will affect the product of TM, i.e., training programs. For example, not using previous training results to plan future training eliminates an important feedback loop, which is an integral part of TM (FM 25-2, Unit Training Management), as shown in Figure 1.1.

Additionally, numerous inefficiencies in the process of conducting TM were observed. These inefficiencies took the form of excessive paperwork, the necessity to hand-carry items to higher echelons for approval, and continual re-working of previously produced documents. Some of these inefficiencies are the result of problems with the system, e.g., too many external taskings, while others are the result of slow or error-prone information processing techniques, such as manual computation or forms generation. The Phase I report presented several examples of areas where automation would enhance the process of TM, including resource scheduling, ammunition forecasting, obtaining publications, and tracking individual and collective proficiency.

Data concerning costs and economic savings revealed that the Army could save \$720 million over a ten year life cycle of an automated system. These figures were based on estimates of time spent on TM tasks by the Ft. Lewis training managers. It was determined, based on information about the structure of the Army, that 49% of these savings would be obtained at the company level. The life cycle analysis indicated that the costs of installing an automated TM system Army-wide, using the ITMS design as a basis, would be recovered within the first year through labor avoidance costs.

The results of the Phase I study were presented to a Test Integration Working Group (TIWG) in December, 1988. This group was composed of representatives from the Combined Arms Training Activity (CATA), Program Manager/Army Communicative Systems (PM/ACS), the Army Development and Employment Agency (ADEA), and Headquarters, Department of the Army. The consensus of this working group was that the sample size for the cost-benefit study should be expanded to include units in addition to Ft. Lewis, since TM requirements may vary depending on unit missions. Further, the group indicated an interest in where actual cost savings in materiel might occur,

FIGURE 1.1. The Four Phases of Training Management

such as ammunition (in distinction to labor avoidance savings). Thus, the charter of the Phase II effort reported here, was to expand the study to include additional CONUS (Continental U.S.) and OCONUS (outside Continental U.S.) units, as well as National Guard and Reserve units, and to examine tangible training costs that may be reduced. These sources of data would provide a more varied portrait of TM requirements, and thereby make the cost-benefit computations more representative of actual Army-wide impacts.

1.3 SCOPE

The present study was guided by the Combined Arms Training Activity (CATA), Ft. Leavenworth, Kansas. In conjunction with CATA, Battelle research staff selected Army installations within the active CONUS and OCONUS components, and within the National Guard and Reserves (referred to here collectively as the reserve component) for survey administration. Initially, three additional CONUS sites (referred to here as U.S. active sites) were selected; due to other commitments, only two of these sites were able to participate. One National Guard site, one Army Reserve site, and multiple units within a forward deployed (OCONUS) site were surveyed. These additional sites contributed data equivalent to that collected in Phase I, concerning time spent on TM tasks, documents used, problems encountered, etc. They also contributed information concerning specific aspects of resource management, including training funds, ammunition, ranges and facilities, and training aids and devices. The subsequent chapters describe the details of the data collection, analysis and cost-benefit implications.

2.0 JOB ANALYSIS SURVEY OF CURRENT TRAINING MANAGEMENT PRACTICES: DESCRIPTION AND ADMINISTRATION

2.1 INTRODUCTION

This chapter describes the job analysis survey that was developed and patterned after the structured interview used in Phase I. The data collection instrument used in Phase I consisted of a structured interview that was individually administered to training managers. These interviews required between 30 minutes and 4 hours for completion. In order to expand the sample size and to decrease the cost of data collection, the structured interview job analysis format was adapted to a survey booklet form suitable for self-administration. The survey was administered to all identified training managers at each echelon, from Company through Installation.

The primary measures obtained include percent time on various TM tasks, type of work performed, and use of documents. Questions were also asked regarding present use of automation, and open-ended questions were posed to identify problems in TM and potential solutions. The survey instrument, subject population, and survey administration procedures are described below.

2.2 JOB ANALYSIS INSTRUMENT DESCRIPTION

There were three broad objectives in conducting the job analysis: (1) to increase the respondent sample from the Phase I study, (2) to provide estimates of time currently spent by Army Training Management personnel that could be used to estimate the cost effectiveness of training management automation, and (3) to provide descriptive and quantitative data characterizing current TM duties and procedures within the Army that are candidates for automation.

2.2.1 Instrument

The survey was based on eight TM tasks identified in a study of Army doctrine (Sanquist et al., 1988). Task titles were modified slightly from Phase I but the definitions are the same. The eight TM tasks are listed in Table 2.1. During Phase I, the respondents were allowed to add other training

TABLE 2.1. Training Management Tasks Used in Job Analysis Survey

<u>Task Number</u>	<u>Task</u>
1	Identify unit missions, mission goals, and METL <ul style="list-style-type: none">• Obtaining and analyzing relevant documents and information• Identifying unit's own wartime missions• Identifying goals for training, manning, and equipping the unit• Developing the unit's Mission Essential Task List (METL) and getting METL approved by higher headquarters
2	Develop training objectives, tasks for training, and training program <ul style="list-style-type: none">• Obtaining and analyzing relevant documents and information• Identifying the unit's training objectives (i.e., tasks, conditions, and standards)• Identifying the unit's training tasks and training program
3	Forecast training requirements <ul style="list-style-type: none">• Obtaining and analyzing relevant documents and information• Forecasting training resource requirements for funds, ammunition, flying hours, ranges, training aids, fuel, etc.
4	Long-range (8-12 month) training guidance <ul style="list-style-type: none">• Obtaining and analyzing relevant documents and information• Issuing long-range training guidance• Coordinating training resources 8-12 months in advance of training• Issuing the long-range plan
5	Short-range (3-6 month) training guidance <ul style="list-style-type: none">• Obtaining and analyzing relevant documents and information• Issuing short-range training guidance• Coordinating training resources 3-6 months in advance of training• Issuing the short-range plan
6	Near-term (3-12 week) training guidance <ul style="list-style-type: none">• Obtaining and analyzing relevant documents and information• Issuing near-term training guidance• Coordinating training resources 3-12 weeks in advance of training• Issuing the near-term plan
7	Issue training schedule <ul style="list-style-type: none">• Obtaining and analyzing relevant documents and information• Developing and publishing the unit's training schedule• Coordinating resources up to the time training is conducted
8	Determine training status <ul style="list-style-type: none">• Obtaining and analyzing relevant documents and information• Determining status of task training• Providing unit feedback on the results of training

management tasks. Only three respondents added a task, so the eight original tasks remained in the self-administered survey.

The survey was designed to be self-administered to reduce the time required to collect data. The instrument yielded data that is completely compatible with data gathered by the structured interview of Phase I; thus, results from Phase I and II are analyzed together. The survey is reproduced in Appendix B.

The survey items were divided into eight sections: (1) biographical information, (2) training management information, (3) TM problems encountered and suggested solutions, (4) a task definition reference sheet (5) documents produced in the performance of eight training management tasks, (6) time spent on the eight training management tasks, (7) types of work performed on each of the eight training management tasks, (8) present use of computers in training management, and (9) conducted and scheduled training.

In Section 1, respondents were asked to state their rank, years at rank, years in the Army, current unit assignment, and job title. Section 2 items covered more specific information regarding TM: length in TM position, percentage of duty time in TM, and preparation of and time spent on training schedules. The third section requested the training managers to list three major TM problems and their suggested solutions to those problems. Section 4 consisted of the titles and definitions of the eight TM tasks to be used as a reference for the remainder of the survey (see Table 2.1).

In Section 5, each respondent was asked to provide information on the documents used and produced in the practice of the eight TM tasks and the number of times per year the document was used or produced. Section 6 asked respondents to estimate the percentage of TM time spent on the eight tasks. Section 7 requested that respondents estimate the percent of time spent on each TM task that was spent on each of seven types of work. The seven types of work defined in Table 2.2, are similar to taxonomies used in previous studies of office automation (Czaja, 1987) and represent general areas where humans and computers have inherently different capabilities (Fitts, 1951). The time estimates were collected as a basis for calculating projected savings resulting from automation.

TABLE 2.2. Types of Work Categories Used in Job Analysis Survey

<u>Work Type Category</u>	<u>Definition</u>
1. Discussing and Planning	Discussing and planning ways to obtain, process, and document training management information
2. Obtaining Information	Obtaining documents and information
3. Compile Information	Copying and compiling information from available source documents
4. Analyze Information	Analyzing and interpreting documents and information
5. Computing Numbers	Computing numerical data
6. Preparing Documents	Preparing task documents, including document revisions
7. Supervising Others	Supervising, directing, and leading others in carrying out a task.

Section 8 requested information concerning the use of computers. First, respondents indicated whether or not they used computers, and then indicated the type of computer or system used specifically in TM tasks. They also indicated the percentage of time spent on each task devoted to using a computer. Finally, Section 9 asked respondents to estimate the amount of scheduled training that was conducted, and the amount of conducted training that had been scheduled.

2.2.2 Survey Pilot Testing

After designing the survey to match the Phase I interview format, the self-administered survey was pilot tested. The test was conducted at Ft. Ord, California with a group of 20 active duty Army personnel from the Test and Experimentation Command (TEC). The respondents were not currently training managers, but had previous TM experience. The respondents completed the TM

survey and a survey feedback sheet. The feedback sheet included questions on the ease of understanding the instructions and task definitions in the survey. Those items that respondents had difficulty understanding were modified or deleted. For example, the respondents indicated that judging the number of hours per week spent using or producing a document was difficult, and many of them made no response to this item. To ensure the validity of the responses, the final survey was modified so that respondents indicated the number of times per year the document was used or produced.

2.2.3 Survey Versions for the National Guard and Reserves

The National Guard and Reserves of the Army have slightly different guidelines for three TM tasks: completion or submission of long-range, short-range, and near-term plans. For all three tasks, the Army Reserve and National Guard guidelines require plans to be submitted further in advance than for the Active component; these shorter timelines were incorporated into a Reserve Component version of the survey. Table 2.3 describes the differences between the active and reserve component surveys.

TABLE 2.3. Differences Between Active and Reserve Components on TM Guidance Tasks

<u>Task Number and Name</u>	<u>Completion or Submission Guideline</u>	
	<u>Active Component</u>	<u>Reserve Component</u>
#4 Long-Range Guidance	6-12 months	18-36 months
#5 Short-Range Guidance	3-6 months	6-18 months
#6 Near-Term Guidance	3-12 weeks	3-6 months

2.3 SURVEY SAMPLE

Units at each survey site were chosen to represent training managers from a range of unit types in the Army. A description of the units surveyed is presented in Table 2.4. In addition to the units for each division, the respondents also included training managers at the division and installation level.

TABLE 2.4. Description of Army Units Surveyed

<u>Installation</u>	<u>Location</u>	<u>Unit Type and Location</u>	<u>Unit Composite</u>
A	U.S.	ACTIVE MOTORIZED DIVISION	1 BRIGADE 4 BATTALIONS 1 SEPARATE COMPANY
B	U.S.	ACTIVE LIGHT DIVISION	2 BRIGADES 6 BATTALIONS
C	U.S.	ACTIVE HEAVY DIVISION	1 BRIGADE 1 DIVARTY 2 BATTALIONS 1 SEPARATE COMPANY
D	OUTSIDE U.S.	ACTIVE HEAVY DIVISION FORWARD DEPLOYED	1 BRIGADE 5 BATTALIONS
E	RESERVE U.S.	NATIONAL GUARD HEAVY, SEPARATE BDE	2 BRIGADES 5 BATTALIONS 1 SEPARATE COMPANY
F	RESERVE U.S.	RESERVE COMBAT SERVICE SUPPORT UNIT	2 BATTALIONS 1 SUPPORT GROUP 2 SEPARATE COMPANIES

2.4 SURVEY ADMINISTRATION

Army personnel at each survey site assisted in selecting the units to be surveyed. They notified units and personnel of the time and place to complete the survey. All training managers in each selected unit were asked to complete the TM Survey. Surveys were administered to training managers by Battelle researchers whenever possible, or were administered by Army personnel. At Installation C, all surveys were administered by Army personnel. All respondents with the rank of major and above had the option to complete the surveys at their own convenience. Respondents were assured of the confidentiality of their responses and of the identity of their units.

3.0 SURVEY ANALYSIS AND RESULTS

3.1 INTRODUCTION

This chapter describes the analysis of the TM survey data and the results obtained. Analysis of survey data began with the coding of completed surveys and entry of coded responses into a data file. Accuracy of survey data entry was ensured through the use of a double-entry verification procedure. After establishing the data file, selected variables in the data file were then accessed and statistical analyses were conducted using the SPSS/PC+ data analysis package (SPSS, 1988).

In conducting data analyses, a common classification of respondents was developed to provide subsets of respondents with adequate sample sizes to allow statistically sensitive comparisons. This classification included the respondent, or between-subjects, variables of component, echelon, and rank. The six installations that were surveyed were divided into three components: U.S. active, forward deployed, and reserve. The variable of echelon included four levels: company (Co), battalion (Bn), brigade (Bde), and division and above (Div+), where data from division and installation were combined. Finally, the variable of rank included two levels: enlisted and officer.

The results obtained in a series of six analyses are discussed in the sections 3.2 through 3.7 of this chapter. A final section, 3.8, reviews survey findings and their general implications for TM automation. The six analyses to be discussed were conducted to determine:

- (1) Survey respondent characteristics,
- (2) Duty time spent by respondents on different aspects of TM,
- (3) TM problems identified and solutions recommended by respondents,
- (4) Correspondence between planned and conducted training,
- (5) Frequency of document use in the performance of TM, and
- (6) Current use of computers in the conduct of TM.

Throughout this chapter, when the effect of a variable is referred to as "highly significant," the corresponding alpha level is $p < .01$, meaning that the reported effect would occur on the basis of chance less than one percent

of the time. When the effect of a variable is referred to as "significant," the corresponding alpha level is $p < .05$, meaning that the reported effect would occur on the basis of chance less than five percent of the time. Tables presenting the results of all statistical analyses of survey data are provided in Appendix C.

3.2 SURVEY RESPONDENT CHARACTERISTICS

Survey data were initially analyzed to determine the number of respondents in the different sites, echelons, and ranks. Table 3.1 presents the complete survey respondent sample, which includes those who did not

<u>TABLE 3.1. Survey Respondents</u>							
<u>Site</u>	<u>Rank</u>	<u>Echelon</u>					<u>TOTALS</u>
		<u>CO</u>	<u>BN</u>	<u>BDE</u>	<u>DIV</u>	<u>INST</u>	
A	ENLISTED	15	11	4	6	1	37
	OFFICER	16	9	6	3	1	35
B	ENLISTED	5	24	1	1	3	34
	OFFICER	11	24	3	7	9	54
C	ENLISTED	0	3	3	0	0	6
	OFFICER	4	3	4	6	1	18
D	ENLISTED	31	33	6	4	0	74
	OFFICER	34	33	10	8	0	85
E	ENLISTED	17	14	4	0	0	35
	OFFICER	17	22	1	0	2	42
F	ENLISTED	17	14	4	0	0	35
	OFFICER	17	22	1	0	2	42
TOTALS							
	ENLISTED	76	90	20	12	4	202
	OFFICER	89	99	26	30	13	257
TOTAL		165	189	46	42	17	459

provide detailed information about their practice TM.¹ Most respondents in this sample are at the Co and Bn levels. Officers make up 56% of the sample; enlisted personnel make up 44%. Site C has the fewest respondents; this is particularly apparent in the number of enlisted personnel surveyed.

The next three tables present frequencies and descriptive statistics for the 337 respondents who reported performing TM and provided detailed information on their TM task performance. Table 3.2 presents the number of respondents who practice TM, in each separate component, echelon, and rank.

TABLE 3.2. Number of Respondents that Perform TM Duties by Rank, Component and Echelon

	U.S. Active				Forward Deployed				Reserve				Total
	Co	Bn	Bde	Div+	Co	Bn	Bde	Div+	Co	Bn	Bde	Div+	
Enlisted	17	23	5	7	19	18	2	1	18	13	6	8	127
Officer	29	28	13	17	32	24	7	6	21	24	3	7	218

The first two sections of the TM survey included items that asked respondents to list the number of years spent in the Army and the number of years spent in their current TM position. Table 3.3 presents the average number of years spent in the Army for each component, echelon, and rank. Respondents in the reserve group have spent more time in the Army. The average number of years spent in the Army increases from the Co level to the Div+ level. Enlisted respondents have also spent more time in the Army than officer respondents.

Table 3.4 presents the average number of years spent in the current TM position for each component, echelon, and rank. Enlisted personnel have spent more time in their current TM position, on the average, than have officers.

¹Forty persons did not provide estimates of time spent on TM. An additional 82 did not provide detailed estimates of time spent on TM tasks and work types. For those analyses requiring only estimates of overall TM time, 419 respondents were used. For analyses requiring task and work type time estimates, 337 respondents were used.

TABLE 3.3. Average Number of Years Spent in the Army

	U.S. Active				Forward Deployed				Reserve				Grand Mean (S.D.)
Rank	Co	Bn	Bde	Div+	Co	Bn	Bde	Div+	Co	Bn	Bde	Div+	
Enlisted													
Mean	8.97	15.87	12.48	14.29	8.68	11.88	18.58	13.88	12.43	14.42	18.58	--	11.99
S.D.	(6.28)	(4.13)	(7.84)	(4.57)	(8.18)	(5.79)	(.71)	(.88)	(4.38)	(5.87)	(7.84)	--	(5.83)
Officer													
Mean	8.38	8.17	9.48	13.89	5.89	5.64	11.38	11.78	12.18	17.13	15.88	18.71	9.99
S.D.	(2.21)	(8.38)	(5.83)	(8.43)	(3.14)	(4.78)	(8.88)	(8.67)	(5.88)	(4.48)	(3.81)	(18.3)	(8.43)

TABLE 3.4. Average Number of Years Spent in Current TM Position

	U.S. Active				Forward Deployed				Reserve				Grand Mean (S.D.)
Rank	Co	Bn	Bde	Div+	Co	Bn	Bde	Div+	Co	Bn	Bde	Div+	
Enlisted													
Mean	.87	1.89	.78	1.78	.94	1.11	.92	.58	1.73	2.98	1.88	--	1.37
S.D.	(.57)	(.78)	(.19)	(.89)	(.85)	(.87)	(1.18)	(.88)	(1.85)	(1.88)	(3.23)	--	(1.34)
Officer													
Mean	.77	.78	.64	1.11	.78	.82	.43	.98	1.28	1.28	.89	2.28	.93
S.D.	(.45)	(.57)	(.38)	(1.38)	(.45)	(.88)	(.34)	(.38)	(.91)	(1.41)	(.42)	(1.18)	(.88)

U.S. active and forward deployed personnel at Div+ have spent more time in their TM positions than have personnel at other echelons. TM personnel at the Co level generally have spent the least amount of time in their positions; however, this is not as pronounced among officers in forward deployed units.

3.3 TIME SPENT MANAGING TRAINING

Coded TM time estimate data were analyzed using the SPSS MANOVA procedure to determine the effects of the between-subjects variables of component,

echelon, and rank; and the within-subjects variables of task and work.²

Table 3.5 presents the proportion of duty time spent on TM across components and echelons for the sample of 337 training managers included in the analyses. Estimates of TM time for the reserve respondents were scaled according to whether they were part time or full time. For example, a part time respondent who estimated spending 25 percent of his time on TM, was adjusted on the basis 272 total hours per year; this converts to 13 percent of full time, thus yielding 3.2 percent full time equivalency. All part time respondents were scaled in this manner.

TABLE 3.5. Average Proportion of Duty Time Spent on Training Management

	U.S. Active				Forward Deployed				Reserve				Grand Mean (S.D.)
Rank	Co	Bn	Bde	Div+	Co	Bn	Bde	Div+	Co	Bn	Bde	Div+	
Enlisted													
Mean	.58	.52	.77	.68	.55	.42	.83	.85	.45	.54	.32	--	.51
S.D.	(.38)	(.32)	(.23)	(.36)	(.28)	(.38)	(.83)	(.88)	(.35)	(.33)	(.25)	--	(.32)
Officer													
Mean	.36	.46	.58	.31	.27	.43	.22	.36	.18	.28	.35	.67	.35
S.D.	(.21)	(.32)	(.33)	(.31)	(.28)	(.31)	(.23)	(.37)	(.15)	(.32)	(.35)	(.35)	(.38)

3.3.1 TM Duty Time

Respondents' estimates of the proportion of duty time spent on all aspects of TM provides the most basic comparison of different components, echelons, and ranks. Figure 3.1 depicts the highly significant effect of component on respondents' estimated proportion of duty time spent managing training. In pair-wise comparisons of the component means depicted in Figure 3.1, it was determined that the average time spent on TM by U.S. active

² In conducting this analysis, a MANOVA approach to repeated measures was used to analyze the within-subjects effects of task and work, as well as any interactions involving these variables and the two-way interaction between the task and work variables.

FIGURE 3.1. Mean Proportion of Duty Time Distributed Across Component

respondents, .47, was significantly greater than the forward deployed and reserve component averages of .37 and .34, respectively.

Figure 3.2 provides a second view of TM time, which depicts the highly significant interaction between respondents' echelon and component. Among the U.S. active respondents, a greater proportion of duty time was spent on managing training at the Bde, with an average of .63, than the other echelons, with a combined average of .44. Among the forward deployed respondents, a larger proportion of duty time was spent on TM at the Bn level, with an average of .43, than at the Co, Bde, and Div+ levels, with a combined average of .28. Finally, respondents in reserve components at Div+ spent a larger proportion of duty time managing training, with an average of .67, than the other echelons, with a combined average of .32.

In reviewing the averages depicted in Figure 3.2, it is important to note that these values represent the average amount of duty time spent on TM by individual survey respondents, rather than the total amount of TM time spent within components and echelons. That is, the data represent time spent per

FIGURE 3.2. Mean Proportion of Duty Time Distributed Across Component and Echelon

person on TM, rather than being aggregated on a unit basis. Thus, it would be inappropriate to conclude that total TM time is greater at Bde than at Co in the U.S. active component. Rather, it is likely that the larger number of Co units would result in more total TM time at Co, even though individuals at Bde level spend more of their time in TM than Co level respondents.

Figure 3.3 depicts the highly significant interaction of echelon and rank. This effect is best illustrated by comparing the ratio of enlisted to officer respondents' TM time at the four echelons. At the Co level the enlisted to officer TM time ratio is 2:1, where enlisted personnel spend approximately twice as much of their duty time on TM as do officers. In contrast, at Bn, Bde, and Div+ the enlisted to officer TM time ratios are approximately 1.2:1, 1:1, and 1.5:1, respectively. Thus, while enlisted

respondents spend twice as much time as officers at the Co level, the difference between enlisted and officer TM time is much less at the other echelons. The highly significant difference between officer and enlisted TM time at the Co level highlights the importance of providing automation that can be used by enlisted personnel.

FIGURE 3.3. Mean Proportion of Duty Time Distributed Across Echelon and Rank

3.3.2 TM Task Time

The analyses of time spent on TM tasks are based on respondents' estimates of time spent on the eight separate TM tasks. These time estimate data were initially analyzed to determine if a reduced number of task factors could adequately explain the variation in respondents' time estimates across the eight tasks. Using factor analysis, it was determined that four task

factors could explain over 68 percent of the total variation in time estimates corresponding to the eight different TM tasks (see Appendix C)³.

A simplified set of task factors was identified on the basis of the factor analytic solution, whereby each of the eight separate tasks was exclusively assigned to one of the four task factors. The grouping of the TM survey tasks under each task factor is presented in Table 3.6. A review of the tasks under each factor reveals a commonality in TM function, which has been interpreted via the names provided for each task factor. The Training Requirements factor includes those tasks concerned with determining what missions a unit is expected to perform in combat, how well the unit's soldiers currently support expected unit performance, and what training should be conducted to improve or maintain current levels of performance. The Training Guidance factor includes those tasks directly related to preparation of long-range, short-range, and near-term guidance. The Training Resources factor

TABLE 3.6. Task Factors and Corresponding Tasks Resulting from
Factor Analysis of TM Task Time Estimates

Task Factor 1: Training Requirements

Task 1: Identify Unit Missions, Goals, and METL
Task 2: Develop Training Objectives, Tasks, and Program
Task 8: Determine Training Status

Task Factor 2: Training Guidance

Task 4: Long-Range Guidance
Task 5: Short-Range Guidance
Task 6: Near-Term Guidance

Task Factor 3: Training Resources

Task 3: Forecast Training Requirements

Task Factor 4: Training Scheduling

Task 7: Issue Training Schedule

³ The SPSS/PC+ factor analysis procedure was employed, using the Principal Components extraction method, an Eigenvalue criterion of 1, and the Varimax rotation method.

includes the one task that involves forecasting, processing, and monitoring of training resource requirements. Finally, the Training Scheduling factor includes the one task that involves the day-to-day management and scheduling of weekly training events.⁴

Figure 3.4 depicts the highly significant differences in respondents' estimates of the time they spend on the tasks within each task factor. As shown by this figure, the Training Requirements factor accounts for the greatest proportion of duty time (average of .15) with a comparable amount of

FIGURE 3.4. Mean Proportion of Duty Time Distributed Across Task Factor

⁴ Analysis of the effect of task factors on TM time estimates was based on the computation of TM time estimate scores for each task factor. This computation consisted of summing each respondent's individual TM task time estimates for the tasks belonging to each factor. For example, if a respondent's TM time estimates for Tasks 1, 2, and 8 were .100, .075, and .025, respectively; the resulting Task Factor 1 score for this respondent (which includes these three tasks) would be equal to $.100 + .075 + .025$, or .200.

time spent providing Training Guidance (average of .13). Substantially less time is spent providing Training Resources (average of .08); and the least amount of time is spent on Training Scheduling (average of .05). All differences in time spent between the pairs of task factors were highly significant, with the exception of the non-significant difference between the Training Requirements and Training Guidance task factors.

As in the case of total TM time, there is a differential distribution of time spent on the task factors across the three components surveyed, as indicated by a highly significant interaction of the task factor and component variables. Inspection of Figure 3.5, which depicts this interaction, reveals that comparable amounts of time are spent on Training Requirements and

FIGURE 3.5. Mean Proportion of Duty Time Distributed Across Task Factor and Component

Training Scheduling in all components, as indicated by non-significant effects of component within these two task factors. In contrast, there are highly significant differences between components in time spent on Training Guidance and Training Resources; with the U.S. active component spending more time than

the forward deployed and reserve components performing the Training Guidance and Training Resources functions.

One possible cause for the increased time consumed by the Training Guidance and Training Resources functions in the U.S. active component is the relative frequency of substantive changes in units' mission statements passed down from higher commands in U.S. active units. In the U.S. active units surveyed, the definition of unit missions was, more or less, an on-going process. According to the TRADOC model of TM (c.f., FM 25-100, Training the Force), redefinition of the mission by higher command will require, in turn, restatement of Training Guidance at all lower echelons and the determination of Training Resources for the newly established missions. In contrast to the U.S. active component, the forward deployed and reserve components surveyed were operating under more focused missions. This stability in mission statement reduces the time required to prepare Training Guidance and determine Training Resources on a regular basis.⁵

A second finding with respect to time spent on the four TM task factors is shown in Figure 3.6. This figure depicts the highly significant differences in distribution of time spent on the task factors across echelons, which reveals the areas of TM specialization at each echelon. At the Co level, the primary emphasis is on the determination of Training Requirements. Additionally, more time is spent on Training Scheduling by Co level personnel than at any other echelon. At the Bn level, there is a high amount of time spent on Training Requirements and Training Guidance. At the Bde level, the emphasis shifts to Training Guidance and Resourcing. Finally, at the Div+ level, substantial amounts of time are spent on Training Requirements, Guidance, and Resourcing. These substantial differences in TM specialization highlight the importance of implementing TM automation in a manner that is adequately flexible to meet the special needs within each echelon.

⁵ The reader should note one possible inconsistency with this explanation. Namely, that it would be expected that changes in missions should also require an increased effort in the identification of training Requirements. However, comparably high levels of TM time for the Requirements task factor were estimated by respondents in all components. These high levels may indicate that the maximum amount of time available for identifying Training Requirements is already being spent; which would tend to nullify any effect of new mission definition on increasing Requirements TM time within the U.S. active component.

FIGURE 3.6. Mean Proportion of Duty Time Distributed Across Task Factor and Echelon

Figure 3.7 depicts the highly significant interaction of respondent rank across the four task factors. An important finding depicted by this figure is the major role that enlisted personnel have in all TM functions. As shown in Figure 3.7, enlisted respondents spend significantly more time than officer respondents in the areas of Training Requirements, Resourcing, and Training Scheduling; whereas the two ranks spend a comparable amount of time in the area of Training Guidance. Thus, enlisted personnel not only support the full spectrum of TM functions, but actually spend more time than officers in all but the one function that is most obviously a supervisory function--Training Guidance. Indeed, even in the case of Training Guidance, enlisted personnel spend a substantial proportion of their duty time, .13, supporting this TM function. This finding points to the need to not only provide enlisted

FIGURE 3.7. Mean Proportion of Duty Time Distributed Across Task Factor and Rank

personnel with TM automation, if developed, but to provide them with the full range of TM automation capabilities.

Three additional effects obtained in the analyses involved three-way interactions. These significant interactions, which provide additionally detailed findings pertinent to the allocation of TM time are: Component X Echelon X Task Factor, Component X Rank X Task Factor, and Echelon X Rank X Task Factor.

3.3.3 TM Work Types

The analysis of TM work types is based on respondents' estimates of time spent on the seven separate types of work listed in Table 2.2. As in the case

of TM tasks, a factor analysis was conducted to determine if a reduced number of work factors could be used to explain the variation in time estimates across the seven types of work.⁶ The factor analysis indicated two work factors could be used to explain over 59 percent of the variance in estimates of the time spent on types of work. Table 3.7 presents the individual work types included in these two work factors. The Procedural Work factor includes those types of work that involve handling, copying, compiling, preparing, and revising documents, as well as computing numerical data. In general, the work types included in this factor can be performed by referencing available procedures that prescribe how work is to be conducted. In contrast, the Decision Making Work factor includes those work types that are not based upon well-established procedures, namely discussing and planning, analyzing and interpreting, and supervising and directing the TM work of others.

TABLE 3.7. Work Factor and Corresponding Work Types Resulting from Factor Analysis of TM Work Time Estimates

Work Factor 1: Procedural Work

Obtaining and delivering documents and information

Copying and compiling information from available source documents

Computing numerical data

Preparing documents, including revisions

Work Factor 2: Decision Making Work

Discussing and planning ways to obtain, process, and document TM information

Analyzing and interpreting documents and information

Supervising, directing, and leading others in carrying out TM

⁶ The SPSS/PC+ factor analysis procedure was employed, using the Principal Components extraction method, an Eigenvalue criterion of 1, and the Varimax rotation method.

Two effects associated with work factors were obtained in the analysis of respondents' estimates of how they spend their time in the conduct of TM.⁷ Figure 3.8 depicts the first effect, which is the highly significant difference in how enlisted and officer respondents spend their time on the two areas of work. As can be seen from the figure, enlisted respondents spend approximately twice as much of their duty time performing Procedural Work as their officer counterparts. In contrast, the proportion of duty time spent on Decision Making Work is comparable for enlisted and officer respondents. This finding highlights the varied role of enlisted training managers. Although the enlisted respondents perform the bulk of Procedural Work, they also perform a large portion of the Decision Making Work.

FIGURE 3.8. Mean Proportion of Duty Time Distributed Across Work Factor and Rank

The second effect obtained in the analysis of work factors was a significant difference in the distribution of time spent on the two work

⁷ As in the case of the task factor analyses, work type factor time estimate scores were computed for each respondent by summing the separate time estimates from those individual work types belonging to one or the other work factor.

factors across the four task factors. Figure 3.9 depicts this interaction. A review of this figure reveals substantial variation in time spent on the four task factors for each work factor, as indicated by highly significant effects. However, it can also be seen that Training Requirements and Training Guidance are relatively more time consuming aspects of Decision Making Work. These two areas provide a challenge for TM automation, in that they represent the two most time consuming TM areas in this figure, but probably represent the most difficult areas for automation implementation.

FIGURE 3.9. Mean Proportion of Duty Time Distributed Across Work Factor and Task Factor

3.4 TRAINING MANAGEMENT PROBLEMS AND SOLUTIONS

Part 3 of the TM survey requested respondents to describe problems encountered in the conduct of TM and to suggest solutions to the problems. These descriptions were analyzed using a method commonly referred to as content analysis. The content analysis of respondents' TM problems and solutions involved four steps. First, all TM problems and solutions described by respondents were broken down into individual statements and transcribed,

along with information identifying the subject by location and echelon. Second, the transcribed problem and solution statements were sorted by theme to develop separate classification schemes for problems and solutions. Third, two raters independently categorized the problem and solution statements according to the two classification schemes. Finally, the frequency with which different categories were identified by respondents was calculated to determine the relative prevalence of identified problems and solutions. A more detailed description of the classification scheme and categorization process can be found in the Appendix D.

3.4.1 Training Management Problems

Table 3.8 presents the 13 categories used in the content analysis of respondents' identified TM problems. A total of 839 separate problem statements were described by 371 of the 459 respondents and subsequently classified into one of the 13 problem categories. Fifty-two problem statements were left unclassified.

TABLE 3.8. Classification Scheme for TM Problems Encountered

1. Schedule conflicts and training distractors
 2. Resource availability
 3. Quality of training programs and outcomes
 4. Training management inhibitors
 5. Excessive number of training requirements
 6. Resource management
 7. Coordinating information and training activities
 8. Communication (needed to plan for training)
 9. Human resources management and needs
 10. Training versus mission
 11. Documentation and paperwork requirements
 12. Compliance with scheduled training
 13. Time availability
-

Table 3.9 presents the proportion of respondents in each echelon who reported encountering each of the 13 TM problem areas. The right-hand column of this table also provides the overall proportion of all respondents who reported encountering each problem. Review of Table 3.9 reveals the order of problem prevalence, as well as those problems that are cited at different rates across echelons. A number of the problems cited pertain directly to areas that are commonly addressed by automation. The most frequently cited

TABLE 3.9. Proportion of Respondents by Echelon and Overall Encountering Each TM Problem

Problem	Echelon				Overall
	Co	Bn	Bde	Div+	
1. Schedule Conflicts	.42	.42	.51	.29	.42
2. Resource Availability	.29	.30	.27	.32	.29
3. Quality of Training	.23	.20	.08	.24	.21
4. TM Inhibitors	.21	.20	.11	.17	.19
5. Training Requirements	.17	.16	.16	.12	.16
6. Resource Management	.17	.13	.24	.15	.16
7. Coordination	.11	.18	.19	.15	.15
8. Communication	.16	.14	.19	.07	.15
9. Personnel Problems	.13	.15	.14	.22	.15
10. Training vs. Mission	.15	.13	.08	.10	.13
11. Documentation	.18	.11	.08	.07	.13
12. Compliance with Schedule	.04	.16	.05	.10	.09
13. Time	.04	.07	.05	.02	.05

problem, Schedule Conflicts, is a problem that is often addressed with centralized automated scheduling systems. Training Management Inhibitors, cited by 19 percent of the respondents, is an area that could be generally addressed through the reduction in time to perform tasks through automation. Resource Management, cited by 16 percent of the respondents, is an obvious area for improvement via automated procedures that could standardize unit priorities for resource access and centralize the resource allocation system. Coordination and Communication were both cited by 15 percent of the respondents. Both of these problems are commonly addressed via a centralized message system. Finally, the problem of Documentation, cited by 13 percent of the respondents, is an area where automation of form preparation, and substitution of electronic messages for hardcopy messages is commonly introduced.

3.4.2 Training Management Solutions

Table 3.10 presents the 13 categories used in the content analysis of respondents' suggested solutions to TM problems. A total of 701 separate solutions were described by 336 of the 459 respondents and subsequently

TABLE 3.10. Classification Scheme for Suggested Solutions to TM Problems

1. Prioritize and enforce importance of training
2. Follow training schedule, provide advance notice and reduce taskings
3. Improve resource management and resource forecasting
4. Improve communication and coordination (for planning and scheduling)
5. Automate TM procedures
6. Improve resource management
7. Personnel management actions
8. Update training programs and evaluation programs
9. Modify the training management program and process
10. Planning efficiency improvement
11. Educate TM personnel
12. Improve TM guidance
13. Adhere to or streamline training management procedures

classified into one of the 13 solution categories. Forty solution descriptions were left unclassified.

Table 3.11 presents the proportion of respondents in each echelon who suggested each of the 13 solutions to TM problems. The right-hand column of this table also provides the overall proportion of all respondents who suggested each solution. Review of Table 3.11 reveals the order of solution

TABLE 3.11. Proportion of Respondents by Echelon and Overall Suggesting Each TM Solution

Solution	Echelon				Overall
	Co	Bn	Bde	Div+	
1. Prioritize and Enforce	.38	.47	.26	.48	.41
2. Follow Training Schedule	.32	.30	.26	.20	.29
3. Improve Resource Management	.18	.14	.32	.15	.18
4. Improve Communication	.15	.17	.29	.10	.17
5. Automate TM Procedures	.16	.17	.13	.20	.17
6. Make Resources Available	.19	.16	.16	.13	.17
7. Personnel Improvements	.16	.14	.07	.30	.16
8. Update Training Program	.15	.19	.13	.10	.16
9. Modify TM Program	.21	.09	.10	.05	.13
10. Planning Efficiency	.12	.11	.10	.18	.12
11. Educate TM Personnel	.06	.12	.03	.28	.10
12. Improve TM Guidance	.09	.08	.10	.05	.08
13. Adhere to TM Procedures	.03	.09	.19	.05	.07

prevalence, as well as those solutions that are cited at different rates across echelons. In reviewing this table, it is remarkable that the five most frequently cited solutions are directly related to automation solutions. Approximately 41 percent of all respondents suggested that the importance of training should be emphasized and training requirements be prioritized. Although emphasis of training is a command responsibility, automation could provide a structured means of prioritizing training areas and individual tasks. Follow Training Schedule was cited by 29 percent of the respondents as a solution. This is an area where a centralized scheduling system could provide a means of reducing the time required to prepare and disseminate initial training plans, as well as improving reaction to unexpected scheduling changes by altering non-training periods. Improve Resource Management and Improve Communication were cited by 18 percent and 17 percent of the respondents, respectively. Both of these solutions are important areas for automation and are briefly covered in the preceding subsection. Finally, 17 percent of all respondents specifically suggested some form of TM Procedure Automation, including:

- Increase allocation of automated equipment
- Automate contents of manuals, FMs, ARTEPs, etc.
- Provide computerized forms that are easily accessible
- Develop computer programs that reduce the amount of repetitive information needed
- Establish a command database that is accessible to all units
- Establish computer networks for units
- Computerize training schedule so that it can easily be changed.

3.5 ESTIMATES OF SCHEDULED AND CONDUCTED TRAINING

Survey respondents were requested to provide structured estimates of the outcomes of scheduled training and the amount of conducted training that was scheduled versus unscheduled. The objective in collecting these estimates was to gain a general understanding of the requirements for making adjustments to quarterly training schedules. A total of 257 respondents indicated that their TM position allowed them to accurately estimate the outcomes of scheduled

training. A total of 249 respondents indicated that their position allowed them to accurately estimate whether conducted training was scheduled or unscheduled. The following analyses are based on these samples of 257 and 249 respondents.

Within each component, the estimates for scheduled and conducted training varied somewhat between respondents from different echelons and rank (see Appendix C). However, these differences are not of primary interest and will not be discussed in detail. Therefore, the following discussion of results will be limited to overall findings and to estimates from different components.

3.5.1 Estimates for Scheduled Training

Figure 3.10 depicts respondents' mean estimates of the percentage of scheduled training that resulted in (a) training being conducted at a different time (17.4%), (b) training not being conducted (16.3%), and (c) training being conducted as scheduled (66.3%). Although these results are based on subjective estimates, they do suggest that approximately one-third of training included in the quarterly schedule is subsequently rescheduled. This finding suggests a requirement for a flexible scheduling system that can respond to changes.

FIGURE 3.10. Mean Estimates of Scheduled Training Outcomes

3.5.2 Estimates for Conducted Training

A second series of estimates requested from respondents involved the division of conducted training into either scheduled or unscheduled training. Figure 3.11 presents respondents' mean estimates these two values. As can be seen, respondents estimated that 22 percent of conducted training was not scheduled; whereas 78 percent of conducted training was scheduled. The 95 percent confidence intervals for these means are ± 02.5 percent. This finding suggests the need for a capability to quickly determine current unit training requirements, which can then be translated into on-the-spot training packages.

FIGURE 3.11. Mean Estimates for Scheduled and Unscheduled Conducted Training

3.6 DOCUMENT USE AND PRODUCTION IN TM

In completing Section 5 of the TM survey, respondents listed up to eight documents used and eight documents produced for each TM task. The current analysis is limited to documents produced. Table 3.12 presents the most frequently produced documents in the performance of each TM task. In this table, documents were only listed if they were identified by a minimum of 25 respondents and the document was one of the three most frequently identified for the task under analysis. For each document listed in Table 3.12,

descriptive statistics indicate the number of times the document was listed, number of respondents listing the task, and the average number of times per year the document is produced.

TABLE 3.12. Documents Produced in TM by Task

	<u>Doc</u>	<u>Document Description</u>	<u>Total Times Listed</u>	<u>Total Number of Respondents</u>	<u>Average Times per Year Produced</u>
<u>Task 1</u>	16	Bn Tng Guidance	86		3.5
	21	Co Tng Guidance	75	60	5.8
	25	Tng Schedules	48	45	21.4
<u>Task 2</u>	16	Bn Tng Guidance	71	46	16.1
	21	Co Tng Guidance	63	48	15.2
	25	Tng Schedules	69	64	35.9
<u>Task 3</u>	42	Range Requests	76	57	10.2
	46	Support Requests	52	39	12.6
<u>Task 4</u>	17	Bn Long-Range Planning	57	42	5.6
	22	Co Long-Range Planning	30	29	9.5
<u>Task 5</u>	16	Bn Tng Guidance	38	26	19.8
	18	Bn Short-Range Planning	63	48	10.7
	23	Co Short-Range Planning	68	56	10.8
<u>Task 6</u>	19	Bn Near-Term Planning	48	37	19.9
	24	Co Near-Term Planning	56	46	31.1
	25	Tng Schedules	76	63	32.1
<u>Task 7</u>	25	Tng Schedules	139	120	38.1
<u>Task 8</u>	25	Tng Schedules	31	27	18.3
	27	Tng Results	194	138	22.5
	28	Readiness Reporting	47	41	24.5

Review of Table 3.12 can assist in the identification of areas where TM automation has a substantial potential for improving current levels of effectiveness. Those documents frequently produced in the performance of one or more tasks are directly related to such candidate areas. For example, the

summary statistics in Table 3.12 show that document 25, Training Schedules, appears most frequently and is listed in Tasks 1, 2, 6, 7, and 8; this indicates that automation of the schedule preparation function could meet a current document preparation requirement. Additionally, training schedules are generally prepared following a standard format prescribed by local command, which could be adapted to a computer-based format, facilitating automated generation of portions of the training schedule. A second example of identifying automation requirements is provided by Document 16, Battalion Training Guidance, which is frequently cited in conjunction with tasks 1, 2, and 5. Most training managers practicing at Bn and Co levels contribute to the production of this document, suggesting one area where a link allowing exchange of electronically-based information would enhance TM effectiveness.

3.7 USE OF COMPUTERS IN MANAGING TRAINING

Detailed information regarding the use of computers was provided by 311 respondents who completed Section 8 of the survey (see Appendix B).

3.7.1 TM Time Spent Using Computers

One of the more basic measures of computer use in TM involves respondents' estimates of the proportion of TM time spent using computers. Statistical analyses of these data indicated significant differences between components and ranks. Figure 3.12 depicts the mean proportion of TM time spent by each component and rank using computers. U.S. active respondents reported the highest level of TM computer use at .14 of TM time, followed by reserve at .11, and forward deployed at .07. Additionally, officer respondents at U.S. active and reserve components spent substantially more of their TM time using computers than their enlisted counterparts.

3.7.2 Use of Computers for TM Word Processing and Data Base Management

Respondents also indicated their use of personal computers to perform word processing and data base management functions in TM. Table 3.13 presents the proportion of training managers in each component and echelon who indicated they performed training management and indicated they used personal

FIGURE 3.12. Mean Proportion of Estimated TM Time Spent Using Any Type of Computer

computers for word processing in the conduct of TM. Note that the sample is reduced from 419 to 347 in this table, due to the exclusion of the 72 respondents from site A, who were not asked this series of questions in their interviews. In this table, each cell includes entries for the proportion of respondents indicating use of computers in TM, followed by the size of the sample in that cell in parentheses. Statistical analyses of these data were conducted using chi-square procedures, which are reported in detail in Appendix C.

The bottom row of Table 3.13 depicts the highly significant difference between components in TM word processing, with the lowest proportion of word processing in TM in the forward deployed component (.28), a substantially higher level in the reserve component (.42), and the highest proportion of TM word processing in the U.S. active component (.53). Looking next at the right-hand column of Table 3.13, it can be seen that word processing across echelons is quite comparable, ranging from .35 at the Co level to .46 at the Div+ level. Finally, review of the individual cells in Table 3.13 indicates a

significant difference between components at the Co level, where variation across components is greater than at any other echelon.

TABLE 3.13. Proportion of Respondents Using Personal Computers for Word Processing in TM. Sample sizes are indicated in parentheses.

<u>Echelon</u>	<u>Component</u>			
	<u>U.S. Active</u>	<u>Forward Deployed</u>	<u>Reserve</u>	<u>All Components</u>
Co	.58 (19)	.20 (64)	.47 (45)	.35 (128)
Bn	.53 (45)	.31 (59)	.42 (48)	.41 (152)
Bde	.50 (10)	.31 (13)	.33 (9)	.38 (32)
Div+	.50 (18)	.56 (9)	.25 (8)	.46 (35)
All Echelons	.53 (92)	.28 (145)	.42 (110)	.39 (347)

Table 3.14 presents the proportion of respondents in each component and echelon who indicated they performed training management and indicated they used personal computers for data base management in the conduct of TM. A review of this table indicates that overall, data base management is less prevalent than word processing; however, the trends among the echelons and components are basically the same in both cases. Looking first at the bottom row, it can be seen that there is a significant difference between components in TM data base management, with the lowest proportion of respondents' data base management in TM in the forward deployed component (.13), a somewhat higher level in the reserve component (.17), and the highest proportion of TM data base management in the U.S. active component (.30). Looking next at the right-hand column of Table 3.14, it can be seen that data base management across echelons is quite comparable, ranging from .16 at the Bde level to .29 at the Div+ level. Finally, review of the individual cells in Table 3.14

depicts the significant differences between components at the company and battalion levels.

TABLE 3.14. Proportion of Respondents Using Personal Computers for Data Base Management in TM. Sample sizes are indicated in parentheses.

<u>Echelon</u>	<u>Component</u>			
	<u>U.S. Active</u>	<u>Forward Deployed</u>	<u>Reserve</u>	<u>All Components</u>
Co	.42 (19)	.11 (64)	.20 (45)	.19 (128)
Bn	.31 (45)	.10 (59)	.15 (48)	.18 (152)
Bde	.30 (10)	.08 (13)	.11 (9)	.16 (32)
Div+	.17 (18)	.56 (9)	.25 (8)	.29 (35)
All Echelons	.30 (92)	.13 (145)	.17 (110)	.19 (347)

3.7.3 Use of Army Automation Systems

Respondents also reported their use of the following automation systems: Training Ammunition Management Information System (TAMIS), Training Management Control System (TMACS), Tactical Unit Financial Management Information System (TUFMIS), Standard Installation/Division Personnel System (SIDPERS), Automated Range Control System (ARCS), and Event Resource Model (ERM). Table 3.15 lists the number of respondents, followed by the proportion of those respondents who indicated they used each of the automation systems. The final row of this table provides the total sample size, 347, and the proportion of all respondents who used each automation system. Review of this final row of Table 3.15 reveals a generally low level of automation system usage among respondents, with the most prevalent usage levels being for SIDPERS (.084), TUFMIS (.078), and TAMIS (.063). Those systems that have very limited availability, ERM and ARCS, were the ones with the lowest usage levels, .014 and .003, respectively.

TABLE 3.15. Proportion of Respondents Using Specific Automation Systems in the Conduct of TM

<u>Component</u>	<u>Echelon</u>	<u>N</u>	<u>TAMIS</u>	<u>TMACS</u>	<u>TUFMIS</u>	<u>SIDPERS</u>	<u>ARCS</u>	<u>ERM</u>
U.S. Active	Co	19	.000	.053	.105	.053	.000	.000
	Bn	45	.089	.044	.133	.156	.000	.044
	Bde	10	.300	.100	.100	.200	.000	.200
	Div+	18	.000	.000	.167	.000	.000	.056
Forward Deployed	Co	64	.031	.031	.047	.063	.000	.000
	Bn	59	.136	.119	.136	.102	.017	.000
	Bde	13	.077	.077	.077	.000	.000	.000
	Div+	8	.125	.000	.000	.125	.000	.000
Reserve	Co	45	.000	.000	.000	.133	.000	.000
	Bn	48	.021	.000	.000	.021	.000	.000
	Bde	9	.000	.000	.000	.000	.000	.000
	Div+	8	.125	.000	.000	.125	.000	.000
Total/Overall Proportion		347	.063	.043	.078	.084	.003	.014

3.7.4 Use of Automation at Home or Work

A summary score for each survey respondent indicating whether or not they use any computers or automation systems either at home or work was a final measure of automation included in these analyses. This measure is pertinent to any TM automation effort, in that it provides a means of estimating the current level of computer literacy among Army training managers. Figure 3.13 depicts the proportion of officer and enlisted respondents in each echelon who reported using automation at home or work. A review of this figure indicates a substantial range in computer usage, from a low of .38 among enlisted respondents at the Div+ level to a high of .90 among officers at the Bde level. It can also be seen that officers use computers significantly more often than their enlisted counterparts with a mean usage level of .69 among officers and .51 among enlisted. Overall, .62 of all respondents use

automation at home or work, indicating a relatively high level of computer literacy among Army training managers.

FIGURE 3.13. Proportion of Officer and Enlisted Respondents in Each Echelon who Reported using Automation at Home or Work

Table 3.16 presents the proportion of respondents reporting use of computers at work or home by component and echelon. Review of this table reveals significant differences in the prevalence of computer use across echelons and components. Additionally, it can be seen that there are some differences in the level of computer use in the different components, with usage lowest in the forward deployed component at .52, somewhat higher in the reserve component at .65, and highest in the U.S. active component at .72.

3.8 SUMMARY OF SURVEY FINDINGS

The analyses of survey data do not specify the costs and benefits associated with automation, which are detailed in Chapters 4 and 5 of this

TABLE 3.16. Proportion of Respondents Using Automation at Home or Work. Sample sizes are indicated in parentheses.

<u>Echelon</u>	<u>Component</u>			
	<u>U.S. Active</u>	<u>Forward Deployed</u>	<u>Reserve</u>	<u>All Components</u>
Co	.68 (19)	.36 (64)	.62 (45)	.50 (128)
Bn	.73 (45)	.59 (59)	.73 (48)	.68 (152)
Bde	.80 (10)	.77 (13)	.56 (9)	.72 (32)
Div+	.67 (18)	.89 (9)	.50 (8)	.69 (35)
All Echelons	.72 (92)	.52 (145)	.65 (110)	.62 (347)

report. However, survey data findings do provide preliminary answers to three important questions pertaining to the needs for TM automation, as summarized below.

3.8.1 What TM Functions Should be Automated?

Analysis of the TM task factor data, the training scheduling data, and the TM problems and solution data facilitate the identification of TM functions that should be automated.

- Analysis of the proportion of duty time spent on TM indicates that all four the TM task factors--Training Requirements, Training Guidance, Training Resources, and Training Scheduling--require substantial amounts of duty time for their performance, suggesting a likely benefit in automating TM functions corresponding to each of these task factors.
- Although Training Scheduling requires the least amount of duty time among the four task factors, the findings that approximately 17 percent of scheduled training is rescheduled prior to training, and that training scheduling was the most frequently cited TM problem point to a need for system improvements in this area.

- The finding that approximately 22 percent of all training is conducted without prior scheduling underscores the need for a capability to quickly identify current unit training requirements and translate these requirements into a training lesson plan.
- The TM problem and solution areas most frequently cited by training managers, such as training scheduling, training resource management, and inter-office communications, lend themselves readily to automation solutions.

3.8.2 Who Should be Provided with TM Automation?

Analysis of the echelon and rank variables enabled a comparison of the relative need for automation; leading to the following conclusions.

- Analysis of the proportion of duty time spent on TM indicates that a substantial amount of time is spent performing TM at all echelons studied and each of the three components surveyed, indicating a potential for benefits of all levels.
- Enlisted and officer training managers share the TM work burden. Enlisted personnel spend significantly more time than officer respondents in the areas of Training Requirements, Training Resourcing, and Training Scheduling; whereas the two ranks spend a comparable amount of time in the area of Training Guidance.

3.8.3 What are Some Major Challenges in Automating TM?

Analysis of the document use, echelon specialization, TM work factors, and current computer use data lead to the identification of some major challenges in automating TM.

- The analysis of the document use and production data highlights the many areas of interaction among the echelons, indicating that an automated system should provide standardized templates for the preparation of many documents, and a communication link for the exchange of TM information between echelons.
- The different areas of TM specialization in the echelons studied points to the need to provide an integrated set of TM automation modules that can be used separately by specialists in the major areas of Requirements, Guidance, Resourcing, and Scheduling.
- Analysis of the TM work factor data indicate that Decision Making work comprises more than 50 percent of the two TM task factors that require the most amount of training time, Training Requirements and Training Guidance, suggesting the need for automation that includes decision aids to improve TM effectiveness in these areas.

The major challenge among these three items is the development of automated decision aids. This will require a more thorough understanding of how individual TM problems are framed and evaluated, and the development of strategies to maximize the payoff for individual and aggregate TM decisions.

The major challenge among these three items is the development of assessment
tools or aids. This will require a more thorough understanding of how
individual TM problems are treated and evaluated, and the development of
strategies to maximize the payoff for individual and aggregate TM decisions.

4.0 AUTOMATED TRAINING MANAGEMENT SYSTEM COSTS AND BENEFITS

4.1 INTRODUCTION: COST-BENEFIT MODEL FOR TRAINING MANAGEMENT LABOR

This chapter builds on the data described in Chapter 3 concerning time spent on TM. The purpose is to describe the costs of TM in terms of where they occur within the Army organization, who (i.e., what rank categories) incur them, the specific tasks and types of work generating costs, and finally, the dollar benefits in terms of labor avoidance that may accrue with automation. As with Phase I of the automation impact study, the costs and benefits of TM automation are compared based on labor costs for conducting TM manually (as presently performed), and with automation. The labor costs are reduced for automation according to assumptions associated with workload reduction factors, described below. The data are presented in terms of the analytic variables described in Chapter 3, i.e., component, echelon, rank, TM task, and TM work type. By presenting savings in these specific terms, the basis for partial solutions and phased implementation of automated TM is provided.

4.1.1 Computation of Labor Costs for Manual TM

Figure 4.1 outlines the procedure used in computing dollar costs and benefits based on the data described in Chapter 3. The general approach to computation is as follows:

Step 1. Mean costs were computed for officer and enlisted ranks separately for each component and echelon. Cost estimates were based on FORSCOM cost planning factors for 1988, shown in Table 4.1.¹ The means were calculated by summing the products of proportion of time on TM and annual rate, and dividing by the number of respondents.

Step 2. The average cost was then multiplied by a generic staff structure factor; this factor represents the number of people performing TM for each rank category at each echelon. The generic staff structure is shown in Table 4.2. This structure is based on subject matter expert knowledge of

¹Annual standard composite rates were used for military personnel. The civilian compensation schedule level 5 was used for civilian positions. GM and GS positions were treated as equivalent, and the GM and GS respondents were treated as officers.

STEP 1. Compute average annual cost of TM for the component/echelon/rank category (cer),

$$\bar{X}_{cer} = \frac{\sum_{i=1}^n t_i \cdot r_i}{n}$$

where n = number of individuals in the component/echelon/rank category

t_i = proportion of time individual i spends on TM

r_i = annual labor costs for individual i .

Example: Average annual cost of TM for the Forward Deployed component/Div+ echelon/Officer rank category

i	Grade	Annual Labor Rate (r_i)	Proportion of Time on TM (t_i)	Tm Annual Cost ($t_i \cdot r_i$)
1	02	\$44,309	0.60	\$ 26,585
2	03	56,694	0.10	5,669
3	03	56,694	0.10	5,669
4	04	71,156	0.90	64,040
5	04	71,156	0.10	7,116

TOTAL $\sum_{i=1}^5 t_i \cdot r_i$ \$109,079

$$\bar{X}_{cer} = \frac{\sum_{i=1}^n t_i \cdot r_i}{n} = \frac{\$109,079}{5} = \$21,816$$

STEP 2. Compute total annual cost of TM for the component/echelon/rank category,

$$TCOST_{cer} = N_{Ger} \cdot \bar{X}_{cer},$$

where $\bar{X}_{cer}$ is obtained from Step 1 and

N_{Ger} is the number of individuals performing TM at the echelon/rank category (obtained from the Generic Staff Structure, Table 4.2).

Example: Total annual cost of TM for the Forward Deployed component/Div+ echelon/Officer rank category

$$TCOST_{cer} = N_{Ger} \cdot \bar{X}_{cer} = 22 \cdot \$21,816 = \$479,952$$

STEP 3. Compute total annual Army TM costs for the component/echelon/rank category,

$$TACOST_{cer} = NU_{ce} \cdot TCOST_{cer}$$

where $TCOST_{cer}$ is obtained from Step 2 and

NU_{ce} is the number of units in the U.S. Army at the component/echelon category (obtained from Table 4.3).

Example: Total annual Army TM costs for the Forward Deployed component/Div+ echelon/Officer rank category

$$TACOST_{cer} = NU_{ce} \cdot TCOST_{cer} = 6 \cdot \$479,952 = \$2,879,712$$

FIGURE 4.1. Procedure to Compute Dollar Costs for TM for a Component/Echelon/Rank Category

TABLE 4.1. U.S. Army Personnel 1988 Labor Costs

<u>Pay Grade</u>	<u>Annual Rate</u>
GM-13	\$ 44769
GS-12	37646
GS-11	31412
GS-10	28590
GS-9	25693
O-6 - Colonel	101827
O-5 - Lt. Colonel	85586
O-4 - Major	71156
O-3 - Captain	56694
O-2 - 1st Lieutenant	44309
O-1 - 2nd Lieutenant	34023
W-2 - Warrant Officer	45617
E-9 - Sgt. Major	55886
E-8 - 1st Sgt., M. Sgt.	46349
E-7 - Sgt. 1st Class, Spec-7	39206
E-6 - Staff Sgt., Spec-6	33469
E-5 - Sgt., Spec-5	28366
E-4 - Corporal, Spec-4	23623
E-3 - Private 1st Class	20321
E-2 - Private	19258

TABLE 4.2. Generic Staff Structure of Personnel Performing Training Management Duties at Different Echelons, by Rank Category*

<u>Echelon Level</u>	<u>Rank Category</u>	<u>Number Performing TM Duties</u>
Co	Enlisted	2
	Officer	2
Bn	Enlisted	6
	Officer	8
Bde	Enlisted	8
	Officer	8
Div+	Enlisted	5
	Officer	22

*Appendix F contains the specific titles contributing to this structure.

TM staff assignments, and on Tables of Organization and Equipment inspected at Ft. Lewis. The detailed generic structure is contained in Appendix F. The result of multiplying the average cost by the generic structure is an estimate of the total cost of TM within a particular component/echelon/rank combination.

Step 3. To obtain the Army-wide costs for each rank category, echelon and component, the representative echelon/rank costs were multiplied by the number of units in the component of interest. The numbers of units employed in these computations are shown in Table 4.3, and are based on the organizational structure described in the Phase I report (Sanquist et al., 1988). For purposes of this analysis the forward deployed component is considered to consist of European and Pacific forces, i.e., the OCONUS units.

TABLE 4.3. Number of Units at Each Echelon for the U.S. Active, Forward Deployed and Reserve Components used to Extrapolate Sample Costs

<u>Component</u>	<u>Echelon</u>	<u>Number</u>
U.S. Active	Div+	12
	Bde	49
	Bn	303
	Co	1504
Forward Deployed	Div+	6
	Bde	42
	Bn	204
	Co	1032
Reserve	Div+	10
	Bde	120
	Bn	599
	Co	2416

In summary, the following steps were taken to compute labor costs for TM:

- (1) Compute average cost of TM within each component, echelon, and rank category,
- (2) Compute total cost for each rank category within an echelon and component, based on the generic staff structure for the echelon/rank category,
- (3) Compute total Army costs for each component/echelon/rank category, based on the number of units at an echelon in a component.

The resolution of the time estimate data is 2 significant digits. This results in cost computations that are accurate to the nearest thousand dollars for each grade. Thus, costs and savings are reported in thousands of dollars. Individual respondent costs are contained in Appendix F. Man-year estimates were computed in a similar three-step manner.

Confidence intervals for the Army-wide costs and savings are based on the means and standard errors of the sample data. For aggregating the rank category costs and savings within an echelon, and to compute confidence intervals for the Army-wide costs and savings, the standard errors of the individual rank categories were combined according to standard methods for estimating variance within stratified samples (Mendenhall et al., 1971).

4.1.2 Computation of Labor Costs for Automated TM

The method for computing TM labor costs with automation was identical to that described above, with one exception: the application of workload reduction factors. As described in the previous report (Sanquist et al., 1988), workload reduction factors are quantitative assumptions about the amount of labor reduction that is expected with automation.

The workload reduction factors were applied to the time estimates for individual types of work, as described in Chapters 2 and 3. The following workload reduction factors were applied:

. Planning and Discussion:	15 percent
. Getting Documents and Information:	15 percent
. Copying and Compiling:	75 percent
. Analyzing and Interpreting:	15 percent
. Computing Numbers:	100 percent
. Preparing Documents:	75 percent
. Supervising, Directing, Leading:	No change

These labor reduction factors are based on productivity improvements reported in the literature concerning the impact of management information systems. Although the reported changes vary widely depending on the type of system, the labor reductions are usually between 19 percent (Warren, 1986) and 100

percent (Strassman, 1986). Fifteen percent was selected as a conservative estimate for several types of work, while 75 percent was selected for the two types of work most obviously involving paper generation. This latter figure is based on the ITMS functional description (ADEA and BDM Corporation, 1987), specifying that an automated system will reduce paperwork by 75 percent. One hundred percent was selected for computing numbers, since appropriate software for calculating such quantities as gasoline or ammunition requirements should virtually eliminate manual computation. It is not anticipated that Supervising will be reduced through automation, and may actually increase, with the additional time made available through automation.

4.1.3 Correspondence of Time Spent on TM and Costs

The presentation of analytic cost-benefit quantities in sections 4.2 and 4.3 is based on the statistical analyses described in Chapter 3. It is expected that when a statistically significant effect is demonstrated for time spent on TM, there will be a corresponding effect on total Army TM costs and savings. It should be borne in mind, however, that there is not a direct relationship between time spent as described in Chapter 3, and costs and savings as presented in this chapter. This is because the time spent data reflect the average time per person in the survey sample, whereas the cost figures reflect the costs for all personnel performing TM duties in all Army units. Thus, the time per person data are aggregated twice (by generic unit structure and by Army structure) to obtain total cost figures. Divergence between the statistical results of Chapter 3 and the cost estimates are due to either variations in generic staff structure, i.e., more individuals performing TM at one echelon or rank category than another, or variations in numbers of units in a component.

4.2 ARMY-WIDE TRAINING MANAGEMENT LABOR COSTS AND BENEFITS

Table 4.4 shows the annual Army-wide costs for the three components under consideration at each of the four echelon levels. It can be seen that for active units, the overall cost of TM is greatest for the U.S. active component. This is an expected finding, since there are approximately twice as many units in the U.S. active component as the forward deployed component. The largest cost of TM is incurred by the reserve component.

TABLE 4.4. Estimated Total Army TM Annual Costs (in Thousands of Dollars) at Each Echelon for U.S. Active, Forward Deployed and Reserve Components, for Manual and Automated TM, with 95% Confidence Intervals (CIs)

Component	Echelon	Present			Automated			Annual		Man Year Savings
		Man Years on TM	Manual Cost	95% CI	Man Years on TM	Automated Cost	95% CI	Savings	95% CI	
U.S. Active	Div+	122	\$ 6,622	\$ 2,557	74	\$ 4,160	\$ 1,626	\$ 2,462	\$ 1,077	48
	Bde	528	24,911	5,328	350	17,025	3,999	7,886	2,423	178
	Bn	2053	97,002	18,775	1323	63,786	13,041	33,216	7,822	730
	Co	2758	106,284	16,138	1814	72,413	11,127	33,871	6,360	944
	TOTAL	5461	\$234,819	\$25,453	3561	\$157,384	\$17,678	\$77,435	\$10,424	1900
4-7 Forward Deployed	Div+	49	\$ 2,939	\$ 2,862	29	\$ 1,784	\$ 1,696	\$ 1,155	\$ 1,212	20
	Bde	83	5,070	4,178	56	3,476	3,149	1,594	1,194	27
	Bn	1219	57,072	13,049	773	36,991	8,645	20,081	5,258	446
	Co	1688	64,990	12,345	1047	41,995	8,240	22,996	4,796	641
	TOTAL	3039	\$130,071	\$18,664	1905	\$ 84,246	\$12,467	\$45,826	\$ 7,318	1134
Reserve	Div+	148	\$ 11,137	\$ 5,588	108	\$ 8,425	\$ 5,275	\$ 2,713	\$ 1,495	40
	Bde	641	34,277	28,458	382	21,007	16,073	13,270	12,433	259
	Bn	3319	155,598	43,330	2287	110,487	33,310	45,111	12,698	1032
	Co	2679	107,430	36,113	1802	73,418	25,089	34,012	12,635	877
	TOTAL	6787	\$308,442	\$63,425	4579	\$213,337	\$45,002	\$95,106	\$21,856	2208

Note: The total cost and savings 95% CIs are not a direct sum of the individual echelon CIs, since the method of aggregating standard errors uses weights based on individual echelon sample size. This is also true for the other CIs reported in this chapter.

An interaction of component with echelon is reflected in the larger cost of TM at the Bn level for the reserve component. This is based on the larger number of reserve Bns; the somewhat larger savings for Div+ in the reserve most likely reflects the larger proportion of time spent on TM in that component.

The benefits of automating TM labor are shown in the column of Table 4.4 indicating costs of an automated system. Adjacent to this is a column indicating savings, i.e., the difference between manual system costs and automated system costs. The largest savings for an individual component is expected for the reserves (\$95 million). Further, the largest savings within the reserve component is expected at the Bn level (\$45 million). The total savings expected for U.S. active units is \$77 million and \$46 million for forward deployed units. Subsequent sections of this chapter explore the cost and benefit implications in greater detail, and show more specifically which aspects of the organizational structure would benefit most from automated TM.

4.2.1 Costs and Benefits within Rank Categories and Echelons

Table 4.5 presents the costs and benefits broken down by personnel category and echelon for each component. Inspection of this table reveals an interaction, such that there are greater savings for enlisted personnel at Co levels. The savings resulting from automation are greater for enlisted personnel at the Co level, i.e., \$19 million vs. \$15 million for U.S. active units, \$15 million vs. \$8 million for forward deployed units, and \$28 million vs. \$6 million for the reserve units, whereas, in general, the savings are greater for officers at the higher echelons. This result is based on two contributing factors: (1) the greater amount of time spent on TM by enlisted personnel at Co level and (2) the much larger number of Cos in the Army structure.

4.2.2 Costs and Benefits of TM Tasks

The survey data permit an estimate of costs and benefits resulting from specific TM tasks. Table 4.6 presents the figures showing cost and benefit differences between the four types of TM tasks. It is evident from this table that the greatest savings resulting from automation will occur in the area of Training Requirements (\$83 million). This is followed by Guidance (\$65

TABLE 4.5. Estimated Total Army Annual TM Labor Costs (in Thousands of Dollars) at Each Echelon and Rank Category for U.S. Active, Forward Deployed and Reserve Components, for Manual and Automated TM, with 95% Confidence Intervals (CIs)

Component	Echelon	Rank	Present			Automated			Annual		Man Year Savings
			Man Years on TM	Manual Cost	95% CI	Man Years on TM	Automated Cost	95% CI	Savings	95% CI	
U.S. Active	Div+	O	81	\$ 5,054	\$ 2,499	55	\$ 3,411	\$ 1,613	\$ 1,643	\$ 1,005	26
		E	41	1,568	541	19	749	211	819	385	22
	Bde	O	226	13,821	3,966	161	10,165	3,123	3,657	1,645	65
		E	302	11,090	3,557	189	6,860	2,498	4,230	1,778	113
	Bn	O	1117	62,815	16,581	746	42,615	11,815	20,200	6,450	371
		E	937	34,187	8,808	577	21,171	5,520	13,015	4,426	360
	Co	O	1082	57,159	11,951	799	42,195	8,625	14,964	3,947	283
		E	1677	49,125	10,846	1015	30,218	7,030	18,907	4,989	662
	TOTAL		5463	\$234,819	\$25,453	3561	\$157,384	\$17,678	\$77,435	\$10,424	1902
4-9 Forward Deployed	Div+	O	48	\$ 2,880	\$ 2,862	28	\$ 1,754	\$ 1,696	\$ 1,126	\$ 1,212	20
		E	2	59	0	1	30	0	29	0	1
	Bde	O	72	4,615	4,130	49	3,130	3,102	1,485	1,191	23
		E	10	455	632	8	345	540	110	92	2
	Bn	O	702	38,449	11,363	470	25,887	7,543	12,561	4,254	232
		E	517	18,623	6,416	302	11,103	4,224	7,520	3,091	215
	Co	O	555	28,805	7,862	402	20,917	5,651	7,888	2,664	153
		E	1133	36,185	9,518	644	21,078	5,997	15,108	3,988	489
	TOTAL		3039	\$130,071	\$18,664	1904	\$ 84,244	\$12,467	\$45,827	\$ 7,318	1135
Reserve	Div+	O	148	\$ 11,137	\$ 5,588	108	\$ 8,425	\$ 5,275	\$ 2,713	\$ 1,495	40
		E	--	--	--	--	--	--	--	--	--
	Bde	O	336	23,446	27,582	215	14,879	15,474	8,567	12,108	121
		E	305	10,832	7,006	168	6,128	4,345	4,703	2,823	137
	Bn	O	1365	79,795	34,477	1008	59,917	25,932	19,877	9,596	357
		E	1955	75,803	26,245	1279	50,570	20,907	25,234	8,316	676
	Co	O	490	27,112	18,038	374	20,799	14,169	6,313	3,949	116
		E	2189	80,318	31,286	1428	52,620	20,705	27,699	12,002	761
	TOTAL		6788	\$308,443	\$63,425	4580	\$213,338	\$45,002	\$95,106	\$21,856	2208

TABLE 4.6. Estimated Total Army Annual Cost (in Thousands of Dollars) of Four TM Task Factors for Manual and Automated TM

<u>Task Factor</u>	<u>Present Man Years on TM</u>	<u>Manual Cost</u>	<u>Automated Man Years on TM</u>	<u>Automated Cost</u>	<u>Annual Savings</u>	<u>Man Year Savings</u>
Guidance	4541	\$208,753	3038	\$143,298	\$ 65,455	1503
Requirements	5926	269,234	3996	185,777	83,457	1930
Resources	2533	109,005	1624	72,310	36,694	909
Scheduling	<u>2287</u>	<u>86,341</u>	<u>1386</u>	<u>53,582</u>	<u>32,759</u>	<u>901</u>
TOTAL	15287	\$673,333	10044	\$454,967	\$218,365	5243

million), Resources (\$37 million) and Scheduling (\$33 million). Clearly, the planning aspects of TM (i.e., Guidance and Requirements) will be the best served by automation.

Table 4.7 indicates that the costs (and corresponding savings) of TM in the Requirements area are substantially higher than the other task areas for the forward deployed and reserve components. For example, the savings for Requirements in the U.S. active component is \$24 million, versus \$27 million for Guidance. Conversely, the savings comparison for Requirements versus Guidance in forward deployed units is \$19 million vs. \$13 million and \$41 million vs. \$25 million for the reserve component. It is apparent that U.S. active units will benefit more in the area of Guidance (\$27 million) than in determining Requirements (\$24 million). These cost estimates parallel the data concerning time spent on TM tasks.

Table 4.8 shows that Cos will save substantially more in Scheduling than other levels, while Bns dominate the savings for Resources, Guidance and Requirements. Thus, Cos will show proportionally greater savings than other echelons from automating Scheduling (\$23 million), while Bns will yield more

TABLE 4.7. Estimated Total Army Annual Cost (in Thousands of Dollars)
of Four Task Factors in Each Component for Manual and
Automated TM

		Present Man Years on TM	Manual Cost	Automated Man Years on TM	Automated Cost	Annual Savings	Man Year Savings
Component	Task Factor						
U.S. Active	Guidance	1783	\$ 82,177	1165	\$ 55,449	\$ 26,728	618
	Requirements	1708	75,807	1149	52,305	23,502	559
	Resources	1077	44,126	664	28,123	16,003	413
	Scheduling	<u>893</u>	<u>32,709</u>	<u>583</u>	<u>21,508</u>	<u>11,201</u>	<u>310</u>
	TOTAL	5461	\$234,819	3561	\$157,385	\$ 77,434	1900
4-11 Forward Deployed	Guidance	894	\$ 39,836	582	\$ 26,518	\$ 13,319	312
	Requirements	1237	54,546	787	35,639	18,908	450
	Resources	403	17,840	254	11,741	6,099	149
	Scheduling	<u>505</u>	<u>17,848</u>	<u>281</u>	<u>10,348</u>	<u>7,500</u>	<u>224</u>
	TOTAL	3039	\$130,070	1904	\$ 84,246	\$ 45,826	1135
Reserve	Guidance	1864	\$ 86,740	1291	\$ 61,331	\$ 25,409	573
	Requirements	2980	138,881	2060	97,834	41,047	920
	Resources	1053	47,038	706	32,446	14,592	347
	Scheduling	<u>889</u>	<u>35,784</u>	<u>522</u>	<u>21,726</u>	<u>14,058</u>	<u>367</u>
	TOTAL	6786	\$308,443	4579	\$213,337	\$ 95,106	2207

TABLE 4.8. Estimated Total Army Annual Cost (in Thousands of Dollars) of Four Task Factors at Each Echelon for Manual and Automated TM

Task Factor	Echelon	Present Man Years on TM	Manual Cost	Automated Man Years on TM	Automated Cost	Annual Savings	Man Year Savings
Guidance	Div+	107	\$ 7,019	72	\$ 4,812	\$ 2,207	35
	Bde	383	21,195	231	13,257	7,938	152
	Bn	2180	105,701	1497	74,131	31,570	683
	Co	<u>1871</u>	<u>74,838</u>	<u>1238</u>	<u>51,098</u>	<u>23,740</u>	<u>633</u>
	TOTAL	4541	\$208,753	3038	\$143,298	\$ 65,455	1503
Requirements	Div+	93	\$ 6,577	67	\$ 4,802	\$ 1,774	26
	Bde	430	23,966	283	15,971	7,996	147
	Bn	2648	125,707	1753	85,275	40,432	895
	Co	<u>2754</u>	<u>112,984</u>	<u>1894</u>	<u>79,730</u>	<u>33,254</u>	<u>860</u>
	TOTAL	5925	\$269,234	3996	\$185,778	\$ 83,456	1928
Resources	Div+	94	\$ 5,889	58	\$ 4,021	\$ 1,868	36
	Bde	368	16,359	236	10,754	5,605	132
	Bn	1189	53,034	749	34,745	18,289	440
	Co	<u>882</u>	<u>33,722</u>	<u>581</u>	<u>22,790</u>	<u>10,932</u>	<u>301</u>
	TOTAL	2533	\$109,004	1624	\$ 72,310	\$ 36,694	909
Scheduling	Div+	24	\$ 1,213	14	\$ 733	\$ 480	10
	Bde	70	2,738	38	1,526	1,212	32
	Bn	575	25,230	384	17,114	8,116	191
	Co	<u>1617</u>	<u>57,160</u>	<u>950</u>	<u>34,209</u>	<u>22,952</u>	<u>667</u>
	TOTAL	2286	\$ 86,341	1386	\$ 53,582	\$ 32,760	900

savings than other echelons by automating Resourcing (\$18 million), Guidance (\$32 million) and Requirements (\$40 million).

In terms of rank categories, Table 4.9 shows that for the tasks of Guidance and Requirements, the savings will be greater for officers than for enlisted personnel (\$36 million vs. \$30 million for Guidance, and \$42 million vs. \$41 million for Requirements).² Conversely, the savings will be greater for enlisted personnel than for officers for the Resources and Scheduling tasks (\$22 million vs. \$15 million for Resources, and \$24 million vs. \$9 million for Scheduling).

4.2.3 Costs and Benefits of Work Type

The two work type factors composing TM tasks, Procedural and Decision Making, show different patterns of savings for officers and enlisted personnel. The data in Table 4.10 indicate that for Procedural work, the savings for officers will be \$78 million, and \$103 million for enlisted personnel. For Decision Making work, the pattern is reversed, with savings for officers being \$23 million and \$15 million for enlisted personnel. These data indicate that the bulk of TM costs and savings will be gained through automating Procedural work.

An interaction between type of work and TM task was obtained in the TM time statistical analysis. A comparable trend is reflected by the data in Table 4.11, showing the relatively small savings in Decision Making work that will be obtained in Training Scheduling (\$4 million) compared with Procedural work (\$29 million). The relative savings in Procedural work compared with Decision Making work is also substantial for the Guidance, Requirements and Resources tasks, but not as large as for Scheduling.

4.3. AUTOMATED TRAINING MANAGEMENT COST ESTIMATES FOR FIELDING

Cost estimates for an automated TM system depend on the type of equipment used and on system fielding requirements. There are two major scenarios regarding equipment type. The first scenario is that a TM system will be

²This result shows an interesting reversal of time spent vs. cost; while enlisted personnel spend more time on requirements than officers (see Figure 3.7), the higher cost of officers results in greater savings.

TABLE 4.9. Enlisted Total Army Annual Cost (in Thousands of Dollars) of Four Task Factors for Officer and Enlisted Personnel for Manual and Automated TM

Task Factor	Rank	Present Man Years on TM	Manual Cost	Automated Man Years on TM	Automated Cost	Annual Savings	Man Year Savings
Guidance	O	2172	\$124,801	1541	\$ 89,252	\$ 35,549	631
	E	<u>2369</u>	<u>83,953</u>	<u>1498</u>	<u>54,047</u>	<u>29,906</u>	<u>871</u>
	TOTAL	4541	\$208,754	3039	\$143,299	\$ 65,455	1502
Requirements	O	2613	\$149,944	1868	\$107,819	\$ 42,126	745
	E	<u>3313</u>	<u>119,289</u>	<u>2129</u>	<u>77,958</u>	<u>41,331</u>	<u>1184</u>
	TOTAL	5926	\$269,233	3997	\$185,777	\$ 83,457	1929
Resources	O	910	\$ 52,341	646	\$ 37,689	\$ 14,651	264
	E	<u>1623</u>	<u>56,664</u>	<u>978</u>	<u>34,621</u>	<u>22,043</u>	<u>645</u>
	TOTAL	2533	\$109,005	1624	\$ 72,310	\$ 36,694	909
Scheduling	O	526	\$ 28,002	361	\$ 19,335	\$ 8,667	165
	E	<u>1760</u>	<u>58,339</u>	<u>1026</u>	<u>34,247</u>	<u>24,093</u>	<u>734</u>
	TOTAL	2286	\$ 86,341	1387	\$ 53,582	\$ 32,760	899

TABLE 4.10. Estimated Total Army Annual Cost (in Thousands of Dollars) of Two Types of Work for each Rank Category for Manual and Automated TM

	<u>Work Type</u>	<u>Rank</u>	<u>Present</u>	<u>Manual</u>	<u>Automated</u>	<u>Automated</u>	<u>Annual</u>	<u>Man Year</u>
			<u>Man Years</u>	<u>Cost</u>	<u>Man Years</u>	<u>Cost</u>	<u>Savings</u>	<u>Savings</u>
4-15	Procedural	O	2452	\$135,411	1039	\$ 57,211	\$ 78,200	1413
		E	5007	170,900	1988	68,200	102,700	3019
	Decision Making	O	3770	\$219,676	3376	\$196,883	\$ 22,793	394
		E	4058	147,345	3642	132,673	14,673	416

TABLE 4.11. Estimated Total Army Annual Cost (in Thousands of Dollars) of Two Types of Work for Each Task Factor for Automated and Manual TM

<u>Task</u>	<u>Work Type</u>	<u>Present Man Years on TM</u>	<u>Manual Cost</u>	<u>Automated Man Years on TM</u>	<u>Automated Cost</u>	<u>Annual Savings</u>	<u>Man Year Savings</u>
Guidance	Procedural	2104	\$ 90,274	856	\$ 37,057	\$ 53,218	1248
	Decision Making	2437	118,479	2183	106,241	12,238	254
Requirements	Procedural	2684	\$114,551	1084	\$ 46,618	\$ 67,933	1600
	Decision Making	3241	154,683	2912	139,159	15,523	329
Resources	Procedural	1280	\$ 51,352	505	\$ 20,792	\$ 30,560	775
	Decision Making	1253	57,653	1119	51,518	6,134	134
Scheduling	Procedural	1390	\$ 50,134	582	\$ 20,945	\$ 29,189	808
	Decision Making	896	36,207	804	32,637	3,570	92

implemented entirely on existing Army equipment (i.e., no new equipment expenditures). The second scenario regarding equipment type is that additional equipment will be purchased to house the system (referred to here as "dedicated equipment").

The scenarios are further divided according to the echelon levels at which the automated equipment is fielded. The first scenario assumes fielding an automated TM system from Div+ through Bn levels. The second scenario extends automation through the Co level.

It should be emphasized that automated equipment cost estimates are not well defined at this time. Army-wide fielding costs recently presented by the BDM Corporation are based on the use of equipment in the Army Tactical Command and Control System (ATCCS) hardware class. These costs are based on current vendor prices for equipment needed to field an operational system incorporating all current features of the Integrated Training Management System (ITMS) prototype.

Installation and system start-up costs are not available; thus, the cost analysis presented in the following sections concentrates on equipment and operating labor costs only.

4.3.1 Training Management Automation Costs Using Existing Army Equipment and Dedicated Equipment

Automation costs for fielding an automated TM system using existing equipment consist of research and development costs, software, system documentation, operator training, direct operating labor, and system maintenance costs. The costs for a system using existing equipment are currently estimated to differ from the dedicated hardware scenario only in the purchase of equipment and maintenance. The system acquisition and maintenance costs for dedicated equipment are shown in Table 4.12 on a per echelon basis. These cost estimates were developed for U.S. active units and it is assumed that they also apply to the forward deployed and reserve components.

TABLE 4.12. Per Echelon Equipment And Supporting Software Costs
for Automating Training Management (BDM Corporation)

Initial Acquisition Costs
(1987 Dollars)

<u>Echelon</u>	<u>ADPE Purchase</u>	<u>Comm. Equip Purchase</u>	<u>Software Procurement</u>	<u>Total Initial Cost</u>
Div+	\$104,427	\$ 19,215	\$102,877	\$226,519
Bde	31,618	2,083	0	33,701
Bn	31,618	2,083	0	33,701
Co	8,133	166	0	8,299

Annual Maintenance Costs
(1987 Dollars)

<u>Echelon</u>	<u>ADPE Maintenance</u>	<u>Comm. Equip Maintenance</u>	<u>Software Maintenance</u>	<u>Annual Maintenance Cost</u>
Div+	\$ 17,160	\$ 4,428	\$ 1,744	\$23,332
Bde	5,688	180	0	5,868
Bn	5,688	180	0	5,868
Co	1,380	0	0	1,380

The total dedicated equipment costs for the three Army components, U.S. active, forward deployed, and reserve, are shown in Tables 4.13, 4.14, and 4.15. Total initial equipment and software acquisition costs, as shown by Tables 4.13-4.15, are approximately \$27 million, \$18 million, and \$47 million for the U.S. active, forward deployed, and reserve components, respectively. These amounts would provide equipment for TM automation from the Div+ through Co levels for all Army units. The annual costs to maintain this equipment are approximately \$4 million a year for the U.S. active component, \$3 million a year for the forward deployed component, and \$8 million a year for the reserve component.

4.3.2 Automated System Cost Effectiveness

The cost effectiveness of an automated TM system is determined by comparing the total expected life cycle costs to the life cycle costs of the existing manual system. Life cycle costs of the existing manual system

TABLE 4.13. U.S. Active Component Equipment/Supporting Software Costs for an Automated Training Management System

<u>Echelon</u>	<u>Total Initial Acquisition Cost (In 1987 Dollars)</u>	<u>Total Annual Maintenance Cost (In 1987 Dollars)</u>
Div+	\$ 2,718,228	\$ 279,984
Bde	1,651,349	287,532
Bn	10,211,403	1,778,004
Co	12,481,696	2,075,520
Total	\$27,062,676	\$4,421,040

TABLE 4.14. Forward Deployed Component Equipment/Supporting Software Costs for an Automated Training Management System

<u>Echelon</u>	<u>Total Initial Acquisition Cost (In 1987 Dollars)</u>	<u>Total Annual Maintenance Cost (In 1987 Dollars)</u>
Div+	\$ 1,359,114	\$ 139,992
Bde	1,415,442	246,456
Bn	6,875,004	1,197,072
Co	8,564,568	1,424,160
Total	\$18,214,128	\$3,007,680

TABLE 4.15. Reserve Component Equipment/Supporting Software Costs for an Automated Training Management System

<u>Echelon</u>	<u>Total Initial Acquisition Cost (In 1987 Dollars)</u>	<u>Total Annual Maintenance Cost (In 1987 Dollars)</u>
Div+	\$ 2,265,190	\$ 233,320
Bde	4,044,120	704,160
Bn	20,186,899	3,514,932
Co	20,050,384	3,334,080
Total	\$46,546,593	\$7,786,492

consist essentially of direct operating labor costs as estimated in Section 4.2. Automated system life cycle costs consist of labor, research and development, investment, and operations and support costs. Only equipment investment costs, direct operating labor costs, and equipment maintenance costs have been quantified for an automated system at this time.

In order to adequately compare the life cycle costs of alternative systems with different costs incurred at different times, it is necessary to, (1) choose a common time period for evaluation, (2) discount all costs incurred over the common time period to the present in order to account for the time value of money, and (3) finally total all discounted costs for each system to arrive at the present value of each alternative. For example, if System A costs \$100 today and System B costs \$110 one year from now and the discount rate (rate of return on money) is 10 percent per year, then systems A and B are equal with respect to total cost, since \$100 today is worth \$110 a year from now when the rate of return on money is 10 percent per year. That is, the present value of \$110 a year from now, with a discount rate of 10 percent, is \$100.

Life cycle costs for five alternative training management systems are given in Tables 4.16 to 4.18 for each of the three Army components, U.S. active, forward deployed and reserve. The cost categories given in the tables consist of equipment acquisition and maintenance costs (from Tables 4.13 to 4.15) and direct operating labor (from Table 4.4). In computing the costs, an equipment life of 10 years and a discount rate of 10 percent per year were assumed. All yearly dollar figures shown are costs that have been discounted to the present. A summary of the expected 10-year life cycle costs for the alternative training management scenarios are presented at the bottom of Tables 4.16 to 4.18. These alternatives and the present value of their 10-year life cycle costs are as follows:

- Alternative 1: Manual System - The current manual training management system from Div+ through Co levels.

	<u>U.S. Active</u>	<u>Forward Deployed</u>	<u>Reserve</u>
10-Year Life Cycle Cost (Millions of Dollars)	\$1591	\$879	\$2082

TABLE 4.16. U.S. Active Costs for Alternative Training Management Scenarios (Discounted at 10% per Year)

Scenarios - Costs In Millions of Dollars						
Year	Cost Category	Manual System	Automated No. Add. Equip. Div+ - Co.	Automated Div+.-Bn No. Add. Equip. Manual at Co. Level	Automated Equip. Req'd. Div+.- Co.	Automated Div+.-Bn Equip. Req'd. Manual at Co. Level
1	Total Initial Investment					
	Cost: Equipment	0	0	0	27	15
	Operations & Support					
	Cost: Direct Labor	235	157	191	157	191
	Equip. Maintenance(a)	0	0	0	4	2
2	Operations & Support					
	Cost: Direct Labor	214	143	174	143	174
	Equip. Maintenance(a)	0	0	0	4	2
3	Operations & Support					
	Cost: Direct Labor	194	130	158	130	158
	Equip. Maintenance(a)	0	0	0	3	2
4	Operations & Support					
	Cost: Direct Labor	177	118	144	118	144
	Equip. Maintenance(a)	0	0	0	3	2
5	Operations & Support					
	Cost: Direct Labor	161	107	130	107	130
	Equip. Maintenance(a)	0	0	0	3	1
6	Operations & Support					
	Cost: Direct Labor	148	97	119	97	119
	Equip. Maintenance(a)	0	0	0	2	1
7	Operations & Support					
	Cost: Direct Labor	133	89	108	89	108
	Equip. Maintenance(a)	0	0	0	2	1
8	Operations & Support					
	Cost: Direct Labor	121	81	98	81	98
	Equip. Maintenance(a)	0	0	0	2	1
9	Operations & Support					
	Cost: Direct Labor	110	73	89	73	89
	Equip. Maintenance(a)	0	0	0	2	1
10	Operations & Support					
	Cost: Direct Labor	100	67	81	67	81
	Equip. Maintenance(a)	0	0	0	2	1
10 Year Present Worth (Cost)						
Of Scenario Assuming A						
10 Percent Discount						
Rate (\$Million)		1,591	1,062	1,292	1,118	1,321

(a) No expected increase in existing equipment maintenance cost.

TABLE 4.17. Forward Deployed Costs for Alternative Training Management Scenarios (Discounted at 10% per Year)

Scenarios - Costs In Millions of Dollars					
Year	Cost Category	Manual System	Automated No. Add. Equip. Div+ - Co.	Automated Div+.-Bn No. Add. Equip. Manual at Co. Level	Automated Div+.-Bn Equip. Req'd. Manual at Co. Level
1	Total Initial Investment Cost: Equipment	0	0	0	10
	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	130 0	84 0	107 0	84 2
2	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	118 0	76 0	97 0	76 2
3	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	107 0	69 0	88 0	69 2
4	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	98 0	63 0	80 0	63 2
5	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	89 0	57 0	73 0	57 1
6	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	81 0	52 0	66 0	52 1
7	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	73 0	47 0	60 0	47 1
8	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	67 0	43 0	55 0	43 1
9	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	61 0	39 0	50 0	39 1
10	Operations & Support Cost: Direct Labor Equip. Maintenance(a)	55 0	35 0	45 0	38 1
10 Year Present Worth (Cost) Of Scenario Assuming A 10 Percent Discount Rate (\$Million)		879	686	721	884
					745

(a) No expected increase in existing equipment maintenance cost.

TABLE 4.18. Reserve Costs for Alternative Training Management Scenarios (Discounted at 10% per Year)

Scenarios - Costs In Millions of Dollars						
Year	Cost Category	Manual System	Automated No. Add. Equip. Div+ - Co.	Automated Div+.-Bn No. Add. Equip. Manual at Co. Level	Automated Equip. Req'd. Div+.-Co.	Automated Div+.-Bn Equip. Req'd. Manual at Co. Level
1	Total Initial Investment					
	Cost: Equipment	0	0	0	47	28
	Operations & Support					
	Cost: Direct Labor	388	213	247	213	247
	Equip. Maintenance(a)	0	0	0	8	4
2	Operations & Support					
	Cost: Direct Labor	288	194	225	194	225
	Equip. Maintenance(a)	0	0	0	7	4
3	Operations & Support					
	Cost: Direct Labor	255	178	204	178	204
	Equip. Maintenance(a)	0	0	0	7	3
4	Operations & Support					
	Cost: Direct Labor	231	168	188	168	188
	Equip. Maintenance(a)	0	0	0	6	3
5	Operations & Support					
	Cost: Direct Labor	218	145	169	145	169
	Equip. Maintenance(a)	0	0	0	5	3
6	Operations & Support					
	Cost: Direct Labor	191	132	153	132	153
	Equip. Maintenance(a)	0	0	0	5	2
7	Operations & Support					
	Cost: Direct Labor	174	128	139	128	139
	Equip. Maintenance(a)	0	0	0	5	2
8	Operations & Support					
	Cost: Direct Labor	158	109	127	109	127
	Equip. Maintenance(a)	0	0	0	4	2
9	Operations & Support					
	Cost: Direct Labor	144	99	115	99	115
	Equip. Maintenance(a)	0	0	0	4	2
10	Operations & Support					
	Cost: Direct Labor	131	98	105	98	105
	Equip. Maintenance(a)	0	0	0	3	2
10 Year Present Worth (Cost)						
Of Scenario Assuming A						
10 Percent Discount						
Rate (\$Million)						
		2,882	1,438	1,678	1,539	1,723

(a) No expected increase in existing equipment maintenance cost.

- Alternative 2: Automated/No Additional Equipment/Div+-Co. - An automated training management system requiring no additional U.S. Army equipment purchases. The system automates training management from Div+ through Co levels.

	<u>U.S. Active</u>	<u>Forward Deployed</u>	<u>Reserve</u>
10-Year Life Cycle Cost (Millions of Dollars)	\$1062	\$566	\$1438

- Alternative 3: Automated/No Additional Equipment/Div+-Bn/Manual at Co Level - The same alternative as Alternative 1, except that Co level TM is not automated and the current manual system is assumed at the Co level.

	<u>U.S. Active</u>	<u>Forward Deployed</u>	<u>Reserve</u>
10-Year Life Cycle Cost (Millions of Dollars)	\$1292	\$721	\$1670

- Alternative 4: Automated/Equipment Required/Div+-Co. - TM is automated by purchasing dedicated equipment for the Div+ through the Co level.

	<u>U.S. Active</u>	<u>Forward Deployed</u>	<u>Reserve</u>
10-Year Life Cycle Cost (Millions of Dollars)	\$1116	\$604	\$1539

- Alternative 5: Automated/Equipment Required/Div+ - Bn/Manual at Co Level - The same as Alternative 4, except that TM is not automated at the Co level, and the current manual system is assumed at the Co level.

	<u>U.S. Active</u>	<u>Forward Deployed</u>	<u>Reserve</u>
10-Year Life Cycle Cost (Millions of Dollars)	\$1321	\$745	\$1723

The resulting rankings of the five TM system alternatives by life cycle cost effectiveness for each component are shown in Tables 4.19-4.21. As shown in these tables, the most cost effective training management alternatives for each Army component are those scenarios that automate TM to the Co level. Not automating at the Co level is expected to result in approximately \$200 million dollars in additional 10-Year life cycle costs for the U.S. active component, \$150 million dollars for the forward deployed component, and \$200 million dollars for the reserve component.

TABLE 4.19. Ranking of Training Management System Alternatives by Life Cycle Cost Effectiveness for U.S. Active Component (in Millions of Dollars)

<u>Alternative</u>	<u>Life Cycle Cost</u>	<u>Life Cycle Savings from Current System</u>
Alt.2 - Automated/No Add. Equip./Div+.-Co.	\$1062	\$529
Alt. 4 - Automated/Equip. Req'd./Div+.-Co.	\$1116	\$475
Alt. 3 - Automated/Div+.- Bn/No Add. Equip./Manual at Co. Level	\$1292	\$299
Alt. 5 - Automated/Div+.- Bn Equip. Req'd/Manual at Co. Level	\$1321	\$270
Alt. 1 - Current Manual System	\$1591	

TABLE 4.20. Ranking of Training Management System Alternatives by Life Cycle Cost Effectiveness for Forward Deployed Component (in Millions of Dollars)

<u>Alternative</u>	<u>Life Cycle Cost</u>	<u>Life Cycle Savings from Current System</u>
Alt.2 - Automated/No Add. Equip./Div+.-Co.	\$ 566	\$313
Alt. 4 - Automated/Equip. Req'd./Div+.-Co.	\$ 604	\$275
Alt. 3 - Automated/Div+.- Bn/No Add. Equip./Manual at Co. Level	\$ 721	\$158
Alt. 5 - Automated/Div+.- Bn Equip. Req'd/Manual at Co. Level	\$ 745	\$134
Alt. 1 - Current Manual System	\$ 879	

TABLE 4.21. Ranking of Training Management System Alternatives by Life Cycle Cost Effectiveness for Reserve Component (in Millions of Dollars)

<u>Alternative</u>	<u>Life Cycle Cost</u>	<u>Life Cycle Savings from Current System</u>
Alt.2 - Automated/No Add. Equip./Div+.-Co.	\$1438	\$644
Alt. 4 - Automated/Equip. Req'd./Div+.-Co.	\$1539	\$543
Alt. 3 - Automated/Div+.- Bn/No Add. Equip./Manual at Co. Level	\$1670	\$412
Alt. 5 - Automated/Div+.- Bn Equip. Req'd/Manual at Co. Level	\$1723	\$359
Alt. 1 - Current Manual System	\$2082	

4.4 SUMMARY OF AUTOMATED TM COST AND BENEFITS

The analysis presented in this chapter has shown that substantial savings in terms of labor avoidance can result from the introduction of automation in the TM process. The reserve component would show the largest annual savings, i.e., \$95 million or 2207 man years. The total annual savings for all components would be \$218 million or 5242 man years. In the U.S. active and forward deployed components, the largest portion of TM savings will occur at the Co level, i.e., 43% and 50%, respectively. In contrast, the largest savings in the reserve component will occur at the Bn level, i.e., 47%. Enlisted personnel account for 55% of the savings in the U.S. active Cos, 65% of the savings in forward deployed Cos and 55% of the savings in reserve Bns. An analysis of TM tasks indicates that 38% of TM costs occur in the area of Training Requirements. The annual savings across components in this task area is \$83 million (1929 man years); \$41 million of these savings occur in the reserve component.

Procedural and Decision Making work types result in differential savings, such that \$103 million (3019 man years) is saved for Procedural work at the

enlisted rank. This is 47% of all cost savings. Additionally, the Requirements task accounts for \$68 million (38%) of the savings in all Procedural work.

A comparison of TM automation alternatives indicates that automating on the basis of existing equipment provides the greatest savings over a 10 year life cycle--\$529 million for U.S. active, \$313 for forward deployed and \$644 for reserve components (a total savings of \$1486 million). This scenario assumes automating to Co level. The other scenario involving new equipment with automation to the Co level results in total Army life cycle savings of \$1,293 million.

5.0 INSTALLATION RESOURCE MANAGEMENT

5.1 INSTALLATION RESOURCE DATA COLLECTION: INTRODUCTION

In an effort to more fully understand the impact that an automated TM system can have on the Army, data were collected on the present utilization of training resources. The resource areas sampled were (1) training funds management, (2) training ammunition management, (3) range management, and (4) training aids and devices management. These four areas are essential to the management and conduct of training in the Army. Funds management provides the allocation of money for training events. Training ammunition management and training aids and devices management provide the ammunition or other aids that may be necessary to conduct that training. Range management provides the location for that training to occur.

Data were collected at four of the six sites that the TM surveys were administered. Installation data were not collected from the National Guard and Reserve units. The data reflect (1) the areas where specific operational cost savings will accrue as a result of more efficient operation through automation, and (2) provide a baseline measure of efficiency for a comparison with post-automation measures.

The data collected at each installation complement that collected through the TM surveys. The data are based on archival information maintained by installations and units which portray parameters such as actual utilization rates, timeliness of requests or reports, and the efficiency of the resource areas to provide service to the units. Additionally, they provide insight into the efficiency of long-range and short-range planning of training.

There is a direct relationship between data gathered through the individual TM surveys and data collected through the objective sources reported in this chapter. The surveys provide self-report data regarding documents used by training and resource managers, what they produced, and the percent time spent on various TM tasks. Installation data provide information concerning training resource management processes, such as compliance with training management policies, unit use of training resources, and the accuracy of long-range resource projections.

The following sections present a description of each resource area and its function in Army TM. Data collection methods are described and the results are presented and discussed in terms of the tangible or intangible benefits that would result from introducing automation.

5.2 FUNDS MANAGEMENT ANALYSIS

5.2.1 Introduction: Training Funds Management

Training funds management is the process that links training events with resources. It is through the management and allocation of training funds that commanders obtain the authority to move equipment a given number of miles; operate equipment a set number of hours; or purchase repair parts, fuel, and expendable items. Several training funds management systems were observed at the different installations, including the Training Management Control System (TMACS), the Event Resource Model (ERM), the Training Mileage Control Model (TMCN), and manual processing with limited automation assistance. Funds management systems are intended to project and account for training.

The general process of training funds management is depicted in Figure 5.1. The process begins with the issuance of training guidance from higher echelons specifying directed training and sustainment activities. A fiscal year command operating budget (COB) is usually prepared by the corps, installation, and division. Letter guidance, stated in terms of funding targets or limits per quarter in the fiscal year, is usually prepared for the brigade, battalion, or separate company.

Each echelon plans training and sustainment events based on the guidance received from the next higher echelon. The event planning serves several functions: (1) checking for compliance with guidance on training, (2) projecting costs of training, and (3) determining unfunded requirements. Training event planning provides a basis for projecting costs. Cost factors for event planning come from several sources: past event spending, FORSCOM cost factors, and other Army-developed cost factors.

Funds are managed at each echelon but the installation directs and accounts for the funding allocations. Funds are also controlled at the

FIGURE 5.1. Funds Management

division level even though data comes from brigade, battalion, or company levels.

Table 5.1 briefly describes the five funds management systems that were observed during the data collection. All of the locations used Tactical Unit Financial Management Information System (TUFMIS) as a means of tracking requisition commitment and obligation information. Though TUFMIS is not a training funds management system in which events are identified and costs are projected, it does serve as a measure of unit spending performance over monthly, quarterly, and annual periods. The manual system that was observed is not included in Table 5.1. At that division, costs were estimated manually using cost factors based on previous expenditures prepared by subordinate units. Appendix G-1 contains a more detailed description of the funds management systems observed.

5.2.2 Methods

Data were collected on funds management in four divisions. Table 5.2 describes the four divisions, type of funds management system in place, and the data collection time period.

Three overlapping categories of training events were investigated: (1) events programmed in automated systems, (2) events programmed in automated systems that were conducted, and (3) events conducted that were not programmed.

The first measure of the accuracy of unit forecasts of individual and collective training was the percentage of programmed training and other sustainment events that eventually appear on published training schedules. This measure investigated the validity of programming training events on an automated system. If programmed training events do not appear on the actual weekly training schedules, the validity of programmed events to project funds can be questioned.

Automated event planning worksheets were screened for programmed training and sustainment activities and compared to published training schedules. Events programmed in TMACS were also reviewed to determine if they had been recoded as accomplished after the 31 May 1988 cutoff period. TCM, ERM, and

TABLE 5.1 Description of Funds Management Systems

<u>System Name</u>	<u>Description</u>
ERM	ERM is a unit-level training management tool under development. Training events are programmed into the system. Output consists of long-range calendars, weekly training schedules, coordination reminders, training ammunition forecasts, and event/sub-event fund summaries. ERM will print range and training area requests, transportation requests, and training ammunition requests. ERM is being designed to interface with BLTM, Training Resources Model (TRM), and the Training Ammunition Management Information System (TAMIS). ERM training event costs will include OPTEMPO costs and elements of resource (EOR) costs. EOR are non-OPTEMPO resource requirements such as transportation, contract support, and travel costs.
TMACS	TMACS is designed to assist in planning, programming, and budgeting mission training funds for unit training plans. TMACS quantifies costs based on training events. TMACS uses the Common Costing Methodology for Unit Training (CCMUT). TMACS should be updated after the event is executed. TMACS includes equipment operating cost factors either in miles, hours, or rounds fired. For TMACS to compute cost factors for an event, the following data is required: equipment density, mile, hours, or rounds, petroleum use, organizational maintenance costs, and direct support maintenance cost. The output consists of equipment cost factors, unit equipment tables, training event category codes, unit ammunition tables, element resource tables, and petroleum cost tables.
TMCM	TMCM is a locally designed training funds management system that uses many features common to TMACS. TMCM quantifies training funds requirements by using planned and actual equipment mileage inputs to generate costs. The purpose of TMCM is to capture costs of training. The output of TMCM is the cost for each event in terms of Class III package and bulk petroleum), and Class IX (organizational and direct support repair parts).
TUFMIS	TUFMIS is a financial reporting system. It is used to monitor funding allocated for training and sustainment activities. TUFMIS is a standard Army financial management system that reports unit expenditures for general supplies, petroleum, repair parts, and chemical defense equipment. TUFMIS was consistently used at all installations surveyed.

TABLE 5.2. Description of Installations Included in Data Collection

<u>Installation</u>	<u>Funds Management System</u>	<u>Period of Collection</u>
A	TMACS	1 Oct 87 - 31 May 88
B	Manual	1 Oct 87 - 31 May 88
C	ERM	1 Apr 88 - 31 Jul 88
D	TMCM	1 Oct 87 - 31 May 88

the manual system (as they were used by those divisions) did not provide for this comparison. Programmed training event start and stop dates were also compared with training schedules as a measure of the accuracy of programming training events.

Another measure of accuracy counted the number of training events on the training schedules that did not appear as programmed on TMACS, ERM, or TMCM. Due to the large number of events that are entered on training schedules, only "training highlights" or "significant training events" were compared to automated system programming. Training highlights are a listing of what a unit commander considers the most important events for a particular week and are signed by that commander and sent to the next higher echelon. When training highlights had not been listed by units, "significant training events" were used; these were defined as training events that took the unit out of garrison and lasted eight or more hours. Training highlight events also had to meet the criteria of being out of garrison and lasting more than eight hours. The objective of this comparison was to determine whether significant training events or "highlights" were programmed into the automated system. "Highlight" events or other significant training events were deemed most useful in this comparison because they are the most important and generally involved ARTEP activities. This measure cross-checks the first measure (which compared programmed events to the training schedule). A useful automated system should, at the very least, have programmed the most important training events. This measure determined the percentage of significant events on the training schedules that had been programmed into the automated training management system.

5.2.3 Results

The first measure, comparing programmed training events to published training schedules, is shown in Table 5.3. The published training schedules were reviewed to determine whether they included events programmed into the automated system. The final comparison was whether the event (if on the training schedule) had the same start and stop date.

Table 5.3 shows that 59% to 81% of the programmed events are also present on the training schedule. Note that there is an inverse relationship between number of programmed events and the percentage included on the training schedule. The system with the most events programmed had the fewest appear on the training schedule.

TABLE 5.3. Programmed Training Events Versus Scheduled Training Events

<u>Automated System</u>	<u># Tng Events Programmed</u>	<u># Tng Events Coded Accomplished</u>	<u>% Programmed Events on Tng Schedule</u>	<u>% Programmed Events with Same Start/ Stop Date</u>
TMACS	197	26%	59%	12%
ERM	72	--	65%	51%
TMCN	27	--	81%	23%
TOTAL	296	AVERAGE	68%	29%

For the next analysis, three types of training events were considered: (A) events programmed into TM funds systems, (B) training events that were programmed and conducted, and (C) events conducted but not programmed. The events included in 'C' were significant training events or training highlights. Figure 5.2 diagrams the comparison of programmed and conducted events.

Table 5.4 presents the percentage of significant conducted training events that were programmed in the automated system. Each division has its own policies governing the level of detail required in training schedules or what is programmed as a training event, so absolute number of events does not indicate quantitative differences between divisions. The total sample in Table 5.4 consists of conducted events.

FIGURE 5.2. Diagram of Programmed and Conducted Events Presented in Table 5.4

TABLE 5.4. Conducted Training Events Programmed on Automated Funds Management System

<u>Automated System</u>	<u>Total Sample of Conducted Events</u>	<u>Percent of Events Programmed</u>
TMACS	236	50%
ERM	135	35%
TMCN	<u>154</u>	<u>14%</u>
Sum	525	Average 33%

The point is clearly made in Table 5.4 that a majority of the conducted events had not been programmed into the automated system.

5.2.4 Discussion of Management of Training Funds

The purpose of collecting training funds management data was to evaluate the accuracy with which units can program training events. Table 5.3 shows that 68% of the programmed events were conducted (e.g., they appeared on the training schedules). Table 5.4 reveals the percentage of conducted events that were programmed (33%); indicating the overall use of funds management system. These data reveal only 33% of conducted events had been programmed. Consequently, it is unlikely that accurate cost projections can be generated when programmed events account for only 1/3 of conducted events.

In this effort it was found that units comply with Army policies by initially programming events; however, units do not regularly update events or record actual miles or the hours equipment is driven. Essentially, all of the initial programming efforts result in unused or inaccurate funds management data.

Until units can perform long-range and short-range planning tasks accurately, funds management systems are not used optimally. The manual system observed yielded performance equivalent to the automated systems. Thus, existing funds management automation appears to yield no advantage in planning training costs.

5.3 TRAINING AMMUNITION ANALYSIS

5.3.1 Introduction: Training Ammunition Management

Strict procedures govern the use of ammunition because of its importance to soldier training and its lethality. Ammunition is packaged, shipped, and stored before it is drawn by units. Extensive paperwork is required when ammunition is drawn, as well as when it is returned, including used shells or casings. For a unit to obtain training ammunition, training plans also must be developed and ranges scheduled. Ammunition use must be forecast. Ammunition is usually forecast twelve months in advance; forecasts are finalized three months in advance.

Units forecast ammunition up to 12 months in advance, but must ensure that the final three month forecast meets their training needs. Ammunition requests must be submitted to the Division Ammunition Office (DAO) or Consolidated Ammunition Office (CAMO) a certain number of days prior to drawing ammunition (according to local policy). If the request is an unforecasted quantity, it must go through at least one more level of approval and the ammunition must be "released" through another unit's forecasted ammunition. Figure 5.3 depicts the ammunition management process.

This process is most efficient when units are able to accurately forecast the ammunition they need for training. Ideal ammunition management occurs when ammunition is provided to units when they need it. This can only happen when units forecast accurately and submit few unforecasted ammunition requests. What often happens, however, is that ammunition managers must reallocate overforecasted ammunition, deal with late or unforecasted requests, store and repackage returned ammunition, and monitor many changes to original unit forecasts.

5.3.2 Methods

Data were collected on ammunition forecasts and requests to determine levels of efficiency for the current system. These data provide insight into areas that could be improved by automation and areas that function well with present automation.

FIGURE 5.3. Training Ammunition Management

Table 5.5 describes the units whose ammunition forecasts and requests were included in the data collection effort. The total sample of units included eleven Infantry Battalions, three Headquarter Companies, two Cavalry Attack Brigades (CAB), a Signal Battalion, a Military Intelligence (MI) Battalion, two Armor Battalions, one Field Artillery (FA) Battalion, one Air Defense Artillery (ADA) Battalion, one Division Artillery (DIVARTY) Battalion, and one Division Support Command (DISCOM). Unless otherwise specified, the data were collected during the first two quarters of FY 88.

TABLE 5.5. Summary of Installation Units in Ammunition Management Data Collection

	<u>Division Type</u>			
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
Installation	Infantry Motorized	Infantry Light	Cavalry Heavy	Infantry Heavy
Units	6 Inf Bn 2 Separate Companies	1 MI Bn 1 Sig Bn 1 CAB 2 Inf Bn	2 Inf Bn 1 Divarty Company 1 CAB 1 DISCOM	1 Inf Bn 2 Armor Bn 1 FA Bn 1 ADA Bn

The data collection entailed reviewing archival data from the Division Ammunition Office (DAO). Data collected on the ammunition forecasting process consisted of (1) errors made by units in forecasting amounts, (2) the timeliness of forecasts, and (3) a comparison of ammunition forecasts to actual ammunition requests. The DAO's records provided the basis for these data; forecast errors are corrected by the DAO and were tallied by data collectors. Date stamps on forecasts were compared to local deadlines. Records on the comparison of forecasts to requests were also evaluated.

For data collection on the ammunition request process, a random sample of the closed-out DA Form 581's were reviewed for (1) timeliness (did the unit submit the request on time according to local guidelines?), (2) whether the ammunition was forecast or not (the unit specifies on the form whether the request is forecast or unforecast), (3) whether the request was filled by

the DAO/CAMO (determined by looking at what was issued in relationship to what was requested), and (4) whether live ammunition was turned back in.

5.3.3 Results

At each installation visited, the level of automation involved in the ammunition forecasting process varied. Table 5.6 provides a brief description of the level of automation found at each site visited; Appendix A-1 provides more detailed information on the forecasting processes at each installation.

TABLE 5.6. Type of Automation at the DAO/CAMO for Forecasting and Ammunition Account Management

Installation A	No automation for unit forecasting. Units must include their own monthly forecast information for next 12-month period regarding account balance information and quantities requested.
Installation B	Locally developed Lotus 1-2-3 spreadsheet for unit forecasts and management of unit accounts (i.e., account balance, quantities forecasted). Units submit monthly forecasts by writing in forecast information on spreadsheet printout for next 12-month period; no account balance information is necessary.
Installation C	Divisional units on network with CAMO with an automated ammunition management system on a mainframe computer, managed by Directorate of Information Management (DOIM). Units can electronically send forecasts to CAMO; non-divisional units submit forecasts manually. Units only submit forecast information on a monthly basis for next 12-month period. Ammunition accounts managed on automated system by CAMO.
Installation D	Units forecast through TAMIS computer system; MSCs are networked with system. Units only submit forecast information 40 days out. TAMIS runs on a mainframe computer system. Ammunition accounts are managed on TAMIS by the ASP.

A forecast error results when a unit forecasts beyond authorization levels, makes errors in recording ammunition balance, records forecast quantities incorrectly, incorrectly records amounts used in the FY, or simply uses the incorrect DODIC when ordering. The tally of forecast errors corrected by the DAO indicated that 13% of the forecasts are submitted without error at Installation A. Forecast error data were unavailable at the

remaining three installations. Table 5.7 shows the type of forecast errors that were made at Installation A. At Installation B, the DAO estimates that 70-75% are submitted without error. At Installation C, the CAMO estimates that 67% are submitted without error on the automated system and 35-40% of the manually developed forecasts are submitted without error. No estimates were available for Installation D.

TABLE 5.7. Forecasting Errors*, Installation A

Balance of Ammunition Left in FY	58%
Quantity of Ammunition Used in FY	24%
Forecasting Quantity Error	9%
Quantity of Ammunition Authorized in FY	6%
DODIC Error (Ammunition ordering number)	3%

*Forecasts could have more than one type of error

Table 5.8 shows the average percent of forecasts that are submitted on time. Units submit forecasts within the deadline 55% of the time.

TABLE 5.8. Timeliness of Ammunition Forecasts

<u>Installation</u>	<u>% of Forecasts on time</u>	<u>Time Period of Data Collection</u>
A	36%	87 Oct - 88 May
B	73%	88 Jan - 88 June
C	67%*	87 Oct - 88 June
D	57%	87 Oct - 88 July
Average: 55%**		

*Estimate

**Does not include Installation C

At two installations the records portrayed the relationship between unit forecasts and unit requests. Forecasted amounts were compared to year-to-date expenditure rates. The DAO at Installation A had analyzed ammunition expenditures versus ammunition forecasts for FY 88. From October 1987 to April 1988 (7 months into the fiscal year), the division had expended 34.4 percent of its forecasted ammunition. According to the original forecasts, 69.1 percent of the ammunition was to have been expended by the end of April 1988. Unit forecasts for May, June, and July indicate the yearly projections would not be met unless unit forecasts or expenditures were to increase substantially for August and September. It should be recalled that units finalize forecasts three months in advance; even though units had forecast to the end of the fiscal year, there was still time to modify the final forecasts. (At the time of data collection, August and September forecasts had not been finalized.)

For Installation B, a copy of the Division Ammunition Forecast for three major training areas where account holders normally train was evaluated. As of June 1988, 36.5 percent of the ammunition forecasted for FY 88 had not been used or forecasted. (This percentage was calculated by taking the amount ammunition expended in FY 1988 and adding the ammunition forecasted for July, August, and September and dividing it by the total amount of FY 88 authorized ammunition.) Unless there are unforecasted requests that reallocate within the division or installation, 36.5 percent of the forecasted ammunition would not be included in training plans.

Table 5.9 presents the ammunition request data. Averages across installations are presented for each of the measures. For data collected on timeliness of request, the suspense time is listed. (The number of days before drawing is the "suspense" of ammunition requests.) Of particular note in this table is the percentage of ammunition drawn that was turned back--39% across the installations surveyed.

5.3.4 Discussion

The ammunition management process optimizes resource use if ammunition is provided to units according to their training needs within authorized levels. This process is disrupted when forecasts do not reflect needs, requests are

TABLE 5.9. All Requests for Ammunition

	<u>Installation</u>				<u>Average</u>
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	
Forecasted Ammunition Requested	81%	60%	83%	62%	72%
Unforecasted					
Division Credit Release	7%	36%	17%	n/a	20%
Installation Credit Release	12%	4%	n/a	24%	13%
Request on Time?	90%	75%	90%	95%	88%
Request Suspense, in Days	6	10	3	1	5
Was request filled?					
Fully filled	81%	90%	95%	82%	87%
Partially filled	7%	2%	3.5%	2%	4%
Not filled	12%	8%	1.5%	16%	9%
Ammunition Drawn that was Turned Back to ASP	51%	40%	40%	26%	39%
Percent Issued that was Forecasted	--	--	--	69%*	
Number of requests reviewed	210	112	201	213**	
Data Collection Time Period					
Start	87 Oct	88 Jan	87 Oct	87 Dec	
End	88 May	88 May	88 Apr	88 June	

* 87 Oct to 88 July

**Not a sample, all requests submitted

unforecasted, requests or forecasts are late, and units overdraw ammunition quantities. The problem areas indicated in the ammunition management data are:

- Forecasting authorization errors, i.e. units do not forecast within authorization levels or do not know ammunition remaining in unit account
- Over-forecasting, i.e, units don't request ammunition to the level forecasted
- Late requests

- Unforecasted requests
- Reallocation of unused ammunition

Automation of ammunition management may provide solutions to the problem areas listed above. From this sample of units, the one unit without automation in forecasting had only 13% of the forecasts free of errors. At the Installations with automated forecasts the subjective estimates reveal that 67%-75% are error free. Lower error rates reduce costs, for example, by eliminating errors that do not have to be corrected by hand. Units are also able to send forecasts via the computer.

A substantial amount (39%) of ammunition is returned, which suggests that intentional overforecasting is a problem. If automation can link training plans with ammunition requests this problem may be solved. Units would have their requests filled and over-forecasting would not be necessary.

Since units consistently have their requests fully filled, over-forecasting does not seem necessary to insure that units get enough ammunition. However, overforecasting and substantial returns allow unforecasted requests to be filled. Overforecasting seems to be compensated for by unforecasted requests. However, because overforecasting is so prevalent, much of the effort spent to develop accurate long range training plans, including long-range resource planning, may be wasted. Training managers indicated in the surveys that they spend 13% of their time on guidance (i.e., long-range, short-range, and near-term); thus substantial waste may be occurring.

Late requests are a problem if the ASP cannot provide ammunition to the units on time. Automation cannot solve this problem but may lessen the need for late requests if an automated system can generate requests based on training plans and assist in the reallocation of unused ammunition.

The most substantial problem appears to be the percentage of ammunition that is returned. This is a direct result of overforecasting. The average turn-back is 39%. There are extensive resources consumed as a result of this: labor for the request and the ordering, and the costs of shipping, storage, and turn back. If 39% of the ammunition is not needed at the time of draw, waste exists. The returned ammunition is eventually reallocated, so at least 39% of the work in ammunition allocation is always repeated. Theoretically,

this 39% will be redrawn. Once redrawn, 39% of it will be returned. If 39% of the ammunition is turned back, this indicates that 15% ($39\% \times 39\% = 15\%$) of the ammunition has been processed three times (the original draw, the return and the second allocation, the return and third reallocation). Finally, about 6% of the ammunition has been processed four times ($15\% \times 39\% = 5.9\%$). Each request is processed through the same channels--approval through the division or MSC and approval through the DAO/CAMO and ASP. Automation can serve to alleviate these problems by (1) providing units with accurate information on how to forecast ammunition, and (2) linking requests to necessary training.

Automation could also assist in linking ammunition requests to range requests and reservations. To draw and use ammunition, a range must be reserved four to six weeks ahead of time. Ammunition is reserved in closer proximity to the date of use. Some of the units stated that they did not use a range that they had reserved because they had no ammunition to shoot. If more information is available to the units quickly, range resources are less likely to be wasted; the units could know whether they were issued ammunition or not and could presumably cancel a range request.

5.3.5 Ammunition Costs Analysis

Each year the Department of the Army authorizes an amount of training ammunition that can be used. However, each year a certain amount of training ammunition is actually "funded." Authorized ammunition may be a combination of funded ammunition and previous years' quantities. Ammunition may also be purchased in different quantities, such as a five-year supply, if the price is good. Therefore, the authorized levels are the best indicator of what can be expended in any year; funded levels are the quantity spent in any year.

According to U.S. Army Training Support Command, Standards in Training Ammunition Commission (STRAC) Directorate at Ft. Eustis, VA, \$824,287,516 was authorized for training ammunition in FY 88 by the Department of the Army. This quantity is divided among installations and units according to needs, historical data, and other factors. According to HQDA-DAMO-TRS at the Pentagon, \$525 million was funded for training ammunition in FY 88.

Table 5.10 shows two scenarios regarding efficient funds management, one for authorized amounts and one for funded amounts. From the ammunition

management data collected at the installations, it was determined that 39% of drawn ammunition is turned back in.

This table shows two estimates of the amount of money that is over-allocated in training ammunition management. Based on authorized levels, overforecasting and drawing consumes \$321,472,131 annually. Using funding level as a basis, \$204,750,000 is overforecast.

TABLE 5.10. Amount of Improperly Managed Ammunition
Based on Authorization and Funding Levels

(1) Authorized Level:

$$\$824,287,516 \times .39 = \$321,472,131$$

(2) Funded Level:

$$\$525,000,000 \times .39 = \$204,750,000$$

These figures do not represent cost savings; they represent the amount of money that is ineffectively managed. These figures do not include the labor expended in processing forecasts, requests, and returned ammunition. Rather, they represent the dollar savings based on the cost of ammunition alone. Table 5.10 shows the substantial amount of money that can be managed more effectively. For any particular fiscal year, actual cost savings would result from more precise ammunition forecasting and use.

5.4 RANGE AND TRAINING AREA ANALYSIS

5.4.1 Introduction: Ranges and Training Area Management

Ranges and training areas are a key resource to training managers. Ranges provide the physical space in which to fire weapons, maneuver, conduct simulations, and complete mission training tasks. Ranges are tangible assets that belong to installations servicing regional customers, not just units assigned to the installation. (Hereafter, the word ranges will be used to indicate ranges, facilities, and training areas.)

Efficient range management consists of the Range Control Office (RCO) managing and maintaining ranges and training areas so that units can train according to their needs while ensuring equitable range use among units.

Each echelon programs training and sustainment events based on guidance appropriate to that echelon (see Figure 5.4). Training guidance comes down from higher echelons with directed training and other sustainment activities. This guidance takes several forms, including training regulations, long-range calendars, policy statements, procedures guides, and range regulations.

Range planning begins during event programming, usually concurrently at several echelons. For example, at the corps or installation where the RCO is located, range priorities are established based on which subordinate units have the need for training as established by corps and division G-3 staff sections. Depending on installation policies and procedures, divisions represent subordinate brigade, battalion, and separate company interests at weekly or monthly range scheduling conferences. Sometimes brigades represent themselves and subordinate echelons. The range conferences schedule on a long-range basis and function to resolve conflicts of scheduling.

Range schedules are published following the weekly and monthly range conferences, projecting out six weeks, 90 days, or 150 days. To confirm scheduling, some installations require a follow-up written request, usually on a local installation form, committing the unit to the range on a given date. Battalions and separate companies initiate their requests normally when training event planning is in the short-term stage, about 10-12 weeks prior to the time needed. Requesting also allows the RCO to confirm that the range will be used correctly and safely. Most RCOs require units to call in and notify them they are occupying a range. This aids the RCO in determining range use. Radio contact can also ensure safety requirements are being met. Weapon lethality, weapon impact distances, unit maneuver requirements, and number of personnel in one area have all combined to make the need for range coordination essential. The use of one weapon system for example, can close down entire range complexes for safety reasons. Armored, mechanized, and motorized units need extremely large maneuver areas in which to practice METL tasks, especially if they want to operate within the task, condition, and standards set by Army Training and Evaluation Plans (ARTEP). For a more

FIGURE 5.4. Range, Facilities, and TA Management

detailed description of Range Management at each installation, see Appendix G-3.

5.4.2 Methods

Data were collected on range scheduling and use at four installations. At each installation, all range requests for the time period were reviewed. Table 5.11 shows the number of range requests, types of units, and time period observed for the range use data.

TABLE 5.11. Description of Data Collection Sample For Ranges

<u>Installation</u>	<u>Time Period</u>	<u>Type of Units</u>	<u># Requests</u>
A	87 Oct - 88 May	Infantry Division	2234
B	87 Oct - 88 May	Infantry Division	3622
C	87 Oct - 88 May	Cavalry Division	3464
D	88 Jan - 88 May	Infantry Division	915

Table 5.12 shows types of ranges, training areas, and facilities observed during this data collection that were used by active and reserve component forces. Data collection sampling did not include range request and use data from Reserve Officer Training Corps (ROTC), non-unit installation activities, other military services, and civilian organizations.

TABLE 5.12. Ranges, Training Areas, and Facilities Observed

<u>Ranges</u>	<u>Training Areas</u>	<u>Facilities</u>
Firing Ranges	Training Areas	Non-Firing Facilities
Firing Points	Training Fields	NBC Sites
Observation Points	Landing Strips	Leader Reaction Centers
Mortar Points	Drop Zones	Training Table Sites
Combined Arms Ranges		

Each installation establishes its own policies governing reserving and requesting of ranges. Table 5.13 summarizes the different policies at the installations sampled.

TABLE 5.13. Local Policies of Ranges by Installation

<u>Installation</u>	<u>Range Conference, Follow-Up, Range Request</u>
A	Monthly range conferences for scheduling 90 days out. Must be followed up in 30 days with an actual paper range request.
B	Weekly range conferences for scheduling six weeks out; the reservation at conferences acts as a request. There is no follow-up action or actual range request required.
C	Monthly range conferences for scheduling 150 days out. A range request form must be submitted four days prior to scheduled use of range.
D	Scheduling conference held every six weeks for 90 days-out scheduling (this has recently been changed to 120 days-out). Weekly conference held for changes or new scheduling, two weeks out. No paper request is required.

Data were collected on present levels of automation, range use rates, range request revisions, and range reservation cancellation rates. Automation data were collected by reviewing written documentation of local policies and procedures, and through interviews with RCO personnel. Range use, revision and cancellation data were collected (1) by comparing submission, revision, or cancellation dates on requests with local policy, and (2) by using the RCO use data for the time period described in Table 5.11. Revisions were collected by tallying the type and number of revisions that the RCO indicated on the range request form.

The amount and type of automation that is used in the scheduling of ranges varied at each installation. Table 5.14 briefly describes the automation that was observed during the data collection effort.

Table 5.15 shows the range use data, including timeliness, errors (necessary revisions) on requests, and use rates found at the four installations surveyed. Timeliness was established by comparing the date the request was submitted to local submission policies; if the request date was within local policies, then it was counted "on time." The range use percentage is derived by taking the total number of ranges requested and

TABLE 5.14. Automation Used in the Reserving and Scheduling of Ranges

<u>Installation</u>	<u>Automation</u>
A	No automation.
B	No automation in scheduling. Automation used to track range usage data on spreadsheet-type program.
C	Use of an automated system called Range Control Automated Scheduling System (RCASS). RCASS is linked with MSCs and assists the RCO and MSCs with range scheduling and approving. The system goal is to give RCASS the ability to assist customers with range selection (i.e., give alternatives if a particular range is not available); RCASS will also query customer on the type of range needed, dates desired, and ammunition to be expended. It will select ranges and print requests for both unit and RCO. The system was locally developed and supported by Directorate of Information Management (DOIM).
D	Automation is currently being developed. A computer is used to schedule and record the long-range Master Schedule for installation. A new system called Range Facilities Management Support System (RFMSS) is being developed to take data from the Master Schedule and monitor range usage and changes in scheduling.

TABLE 5.15. Timeliness of Range Requests, Requests Requiring Revisions, and Range Use Data

<u>Inst.</u>	<u>% On Time</u>	<u>% Needing Revisions</u>	<u>Range Use</u>	<u># Requests</u>
A	98%	26%	63%	2234
B	67%	No Data*	76%	3622
C	86%	64%	72%	3464
D	80%	No Data*	88%	915
	-----	-----	-----	-----
Average:	83%	45%	75%	Sum: 2330

*No range request form is submitted.

subtracting the number of cancellations then dividing by the number of ranges actually used.

At Installation B, the reasons cited for not submitting range and training area requests before the six-week installation cut off were collected from written explanations passed through the G-3 to Range Control. Table 5.16

TABLE 5.16. Most Frequently Cited Reasons for not Submitting Requests on Time*

- Changes in training plans and schedules: 39%
- Change in unit mission, designation, or equipment: 11%
- Unit unable to send representative to weekly range conference because of training conflicts or deployment: 11%
- Scheduling oversight by the unit: 8%
- Unanticipated training requirements: 7%
- New commander changed previously made plans or training guidance: 5%
- Unexpected new personnel required weapons qualifying before assuming new mission: 5%

*Reasons that were cited less than 5% are not listed. N=132

lists the most frequently cited reasons why units did not schedule ranges in accordance with installation policy. Installation B was the only installation that kept records such as these.

Table 5.17 lists the local policies along with the compliance rates regarding cancellations of range reservations. The lowest rate of on-time cancellations occurs with a cancellation policy of 14 days before scheduled date, which is the most stringent policy.

**TABLE 5.17. Cancellation Compliance and Local Policy
Governing Compliance**

<u>Inst.</u>	<u>Cancel On Time?</u>	<u>% Cancel</u>	<u>Policy of Cancellation</u>
A	96%	15%	3 days before scheduled date
B	100%	10%	3 days before scheduled date
C	28%	7%	14 days before scheduled date*
D	<u>100%</u>	<u>28%</u>	No formal policy; cancel at weekly conference
Average	81%	15%	

*Recently implemented policy.

5.4.3 Discussion

Range use data showed that 25% of the reserved ranges are not used. This prevents units from optimally using 25% of the range resources. Various types of training, such as large maneuvers, can only be conducted on certain types of ranges in specific weather conditions. These "scarce" ranges, if reserved and not used, incur cost to the Army in terms of lost training opportunities. Further, 15% of the remaining 75% are cancelled and scheduling units to use those newly available ranges may be difficult.

The results show that cancelling range reservations may result in ranges not being used. Two installations had a three-day cancellation policy and had high compliance; units cancelled requests on time. However, this may not allow time for other units to use the newly available range. Most training plans are finalized a week in advance (i.e., weekly training schedules). The installation requiring cancellations to be two weeks before the scheduled reservation had a 28% compliance rate. Thus, the policy that would allow time to reschedule available ranges is not complied with. So, while these data show that 15% of the units cancel their range reservations and 81% are on time; the cancellation policies may not allow for reallocation of the available ranges.

Automation can assist in scheduling, as demonstrated by the RCASS system, which schedules ranges via MSCs and provides various range options to the

user. Unit training plans can generate ranges, facilities, and training area requests based on planned events. Automation can also provide range lists and descriptions, monitor range and facility usage, and provide alternative ranges if the desired range is already scheduled. Range reservations that are cancelled can be re-scheduled to units who request them by providing range availability to units sooner. Waiting lists and priority lists can be established to fairly allocate ranges when conflicts exist. The ultimate benefit of automation may be assisting units with accurate long-range planning, thus eliminating the need for near-term schedule changes.

5.5 TRAINING AIDS AND DEVICES ANALYSIS

5.5.1 Introduction: Training Aids and Devices Management

Training Audiovisual Support Centers (TASC) provide training aids and audiovisual support to Army units and other Army-related groups located in a geographical region. They operate under the guidelines of Army Regulation 108-2, Army Training and Audiovisual Support.

TASC manages training aids and devices, which includes items such as films, publications and manuals, audiovisual equipment, and mock-ups of enemy equipment. They also maintain shops which build devices that units may need for training, and perform graphics and printing work for the installations they serve. TASC items are not the most expensive training-related equipment, but a substantial number of hours are spent managing these resources.

The frequent use of training aids and devices adds to their importance. When training is limited by lack of money, TASC items can provide many inexpensive ways to train personnel.

An account holder is a responsible officer or individual who authorizes other unit representatives to request, receive, and turn in training aids and devices. An account holder must meet certain administrative requirements. First, an account holder must be placed on orders from a commanding officer. In the case of non-Army groups (e.g., community groups who may check out TASC items) there must be an appointing order from the Army. TASC must also be furnished copies of DA Form 1687, Notice of Delegation of Authority-Receipt for Supplies, indicating the name and rank of the authorized representatives (DA Pam 710-2-1). The account holder is responsible for keeping the account

current, including providing TASC with subsequent DA Form 1687 signature updates.

Units planning to use training aids and devices must first determine the type of training being conducted and then choose appropriate training support devices (see Figure 5.5). All TASCs maintain catalogs from which trainers can select the most appropriate aids and devices. Units must then contact the TASC and arrange for the device. Some installations require reservations; others do not. Many TASC units issue equipment on a walk-in basis.

Before an account representative can draw items from a TASC, the unit's account status is checked. TASC verifies the status of the temporary loan hand receipt of the signature card and any delinquent equipment loans. If the account is not up-to-date, the equipment is not loaned.

Units can acquire training aids and devices on short-term loan for the period of training, usually for two weeks, but sometimes as long as 30 days. Equipment is loaned by calling, visiting, writing, or submitting a formal request form in accordance with local TASC policy. Units can also acquire training aids and devices on a long-term loan basis, usually for 30 days or more, by coordinating with the TASC and signing a DA Form 2062, Hand Receipt, or a DA Form 4103, Request for Issue.

Units are responsible for opening TASC accounts according to the procedures outlined above. Units are also responsible for keeping accounts up to date. They must update signature cards on a yearly basis and ensure that command orders are current. TASC assists the units by notifying them when their accounts need updating. Units also must follow local policies when reserving equipment. They are responsible for filling out paperwork involved in borrowing equipment and for the timely return of equipment. TASC provides support to units in selecting equipment and provides lists of equipment available. See Appendix G-4 for a more detailed description of TASC management.

5.5.2 Methods

Data were collected at four Army installations. Rather than sampling the particular divisions included in the TM survey, data were collected on all

FIGURE 5.5. Training Aids and Devices

military-related groups served by TASC at each installation. Data included active military assigned to each installation as well as the reserve and National Guard components.

The data collected were based on archival records maintained at each TASC site. Archival records cover the reserving and requesting of TASC items between October 1987 and May 1988 (unless otherwise noted). Data collection involved two aspects: (1) management of account holders and (2) reserving and obtaining TASC items. Management of account holder data consisted of recording account status (including expired signature cards) and late turn-in of equipment data. Data collected on reserving and obtaining TASC items consisted of describing the type of formal reservation system, rate of reserving items, and "no-shows" after reservations had been made.

5.5.3 Results

Not all TASC accounts were managed in the same manner. Table 5.18 describes the level of automation involved and procedures used at each installation in the management of TASC account holders.

Table 5.19 shows the status of accounts at each installation visited, including the percentage of delinquent accounts and a break down of the reason for delinquency. The two installations with automation have the lowest delinquency rates. Expired signature cards account for most of the delinquent accounts.

Three of the four installations observed do not have a formal reservation system for TASC items. Table 5.20 presents data collected on reserving TASC items prior to the date needed. If the installation had no formal policy, reservations were counted if they were made 24 hours before the time needed.

5.5.4 Discussion

Table 5.21 summarizes problem areas detected during data collection which should be targeted for improvement through automation.

TABLE 5.18. Automation of Account Holder Status by Installation

<u>Installation</u>	<u>Level of Automation</u>
A	TAMIS (Training Audiovisual Management Information System) is used to manage TASC accounts. This automated system runs on a mainframe computer with terminal at the TASC issue site. A computer check is used to determine eligibility prior to equipment check-out.
B	No automation. All accounts are managed by hand. Daily (or weekly) lists are circulated to four TASC equipment issue sites for verification of eligibility to check-out equipment.
C	No automation. All accounts are managed by hand. Issue of equipment and account management at one site.
D	Locally developed automated system on an Intel computer. System managed under Directorate of Planning, Training, and Mobilization (DPTMS). Account status is shared by Planning, Training, and Mobilization areas. Automated system manages accounts, scheduling of Local Training Areas (LTAs), and loan and turn-in of equipment. Equipment is drawn at the site of account management. A computer check is used to determine eligibility prior to equipment check-out.

TABLE 5.19. Status of TASC Accounts

<u>Installation</u>	<u># Accounts Managed</u>	<u>Accounts Delinquent</u>	<u>Accounts Delinquent Due To:</u>	
			<u>Late Turn-In</u>	<u>Expired Signature Cards*</u>
A	942	5%	No Data	No Data
B	581	36%	11%	25%
C	486	34%	14%	20%
D	106	13%	6%	7%
Average	529	22%	10%	18%

*Also included outdated assumption of command orders

TABLE 5.20. Reservation System at TASCs

<u>Installation</u>	<u>Formal Reservation System?</u>	<u>Percent Reserved Ahead</u>	<u>Percent Who Didn't Draw Reserved Item</u>
A	Yes	69%	41%
B	No	11%	3%
C	No	29%	11%
D	No	No data	No data

TABLE 5.21. Problem Areas of Training Aids and Devices Management

1. Account status delinquency
 2. No reservation system
 3. No-shows as a result of previous reservations
-

The account status data indicate units may not be training optimally because they cannot check out TASC items. Expired accounts indicate that units are unable to obtain equipment, possibly making the training less effective or preventing training entirely. The results show that automation of account status is associated with fewer delinquent accounts, indicating that the number of delinquent accounts may decrease as a result of automation. Automated systems can notify units via letters or electronic mail when their accounts are going to expire (accounts must be updated yearly and every time there is a change of unit command); thus the customer is better served.

An automated system can save time by providing one source for checking account status. All systems must check the actual signature card but, without automation, TASC personnel must manually look through files to check for delinquent equipment or outdated accounts. When issue areas are decentralized, one automated system can be networked to each site, enabling up-to-date account status information. This improves management of resources.

Training plans are used in generating TASC item request lists. An automated system could play a role in this process. However, with the

present use of TASC items, it appears that units are able to obtain what they need within a short time frame. Most training plans are done in advance but may not contain the detail required for generating TASC-type of items needed for training events.

A reservation system appears to tie up resources that are not always used; a formal reservation system is associated with a high percentage of no-shows. The TASC groups in this study believe that equipment is available to customers who need it. Walk-in service is common and appears to adequately provide the units with the TASC items. However, it is also true that training plans are flexible enough to accommodate an unavailable film or training device, since a substitute can be used and the training can still occur.

Training aids and devices management is similar to ammunition and range management, although prior reservation and scheduling is not practiced in the TASCs. An automated system may assist in the reservation of aids and devices by updating account status, linking units with the TASC, and in showing item availability.

5.6 SUMMARY

Resource management data reveal the need for long-range training plans to be more consistent with conducted training. The funds management data showed that projecting funds based on programmed events results in inaccurate cost projections. The funds management systems are not wrong, rather, they are not used as intended. The ammunition management data revealed a 39% return rate of drawn ammunition, indicating the need for more accurate ammunition forecasting and requesting methods. If forecasts and requests are based on long-range plans (and the funds management data showed that only 33% of the conducted events were actually programmed) it stands to reason that units are not forecasting or requesting correct amounts. The range data revealed similar results; 25% of the reserved ranges are not used. Units are unable to carry out their plans 25% of the time.

In summary, the funds, ammunition, and range data indicate the need for more accurate long and short-range training plans. Resource management depends upon units knowing their training resource needs in advance. If the long-range plans, which dictate programmed events, ammunition forecasts, and range reservations, reflect the training conducted, then training resources

could be used more effectively. An automated TM system could assist resource managers by linking units with training resource areas to assist in the near-term allocation of training resources. However, automation may lessen the need for near-term changes by providing information and procedures to ensure accurate long-range training plans.

6.0 CONCLUSIONS

6.1 CONTRAST OF SELECTED PHASE I RESULTS WITH CURRENT FINDINGS

The Phase I portion of this study, based on a relatively small sample of 70 training managers at a single installation, was the foundation for initial conclusions regarding the cost effectiveness of automating Army TM. That study yielded preliminary data concerning the differential distribution of how training managers spend their time, and the differential distribution of costs across echelons.

In terms of TM tasks, the Phase I study indicated that the Resources task consumed the largest amount of time across echelons, followed by Requirements, Guidance and Scheduling. This contrasts with the current finding that the Requirements tasks are the primary activities in which training managers expend their effort. In terms of the cross-echelon distribution of time spent, the Phase I report showed a number of similar patterns to the present set of results, such as Co level personnel spending the greatest amount of time on scheduling, and Div+ and Bde spending the most time on Resources. The present effort found that Bn level personnel spend the most time on Requirements, whereas the previous study showed little difference between echelons. Thus, the inclusion of additional units from the active and reserve components in the study sample provides additional information for considering the implementation details of automated TM.

The Phase I study predicted an annual cost savings in the active component of \$121 million. The current study reached a similar conclusion, i.e., an annual cost savings in labor avoidance of \$123 million for U.S. active and forward deployed components. The additional information provided by the current study includes the cost impact for the reserve component and forward deployed troops calculated separately, based on time estimate data sampled from those groups, costs associated with separate TM tasks and work types, and confidence intervals based on the variance within the data. The Phase I study did not permit a statistical assessment of results due to the small sample size, whereas the current study can precisely identify significant differences in time spent; this further permits estimating the corresponding cost impact, and thus the relative priority of automation

solutions. Additionally, the installation resource data permit an assessment of the effectiveness of current automation efforts, and the potential need for new or alternative approaches.

6.2 REVIEW AND DISCUSSION OF RESULTS

6.2.1 Time Spent on TM

The basic comparison of the three components indicated that personnel in the U.S. active component spend significantly more time on TM than their forward deployed or reserve counterparts. This suggests that for active component units, the U.S. troops face greater variability in their training missions and are subject to more training distractors. An example of this was seen recently with the assignment of the 1st Bde, 9ID (MTZ) to firefighting duty in Yellowstone Park during the summer of 1988. Reserve units have preparedness based on training as their primary mission, and so are likely spending the amount of time that is necessary to achieve their training goals. It is possible that the forward deployed and reserve components approximate the time spent needed to achieve training goals in the absence of the numerous distractors and inhibitors that routinely affect the U.S. active troops.

The distribution of TM time across echelons provides a basis for automation system architecture. In the U.S. active forces, personnel spend the largest amounts of time at the Bde level, whereas the least amount of TM time is spent at this level in the forward deployed component. Reserve component personnel spend the most time on TM at the Div+ level. As with the overall pattern of time spent on TM, these results reflect structural and management differences that will need to be accommodated by TM automation. The U.S. active forces seem to have very specialized personnel within the Bde G-3 offices who spend substantial amounts of time on TM, whereas the more decentralized organization of forward deployed forces results in a shift in TM time toward the Bn. In the reserve component, the Div+ level is staffed by full-time personnel who spend more of their time on TM, while the lower echelon personnel must divide their time among a variety of duties.

While the concept of TM seems to imply primarily management types of activities, the results show that across echelons enlisted personnel spend

equal or greater amounts of time on TM than officers. The difference is substantial at the Co level, with enlisted personnel spending approximately twice the amount of time on TM as officers. At the Div+ level, enlisted personnel spend approximately 1.5 the amount of time as officers on TM. The enlisted personnel from whom data were collected had been in the Army for an average of 12 years, and were therefore in relatively responsible positions. Additionally, the myriad duties of officers at the Co level reduces the amount of time that can be spent on TM, and shifts the responsibility to enlisted personnel.

Task factor comparisons indicate that a comparable proportion of time is spent on Requirements and Guidance (.15 and .13), while less time is spent on Training Resources and Scheduling. This finding suggests that any automated TM system should emphasize Requirements and Guidance functions, as for example in storing specific ARTEPS and in providing electronic communication. It also appears that guidance is also closely linked to forecasting resources, as shown by the significant interaction of component and the four TM task factors. This relationship shows that the U.S. active component spends substantially more time on the task factors of Guidance and Resources than the forward deployed and reserve components. The latter components spend time first on Requirements, followed by Guidance, Resources and Scheduling. The most likely interpretation of these data is that the U.S. active component receives substantial guidance which affects the necessary resources and scheduling for training events. This set of results reinforces the Phase I conclusions that TM is event-driven; the present set of results suggest that this is true primarily in the U.S. active component.

Several results in the time spent data suggest aspects of TM automation functionality. For example, the four TM task factors show differential amounts of time spent across echelons, with Co and Bn levels spending more time on Requirements and Guidance, while Bde and Div+ emphasize Guidance and Resources. Co level personnel spend the most time on Scheduling, indicating that automated scheduling aids would be most beneficial at this level.

The type of work performed (Procedural or Decision Making) varies with rank, such that enlisted personnel spend more time on Procedural tasks and officers on Decision Making tasks. Despite this expected effect, officers

still spend 20% of their time on routine procedural work. An interaction of work type with task factor indicates that the Requirements and Guidance tasks involve more Decision Making than Procedural work. This result emphasizes the need for analyzing and interpreting information, which can be facilitated by faster access to data which is electronically transmitted and stored.

6.2.2 Current Use of Computers in TM

It would be unrealistic to assume that no automation is currently being used in the conduct of TM duties. Instead, a variety of personal computers and existing Army automation systems are sometimes used to process data for specific TM needs. However, most of these systems are not designed specifically for TM purposes, and should not be considered general solutions.

The TM survey found that overall, the largest proportion of TM time spent using computers was .14 for U.S. active respondents. Further analysis showed that 39 percent and 19 percent of the respondents used computers for word processing and database management respectively. The SIDPERS Army system was reported used by 8 percent of the respondents--this was the system used most frequently. It appears from these results that there is little automation in existence that is directly applicable to Army TM. Although 39 percent of the respondents reported using word processing, this accounts for less than 14 percent TM time, indicating that most of the existing TM tasks, forms, messages, computations, etc., are not amenable to "home-grown" personal computer solutions.

6.2.3 Costs and Benefits

The TM time data discussed above provided the basis for computing the costs and benefits associated with TM automation on an Army-wide basis. Thus, the discussion above focused on the benefits to the individual training manager within the organization; this discussion will focus on the cost savings extrapolated to the entire Army.

The estimated annual savings for the U.S. active, forward deployed and reserve components are \$77 million $\pm$ \$10 million, \$46 million $\pm$ \$7 million, and \$95 million $\pm$ \$22 million, respectively. The estimated total annual savings for the active and reserve components is \$218 million $\pm$ \$25 million.

To give these dollar savings a more comprehensible scale, the savings at the unit level is informative. The typical active component Bn will save 2.4 man years through automation, while the typical Co will save 6 months. This extra time can be productively employed in additional training. The organizational distribution of these savings is important from the standpoint of system design. To the extent that automation can be co-located with those echelons and personnel who will generate savings, a cost effective solution will be achieved.

Co level units in the U.S. active and forward deployed components will yield 43% and 50% of the total cost savings for these components, respectively. The reserve component will show a smaller percentage of total savings resulting from Co level automation: 35%. In the reserve component, the largest percentage savings, 47%, will occur at the Bn level. These findings indicate potentially different automation solutions for the active and reserve components. Alternative automation designs are particularly important in view of the heavy reliance of the reserve component on part-time personnel.

The potential benefits in terms of TM tasks indicates that over all components, the Requirements task factor will yield \$83 million in savings. This constitutes 38% of all savings. These savings will be unevenly distributed across components, such that Requirements will yield the largest savings for the forward deployed and reserve components. Guidance will yield the largest savings (\$27 million) for the U.S. active component, followed by Requirements (\$24 million). This differential distribution is a result of the greater time spent on Guidance tasks in U.S. active units. The largest savings for the Guidance, Requirements and Resource task factors will be at the Bn level, with the largest savings in Scheduling at the Co level. These results suggest that (1) any automated TM system must have Training Requirements functions at its core, (2) the planning functions should be targeted toward upper echelon activities, i.e., Bn and above, and (3) the Co level should be provided with automation to facilitate responses to upper echelon guidance. This may take the form of determining new training requirements or resources necessary for training events; in either case it is necessary to rework the schedule at the Co level.

Work type is a final way of considering the features of automation that may lead to savings. The heavy emphasis of the workload reduction factors on eliminating paperwork, i.e., Procedural Work, leads to an estimated \$181 million savings. Enlisted personnel account for \$103 million of these savings, while officers account for \$78 million. In contrast, Decision Making work leads to an overall cost savings of \$38 million. Thus, by concentrating efforts on automating the routine clerical aspects of TM, such that TM time spent processing paperwork can be significantly reduced, Decision Making work would have a marginal impact. However, it should be recalled that the survey data indicate that a larger proportion of time is spent by both officers and enlisted personnel on the Decision Making aspects of the Requirements and Guidance TM tasks. The challenge for designers of automation will be to achieve the workload reduction targets that will yield the benefits estimated for Procedural Work, while providing decision support systems for those areas where individual training managers spend a great deal of time.

Life cycle cost analyses of several automation design alternatives suggest that automating TM to the Co level using existing Army equipment would result in a cost savings of \$1486 million over a ten year period, compared to the existing manual system. This scenario assumes that no additional equipment will need to be purchased. However, such assumptions are not plausible in light of the data concerning the present utilization of computers for TM. A more likely automation scenario would involve the purchase of new equipment. Under this assumption, automating to the Co level will result in a 10 year savings of \$1293 million. The corresponding savings for scenarios involving manual TM at the Co level are \$869 million with no new equipment and \$763 million with new equipment. The data point strongly to the use of automation at all echelon levels in order to achieve maximum savings.

6.2.4 Installation Resource Management

The data described in Chapter 5 permit an assessment of TM at the level of functional areas, i.e., funds, ammunition, ranges and training aids and devices. The effectiveness of installation resource management is both a result of effective TM in operational units, and a modulating influence on TM activities at the unit level.

The overall picture that emerged from the data concerning installation resource management is one of "compensatory" TM. That is, units either lag behind or push too far forward in their planning and consumption of resources to compensate for lack of information or near-term changes. This is exemplified by the funds management situation: only 33% of the training events actually conducted are programmed into installation funds management systems. On the other hand, a substantial percentage of programmed events (32%) never appear on the training schedule. This indicates a disparity between planning and execution; in this case, the planning (funds programming) either lags behind the execution (accomplishing a training event), or it never gets done.

An example of how planning "pushes forward" is in the ammunition management area. Here, units overdraw ammunition by 39%, i.e., this amount is overforecast, authorized and drawn, only to be turned back unused. A cost analysis suggests that as much as \$321 million in training ammunition is overdrawn.

6.3 CONCLUSIONS

The data presented in this report clearly indicate that there are differential distributions of time spent on TM throughout the Army organization. When these data are used as the basis for cost-benefit computations related to automating TM, the quantities reflect the potential savings that may accrue.

The major conclusions that can be drawn based on this analysis are:

- Estimated savings are greatest for the reserve component, followed by U.S. active and forward deployed components, yielding a total potential cost savings of \$218 ± 25 million annually in labor avoidance;
- The cost savings will be concentrated at the Co level for the active component and at the Bn level for the reserve component;
- Priority for automation should be given to the Training Requirements tasks, i.e., identifying unit missions, goals and METL, developing training objectives, tasks and programs, and determining training requirements; this should be followed by Guidance, Resources and Scheduling;

- Emphasis for automation should be placed on Procedural Work, since the majority of savings are estimated to occur in this area;
- Consideration should be given to new equipment and software solutions, since existing equipment is used for TM only 14% of the time;
- TM automation solutions should link installation resource management offices to units, provide waiting list and alternate resource functions, and generally should more closely link long-range plans to the execution of training events.

In evaluating these conclusions, it is important to recall that the cost savings estimates are extrapolations from reports of time spent by individual training managers, and are based on analytic workload reduction factors. The data concerning time spent on TM can be used as a first approximation of where costs are actually incurred; the economic assumptions are applied to obtain Army-wide cost estimates. These cost estimates should be viewed as carefully formulated predictions, based on the best data available, and subject to verification by a field test. However, as a decision making tool, these predictions are conservative, and do suggest that a beneficial result will be obtained by automating TM.

7.0 REFERENCES

Army Development and Employment Agency, and BDM Corporation. 1987. Functional Description for ITMS, Volume I System Description; Volume II System Design (Draft). Army Development and Employment Agency.

Czaja, S. J. 1987. Human Factors in Office Automation. In G. Salvendy (Ed.) Handbook of Human Factors, New York: Wiley, 1587-1616.

Fitts, P. M. 1951. Engineering Psychology and Equipment Design. In S. S. Stevens (Ed.) Handbook of Experimental Psychology, New York: Wiley, 1287-1340.

Hiller, J. H. 1982. United States Army Training Detractors and Proposed Solution. U.S. Army Research Institute for the Behavioral and Social Sciences, Alexandria, VA.

Mendenhall, W., Ott, L. and Schaeffer, R. L. 1971. Elementary Survey Sampling. Belmont, CA: Duxbury Press.

Sanquist, T. F., Schuller, C. R., McCallum, M. C., Underwood, J. A., Bettin, P. J., King, J. L., Melber, B. D., Hostick, C. J. and Seaver, D. A. 1988. Automation Impact Study of Army Training Management. PNL-6435, BHARC-700/87/030, prepared by Pacific Northwest Laboratory for the U.S. Army Development and Employment Agency.

SPSS Inc. 1988. SPSS/PC+ V2.0 Base Manual. Chicago, IL: SPSS, Inc.

SPSS Inc. 1988. SPSS/PC+ Advanced Statistics V2.0. Chicago, IL: SPSS, Inc.

Strassman, P. A. 1986. The Real Cost of OA. Datamation, 82-94.

Warren, H. M. 1986. Benefits of Office Automation. ACSC/EDCC-2645.

APPENDIX A
ACRONYM APPENDIX

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ACRONYM APPENDIX

<u>Acronym or Abbreviation</u>	<u>Definition</u>
ACS	Army Communicative Systems
ADA	Air Defense Artillery
ADEA	Army Development and Employment Agency
ARCS	Automated Range Control System
ARTEP	Army Training and Evaluation Program
ASP	Ammunition Supply Point
ATCCS	Army Tactical Command and Control System
ATUTMS	Advanced Technology Unit and Training Management System
BDE	Brigade
BLTM	Battalion Level Training Model
BN	Battalion
BTMS	Battalion Training Management System
CAB	Cavalry Attack Brigade
CAMO	Consolidated Ammunition Office
CATA	Combined Arms Training Activity
CCMUT	Common Costing Methodology for Unit Training
CI	Confidence Interval
CO	Company
CONUS	Continental United States
DA	Department of the Army
DAO	Division Ammunition Office
DA Pam	Department of the Army Pamphlet

<u>Acronym or Abbreviation</u>	<u>Definition</u>
DISCOM	Division Support Command
DIV	Division
DIV+	Division and Installation
DIVARTY	Division Artillery
DODIC	Department of Defense Identification Code
DOIM	Directorate of Information Management
DPTM	Directorate of Planning, Training, and Mobilization
DS4	Direct Support Unit Standard Supply System
EOR	Element of Resource
ERM	Event Resource Model
EXEVAL	Exercise Evaluations
FA	Field Artillery
FM	Field Manual
FORSCOM	Forces Command
FTX	Field Training Exercise
FY	Fiscal Year
HQDA-DAMO-TRS	Headquarters (Department of the Army, Deputy Chief of Staff for Operations, Training Office)
IAMO	Installation Ammunition Management Office
ITMS	Integrated Training Management System
JRTC	Joint Readiness Training Center
LAN	Local Area Network
LTA	Local Training Area
MACOM	Major Command

<u>Acronym or Abbreviation</u>	<u>Definition</u>
MANOVA	Multivariate Analysis of Variance (a statistical procedure)
METL	Mission Essential Task List
MI	Military Intelligence
MILES	Multiple Integrated LASER Engagement System
MIS	Management Information System
MOGAS	Motor Gasoline
MSC	Major Subordinate Command
MTZ	Motorized
OCONUS	Outside Conus
OPTEMPO	Operating Tempo (average number of hours, miles that equipment is used to achieve readiness)
P2	Program 2 (Mission Training Funds)
PBAC	Program Budget Advisory Council
PM/ACS	Program Manager/Army Communicative Systems
RCASS	Range Control Automated Scheduling System
RCO	Range Control Office
RFMSS	Range Facilities Management Support System
SAILS	Standard Army Immediate Level Supply System
SIDPERS	Standard Installation/Division Personnel System
SPBS	Standard Property Book System
SPSS	Statistical Package for the Social Sciences
SSSC	Self Service Supply Center
STANFINS	Standard Finance System
STARFIARS	Standard Army Financial Inventory Accounting and Reporting System
STRAC	Standards in Training Ammunition Commission

<u>Acronym or Abbreviation</u>	<u>Definition</u>
TA	Training Areas
TAMIS	Training Ammunition Management Information System
TAMMS	The Army Maintenance Management System
TASC	Training Aids and Devices Center
TDY	Temporary Duty (on travel)
TEC	Test and Experimentation Command
TECC	Training Event Category Codes
TIWG	Test Integration Working Group
TM	Training Management
TMACS	Training Management Control System
TMCN	Training Mileage Control System
TOE	Table of Organization and Equipment
TRADOC	Training and Doctrine Command
TRM	Training Resources Model
TSD	Training Support Division
TUFMIS	Tactical Unit Financial Management Information System
USAREUR	U.S. Army Europe
WESDC	Weapons/Equipment System Designator Codes

APPENDIX B

TRAINING MANAGEMENT SURVEY APPENDIX

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ARMY TRAINING MANAGEMENT SURVEY

Conducted by:

Battelle Human Affairs Research Centers

Conducted for:

U.S. Army Combined Arms Training Activity

ARMY TRAINING MANAGEMENT SURVEY

**Conducted by:
Battelle Human Affairs Research Centers**

**Conducted for:
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PURPOSE

Army training managers at several locations [REDACTED] are completing this survey to provide information on how they manage training. The results of this survey will be used by the Army to identify training management procedures or equipment that could be improved. Your input is needed to help the Army accurately understand how training is managed at your location.

CONFIDENTIALITY

All of the information you provide will be confidential. Findings for individual staff or units will not be reported to the Army.

SURVEY COMPLETION TIME

It will take between 30 and 90 minutes to complete this survey, depending on the number of different training management tasks you perform and the detail of information you provide.

GENERAL INSTRUCTIONS

This survey is divided into nine sections. Please read the instructions for each section, then complete all items in that section before going on to the next section. The quality of findings and recommendations provided to the Army depends on the quality of your answers. Please answer each item carefully and to the best of your ability.

SECTION 1: BIOGRAPHICAL INFORMATION

INSTRUCTIONS

Please provide us with the following information.

1. Your current rank: _____
2. Years and months at your current rank: _____ Years _____ Months
3. Years in the Army: _____
4. Your current unit assignment (include only the units listed below that are necessary to describe your unit; if a space doesn't apply, write "N/A"):
Division: _____
Major Subordinate Command: _____
Battalion: _____
Company/Battery: _____
5. Your current job title, as listed in your unit's current Modified Table of Organization and Equipment (MTO&E) or Table of Distribution and Allowance (TDA):

SECTION 2: GENERAL TRAINING MANAGEMENT INFORMATION

INSTRUCTIONS

Please review the definition of training management below and answer each of the following items as directed.

DEFINITION OF TRAINING MANAGEMENT

Training management is the process commanders, their staff, and other trainers use to plan training and to identify related resources needed to conduct and evaluate training. It is the process of developing training programs with the goal of utilizing resources, materials, guidance, and time to meet specific unit training requirements.

1. Is the unit where you perform training management different from the unit to which you are officially assigned in the MTO&E or TDA?

☐ CHECK IF YES

If you checked this box, write in the name of the unit where you perform training management in the space below.

2. How long have you held your current training management position?

Years: _____ Months: _____

3. Please estimate the percentage of your duty time that you spend managing training in your current position. (Do not include time spent conducting training, or time spent evaluating training.)

Percent time managing training: _____%

4. Are you involved in the preparation of weekly training schedules? (This includes actual preparation, assistance, and supervision.)

☐ CHECK IF YES

If you checked this box, please estimate the time each week spent preparing training schedules.

Hours: _____ Minutes: _____

SECTION 3: GENERAL TRAINING MANAGEMENT PROBLEMS AND SUGGESTED SOLUTIONS

INSTRUCTIONS

In the spaces provided below, please list the three major problems you encounter in managing training. On the adjacent page, list your suggested solution for each of those problems.

1. Three Major Problems

A.

B.

C.

2. Suggested Solution for Each Problem

A.

B.

C.

TRAINING MANAGEMENT TASK REFERENCE SHEET

Refer to the instructions in Section 4 of the survey on how to fill out this reference sheet.

CHECK
IF DONE

CHECK
IF DONE

☐ **Task 1: Identify Unit Missions, Goals, and METL**

- Obtaining and analyzing relevant documents and information.
- Identifying unit's own wartime missions.
- Identifying the goals for training, manning and equipping the unit.
- Developing the unit's Mission Essential Task List (METL) and getting METL approved by higher headquarters.

☐ **Task 2: Develop Training Objectives, Tasks for Training, and Training Programs**

- Obtaining and analyzing relevant documents and information.
- Identifying the unit's training objectives (i.e., tasks, conditions, and standards).
- Identifying the unit's training tasks and training program.

☐ **Task 3: Forecast Training Requirements**

- Obtaining and analyzing relevant documents and information.
- Forecasting training resource requirements for funds, ammunition, flying hours, ranges, training aids, fuel, etc.

☐ **Task 4: Long-Range (6-12 months) Guidance**

- Obtaining and analyzing relevant documents and information.
- Issuing long-range training guidance.
- Coordinating training resources 6-12 months in advance of training.
- Issuing the long-range plan.

☐ **Task 5: Short-Range (3-6 months) Guidance**

- Obtaining and analyzing relevant documents and information.
- Issuing short-range training guidance.
- Coordinating training resources 3-6 months in advance of training.
- Issuing the short-range plan.

☐ **Task 6: Near-Term (3-12 weeks) Guidance**

- Obtaining and analyzing relevant documents and information.
- Issuing near-term training guidance.
- Coordinating training resources 3-12 weeks in advance of training.
- Issuing the near-term plan.

☐ **Task 7: Issue Training Schedule**

- Obtaining and analyzing relevant documents and information.
- Developing and publishing the unit's training schedule.
- Coordinating resources up to the time that training is conducted.

☐ **Task 8: Determine Training Status**

- Obtaining and analyzing relevant documents and information.
- Determining the status of task training.
- Providing unit feedback on the results of training.

SECTION 4: TRAINING MANAGEMENT TASKS REFERENCE SHEET

Instructions:

A Training Management Tasks Reference Sheet is included with this booklet. Fill out this reference sheet before you continue with this questionnaire. You will need to refer to this reference sheet as you complete the remainder of this questionnaire.

First: Read the titles and activities for the eight training management tasks listed on the reference sheet.

Second: Check the box next to the task if you personally work on one or more of the activities listed under the task; then check the boxes under the task to indicate those activities that you work on. Do not check the box beside the task if you do not personally work on any of the activities for that task.

Third: Once you complete the reference sheet, refer to it as instructed in Sections 5 through 8.

SECTION 5: TRAINING MANAGEMENT TASKS

Instructions:

In Section 5, you will be asked to provide the names of the documents that you use and prepare when performing each of the eight training management tasks from the Reference Sheet.

The following example shows a form similar to the ones for the eight tasks. The example, which involves the documents you would use and prepare when evaluating training, should give you an idea of how to fill out the forms for the eight training management tasks. Remember that this is just an example: evaluating training is not one of the eight training management tasks from the Reference Sheet.

TASK X: Evaluating Training

1. Do you work on Task X? (Make sure your answer agrees with your Reference Sheet.)

☒ CHECK IF YOU WORK ON TASK X

If you check this box, please complete the items below. If you do not check this box, please go to the next task.

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you get this document?	How many times per year do you use this document?
<u>Training Schedule</u>	<u>CO HQ</u>	<u>12</u>
<u>Personnel Roster</u>	<u>CO HQ</u>	<u>12</u>
<u>Performance Standards</u>	<u>CO HQ</u>	<u>12</u>
<u>Evaluation Form</u>	<u>BN HQ</u>	<u>12</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?
<u>Completed Evaluation Form</u>	<u>BN HQ & Dwn files</u>	<u>12</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SECTION 5: TRAINING MANAGEMENT TASKS (continued)

TASK 1: Identify Unit Missions, Goals, and METL

1. Do you work on Task 1? (Make sure your answer agrees with your Reference Sheet.)

☐ CHECK IF YOU WORK ON TASK 1

If you check this box, please complete the items below. If you do not check this box, please go to Task 2 on the next page.

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you go to find this document?	How many times per year do you use this document?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SECTION 5: TRAINING MANAGEMENT TASKS (continued)

TASK 2: Develop Training Objectives, Tasks for Training, and Training Programs

1. Do you work on Task 2? (Make sure your answer agrees with your Reference Sheet.)

☐ CHECK IF YOU WORK ON TASK 2

If you check this box, please complete the items below. If you do not check this box, please go to Task 3 on the next page.

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you go to find this document?	How many times per year do you use this document?

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?

SECTION 5: TRAINING MANAGEMENT TASKS (continued)

TASK 3: Forecast Training Requirements

1. Do you work on Task 3? (Make sure your answer agrees with your Reference Sheet.)

☐ CHECK IF YOU WORK ON TASK 3

If you check this box, please complete the items below. If you do not check this box, please go to Task 4 on the next page.

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you go to find this document?	How many times per year do you use this document?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SECTION 5: TRAINING MANAGEMENT TASKS (continued)

TASK 4: Long-Range (6-12 months) Guidance

1. Do you work on Task 4? (Make sure your answer agrees with your Reference Sheet.)

☐ CHECK IF YOU WORK ON TASK 4

If you check this box, please complete the items below. If you do not check this box, please go to Task 5 on the next page.)

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you go to find this document?	How many times per year do you use this document?

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?

SECTION 5: TRAINING MANAGEMENT TASKS (continued)

TASK 5: Short-Range (3-6 months) Guidance

1. Do you work on Task 5? (Make sure your answer agrees with your Reference Sheet.)

☐ CHECK IF YOU WORK ON TASK 5

If you check this box, please complete the items below. If you do not check this box, please go to Task 6 on the next page.

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you go to find this document?	How many times per year do you use this document?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SECTION 5: TRAINING MANAGEMENT TASKS (continued)

TASK 6: Near-Term (3-12 weeks) Guidance

1. Do you work on Task 6? (Make sure your answer agrees with your Reference Sheet.)

☐ CHECK IF YOU WORK ON TASK 6

If you check this box, please complete the items below. If you do not check this box, please go to Task 7 on the next page.

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you go to find this document?	How many times per year do you use this document?

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?

SECTION 5: TRAINING MANAGEMENT TASKS (continued)

TASK 7: Issue Training Schedule

1. Do you work on Task 7? (Make sure your answer agrees with your Reference Sheet.)

☐ CHECK IF YOU WORK ON TASK 7

If you check this box, please complete the items below. If you do not check this box, please go to Task 8 on the next page.

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you go to find this document?	How many times per year do you use this document?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

SECTION 5: TRAINING MANAGEMENT TASKS (continued)

TASK 8: Determine Training Status

1. Do you work on Task 8? (Make sure your answer agrees with your Reference Sheet.)

☐ CHECK IF YOU WORK ON TASK 8

If you check this box, please complete the items below. If you do not check this box, please go to Section 6 on the next page.

2. What documents, forms, and other sources of information do you personally use when performing this task? If you use more than eight documents, list the eight most important.

Document Used	Where do you go to find this document?	How many times per year do you use this document?

3. What documents, forms, and other sources of information do you prepare or assist in preparing when performing this task? (This includes supervising or directing document preparation.) If you prepare more than eight documents, list the eight most important.

Document Prepared	Where do you send this document?	How many times per year do you prepare this document?

SECTION 6: TIME SPENT ON TRAINING MANAGEMENT TASKS

INSTRUCTIONS

The eight Training Management Tasks are listed below. Please complete this section in the following manner:

First: Refer to your completed reference sheet and check the box next to each task if you work on that task.

Second: Estimate the percentage of your training management time that you personally spend on each task. If you did not check the box for that task, put in 0%.

Third: Make sure that the your estimates add up to 100%

CHECK IF DONE	Task	Percent of TM time
☐	1. Identify Unit Missions, Goals, and METL	_____
☐	2. Develop Training Objectives, Tasks for Training, and Training Programs	_____
☐	3. Forecast Training Requirements	_____
☐	4. Long-range Guidance	_____
☐	5. Short-range Guidance	_____
☐	6. Near-term Guidance	_____
☐	7. Issue Training Schedule	_____
☐	8. Determine Training Status	_____
		= 100%

SECTION 7: COMPARISON OF TYPES OF WORK FOR EACH TASK

INSTRUCTIONS

The next page contains an answer sheet that lists the eight training management tasks and the seven types of work that you might do when completing each of these tasks:

First: Refer to your completed reference sheet. Check the box next to each task on the Section 7 answer sheet if you perform that task.

Second: For those tasks that you check, indicate the percentage of time that you spend on each of the following types of work:

- Discussing and planning ways to obtain, process, and document training management information.
- Obtaining or delivering documents and information.
- Copying and compiling information from available source documents.
- Analyzing and interpreting documents and information.
- Computing numerical data.
- Preparing task documents, including document revisions.
- Supervising, directing, and leading others in carrying out this task.

Third: Make sure that the time you spend on each type of work for a single task adds up horizontally to 100%. Below is an example of two completed lines from the Section 7 answer sheet.

CHECK IF
DONE

		TYPES OF WORK						
TASK		Discussing & Planning	Getting Documents & Info	Copying & Compiling	Analyzing & Interpreting	Computing Numbers	Preparing Documents	Supervising, Directing, Leading
☒	1. Identify Unit Missions, Goals, And Met	<u>10%</u>	<u>20%</u>	<u>10%</u>	<u>0</u>	<u>30%</u>	<u>30%</u>	<u>0</u> = 100%
☒	2. Develop Training Objectives, Tasks For Training, And Training Programs	<u>10%</u>	<u>5%</u>	<u>5%</u>	<u>10%</u>	<u>50%</u>	<u>20%</u>	<u>0</u>

SECTION 7: COMPARISON OF TYPES OF WORK FOR EACH TASK

CHECK IF
DONE

TYPES OF WORK

TASK	Discussing & Planning	Getting Documents & Info	Copying & Compling	Analyzing & Interpreting	Computing Numbers	Preparing Documents	Supervising, Directing, Leading	
☐ 1. Identify Unit Missions, Goals, And Metl	_____	+ _____	+ _____	+ _____	+ _____	+ _____	+ _____	=100%
☐ 2. Develop Training Objectives, Tasks For Training, And Training Programs	_____	_____	_____	_____	_____	_____	_____	
☐ 3. Forecast Training Requirements	_____	_____	_____	_____	_____	_____	_____	
☐ 4. Long-range Guidance	_____	_____	_____	_____	_____	_____	_____	
☐ 5. Short-range Guidance	_____	_____	_____	_____	_____	_____	_____	
☐ 6. Near-term Guidance	_____	_____	_____	_____	_____	_____	_____	
☐ 7. Issue Training Schedule	_____	_____	_____	_____	_____	_____	_____	
☐ 8. Determine Training Status	_____	_____	_____	_____	_____	_____	_____	

SECTION 8: USE OF COMPUTERS FOR TRAINING MANAGEMENT

INSTRUCTIONS

Listed below are different computers or computer systems. Check the boxes beside those which you have used at home or at work.

- ☐ Personal computer for word processing
- ☐ Personal computer for data base management
- ☐ Personal computer for spreadsheet
- ☐ Other use of personal computer (please specify) _____
- ☐ Army-related automated system with Army computer
- ☐ Other computers or computer systems (please specify) _____

If you checked any boxes, please read the instructions below and complete the answer sheet on the next page. If you did not check any boxes, please go to Section 9.

First: Refer to the answer sheet on the facing page. The eight training management tasks and nine computer programs or general uses of computers are listed. Refer to your reference sheet and check the box on the Section 8 answer sheet next to each task, if you perform that task. The answer sheet also includes non-training management use of computers; check this box if you use computers for non-training management tasks.

Second: For each training management task checked, indicate the percentage of the time spent on that task using computers

Third: For each task you checked, check the box or boxes for each automated system or computer that you use. The following systems and computers are listed on the answer sheet:

• TAMIS (Training Ammunition Management Information System)	• TMACS (Training Management Control System)
• TUFMIS (Tactical Unit Financial Management Information System)	• SIDPERS (Standard Installation/Division Personnel System)
• ARCS (Automated Range Control System)	• ERM (Event Resource Model)
• Personal computer word processing	• Personal computer spreadsheet or database management
• Other computer applications. Be sure to specify any other computer systems that you use.	

SECTION 8: USE OF AUTOMATED SYSTEMS

CHECK IF DONE	% OF TASK TIME SPENT USING AUTOMATION	TASK	TAMIS	TMACS	TUFMS	SIDPERS	ARCS	ERM	PERSONAL COMPUTER WORD PROCESSING	PERSONAL COMPUTER SPREADSHEET OR DATABASE MNGMT	OTHER PLEASE SPECIFY
		1. IDENTIFY UNIT MISSIONS, GOALS, AND METL									
		2. DEVELOP TRAINING OBJECTIVES, TASKS FOR TRAINING, AND TRAINING PROGRAMS									
		3. FORECAST TRAINING REQUIREMENTS									
		4. LONG-RANGE GUIDANCE									
		5. SHORT-RANGE GUIDANCE									
		6. NEAR-TERM GUIDANCE									
		7. ISSUE TRAINING SCHEDULE									
		8. DETERMINE TRAINING STATUS									
		NON-TRAINING MANAGEMENT USE									

SECTION 9: SCHEDULED TRAINING AND CONDUCTED TRAINING

INSTRUCTIONS

This section asks you to estimate the amount of Scheduled Training and the amount of Conducted Training that occurs in your unit. Please refer to the figure associated with each part to aid you in your estimates.

1. Does your position allow you to compare your unit's scheduled and and conducted training for the most recently completed quarter?

☐ CHECK IF YOUR POSITION ALLOWS YOU TO MAKE THIS COMPARISON

If you check this box, please answer questions 2 and 3. If you do not check this box, please review your survey, make any necessary corrections and return your survey as instructed.

2. Scheduled training is the individual and collective training events included in your unit's quarterly schedule, as approved before the quarter begins. Estimate below what was done after training was scheduled in your unit during the previous quarter. The total percentage in the column should sum to 100%.

Individual and Collective
Scheduled Training

- a. Percentage of scheduled training not conducted (training that was scheduled but not conducted in the quarter in which it was scheduled): _____
- b. Percentage of scheduled training conducted as scheduled (Training that was scheduled and conducted in your unit during the date[s] initially scheduled): _____
- c. Percentage of scheduled training conducted at a different time (Training that was scheduled for a quarter and conducted in that quarter, but at a different time than was originally scheduled): _____

= 100%

Scheduled Training

3. Conducted training is the individual and collective training that is actually conducted in your unit during the quarter. Estimate below the training that was actually conducted in your unit during the previous quarter. The total percentage should sum to 100%.

Individual and Collective
Conducted Training

- a. Percentage of conducted training that was not scheduled (Training that was conducted, but not scheduled for the quarter in which it was conducted):

- b. All other conducted training

= 100%

Conducted Training

Thank you for completing the survey.
When you are done, review the survey, make necessary corrections, and turn in the survey as instructed.

APPENDIX C

STATISTICAL ANALYSIS OF SURVEY DATA

APPENDIX C-1

FACTOR ANALYSIS OF TASK TIME DATA

APPENDIX C-1

FACTOR ANALYSIS OF TASK TIME DATA

The following pages provide the SPSS/PC+ output obtained after conducting a factor analysis of the task time estimate data. The raw data used in this analysis included the following nine variables:

PCT@TM : Respondents' estimated percent time managing
training

PCTM@T1: Respondents' estimated percent of training
through management time spent on Task 1 through
PCTM@T8 Task 8

Eight variables, PR_DT@T1 through PR_DT@T8, were then computed by multiplying PCTM@T1 through PCTM@T8 by PCT@TM.

Thus, the dependent measures in the following factor analysis are PR_DT@T1 through PR_DT@T8.

Summary Statistics:

	<u>Mean</u>	<u>Std Dev</u>
PR_DT@T1	.03558	.07034
PR_DT@T2	.05804	.08169
PR_DT@T3	.08140	.16037
PR_DT@T4	.02872	.05152
PR_DT@T5	.04410	.05929
PR_DT@T6	.05570	.08749
PR_DT@T7	.05208	.10243
PR_DT@T8	.05173	.07940

Number of Cases = 337

Correlation Matrix:

	PR_DT@T1	PR_DT@T2	PR_DT@T3	PR_DT@T4	PR_DT@T5	PR_DT@T6	PR_DT@T7	PR_DT@T8
PR_DT@T1	1.00000							
PR_DT@T2	.21389	1.00000						
PR_DT@T3	.05844	-.00381	1.00000					
PR_DT@T4	.00182	.21006	.22241	1.00000				
PR_DT@T5	.09172	.29823	.04015	.51829	1.00000			
PR_DT@T6	-.04524	.11481	-.02384	.11104	.45418	1.00000		
PR_DT@T7	-.06779	.03178	.03294	-.06739	.04354	.00508	1.00000	
PR_DT@T8	.14454	.19518	-.04046	.01338	.05527	.00832	.09339	1.00000

Determinant of Correlation Matrix = .4151752

Extraction 1 Principal-Components Analysis (PC)

Initial Statistics:

<u>Factor</u>	<u>Eigenvalue</u>	<u>Pct of Var</u>	<u>Cum Pct</u>
1	1.98306	24.8	24.8
2	1.22978	15.4	40.2
3	1.19426	14.9	55.1
4	1.02702	12.8	67.9
5	.78305	9.8	77.7
6	.76901	9.6	87.3
7	.66957	8.4	95.7
8	.34425	4.3	100.0

PC Extracted 4 factors.

Factor Matrix:

	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>	<u>Factor 4</u>
PR_DT@T5	.83905	-.23192	.11513	-.13665
PR_DT@T4	.69078	-.28087	-.35116	.02691
PR_DT@T2	.57729	.42703	-.02890	-.05758
PR_DT@T6	.53927	-.25599	.52284	-.14347
PR_DT@T8	.24789	.65635	.23025	.19007
PR_DT@T1	.27885	.58603	-.41795	-.03726
PR_DT@T7	.07261	.04567	.51971	.73304
PR_DT@T3	.18254	-.27002	-.53451	.63943

Final Statistics:

Variable	Communality	<u>Factor</u>	<u>Eigenvalue</u>	<u>Pct of Var</u>	<u>Cum Pct</u>
PR_DT@T1	.59725	1	1.98306	24.8	24.8
PR_DT@T2	.51977	2	1.22978	15.4	40.2
PR_DT@T3	.80079	3	1.19426	14.9	55.1
PR_DT@T4	.68010	4	1.02702	12.8	67.9
PR_DT@T5	.78972				
PR_DT@T6	.65030				
PR_DT@T7	.81481				
PR_DT@T8	.58138				

Varimax Rotation 1, Extraction 1, Kaiser Normalization.

Varimax converged in 8 iterations.

Rotated Factor Matrix:

	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>	<u>Factor 4</u>
PR_DT@T5	.86254	.15785	.13759	-.04354
PR_DT@T6	.74586	-.08285	-.21747	.19959
PR_DT@T4	.57415	.14506	.52983	-.22065
PR_DT@T1	-.10296	.71850	.15240	-.21723
PR_DT@T8	-.00358	.63901	-.18325	.37343
PR_DT@T2	.33427	.63875	.00511	-.00068
PR_DT@T3	-.05192	-.02878	.88410	.12506
PR_DT@T7	.04523	-.01690	.09228	.89664

Factor Transformation Matrix:

	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>	<u>Factor 4</u>
Factor 1	.84704	.45838	.26841	.01927
Factor 2	-.37087	.86528	-.31579	.11845
Factor 3	.31104	-.20189	-.68205	.63032
Factor 4	-.21962	.02077	.60253	.76700

Factor Score Coefficient Matrix:

	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>	<u>Factor 4</u>
PR_DT@T1	-.15851	.54668	.10409	-.18926
PR_DT@T2	.12259	.43762	-.04880	-.01152
PR_DT@T3	-.11654	-.04451	.77444	.17120
PR_DT@T4	.28255	.02196	.38196	-.18558
PR_DT@T5	.48754	.00854	.02720	-.05547
PR_DT@T6	.47440	-.14675	-.24404	.14939
PR_DT@T7	-.00415	-.02412	.13135	.82686
PR_DT@T8	-.07274	.48403	-.15498	.32910

Covariance Matrix for Estimated Regression Factor Scores:

	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>	<u>Factor 4</u>
Factor 1	1.00000			
Factor 2	.00000	1.00000		
Factor 3	-.00000	.00000	1.00000	
Factor 4	-.00000	.00000	-.00000	1.00000

APPENDIX C-2

FACTOR ANALYSIS OF WORK TIME DATA

APPENDIX C-2

FACTOR ANALYSIS OF WORK TIME DATA

The following pages provide the SPSS/PC+ output obtained after conducting a factor analysis of the work time estimate data. The raw data used in this analysis included the following variables:

PCT@TM : Respondents' estimated percent time managing training

PCTM@T1 : Respondents' estimated percent of training through management time spent on Task 1 through
PCTM@T8 Task 8

T1-PC@DP: The 56 estimates of the percent of task time through spent on each of seven work types across the
T8-PC@SD eight tasks, where the abbreviations for the seven work types are:

DP: Discussing and Planning
GD: Getting Documents and Information
CC: Copying and Compiling
AI: Analyzing and Interpreting
CN: Computing Numbers
PD: Preparing Documents
SD: Supervising, Directing, Leading

Seven variables, DT@DP through DT@SD, were then computed by:

(1) adjusting the estimates for the work types within each task (e.g., T1-PC@DP through T1-PC@SD, to ensure they equalled 1.0

(2) multiplying each estimate for work type by the appropriate task estimate, adjusted for overall TM time

(e.g., $PCT@TM * PCTM@T1 * T1_PC@DP$)

to obtain an estimate of the proportion of duty time spent performing each work type for each task

(3) summing the estimates for each work type across each task to obtain seven estimates of the proportion of training management spent on each type of work. These variables are labelled DT@DP through DT@SD.

Summary Statistics:

	<u>Mean</u>	<u>Std Dev</u>
DT@DP	.09241	.09956
DT@GD	.06085	.06903
DT@CC	.03746	.04666
DT@AI	.05512	.06216
DT@CN	.02759	.04752
DT@PD	.07215	.09074
DT@SD	.06178	.08622

Number of Cases = 337

Correlation Matrix:

	DT@DP	DT@GD	DT@CC	DT@AI	DT@CN	DT@PD	DT@SD
DT@DP	1.00000						
DT@GD	.40981	1.00000					
DT@CC	.27459	.56599	1.00000				
DT@AI	.37473	.39118	.40204	1.00000			
DT@CN	.11879	.33168	.48593	.30768	1.00000		
DT@PD	.29003	.54856	.56370	.29029	.38069	1.00000	
DT@SD	.21315	.03752	.04537	.21161	.00329	.08027	1.00000

Extraction 1 for Analysis 1, Principal-Components Analysis (PC)

Initial Statistics:

<u>Factor</u>	<u>Eigenvalue</u>	<u>Pct of Var</u>	<u>Cum Pct</u>
1	2.98045	42.6	42.6
2	1.17210	16.7	59.3
3	.81224	11.6	70.9
4	.69450	9.9	80.8
5	.54010	7.7	88.6
6	.41554	5.9	94.5
7	.38507	5.5	100.0

PC Extracted 2 factors.

Factor Matrix:

	<u>Factor 1</u>	<u>Factor 2</u>
DT@CC	.80307	-.23986
DT@GD	.78837	-.08448
DT@PD	.75001	-.18347
DT@AI	.65099	.29857
DT@CN	.60860	-.36562
DT@DP	.56500	.48019
DT@SD	.19511	.78764

Final Statistics:

<u>Variable</u>	<u>Communality</u>
DT@DP	.54981
DT@GD	.62867
DT@CC	.70246
DT@AI	.51293
DT@CN	.50407
DT@PD	.59618
DT@SD	.65844

<u>Factor</u>	<u>Eigenvalue</u>	<u>Pct of Var</u>	<u>Cum Pct</u>
1	2.98045	42.6	42.6
2	1.17210	16.7	59.3

Varimax Rotation 1, Extraction 9, Kaiser Normalization
Varimax converged in 3 iterations

Rotated Factor Matrix:

	<u>Factor 1</u>	<u>Factor 2</u>
DT@CC	.82776	.13142
DT@PD	.75552	.15928
DT@GD	.74725	.26513
DT@CN	.70689	-.06613
DT@SD	-.16508	.79447
DT@DP	.30145	.67745
DT@AI	.45759	.55095

Factor Transformation Matrix:

	<u>Factor 1</u>	<u>Factor 2</u>
Factor 1	.90145	.43289
Factor 2	-.43289	.90145

Factor Score Coefficient Matrix:

	<u>Factor 1</u>	<u>Factor 2</u>
DT@DP	-.00646	.45137
DT@GD	.26965	.04954
DT@CC	.33148	-.06783
DT@AI	.08663	.32417
DT@CN	.31911	-.19280
DT@PD	.29460	-.03217
DT@SD	-.23188	.63410

Covariance Matrix for Estimated Regression Factor Scores:

	<u>Factor 1</u>	<u>Factor 2</u>
Factor 1	1.00000	
Factor 2	-.00000	1.00000

APPENDIX C-3

MANOVA ANALYSIS OF TRAINING MANAGEMENT TIME

APPENDIX C-3

MANOVA ANALYSIS OF TRAINING MANAGEMENT TIME

The following pages provide the SPSS/PC+ output obtained from the planned analysis of respondents' training management time estimates.

The dependent variable in this analysis is the estimate of time spent performing training management in each of the two work factors, Procedural Work and Decision Making Work, across the four Task Factors. The eight corresponding estimates of time spent were calculated for each respondent in accordance with the results of the task and work factor analysis.

The independent variables in the MANOVA design were the between-subjects variables of component, echelon, and rank; and the within-subjects variables of task factor and work factor. A MANOVA approach towards analysis of repeated measures was used to analyze the effect of the within-subjects variable of task factor.

Tests of Between-Subjects Effects.

Tests of Significance for PCT@TM using UNIQUE sums of squares:

<u>Source of Variation</u>	<u>SS</u>	<u>DF</u>	<u>MS</u>	<u>F</u>	<u>Sig. of F</u>
Within Cells	3.26	314	.01		
Constant	2.68	1	2.68	257.92	.000
Component	.18	2	.09	8.59	.000
Echelon	.03	3	.01	1.11	.343
Rank	.03	1	.03	3.19	.075
Component by Echelon	.20	6	.03	3.15	.005
Component by Rank	.05	2	.03	2.44	.089
Echelon by Rank	.10	3	.03	3.22	.023
Component by Echelon by Rank	.10	6	.02	1.61	.145

Tests involving 'WORK' Within-Subject Effect.

Tests of Significance for TWORKDIF using UNIQUE sums of squares:

<u>Source of Variation</u>	<u>SS</u>	<u>DF</u>	<u>MS</u>	<u>F</u>	<u>Sig. of F</u>
Within Cells	1.53	314	.00		
Work	.00	1	.00	.85	.358
Component by Work	.00	2	.00	.22	.806
Echelon by Work	.01	3	.00	.76	.519
Rank by Work	.08	1	.08	17.10	.000
Component by Echelon by Work	.01	6	.00	.45	.846
Component by Rank by Work	.02	2	.01	1.67	.190
Echelon by Rank by Work	.01	3	.00	.63	.594
Component by Echelon by Rank by Work	.04	6	.01	1.48	.183

Effect . . Component by Echelon by Rank by Task

Multivariate Tests of Significance (S = 3, M = 1, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.06081	1.08275	18.00	942.00	.364
Hotellings	.06282	1.08423	18.00	932.00	.363
Wilks	.94007	1.08362	18.00	882.95	.364
Rois	.04150				

Effect . . Echelon by Rank by Task

Multivariate Tests of Significance (S = 3, M = -1/2, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.06424	2.29017	9.00	942.00	.015
Hotellings	.06732	2.32382	9.00	932.00	.014
Wilks	.93636	2.31092	9.00	759.48	.014
Rois	.05296				

Effect . . Component by Rank by Task

Multivariate Tests of Significance (S = 2, M = 0, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.04421	2.35833	6.00	626.00	.029
Hotellings	.04609	2.38913	6.00	622.00	.027
Wilks	.95587	2.37380	6.00	624.00	.028
Rois	.04244				

Effect . . Component by Echelon by Task

Multivariate Tests of Significance (S = 3, M = 1, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.09465	1.70484	18.00	942.00	.033
Hotellings	.10135	1.74914	18.00	932.00	.027
Wilks	.90673	1.72773	18.00	882.95	.030
Rois	.07764				

Effect . . Rank by Task

Multivariate Tests of Significance (S = 1, M = 1/2, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.05106	5.59564	3.00	312.00	.001
Hotellings	.05380	5.59564	3.00	312.00	.001
Wilks	.94894	5.59564	3.00	312.00	.001
Rois	.05106				

Effect . . Echelon by Task

Multivariate Tests of Significance (S = 3, M = -1/2, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.16366	6.03931	9.00	942.00	.000
Hotellings	.18090	6.24450	9.00	932.00	.000
Wilks	.84201	6.17829	9.00	759.48	.000
Roys	.11389				

Effect . . Component by Task

Multivariate Tests of Significance (S = 2, M = 0, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.05916	3.18048	6.00	626.00	.004
Hotellings	.06226	3.22720	6.00	622.00	.004
Wilks	.94112	3.20394	6.00	624.00	.004
Roys	.05388				

Effect . . Task

Multivariate Tests of Significance (S = 1, M = 1/2, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.10992	12.84297	3.00	312.00	.000
Hotellings	.12349	12.84297	3.00	312.00	.000
Wilks	.89008	12.84297	3.00	312.00	.000
Roys	.10992				

Effect . . Component by Echelon by Rank by Work by Task

Multivariate Tests of Significance (S = 3, M = 1, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.03164	.55780	18.00	942.00	.930
Hotellings	.03224	.55652	18.00	932.00	.930
Wilks	.96857	.55706	18.00	882.95	.930
Roys	.02362				

Effect . . Echelon by Rank by Work by Task

Multivariate Tests of Significance (S = 3, M = -1/2, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.03830	1.35366	9.00	942.00	.205
Hotellings	.03922	1.35373	9.00	932.00	.205
Wilks	.96198	1.35459	9.00	759.48	.205
Roy's	.02814				

Effect . . Component by Rank by Work by Task

Multivariate Tests of Significance (S = 2, M = 0, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.01411	.74122	6.00	626.00	.617
Hotellings	.01429	.74091	6.00	622.00	.617
Wilks	.98590	.74107	6.00	624.00	.617
Roy's	.01352				

Effect . . Component by Echelon by Work by Task

Multivariate Tests of Significance (S = 3, M = 1, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.03597	.63504	18.00	942.00	.874
Hotellings	.03670	.63340	18.00	932.00	.875
Wilks	.96432	.63413	18.00	882.95	.875
Roy's	.02506				

Effect . . Rank by Work by Task

Multivariate Tests of Significance (S = 1, M = 1/2, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.00943	.99022	3.00	312.00	.398
Hotellings	.00952	.99022	3.00	312.00	.398
Wilks	.99057	.99022	3.00	312.00	.398
Roy's	.00943				

Effect . . Echelon by Work by Task

Multivariate Tests of Significance (S = 3, M = -1/2, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.04036	1.42731	9.00	942.00	.172
Hotellings	.04143	1.43022	9.00	932.00	.170
Wilks	.95993	1.42982	9.00	759.48	.171
Roys	.03142				

Effect . . Component by Work by Task

Multivariate Tests of Significance (S = 2, M = 0, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.01445	.75933	6.00	626.00	.602
Hotellings	.01465	.75937	6.00	622.00	.602
Wilks	.98556	.75936	6.00	624.00	.602
Roys	.01402				

Effect . . Work by Task

Multivariate Tests of Significance (S = 1, M = 1/2, N = 155)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.03295	3.54341	3.00	312.00	.015
Hotellings	.03407	3.54341	3.00	312.00	.015
Wilks	.96705	3.54341	3.00	312.00	.015
Roys	.03295				

APPENDIX C-4

POST-HOC ANALYSES OF TRAINING MANAGEMENT TIME

APPENDIX C-4

POST-HOC ANALYSES OF TRAINING MANAGEMENT TIME

The following pages provide the SPSS/PC+ output obtained from the post-hoc analyses of respondent training management time estimates. One or more sets of post-hoc analyses were conducted to assist in the interpretation of many of the significant effects obtained in the MANOVA analysis of training management time. The MANOVA effect of interest is identified above each of the following post-hoc analyses.

MANOVA Effect of Interest: Component

Following are t-tests for pairs of component levels

Independent samples of COMPONET

Group 1: COMPONET EQ U.S. ACTIVE

Group 2: COMPONET EQ FORWARD DEPLOYED

t-test for: PRP@TM

	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Group 1	139	.4745	.311	.026			
Group 2	108	.3739	.289	.028			
<u>Pooled Variance Estimate</u>			<u>Separate Variance Estimate</u>				
<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>		
2.60	245	.010	2.62	237.27	.009		

Independent samples of COMPONET

Group 1: COMPONET EQ U.S. ACTIVE

Group 2: COMPONET EQ RESERVE

t-test for: PRP@TM

	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Group 1	139	.4745	.311	.026			
Group 2	90	.3438	.336	.035			
<u>Pooled Variance Estimate</u>			<u>Separate Variance Estimate</u>				
<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>		
3.01	227	.003	2.96	179.52	.003		

Independent samples of COMPONENT

Group 1: COMPONENT EQ FORWARD DEPLOYED

Group 2: COMPONENT EQ RESERVE

t-test for: PRP@TM

	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>	
Group 1	108	.3739	.289	.028	
Group 2	90	.3438	.336	.035	
<u>Pooled Variance Estimate</u>			<u>Separate Variance Estimate</u>		
<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>
.68	196	.498	.67	176.69	.504

MANOVA Effect of Interest: Component X Echelon

Following is an ANOVA for Echelon, where Component = U.S. Active

Cell Means

Total Population

.47
(139)

<u>Echelon</u>			
<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
.43 (46)	.49 (51)	.63 (18)	.41 (24)

Analysis of Variance

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.611	3	.204	2.157	.096
Echelon	.611	3	.204	2.157	.096
Explained	.611	3	.204	2.157	.096
Residual	12.741	135	.094		
Total	13.351	138	.097		

139 Cases were processed.
0 Cases (.0 PCT) were missing.

PRP@TM by Echelon

Following is an ANOVA for Echelon, where Component = Forward Deployed.

Cell Means

Total Population

.37
(108)

Echelon

<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
.37 (51)	.43 (42)	.17 (9)	.31 (6)

Analysis of Variance

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.502	3	.167	2.063	.110
Echelon	.502	3	.167	2.063	.110
Explained	.502	3	.167	2.063	.110
Residual	8.433	104	.081		
Total	8.935	107	.084		

108 Cases were processed.
0 Cases (.0 PCT) were missing.

Following is an ANOVA for Echelon, where Component = Reserve

Cell Means

Total Population

.34
(90)

<u>Echelon</u>			
<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
.25 (37)	.38 (37)	.33 (9)	.67 (7)

Analysis of Variance

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	1.095	3	.365	3.506	.019
Echelon	1.095	3	.365	3.506	.019
Explained	1.095	3	.365	3.506	.019
Residual	8.953	86	.104		
Total	10.048	89	.113		

90 Cases were processed.
0 Cases (.0 PCT) were missing.

MANOVA Effect of Interest: Echelon X Rank. Following is a t-test for Rank, where Echelon = Company

Independent samples of Rank

Group 1: RANK EQ ENLISTED

Group 2: RANK EQ OFFICER

t-test for: PRP@TM

		<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>
	Group 1	52	.5222	.305	.042
	Group 2	82	.2581	.217	.024
<u>Pooled Variance Estimate</u>			<u>Separate Variance Estimate</u>		
<u>t</u>	<u>Degrees of</u>	<u>2-Tail</u>	<u>t</u>	<u>Degrees of</u>	<u>2-Tail</u>
<u>Value</u>	<u>Freedom</u>	<u>Prob.</u>	<u>Value</u>	<u>Freedom</u>	<u>Prob.</u>
5.84	132	.000	5.43	83.63	.000

Following is a t-test for Rank, where Echelon = Battalion

Independent samples of Rank

Group 1: RANK EQ ENLISTED

Group 2: RANK EQ OFFICER

t-test for: PRP@TM

		<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>
	Group 1	54	.4911	.316	.043
	Group 2	76	.3956	.322	.037
<u>Pooled Variance Estimate</u>			<u>Separate Variance Estimate</u>		
<u>t</u>	<u>Degrees of</u>	<u>2-Tail</u>	<u>t</u>	<u>Degrees of</u>	<u>2-Tail</u>
<u>Value</u>	<u>Freedom</u>	<u>Prob.</u>	<u>Value</u>	<u>Freedom</u>	<u>Prob.</u>
1.68	128	.095	1.69	115.58	.095

Following is a t-test for Rank, where Echelon = Brigade

Independent samples of Rank

Group 1: RANK EQ ENLISTED

Group 2: RANK EQ OFFICER

t-test for: PRP@TM

	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Group 1	13	.4473	.351	.097			
Group 2	23	.4374	.338	.070			
<u>Pooled Variance Estimate</u>			<u>Separate Variance Estimate</u>				
<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>		
.08	34	.934	.08	24.23	.935		

Following is a t-test for Rank, where Echelon = Division and above

Independent samples of Rank

Group 1: RANK EQ ENLISTED

Group 2: RANK EQ OFFICER

t-test for: PRP@TM

	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Group 1	8	.5988	.398	.141			
Group 2	29	.4039	.352	.065			
<u>Pooled Variance Estimate</u>			<u>Separate Variance Estimate</u>				
<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>		
1.35	35	.185	1.26	10.22	.237		

MANOVA Effect of Interest: Task Factor

Following are t-tests of all pairs of Task factors.

Paired samples t-test: Guidance/Requirements

<u>Variable</u>	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Guidance	337	.1285	.151	.008			
Requirements	337	.1454	.157	.009			
<u>(Difference) Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>	<u>Corr.</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>
-.0168	.196	.011	.184	.001	-1.57	336	.117

Paired samples t-test: Guidance/Resources

<u>Variable</u>	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Guidance	337	.1285	.151	.008			
Resources	337	.0814	.160	.009			
<u>(Difference) Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>	<u>Corr.</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>
.0471	.211	.012	.078	.153	4.09	336	.000

Paired samples t-test: Guidance/Scheduling

<u>Variable</u>	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Guidance	337	.1285	.151	.008			
Scheduling	337	.0521	.102	.006			
<u>(Difference) Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>	<u>Corr.</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>
.0764	.178	.010	.047	.391	7.88	336	.000

Paired samples t-test: Requirements/Resources

<u>Variable</u>	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>				
Requirements	337	.1454	.157	.009				
Resources	337	.0814	.160	.009				
<u>(Difference) Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>	<u>Corr.</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>	
.0640	.224	.012	.001	.990	5.24	336	.000	

Paired samples t-test: Requirements/Scheduling

<u>Variable</u>	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>				
Requirements	337	.1454	.157	.009				
Scheduling	337	.0521	.102	.006				
<u>(Difference) Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>	<u>Corr.</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>	
.0933	.184	.010	.033	.540	9.29	336	.000	

Paired samples t-test: Resources/Scheduling

<u>Variable</u>	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>				
Resources	337	.0814	.160	.009				
Scheduling	337	.0521	.102	.006				
<u>(Difference) Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>	<u>Corr.</u>	<u>2-Tail Prob.</u>	<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>	
.0293	.187	.010	.033	.547	2.87	336	.004	

MANOVA Effect of Interest: Task Factor X Component

Following are one-way ANOVAS of Component for each Task Factor.

Guidance - Total Population

.13
(337)

<u>Reserve</u>	<u>U.S. Active</u>	<u>Forward Deployed</u>
.10 (90)	.16 (139)	.12 (108)

Requirements - Total Population

.15
(337)

<u>Reserve</u>	<u>U.S. Active</u>	<u>Forward Deployed</u>
.15 (90)	.14 (139)	.15 (108)

Resources - Total Population

.08
(337)

<u>Reserve</u>	<u>U.S. Active</u>	<u>Forward Deployed</u>
.06 (90)	.12 (139)	.05 (108)

Scheduling - Total Population

.05
(337)

<u>Reserve</u>	<u>U.S. Active</u>	<u>Forward Deployed</u>
.04 (90)	.06 (139)	.05 (108)

Analysis of Variance

Requirements

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.016	2	.008	.323	.724
COMP_CD	.016	2	.008	.323	.724
Explained	.016	2	.008	.323	.724
Residual	8.226	334	.025		
Total	8.242	336	.025		

337 Cases were processed.
0 Cases (.0 PCT) were missing.

Guidance

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.211	2	.106	4.758	.009
COMP_CD	.211	2	.106	4.758	.009
Explained	.211	2	.106	4.758	.009
Residual	7.417	334	.022		
Total	7.628	336	.023		

337 Cases were processed.
0 Cases (.0 PCT) were missing.

Resources

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.339	2	.170	6.828	.001
COMP_CD	.339	2	.170	6.828	.001
Explained	.339	2	.170	6.828	.001
Residual	8.302	334	.025		
Total	8.642	336	.026		

337 Cases were processed.
0 Cases (.0 PCT) were missing.

Scheduling

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.027	2	.014	1.308	.272
COMP_CD	.027	2	.014	1.308	.272
Explained	.027	2	.014	1.308	.272
Residual	3.498	334	.010		
Total	3.525	336	.010		

337 Cases were processed.
0 Cases (.0 PCT) were missing.

MANOVA Effect of Interest: Work x Rank

t-test for: Procedural Work

<u>Variable</u>	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Enlisted	127	.2922	.221	.020			
Officer	210	.1411	.164	.011			
<u>Pooled Variance Estimate</u>					<u>Separate Variance Estimate</u>		
<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>			<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>
7.17	335	.000			6.67	209.34	.000

t-test for: Decision Making Work

<u>Variable</u>	<u>Number of Cases</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Standard Error</u>			
Enlisted	127	.2140	.165	.015			
Officer	210	.2065	.186	.013			
<u>Pooled Variance Estimate</u>					<u>Separate Variance Estimate</u>		
<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>			<u>t Value</u>	<u>Degrees of Freedom</u>	<u>2-Tail Prob.</u>
.37	335	.710			.38	290.51	.702

MANOVA Effect of Interest: Work x Task

Cell Means and Standard Deviations for Procedural Work.

	<u>Mean</u>	<u>Standard Deviation</u>	<u>N</u>
Guidance	.060	.092	337
Requirements	.065	.090	337
Resources	.042	.110	337
Scheduling	.031	.078	337

Effect . . Task

Multivariate Tests of Significance (S = 1, M = -1/2, N = 166)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.09411	11.56588	3.00	334.00	.000
Hotellings	.10389	11.56588	3.00	334.00	.000
Wilks	.90589	11.56588	3.00	334.00	.000
Roys	.09411				

Cell Means and Standard Deviations for Decision Making Work.

	<u>Mean</u>	<u>Standard Deviation</u>	<u>N</u>
Guidance	.069	.078	337
Requirements	.080	.088	337
Resources	.039	.078	337
Scheduling	.021	.040	337

Effect . . Task

Multivariate Tests of Significance (S = 1, M = -1/2, N = 166)

<u>Test Name</u>	<u>Value</u>	<u>Approx. F</u>	<u>Hypoth. DF</u>	<u>Error DF</u>	<u>Sig. of F</u>
Pillais	.34796	59.41411	3.00	334.00	.000
Hotellings	.53366	59.41411	3.00	334.00	.000
Wilks	.65204	59.41411	3.00	334.00	.000
Roys	.34796				

APPENDIX C-5

ANALYSIS OF SCHEDULED AND CONDUCTED TRAINING

APPENDIX C-5

ANALYSIS OF SCHEDULED AND CONDUCTED TRAINING

The following pages provide the SPSS/PC+ output obtained from the four ANOVA analysis of the following four dependent variables:

PC_SCHA: Estimated percent of scheduled training not conducted

PC_SCHB: Estimated percent of scheduled training conducted as scheduled

PC_SCHC: Estimated percent of scheduled training conducted at a different time

PC_CONA: Estimated percent of conducted training not scheduled

Each ANOVA analysis tested all effects in the full between-subjects factorial model that included the independent variables of Rank, Echelon, and Component.

Total Population

.16
(257)

Component

<u>Reserve</u>	<u>U.S. Active</u>	<u>Forward Deployed</u>
.16 (82)	.16 (89)	.17 (86)

Echelon

<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
.17 (118)	.16 (104)	.14 (24)	.18 (11)

Rank

<u>Unlisted</u>	<u>Officer</u>
.16 (100)	.16 (157)

	<u>Echelon</u>			
<u>Component</u>	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.14 (35)	.17 (37)	.13 (6)	.20 (4)
U.S. Active	.21 (36)	.12 (34)	.12 (13)	.16 (6)
Forward Deployed	.17 (47)	.18 (33)	.18 (5)	.20 (1)

<u>Component</u>	<u>Rank</u>	
	<u>Unlisted</u>	<u>Officer</u>
Reserve	.19 (37)	.13 (45)
U.S. Active	.13 (29)	.17 (60)
Forward Deployed	.17 (34)	.18 (52)

<u>Echelon</u>	<u>Rank</u>	
	<u>Unlisted</u>	<u>Officer</u>
Co	.16 (45)	.18 (73)
Bn	.18 (44)	.14 (60)
Bde	.14 (9)	.14 (15)
Div+	.15 (2)	.18 (9)

Rank = Unlisted

<u>Component</u>	<u>Echelon</u>			
	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.15 (18)	.25 (13)	.13 (5)	.20 (1)
U.S. Active	.21 (10)	.09 (16)	.10 (2)	.10 (1)
Forward Deployed	.14 (17)	.20 (15)	.17 (2)	.00 (0)

Rank = Officer

<u>Component</u>	<u>Echelon</u>			
	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.12 (17)	.13 (24)	.10 (1)	.20 (3)
U.S. Active	.21 (26)	.15 (18)	.13 (11)	.17 (5)
Forward Deployed	.18 (30)	.16 (18)	.18 (3)	.20 (1)

Analysis of Variance
by PC_SCHA
Component
Echelon
Rank

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.042	6	.007	.432	.857
Component	.011	2	.005	.329	.720
Echelon	.029	3	.010	.593	.620
Rank	.001	1	.001	.060	.807
2-Way Interactions	.320	11	.029	1.812	.053
Component Echelon	.184	6	.031	1.907	.081
Component Rank	.105	2	.053	3.270	.040
Echelon Rank	.032	3	.011	.663	.576
3-Way Interactions	.053	5	.011	.657	.656
Component Echelon Rank	.053	5	.011	.657	.656
Explained	.415	22	.019	1.173	.273
Residual	3.760	234	.016		
Total	4.175	256	.016		

257 Cases were processed.
0 Cases (.0 PCT) were missing.

Cell Means
by PC_SCHB
Component
Echelon
Rank

Total Population

.66
(257)

Component

<u>Reserve</u>	<u>U.S. Active</u>	<u>Forward Deployed</u>
.69 (82)	.64 (89)	.66 (86)

Echelon

<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
.64 (118)	.68 (104)	.69 (24)	.65 (11)

Rank

<u>Unlisted</u>	<u>Officer</u>
.66 (100)	.66 (157)

	<u>Echelon</u>			
<u>Component</u>	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.73 (35)	.67 (37)	.61 (6)	.60 (4)
U.S. Active	.56 (36)	.70 (34)	.71 (13)	.69 (6)
Forward Deployed	.64 (47)	.67 (33)	.74 (5)	.60 (1)

<u>Component</u>	<u>Rank</u>	
	<u>Unlisted</u>	<u>Officer</u>
Reserve	.64 (37)	.73 (45)
U.S. Active	.68 (29)	.62 (60)
Forward Deployed	.66 (34)	.65 (52)

<u>Echelon</u>	<u>Rank</u>	
	<u>Unlisted</u>	<u>Officer</u>
Co	.67 (45)	.62 (73)
Bn	.66 (44)	.70 (60)
Bde	.65 (9)	.71 (15)
Div+	.68 (2)	.65 (9)

Rank = Unlisted

<u>Component</u>	<u>Echelon</u>			
	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.69 (18)	.61 (13)	.58 (5)	.50 (1)
U.S. Active	.62 (10)	.71 (16)	.75 (2)	.85 (1)
Forward Deployed	.67 (17)	.65 (15)	.73 (2)	.00 (0)

Rank = Officer

<u>Component</u>	<u>Echelon</u>			
	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.78 (17)	.71 (24)	.75 (1)	.63 (3)
U.S. Active	.53 (26)	.69 (18)	.70 (11)	.66 (5)
Forward Deployed	.61 (30)	.70 (18)	.75 (3)	.60 (1)

Analysis of Variance
by PC_SCHB
Component
Echelon
Rank

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.219	6	.036	1.178	.319
Component	.100	2	.050	1.621	.200
Echelon	.120	3	.040	1.295	.277
Rank	.004	1	.004	.138	.711
2-Way Interactions	.846	11	.077	2.481	.006
Component Echelon	.482	6	.080	2.593	.019
Component Rank	.249	2	.124	4.016	.019
Echelon Rank	.057	3	.019	.615	.606
3-Way Interactions	.039	5	.008	.253	.938
Component Echelon Rank	.039	5	.008	.253	.938
Explained	1.104	22	.050	1.619	.043
Residual	7.251	234	.031		
Total	8.355	256	.033		

257 Cases were processed.
0 Cases (.0 PCT) were missing.

Cell Means
by PC_SCHC
Component
Echelon
Rank

Total Population

.17
(257)

Component

<u>Reserve</u>	<u>U.S. Active</u>	<u>Forward Deployed</u>
.15 (82)	.20 (89)	.17 (86)

Echelon

<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
.19 (118)	.16 (104)	.17 (24)	.17 (11)

Rank

<u>Unlisted</u>	<u>Officer</u>
.17 (100)	.17 (157)

	<u>Echelon</u>			
<u>Component</u>	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.13 (35)	.15 (37)	.26 (6)	.20 (4)
U.S. Active	.23 (36)	.18 (34)	.17 (13)	.15 (6)
Forward Deployed	.20 (47)	.15 (33)	.08 (5)	.20 (1)

<u>Component</u>	<u>Rank</u>	
	<u>Unlisted</u>	<u>Officer</u>
Reserve	.18 (37)	.14 (45)
U.S. Active	.18 (29)	.20 (60)
Forward Deployed	.17 (34)	.17 (52)

<u>Echelon</u>	<u>Rank</u>	
	<u>Unlisted</u>	<u>Officer</u>
Co	.18 (45)	.20 (73)
Bn	.17 (44)	.16 (60)
Bde	.21 (9)	.15 (15)
Div+	.18 (2)	.17 (9)

Rank = Unlisted

<u>Component</u>	<u>Echelon</u>			
	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.16 (18)	.14 (13)	.29 (5)	.30 (1)
U.S. Active	.18 (10)	.20 (16)	.15 (2)	.05 (1)
Forward Deployed	.19 (17)	.15 (15)	.10 (2)	.00 (0)

Rank = Officer

<u>Component</u>	<u>Echelon</u>			
	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.10 (17)	.16 (24)	.15 (1)	.17 (3)
U.S. Active	.25 (26)	.16 (18)	.17 (11)	.17 (5)
Forward Deployed	.20 (30)	.14 (18)	.07 (3)	.20 (1)

Analysis of Variance
by PC_SCHC
Component
Echelon
Rank

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.121	6	.020	1.354	.234
Component	.076	2	.038	2.566	.079
Echelon	.046	3	.015	1.027	.381
Rank	.001	1	.001	.079	.779
2-Way Interactions	.258	11	.023	1.576	.107
Component Echelon	.175	6	.029	1.955	.073
Component Rank	.031	2	.015	1.038	.356
Echelon Rank	.008	3	.003	.177	.912
3-Way Interactions	.100	5	.020	1.336	.250
Component Echelon Rank	.100	5	.020	1.336	.250
Explained	.479	22	.022	1.461	.089
Residual	3.486	234	.015		
Total	3.965	256	.015		

257 Cases were processed.
0 Cases (.0 PCT) were missing.

Cell Means
by PC_CONA
Component
Echelon
Rank

Total Population

.22
(249)

Component

Reserve U.S. Active Forward Deployed

.20 .25 .21
(82) (80) (87)

Echelon

Co Bn Bde Div+

.23 .21 .25 .19
(116) (103) (21) (9)

Rank

Unlisted Officer

.23 .22
(98) (151)

Echelon

Component Co Bn Bde Div+

Reserve .22 .17 .27 .24
(35) (37) (6) (4)

U.S. Active .28 .26 .19 .10
(34) (32) (10) (4)

Forward Deployed .21 .20 .33 .40
(47) (34) (5) (1)

<u>Component</u>	<u>Rank</u>	
	<u>Unlisted</u>	<u>Officer</u>
Reserve	.22 (37)	.18 (45)
U.S. Active	.28 (26)	.24 (54)
Forward Deployed	.21 (35)	.22 (52)

<u>Echelon</u>	<u>Rank</u>	
	<u>Unlisted</u>	<u>Officer</u>
Co	.21 (44)	.25 (72)
Bn	.24 (44)	.19 (59)
Bde	.34 (8)	.18 (13)
Div+	.30 (2)	.16 (7)

Rank = Unlisted

<u>Component</u>	<u>Echelon</u>			
	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.19 (18)	.23 (13)	.29 (5)	.50 (1)
U.S. Active	.27 (9)	.29 (15)	.30 (1)	.10 (1)
Forward Deployed	.19 (17)	.20 (16)	.50 (2)	.00 (0)

Rank = Officer

<u>Component</u>	<u>Echelon</u>			
	<u>Co</u>	<u>Bn</u>	<u>Bde</u>	<u>Div+</u>
Reserve	.25 (17)	.14 (24)	.15 (1)	.15 (3)
U.S. Active	.29 (25)	.23 (17)	.18 (9)	.10 (3)
Forward Deployed	.21 (30)	.21 (18)	.22 (3)	.40 (1)

Analysis of Variance
by PC_CONA
Component
Echelon
Rank

<u>Source of Variation</u>	<u>Sum of Squares</u>	<u>DF</u>	<u>Mean Square</u>	<u>F</u>	<u>Signif of F</u>
Main Effects	.191	6	.032	.805	.567
Component	.126	2	.063	1.596	.205
Echelon	.041	3	.014	.345	.793
Rank	.032	1	.032	.816	.367
2-Way Interactions	.512	11	.047	1.179	.302
Component Echelon	.244	6	.041	1.030	.407
Component Rank	.006	2	.003	.075	.928
Echelon Rank	.208	3	.069	1.755	.157
3-Way Interactions	.115	5	.023	.584	.712
Component Echelon Rank	.115	5	.023	.584	.712
Explained	.819	22	.037	.942	.540
Residual	8.927	226	.040		
Total	9.746	248	.039		

249 Cases were processed.
0 Cases (.0 PCT) were missing.

APPENDIX C-6

ANALYSIS OF COMPUTER USE

APPENDIX C-6

ANALYSIS OF COMPUTER USE

The following pages provide the SPSS/PC+ output from crosstabulation analyses for the following three dependent variables:

PCWP: Reported use (No/Yes) of computers for TM word processing.

PCDM: Reported use (No/Yes) of computers for TM data base management.

USE_COMP: Reported use (No/Yes) of a computer in either Army or personal use.

Crosstabulation: PCWP
By COMPONENT

COMPONENT-> PCWP		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res	ACT	FWD	RES	Row Total
N		43	105	64									212
		56.2	88.6	67.2									61.1%
		20.3%	49.5%	30.2%									
		46.7%	72.4%	58.2%									
		12.4%	30.3%	18.4%									
		-13.2	16.4	-3.2									
		-1.8	1.7	-.4									
		-3.3	3.7	-.8									
Y		49	40	46									135
		35.8	56.4	42.8									38.9%
		36.3%	29.6%	34.1%									
		53.3%	27.6%	41.8%									
		14.1%	11.5%	13.3%									
		13.2	-16.4	3.2									
		2.2	-2.2	.5									
		3.3	-3.7	.8									
Column Total		92	145	110									347
		26.5%	41.8%	31.7%									100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
16.18520	2	.0003	35.793	None

Statistic	Symmetric	With PCWP Dependent	With COMPONENT Dependent
Lambda	.04451	.04444	.04455
Uncertainty Coefficient	.02689	.03519	.02176

Statistic	Value	Significance
Cramer's V	.21597	
Contingency Coefficient	.21110	

Number of Missing Observations = 0

Crosstabulation: PCWP
By ECHELON

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res					Row Total
ECHELON->	PCWP									BN	CO	BDE	DIV+	
N		90												212
		92.9												61.1%
		42.5%												
		59.2%												
		25.9%												
		-2.9												
		-.3												
		-.6												
Y		62												135
		59.1												38.9%
		45.9%												
		40.8%												
		17.9%												
		2.9												
		.4												
		.6												
Column Total		152	128	32	35	347								
		43.8%	36.9%	9.2%	10.1%	100.0%								

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
1.69321	3	.6384	12.450	None

Statistic	Symmetric	With PCWP Dependent	With ECHELON Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.00263	.00364	.00206

Statistic	Value	Significance
Cramer's V	.06985	
Contingency Coefficient	.06968	

Number of Missing Observations = 0

Crosstabulation: PCWP
By PERSON

PERSON-> PCWP		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res	ENLISTD	OFFICER	Row Total
N		95									117	212
		88.0								124.0		61.1%
		44.8%								55.2%		
		66.0%								57.6%		
		27.4%								33.7%		
		7.0								-7.0		
		.7								-.6		
		1.6								-1.6		
Y		49									86	135
		56.0								79.0		38.9%
		36.3%								63.7%		
		34.0%								42.4%		
		14.1%								24.8%		
		-7.0								7.0		
		-.9								.8		
		-1.6								1.6		
Column Total		144								203		347
		41.5%								58.5%		100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
2.12502	1	.1449	56.023	None
2.46327	1	.1165	(Before Yates Correction)	

Statistic	Symmetric	With PCWP Dependent	With PERSON Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.00530	.00534	.00526

Statistic	Value	Significance
Phi	.08425	
Contingency Coefficient	.08396	

Number of Missing Observations = 0

Crosstabulation: PCWP
By ECHELON
Controlling for PERSON

= ENLISTD

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res					Row Total
ECHELON->										BN	CO	BDE	DIV+	
PCWP														
N		42	39	9	5									95
		43.5	37.6	8.6	5.3									66.0%
		44.2%	41.1%	9.5%	5.3%									
		63.6%	68.4%	69.2%	62.5%									
		29.2%	27.1%	6.3%	3.5%									
		-1.5	1.4	.4	-.3									
		-.2	.2	.1	-.1									
		-.5	.5	.3	-.2									
Y		24	18	4	3									49
		22.5	19.4	4.4	2.7									34.0%
		49.0%	36.7%	8.2%	6.1%									
		36.4%	31.6%	30.8%	37.5%									
		16.7%	12.5%	2.8%	2.1%									
		1.5	-1.4	-.4	.3									
		.3	-.3	-.2	.2									
		.5	-.5	-.3	.2									
Column Total		66	57	13	8									144
		45.8%	39.6%	9.0%	5.6%									100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5	
.41713	3	.9367	2.722	2 OF	8 (25.0%)
Statistic		Symmetric	With PCWP Dependent	With ECHELON Dependent	
Lambda		.00000	.00000	.00000	
Uncertainty Coefficient		.00166	.00226	.00132	
Statistic		Value	Significance		
Cramer's V		.05382			
Contingency Coefficient		.05374			

Crosstabulation: PCWP
By ECHELON
Controlling for PERSON

= OFFICER

ECHELON->	PCWP	Count					Row Total
		Exp Val	Row Pct	Col Pct	Tot Pct	Residual	
		Std Res	Adj Res	BN	CO	BDE	DIV+
N		48	44	11	14	117	
		49.6	40.9	11.0	15.6	57.6%	
		41.0%	37.6%	9.4%	12.0%		
		55.8%	62.0%	57.9%	51.9%		
		23.6%	21.7%	5.4%	6.9%		
		-1.6	3.1	.0	-1.6		
		-.2	.5	.0	-.4		
		-.5	.9	.0	-.7		
Y		38	27	8	13	86	
		36.4	30.1	8.0	11.4	42.4%	
		44.2%	31.4%	9.3%	15.1%		
		44.2%	38.0%	42.1%	48.1%		
		18.7%	13.3%	3.9%	6.4%		
		1.6	-3.1	-.0	1.6		
		.3	-.6	-.0	.5		
		.5	-.9	-.0	.7		
Column Total		86	71	19	27	203	
		42.4%	35.0%	9.4%	13.3%	100.0%	

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
1.03406	3	.7930	8.049	None

Statistic	Symmetric	With PCWP Dependent	With ECHELON Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.00268	.00374	.00209

Statistic	Value	Significance
Cramer's V	.07137	
Contingency Coefficient	.07119	

Number of Missing Observations = 0

Crosstabulation: PCWP
By COMPONENT
Controlling for ECHELON

= C0

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res
COMPONENT->		ACT	FWD	RES	Row Total				
PCWP									
N		8	51	24	83				
		12.3	41.5	29.2	64.8%				
		9.6%	61.4%	28.9%					
		42.1%	79.7%	53.3%					
		6.3%	39.8%	18.8%					
		-4.3	9.5	-5.2					
		-1.2	1.5	-1.0					
		-2.2	3.5	-2.0					
Y		11	13	21	45				
		6.7	22.5	15.8	35.2%				
		24.4%	28.9%	46.7%					
		57.9%	20.3%	46.7%					
		8.6%	10.2%	16.4%					
		4.3	-9.5	5.2					
		1.7	-2.0	1.3					
		2.2	-3.5	2.0					
Column Total		19	64	45	128				
		14.8%	50.0%	35.2%	100.0%				

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
13.11042	2	.0014	6.680	None
Statistic	Symmetric		With PCWP Dependent	With COMPONENT Dependent
Lambda	.10092		.06667	.12500
Uncertainty Coefficient	.06335		.08039	.05227
Statistic	Value	Significance		
Cramer's V	.32004			
Contingency Coefficient	.30481			

Crosstabulation: PCWP
By COMPONENT
Controlling for ECHELON

= BN

COMPONENT-> PCWP		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res
		ACT	FWD	RES	Row Total				
N		21	41	28	90				
		26.6	34.9	28.4	59.2%				
		23.3%	45.6%	31.1%					
		46.7%	69.5%	58.3%					
		13.8%	27.0%	18.4%					
		-5.6	6.1	-.4					
		-1.1	1.0	-.1					
		-2.0	2.1	-.1					
Y		24	18	20	62				
		18.4	24.1	19.6	40.8%				
		38.7%	29.0%	32.3%					
		53.3%	30.5%	41.7%					
		15.8%	11.8%	13.2%					
		5.6	-6.1	.4					
		1.3	-1.2	.1					
		2.0	-2.1	.1					
Column Total		45	59	48	152				
		29.6%	38.8%	31.6%	100.0%				

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
5.52916	2	.0630	18.355	None

Statistic	Symmetric	With PCWP Dependent	With COMPONENT Dependent
Lambda	.05806	.04839	.06452
Uncertainty Coefficient	.02069	.02705	.01675
Statistic	Value	Significance	
Cramer's V	.19073		
Contingency Coefficient	.18735		

Crosstabulation: PCWP
By COMPONENT
Controlling for ECHELON

= BOE

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res	ACT	FWD	RES	Row Total
COMPONENT->													
PCWP													
N		5	9	6									20
		6.3	8.1	5.6									62.5%
		25.0%	45.0%	30.0%									
		50.0%	69.2%	66.7%									
		15.6%	28.1%	18.8%									
		-1.3	.9	.4									
		-.5	.3	.2									
		-1.0	.7	.3									
Y		5	4	3									12
		3.8	4.9	3.4									37.5%
		41.7%	33.3%	25.0%									
		50.0%	30.8%	33.3%									
		15.6%	12.5%	9.4%									
		1.3	-.9	-.4									
		.6	-.4	-.2									
		1.0	-.7	-.3									
Column Total		10	13	9									32
		31.3%	40.6%	28.1%									100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5	
.98462	2	.6112	3.375	3 OF	6 (50.0%)

Statistic	Symmetric	With PCWP Dependent	With COMPONENT Dependent
Lambda	.03226	.00000	.05263
Uncertainty Coefficient	.01737	.02295	.01398

Statistic	Value	Significance
Cramer's V	.17541	
Contingency Coefficient	.17277	

Crosstabulation: PCWP
By COMPONENT
Controlling for ECHELON

= DIV+

		Count				
		Exp Val				
		Row Pct				
		Col Pct				
		Tot Pct				
		Residual				
COMPONET->	Std Res					Row
PCWP	Adj Res	ACT	FWD	RES		Total
N		9	4	6		19
		9.8	4.9	4.3		54.3%
		47.4%	21.1%	31.6%		
		50.0%	44.4%	75.0%		
		25.7%	11.4%	17.1%		
		-.8	-.9	1.7		
		-.2	-.4	.8		
		-.5	-.7	1.3		
Y		9	5	2		16
		8.2	4.1	3.7		45.7%
		56.3%	31.3%	12.5%		
		50.0%	55.6%	25.0%		
		25.7%	14.3%	5.7%		
		.8	.9	-1.7		
		.3	.4	-.9		
		.5	.7	-1.3		
	Column	18	9	8		35
	Total	51.4%	25.7%	22.9%		100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
1.86769	2	.3930	3.657	4 OF 6 (66.7%)

Statistic	Symmetric	With PCWP Dependent	With COMPONENT Dependent
Lambda	.03030	.06250	.00000
Uncertainty Coefficient	.03238	.04034	.02704

Statistic	Value	Significance
Cramer's V	.23100	
Contingency Coefficient	.22508	

Number of Missing Observations = 0

Crosstabulation: PCDM
By COMPONET

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res				Row Total
COMPONET->										ACT	FWD	RES	
PCDM													
N		64	126	91		281							
		74.5	117.4	89.1		81.0%							
		22.8%	44.8%	32.4%									
		69.6%	86.9%	82.7%									
		18.4%	36.3%	26.2%									
		-10.5	8.6	1.9									
		-1.2	.8	.2									
		-3.3	2.4	.6									
Y		28	19	19		66							
		17.5	27.6	20.9		19.0%							
		42.4%	28.8%	28.8%									
		30.4%	13.1%	17.3%									
		8.1%	5.5%	5.5%									
		10.5	-8.6	-1.9									
		2.5	-1.6	-.4									
		3.3	-2.4	-.6									
Column Total		92	145	110		347							
		26.5%	41.8%	31.7%		100.0%							

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
11.29620	2	.0035	17.499	None

Statistic	Symmetric	With PCDM Dependent	With COMPONET Dependent
Lambda	.03358	.00000	.04455
Uncertainty Coefficient	.01970	.03172	.01428

Statistic	Value	Significance
Cramer's V	.18043	
Contingency Coefficient	.17756	

Number of Missing Observations = 0

Crosstabulation: PCDM
By ECHELON

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res					Row Total
ECHELON->	PCDM	BN	CO	BDE	DIV+									
N		125	104	27	25					281				
		123.1	103.7	25.9	28.3					81.0%				
		44.5%	37.0%	9.6%	8.9%									
		82.2%	81.3%	84.4%	71.4%									
		36.0%	30.0%	7.8%	7.2%									
		1.9	.3	1.1	-3.3									
		.2	.0	.2	-.6									
		.5	.1	.5	-1.5									
Y		27	24	5	10					66				
		28.9	24.3	6.1	6.7					19.0%				
		40.9%	36.4%	7.6%	15.2%									
		17.8%	18.8%	15.6%	28.6%									
		7.8%	6.9%	1.4%	2.9%									
		-1.9	-.3	-1.1	3.3									
		-.4	-.1	-.4	1.3									
		-.5	-.1	-.5	1.5									
Column Total		152	128	32	35					347				
		43.8%	36.9%	9.2%	10.1%					100.0%				

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5
2.47448	3	.4799	6.086	None

Statistic	Symmetric	With PCDM Dependent	With ECHELON Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.00394	.00675	.00278

Statistic	Value	Significance
Cramer's V	.08445	
Contingency Coefficient	.08415	

Number of Missing Observations = 0

Crosstabulation: PCDM
By PERSON

		Count			
		Exp Val			
		Row Pct			
		Col Pct			
		Tot Pct			
		Residual			
PERSON->		Std Res			Row
PCDM		Adj Res	ENLISTD	OFFICER	Total
	N		121	160	281
			116.6	164.4	81.0%
			43.1%	56.9%	
			84.0%	78.8%	
			34.9%	46.1%	
			4.4	-4.4	
			.4	-.3	
			1.2	-1.2	
	Y		23	43	66
			27.4	38.6	19.0%
			34.8%	65.2%	
			16.0%	21.2%	
			6.6%	12.4%	
			-4.4	4.4	
			-.8	.7	
			-1.2	1.2	
	Column		144	203	347
	Total		41.5%	58.5%	100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
1.16565	1	.2803	27.389	None
1.48464	1	.2231	(Before Yates Correction)	

Statistic	Symmetric	With PCDM Dependent	With PERSON Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.00373	.00446	.00320
Statistic	Value	Significance	
Phi	.06541		
Contingency Coefficient	.06527		

Number of Missing Observations = 0

Crosstabulation: PCDM
By ECHELON
Controlling for PERSON

= ENLISTD

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res					Row Total
ECHELON->										BN	CO	BDE	DIV+	
PCDM														
N		56	48	12	5	121								
		55.5	47.9	10.9	6.7	84.0%								
		46.3%	39.7%	9.9%	4.1%									
		84.8%	84.2%	92.3%	62.5%									
		38.9%	33.3%	8.3%	3.5%									
		.5	.1	1.1	-1.7									
		.1	.0	.3	-.7									
		.2	.0	.9	-1.7									
Y		10	9	1	3	23								
		10.5	9.1	2.1	1.3	16.0%								
		43.5%	39.1%	4.3%	13.0%									
		15.2%	15.8%	7.7%	37.5%									
		6.9%	6.3%	.7%	2.1%									
		-.5	-.1	-1.1	1.7									
		-.2	-.0	-.7	1.5									
		-.2	-.0	-.9	1.7									
Column Total		66	57	13	8	144								
		45.8%	39.6%	9.0%	5.6%	100.0%								

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5
3.46109	3	.3258	1.278	2 OF 8 (25.0%)

Statistic	Symmetric	With PCDM Dependent	With ECHELON Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.01347	.02364	.00942

Statistic	Value	Significance
Cramer's V	.15503	
Contingency Coefficient	.15320	

Crosstabulation: PCDM
By ECHELON
Controlling for PERSON

= OFFICER

		Count					
		Exp Val					
		Row Pct					
		Col Pct					
		Tot Pct					
		Residual					
ECHELON->		Std Res					Row
PCDM		Adj Res	BN	CO	BDE	DIV+	Total
	N		69	56	15	20	160
			67.8	56.0	15.0	21.3	78.8%
			43.1%	35.0%	9.4%	12.5%	
			80.2%	78.9%	78.9%	74.1%	
			34.0%	27.6%	7.4%	9.9%	
			1.2	.0	.0	-1.3	
			.1	.0	.0	-.3	
			.4	.0	.0	-.6	
	Y		17	15	4	7	43
			18.2	15.0	4.0	5.7	21.2%
			39.5%	34.9%	9.3%	16.3%	
			19.8%	21.1%	21.1%	25.9%	
			8.4%	7.4%	2.0%	3.4%	
			-1.2	-.0	-.0	1.3	
			-.3	-.0	-.0	.5	
			-.4	-.0	-.0	.6	
	Column		86	71	19	27	203
	Total		42.4%	35.0%	9.4%	13.3%	100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
.46734	3	.9260	4.025	1 OF 8 (12.5%)

Statistic	Symmetric	With PCDM Dependent	With ECHELON Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.00128	.00215	.00091

Statistic	Value	Significance
Cramer's V	.04798	
Contingency Coefficient	.04793	

Number of Missing Observations = 0

Crosstabulation: PCDM
By COMPONET
Controlling for ECHELON

= C0

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res	
COMPONET->		ACT	FWD	RES	Row Total					
PCDM	N	11	57	36	104					
		15.4	52.0	36.6	81.3%					
		10.6%	54.8%	34.6%						
		57.9%	89.1%	80.0%						
		8.6%	44.5%	28.1%						
		-4.4	5.0	-.6						
		-1.1	.7	-.1						
		-2.8	2.3	-.3						
		Y	8	7	9	24				
			3.6	12.0	8.4	18.8%				
33.3%	29.2%		37.5%							
42.1%	10.9%		20.0%							
6.3%	5.5%		7.0%							
4.4	-5.0		.6							
2.4	-1.4		.2							
2.8	-2.3		.3							
Column Total			19	64	45	128				
			14.8%	50.0%	35.2%	100.0%				

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
9.41323	2	.0090	3.563	1 OF 6 (16.7%)

Statistic	Symmetric	With PCDM Dependent	With COMPONET Dependent
Lambda	.02273	.00000	.03125
Uncertainty Coefficient	.04463	.06843	.03311

Statistic	Value	Significance
Cramer's V	.27118	
Contingency Coefficient	.26173	

Crosstabulation: PCDM
By COMPONENT
Controlling for ECHELON

= BN

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res		Row Total
COMPONENT->											
PCDM		ACT	FWD	RES							
	N	31	53	41							125
		37.0	48.5	39.5							82.2%
		24.8%	42.4%	32.8%							
		68.9%	89.8%	85.4%							
		20.4%	34.9%	27.0%							
		-6.0	4.5	1.5							
		-1.0	.6	.2							
		-2.8	2.0	.7							
	Y	14	6	7							27
		8.0	10.5	8.5							17.8%
		51.9%	22.2%	25.9%							
		31.1%	10.2%	14.6%							
		9.2%	3.9%	4.6%							
		6.0	-4.5	-1.5							
		2.1	-1.4	-.5							
		2.8	-2.0	-.7							
	Column Total	45	59	48							152
		29.6%	38.8%	31.6%							100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
8.14976	2	.0170	7.993	None

Statistic	Symmetric	With PCDM Dependent	With COMPONENT Dependent
Lambda	.06667	.00000	.08602
Uncertainty Coefficient	.03261	.05436	.02329
Statistic	Value	Significance	
Cramer's V	.23155		
Contingency Coefficient	.22558		

Crosstabulation: PCDM
By COMPONENT
Controlling for ECHELON

= BDE

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res
COMPONENT->		ACT	FWD	RES	Row Total				
PCDM									
N		7	12	8	27				
		8.4	11.0	7.6	84.4%				
		25.9%	44.4%	29.6%					
		70.0%	92.3%	88.9%					
		21.9%	37.5%	25.0%					
		-1.4	1.0	.4					
		-.5	.3	.1					
		-1.5	1.0	.4					
Y		3	1	1	5				
		1.6	2.0	1.4	15.6%				
		60.0%	20.0%	20.0%					
		30.0%	7.7%	11.1%					
		9.4%	3.1%	3.1%					
		1.4	-1.0	-.4					
		1.2	-.7	-.3					
		1.5	-1.0	-.4					
Column Total		10	13	9	32				
		31.3%	40.6%	28.1%	100.0%				

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
2.32701	2	.3124	1.406	3 OF 6 (50.0%)

Statistic	Symmetric	With PCDM Dependent	With COMPONENT Dependent
Lambda	.08333	.00000	.10526
Uncertainty Coefficient	.04504	.07897	.03151

Statistic	Value	Significance
Cramer's V	.26967	
Contingency Coefficient	.26036	

Crosstabulation: PCDM
By COMPONENT
Controlling for ECHELON

= DIV+

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res				Row Total
COMPONENT->		ACT	FWD	RES									
PCDM													
N		15	4	6									25
		12.9	6.4	5.7									71.4%
		60.0%	16.0%	24.0%									
		83.3%	44.4%	75.0%									
		42.9%	11.4%	17.1%									
		2.1	-2.4	.3									
		.6	-1.0	.1									
Y		1.6	-2.1	.3									
		3	5	2									10
		5.1	2.6	2.3									28.6%
		30.0%	50.0%	20.0%									
		16.7%	55.6%	25.0%									
		8.6%	14.3%	5.7%									
		-2.1	2.4	-.3									
.		-.9	1.5	-.2									
		-1.6	2.1	-.3									
Column Total		18	9	8									35
		51.4%	25.7%	22.9%									100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5	
4.51111	2	.1048	2.286	2 OF	6 (33.3%)
Statistic		Symmetric	With PCDM Dependent	With COMPONENT Dependent	
-----		-----	-----	-----	
Lambda		.11111	.10000	.11765	
Uncertainty Coefficient		.07545	.10258	.05967	
Statistic		Value	Significance		
-----		-----	-----		
Cramer's V		.35901			
Contingency Coefficient		.33790			

Number of Missing Observations = 0

Crosstabulation: USE_COMP
By COMPONENT

COMPONENT-> USE_COMP	Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res	ACT	FWD	RES	Row Total
N	26	69	38						133			
	35.3	55.6	42.2						38.3%			
	19.5%	51.9%	28.6%									
	28.3%	47.6%	34.5%									
	7.5%	19.9%	11.0%									
	-9.3	13.4	-4.2									
	-1.6	1.8	-.6									
	-2.3	3.0	-1.0									
Y	66	76	72						214			
	56.7	89.4	67.8						61.7%			
	30.8%	35.5%	33.6%									
	71.7%	52.4%	65.5%									
	19.0%	21.9%	20.7%									
	9.3	-13.4	4.2									
	1.2	-1.4	.5									
	2.3	-3.0	1.0									
Column Total	92	145	110						347			
	26.5%	41.8%	31.7%						100.0%			

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
9.86826	2	.0072	35.262	None

Statistic	Symmetric	With USE_COMP Dependent	With COMPONENT Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.01637	.02148	.01323

Statistic	Value	Significance
Cramer's V	.16864	
Contingency Coefficient	.16629	

Number of Missing Observations = 0

Crosstabulation: USE COMP
By ECHELON

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res					Row Total
ECHELON->	USE_COMP	BN	CO	BDE	DIV+									
N		49	64	9	11					133				
		58.3	49.1	12.3	13.4					38.3%				
		36.8%	48.1%	6.8%	8.3%									
		32.2%	50.0%	28.1%	31.4%									
		14.1%	18.4%	2.6%	3.2%									
		-9.3	14.9	-3.3	-2.4									
		-1.2	2.1	-.9	-.7									
		-2.1	3.4	-1.2	-.9									
Y		103	64	23	24					214				
		93.7	78.9	19.7	21.6					61.7%				
		48.1%	29.9%	10.7%	11.2%									
		67.8%	50.0%	71.9%	68.6%									
		29.7%	18.4%	6.6%	6.9%									
		9.3	-14.9	3.3	2.4									
		1.0	-1.7	.7	.5									
		2.1	-3.4	1.2	.9									
	Column Total	152	128	32	35					347				
	Total	43.8%	36.9%	9.2%	10.1%					100.0%				

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
11.87718	3	.0078	12.265	None

Statistic	Symmetric	With USE_COMP Dependent	With ECHELON Dependent
Lambda	.04573	.00000	.07692
Uncertainty Coefficient	.01843	.02556	.01441

Statistic	Value	Significance
Cramer's V	.18501	
Contingency Coefficient	.18192	

Number of Missing Observations = 0

Crosstabulation: USE_COMP
By PERSON

		Count			
		Exp Val			
		Row Pct			
		Col Pct			
		Tot Pct			
		Residual			
PERSON->		Std Res		Row	
USE_COMP		Adj Res	ENLISTD	OFFICER	Total
	N		70	63	133
			55.2	77.8	38.3%
			52.6%	47.4%	
			48.6%	31.0%	
			20.2%	18.2%	
			14.8	-14.8	
			2.0	-1.7	
			3.3	-3.3	
	Y		74	140	214
			88.8	125.2	61.7%
			34.6%	65.4%	
			51.4%	69.0%	
			21.3%	40.3%	
			-14.8	14.8	
			-1.6	1.3	
			-3.3	3.3	
		Column	144	203	347
		Total	41.5%	58.5%	100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
10.27913	1	.0013	55.193	None
11.01016	1	.0009	(Before Yates Correction)	

Statistic	Symmetric	With USE_COMP Dependent	With PERSON Dependent
Lambda	.02527	.00000	.04861
Uncertainty Coefficient	.02354	.02377	.02331
Statistic	Value	Significance	
Phi	.17813		
Contingency Coefficient	.17537		

Number of Missing Observations = 0

Crosstabulation: USE_COMP
By ECHELON
Controlling for PERSON

= ENLISTD

ECHELON-> USE_COMP	Count					Row Total
	Exp Val Row Pct Col Pct Tot Pct Residual Std Res Adj Res	BN	CO	BDE	DIV+	
N		26 32.1 37.1% 39.4% 18.1% -6.1 -1.1 -2.0	32 27.7 45.7% 56.1% 22.2% 4.3 .8 1.5	7 6.3 10.0% 53.8% 4.9% .7 .3 .4	5 3.9 7.1% 62.5% 3.5% 1.1 .6 .8	70 48.6%
Y		40 33.9 54.1% 60.6% 27.8% 6.1 1.0 2.0	25 29.3 33.8% 43.9% 17.4% -4.3 -.8 -1.5	6 6.7 8.1% 46.2% 4.2% -.7 -.3 -.4	3 4.1 4.1% 37.5% 2.1% -1.1 -.5 -.8	74 51.4%
	Column Total	66 45.8%	57 39.6%	13 9.0%	8 5.6%	144 100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5	
4.29847	3	.2310	3.889	2 OF	8 (25.0%)

Statistic	Symmetric	With USE_COMP Dependent	With ECHELON Dependent
Lambda	.10811	.14286	.07692
Uncertainty Coefficient	.01674	.02168	.01363

Statistic	Value	Significance
Cramer's V	.17277	
Contingency Coefficient	.17025	

Crosstabulation: USE COMP
By ECHELON
Controlling for PERSON

= OFFICER

ECHELON-> USE_COMP	Count Exp Val Row Pct Col Pct Tot Pct Residual Std Res Adj Res	BN	CO	BDE	DIV+	Row Total
N		23 26.7 36.5% 26.7% 11.3% -3.7 -.7 -1.1	32 22.0 50.8% 45.1% 15.8% 10.0 2.1 3.2	2 5.9 3.2% 10.5% 1.0% -3.9 -1.6 -2.0	6 8.4 9.5% 22.2% 3.0% -2.4 -.8 -1.1	63 31.0%
Y		63 59.3 45.0% 73.3% 31.0% 3.7 .5 1.1	39 49.0 27.9% 54.9% 19.2% -10.0 -1.4 -3.2	17 13.1 12.1% 89.5% 8.4% 3.9 1.1 2.0	21 18.6 15.0% 77.8% 10.3% 2.4 .6 1.1	140 69.0%
Column Total		86 42.4%	71 35.0%	19 9.4%	27 13.3%	203 100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
11.98815	3	.0074	5.897	None

Statistic	Symmetric	With USE_COMP Dependent	With ECHELON Dependent
Lambda	.05000	.00000	.07692
Uncertainty Coefficient	.03335	.04955	.02513

Statistic	Value	Significance
Cramer's V	.24301	
Contingency Coefficient	.23614	

Number of Missing Observations = 0

Crosstabulation: USE COMP
By COMPONENT
Controlling for ECHELON

= C0

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res				Row Total
COMPONENT->		ACT	FWD	RES									
USE_COMP													
N		6	41	17									64
		9.5	32.0	22.5									50.0%
		9.4%	64.1%	26.6%									
		31.6%	64.1%	37.8%									
		4.7%	32.0%	13.3%									
		-3.5	9.0	-5.5									
		-1.1	1.6	-1.2									
		-1.7	3.2	-2.0									
Y		13	23	28									64
		9.5	32.0	22.5									50.0%
		20.3%	35.9%	43.8%									
		68.4%	35.9%	62.2%									
		10.2%	18.0%	21.9%									
		3.5	-9.0	5.5									
		1.1	-1.6	1.2									
		1.7	-3.2	2.0									
Column Total		19	64	45									128
		14.8%	50.0%	35.2%									100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
10.33034	2	.0057	9.500	None

Statistic	Symmetric	With USE_COMP Dependent	With COMPONENT Dependent
Lambda	.17969	.28125	.07813
Uncertainty Coefficient	.04847	.05911	.04108

Statistic	Value	Significance
Cramer's V	.28409	
Contingency Coefficient	.27327	

Crosstabulation: USE_COMP
By COMPONET
Controlling for ECHELON

= BN

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res
COMPONET->	USE_COMP	ACT	FWD	RES	Row Total				
N		12	24	13	49				
		14.5	19.0	15.5	32.2%				
		24.5%	49.0%	26.5%					
		26.7%	40.7%	27.1%					
		7.9%	15.8%	8.6%					
		-2.5	5.0	-2.5					
		-.7	1.1	-.6					
		-1.0	1.8	-.9					
Y		33	35	35	103				
		30.5	40.0	32.5	67.8%				
		32.0%	34.0%	34.0%					
		73.3%	59.3%	72.9%					
		21.7%	23.0%	23.0%					
		2.5	-5.0	2.5					
		.5	-.8	.4					
		1.0	-1.8	.9					
Column Total		45	59	48	152				
		29.6%	38.8%	31.6%	100.0%				

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5
3.14718	2	.2073	14.507	None

Statistic	Symmetric	With USE_COMP Dependent	With COMPONET Dependent
Lambda	.00000	.00000	.00000
Uncertainty Coefficient	.01191	.01629	.00938
Statistic	Value	Significance	
Cramer's V	.14389		
Contingency Coefficient	.14243		

Crosstabulation: USE_COMP
By COMPONENT
Controlling for ECHELON

= BDE

		Count	Exp Val	Row Pct	Col Pct	Tot Pct	Residual	Std Res	Adj Res				Row Total
COMPONENT->		ACT	FWD	RES									
USE_COMP													
N		2	3	4									9
		2.8	3.7	2.5									28.1%
		22.2%	33.3%	44.4%									
		20.0%	23.1%	44.4%									
		6.3%	9.4%	12.5%									
		-.8	-.7	1.5									
		-.5	-.3	.9									
		-.7	-.5	1.3									
Y		8	10	5									23
		7.2	9.3	6.5									71.9%
		34.8%	43.5%	21.7%									
		80.0%	76.9%	55.6%									
		25.0%	31.3%	15.6%									
		.8	.7	-1.5									
		.3	.2	-.6									
		.7	.5	-1.3									
Column Total		10	13	9									32
		31.3%	40.6%	28.1%									100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F. < 5	
1.67617	2	.4325	2.531	3 OF	6 (50.0%)
Statistic		Symmetric	With USE_COMP Dependent	With COMPONENT Dependent	
Lambda		.03571	.00000	.05263	
Uncertainty Coefficient		.02986	.04223	.02310	
Statistic		Value	Significance		
Cramer's V		.22887			
Contingency Coefficient		.22310			

Crosstabulation: USE_COMP
By COMPONENT
Controlling for ECHELON

= DIV+

COMPONENT-> USE_COMP	Count Exp Val Row Pct Col Pct Tot Pct Residual Std Res Adj Res	ACT	FWD	RES	Row Total
N		6	1	4	11
		5.7	2.8	2.5	31.4%
		54.5%	9.1%	36.4%	
		33.3%	11.1%	50.0%	
		17.1%	2.9%	11.4%	
		.3	-1.8	1.5	
		.1	-1.1	.9	
		.2	-1.5	1.3	
Y		12	8	4	24
		12.3	6.2	5.5	68.6%
		50.0%	33.3%	16.7%	
		66.7%	88.9%	50.0%	
		34.3%	22.9%	11.4%	
		-.3	1.8	-1.5	
		-.1	.7	-.6	
		-.2	1.5	-1.3	
Column Total		18	9	8	35
		51.4%	25.7%	22.9%	100.0%

*** NOTE: Statistics 6-11 will not be computed for tables with string variables.

Chi-Square	D.F.	Significance	Min E.F.	Cells with E.F.< 5	
3.03451	2	.2193	2.514	2 OF	6 (33.3%)
Statistic		Symmetric	With USE_COMP Dependent	With COMPONENT Dependent	
Lambda		.00000	.00000	.00000	
Uncertainty Coefficient		.05694	.07551	.04570	
Statistic		Value	Significance		
Cramer's V		.29445			
Contingency Coefficient		.28246			
Number of Missing Observations =		0			

APPENDIX D

SUMMARY OF TRAINING MANAGEMENT PROBLEMS AND
SOLUTION ANALYSIS AND RESULTS

APPENDIX D-1

ANALYSIS OF TM PROBLEMS AND SUGGESTED SOLUTIONS

APPENDIX D-1

ANALYSIS OF TM PROBLEMS AND SUGGESTED SOLUTIONS

Two raters independently categorized the 891 problems and 741 solutions according to the two classification schemes. In addition to the categories developed for problems and solutions, raters could opt not to classify based on lack of information, poor handwriting, or incoherent grammar. Fifty-two problems and 40 solutions were coded as "non-codeable." After each response had been independently coded twice, the codes were compared. If differences existed between the raters, they were resolved by consensus. A strict inter-rater agreement calculation was applied. The inter-rater agreement for the Problems section was 64%, and for the Solutions section was 55%. No credit was given for "almost" or "close," as can be done with other reliability calculations.

Following is a summary of the categories for TM problems and solutions, along with definitions and examples of respondent descriptions.

TABLE 1. Summary of Categories for TM Problems

<u>Code</u>	<u>Description and Examples</u>
00.	No Response
01.	<p>Lack of Communication (Input Needed to Plan for Training)</p> <p>Respondents indicated that to plan for training higher command needs to provide more guidance about the training needs and training requirements (e.g., battalion, commander, division, Divarty, and Four-Star General). Higher headquarters also provides inconsistent and nonsensical information. There is also a problem related to obtaining the necessary information from NCOs and the soldiers themselves.</p> <ul style="list-style-type: none"> • lack guidance and resources from higher headquarters to plan training schedule; need input from battalion, commander, division, Divarty, Four-Star General and so on • inconsistent and nonsensical guidance from higher headquarters in many different areas such as funding, training objectives • requests for guidance are ignored or not passed up the chain • difficult to get the necessary information from units, section sgts., platoon sgt., staff sgts., NCOs, and other soldiers • obtaining accurate information about training that has been conducted
02.	<p>Training Management Inhibitors</p> <p>Training managers have too little time to properly manage training. Too much guidance is provided by higher headquarters, and as a result immediate commanders have very little input into the training schedule. Also included are statements that suggest Army regulations, policies, and doctrine fail to provide clear guidance for planning training programs.</p> <ul style="list-style-type: none"> • too much training is directed from above; once higher commands have identified training needs, there is very little time remaining for the immediate commander to plan for the unit's needs • training is micro-managed by higher commands • training manager has too many distractors to properly perform the job (e.g., answering phones, counseling problem soldiers, determining promotions and awards) • too little information available about the unit to manage and plan for training • too few staff members to adequately manage training

TABLE 1 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • Army policies, regulations, requirements, and doctrine provide too little guidance for training needs and standards • requirements from different sources sometimes conflict • Army manuals give too little information to plan training
03.	<p>Number of Training Requirements</p> <p>This refers to the actual number of different types of tasks that must be trained including common skills and MOS-specific skills. It also includes comments related to force modernization and technological changes that produce additional training requirements. Often respondents indicate that there is too little time to train in all required task areas.</p> <ul style="list-style-type: none"> • too many training requirements for the time available; difficult to determine priority of training requirements • too many requirements versus time available; too many to fit into a single year • difficult to meet training standards with such little time • too many training requirements mandated from above; excessive requirements mandated from all levels • technological changes (force modernization) result in more training requirements • difficult to meet standards in common skills and individual MOS skills areas • difficult to train MOS specific tasks for low density MOS (one to two soldiers per MOS)
04.	<p>Training Documentation and Paperwork Requirements</p> <p>Units report that there is too much paperwork to complete and that it is difficult to plan for training and to conduct training because of the many forms they need to complete. Also many of the forms are similar or identical. This process needs to be streamlined by making computers, photocopiers, and standardized forms available</p> <ul style="list-style-type: none"> • lack necessary equipment to complete all the paperwork in a timely fashion (e.g., copiers and computers) • lack standardized forms to document training schedule and training outcomes

TABLE 1 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • required training documents are repetitious; they ask for the same information over and over again • too little time to complete training and complete all required documentation • enormous amounts of paperwork to complete • report forms are difficult to complete; all must be completed manually • too many forms need to be completed to document training plans and schedules, actual training that has been conducted, and outcomes from training • processing training paperwork is time consuming (e.g., getting all the necessary signatures and submitting forms to the correct office on time) • lack high tech equipment to manage training documentation (e.g., computers and people who know how to operate them) • documentation (reporting procedures) constantly change; lack systematic reporting procedures

05. Resource Management

This category is similar to the above category, but it differs with respect to how the available resources are managed, assigned or allocated to units, and made available to units. It also includes the unit's responsibility for managing available resources.

- some types of units appear to have priority over other units when getting access to ranges (e.g., active Army units supercede reserve Army units and support units appear to have lower priority than combat units); scheduled ranges are not always available on the specified day
- rules for obtaining equipment are nit-picky and complicated
- resources are controlled by too many different agencies; this makes it difficult to obtain all that is needed for training
- tends to be a difference between allocated and available ammunition
- difficult to obtain research materials and other documents; they are on order "forever"
- funds are improperly allocated

TABLE 1 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • units do not make use of all available resources
06.	<p>Resource Availability</p> <p>This broad category focuses on problems that units have getting access to equipment, ranges, facilities, funding, ammunition, training aids, school slots, and so on.</p> <ul style="list-style-type: none"> • getting access to equipment, ranges, training facilities, funding, ammunition, and so on to conduct training programs • there is a shortage of training areas and areas that provide for realistic training; too little field time is allocated for this reason • training areas often are located too far away from the unit to be convenient; other units lack the space to maneuver • problems with equipment include the unavailability of equipment such as MILES, microwave vans, and equipment specified in the MTOE; some equipment is poorly maintained and parts are difficult to obtain • insufficient funding; there is seldom enough to conduct the types of training programs needed to meet standards • resource cutbacks curtail training • too few school training slots are available • the proper training aids and other materials (e.g., field manuals) are not always available
07.	<p>Coordinating Information and Training Activities</p> <p>This involves the lack of coordination efforts that should exist up and down the line and across units. The bulk of the statements in this category focus on the unit failing to submit accurate and complete requests and schedules in a timely fashion. Also included are statements about the lack of cooperation between units when scheduling or conducting training programs.</p> <ul style="list-style-type: none"> • submitting paperwork in a timely fashion (e.g., requests for resources, support requirements, deferments, etc.) • using non-compatible computer systems in different units • coordinating with other units to plan and schedule training • providing training feedback and test scores in a timely fashion

TABLE 1 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • training schedules are often submitted late, are incomplete or are inaccurate, as a result commanders do not always have time to review them before sending them up the chain • units fail to cancel when a range or facility will not be used • confirmation of resources is extremely slow • paperwork completed on time may be lost as it moves up the chain • units fail to coordinate with others to make sure scheduled training is conducted
08.	<p>Training Schedule Conflicts and Distractors</p> <p>This broad (and large) category focuses on the many times that higher commands insert short notice changes in the schedule. It also includes distractors which in some cases are the same as higher command changes. Short-fused taskings and distractors can include parades, inspections, VIP visits, and special surveys.</p> <ul style="list-style-type: none"> • chain of command fails to follow the training matrix; higher headquarters changes schedule • last minute events, short-fused suspenses from higher headquarters result in training schedule changes and external taskings (e.g., parades, inspections, VIP visitors, and special surveys) • training is postponed or cancelled at the last minute • long-term training schedules are seldom accurate; they may be accurate about 10% of the time (i.e., 6 months out) • training schedules are seldom locked in even 5 weeks in advance
09.	<p>Training versus Mission</p> <p>This involve the conflict between conducting scheduled training and meeting mission objectives. Mission objectives often take precedence over training. Respondents also indicate that there is too little time to meet both training and mission requirements.</p> <ul style="list-style-type: none"> • many internal taskings that a unit must complete competes with required/scheduled training • mission and mission support activities often take precedence over scheduled training • mission goals may change frequently, as a result training objectives also change

TABLE 1 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • because of mission and training requirements, units are over committed and over tasked and have little time to actually complete all required training • frequently only half of the soldiers from a unit is available because of mission requirements
10.	<p>Unit Compliance with Scheduled Training</p> <p>This category is restricted to unit compliance with scheduled training that survives higher command review and is not postponed or cancelled for other reasons. Basically, units fail to notify soldiers of scheduled training, or soldiers may miss training for personal reasons (e.g., doctor's appointments).</p> <ul style="list-style-type: none"> • failing to ensure that soldiers are informed of training and show up for it • units place too much emphasis on maintenance and too little on training • failing to follow the training schedule; units refuse to release soldiers for scheduled training • units allow other events to assume priority over training (e.g., meetings) • fail to show up for scheduled ranges and schools • soldiers miss training for personal reasons (e.g., doctor's appointments; units do not appear concerned or plan for make-up training sessions)
11.	<p>Quality of Training Programs and Outcomes (This is independent of problems related to Resource Availability.)</p> <p>Instructors are not qualified to conduct training programs; they are not prepared or are poorly trained themselves. Training is not geared toward going beyond the standards; students sometimes fail to meet the standards. It is difficult to evaluate training programs because of limited resources and personnel. More realistic training is needed.</p> <ul style="list-style-type: none"> • instructors are not qualified or are not prepared to conduct training • instructors (first-line supervisors) are not properly trained before conducting a training class; they are not well informed about the objectives of the training program • training is geared toward meeting standards and not excelling; in some training programs, soldiers do not even meet standards

TABLE 1 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • too little training time is available for soldiers to become proficient • lack resources and time to properly evaluate training programs • lack realistic training • materials for training programs are outdated or inaccurate (e.g., Training Education Center tapes, and Army correspondence courses) • training is not conducted according to BTMS • valuable training programs have been cut (e.g., supervised on the job training) • units providing mission support in training programs may find that there is little or no work
12.	<p>Human Resources Management and Needs (This is independent of the need for qualified, prepared instructors.)</p> <p>Training management suffers because of high turnover rates, continued high workload demands, poor person-job matches in the training management area, general shortages of personnel, and poor staff utilization.</p> <ul style="list-style-type: none"> • shortage of personnel in the unit; when soldiers leave they are not replace, but the workload remains the same; thus, there is too little time for training activities • high rates of turnover which result in increased training needs • shortage of experienced personnel and senior grade personnel; too few know training doctrine, regulation and policy • person-job mismatches, especially with respect to training management positions • poor utilization of staff for training management purposes • training personnel often have other required duties, or units do not have someone assigned to training
13.	<p>Time</p> <p>If no other information is provided or the information does not help to determine where time is limited, such as in training management, coordinating training, and so on, use this code.</p>

TABLE 1 (continued)

<u>Code</u>	<u>Description and Examples</u>
99.	Unable to categorize The statement does not appear to fit in any of the above categories. For example, "environmental impact of smoke generators" does not appear to fit in any of the above categories. <ul style="list-style-type: none">• I do not spend enough time managing training to have major problems• environmental impact of smoke generators• repeated training

TABLE 2. Summary of Categories for Suggested Solutions to TM Problems

<u>Code</u>	<u>Description and Examples</u>
00.	No Response
01.	<p>Improve Planning Efficiency</p> <p>Higher headquarters and units should plan training more efficiently to avoid problems such as turbulence between units, long distances between units training together, and over committing soldiers' time. Units should plan training according to available resources and identify resources well in advance.</p> <ul style="list-style-type: none"> • better planning at higher headquarters would help us to do our job better • use proper planning procedure • more advance planning should be used to reduce turbulence between units, to better utilize units in different exercises, and to help ease problems related to lengthy distances between units that are training together • units should do a better job of planning and projecting near and long term training events • units should plan better so that soldiers are not over-committed • units should plan and identify resource needs in advance, especially if resources must be fabricated or obtained from other sources • training should be planned according to available resources
02.	<p>Command Should Establish Training as a Priority and Establish Training Priorities, including Develop and Enforce Hardline Training Objectives</p> <p>Chain of command should support the training schedule, supervise first line supervisors as they train, and encourage all scheduled for training to attend. Training should be made a top priority. Training tasks should be prioritized to determine what needs are most immediate. Respondents have provided several suggestions for mandating training to ensure that objectives are met. These suggestions involve setting aside specific days or times for training without exception.</p> <ul style="list-style-type: none"> • from DA down, priorities must be set • reduce yearly mandated training • avoid unnecessary training • identify and concentrate training on high priority requirements

TABLE 2 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • reduce time spent on other types of tasks • prioritize training tasks according to mission • recognize that the National Guard and Reserve cannot meet Active Army training standards and adjust their training requirements to meet obvious priorities • chain of command should enforce the system • command should emphasize training; if it is scheduled, then it should take place • commanders at all levels should get involved in training • company commanders and first sergeants should actively supervise first line supervisors to make sure training is effective • commanders should decide where to place the training emphasis (e.g., on special training programs, to make sure schedules are met). • set aside one day each month for mandatory training • authorize more Individual Development Training • allow more time for training • allow a percentage of drill time with no staff activities so training can be conducted • schedule and enforce 25% time for maintenance and maintenance training • establish a continuous program for specific MOS that require licensing (e.g., marine certification) • Training Extension Course should be mandatory for MOS specific training • meet all administrative requirements on a scheduled date once each year (e.g., AIDS testing, shots, ID cards, dog tags, physical, and over-40 screening)
03.	<p>Modify the Training Management Program and Process</p> <p>This involves decentralizing training management activities and decisions so that more information is obtained from lower levels and lower level commanders are encouraged to make decisions, staff are more</p>

TABLE 2 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<p>aggressive in training management and time management. Also part-timers have more input into training schedules and commanders have more flexibility in scheduling training.</p> <ul style="list-style-type: none"> • decentralize training management giving lower commands more input in the decisions • improve training management at the division and subordinate unit level • more staff at each level should be encouraged to get involved in training management • allocate more funds to training management • staff should employ aggressive time management procedures (e.g., set aside time to handle phone calls, avoid useless meetings) • find a better way to manage support cycles • first line supervisors should be more involved in managing the training program • part-timers should have more input into training management • commanders should have more flexibility in scheduling training
04.	<p>Adhere to/Streamline Training Management Procedures</p> <p>Respondents indicate that if all units and higher command would follow the TM procedures then training activities would actually go more smoothly. Units should follow all guidance, complete all forms on time and make sure they are accurate. Higher headquarters should make sure that the paperwork flows through the system more quickly, they should make decisions more rapidly, and review Army doctrine.</p> <ul style="list-style-type: none"> • perform training management activities according to the BTMS (Battalion Training Management System) • units should follow regulations and guidelines (350-1) • process all forms, tests, and other information the time allotted • units should follow guidance on lead times required for requesting resources • speed up decision making process • get information to and from commanders faster

TABLE 2 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • verify information accuracy by checking resources • units should use a checklist to make sure all information is provided • Corps and Division staff should read Army doctrine and follow Army guidelines
05.	<p>Improve Lines of Communication and Coordination Activities (to Plan and Schedule Training)</p> <p>Higher commands should disseminate information more broadly and personally notify units of scheduling changes. Units should spend more time coordinating training activities within the unit and with other units.</p> <ul style="list-style-type: none"> • ensure widespread distribution of training schedules • Brigade should provide an advance list of testing notices • when short notice changes are required, Division should personally inform each unit • coordinate with maintenance personnel and trainers to plan training activities • improve communications between units and between local Reserve and National Guard • conduct more meetings to ensure all personnel are aware of the schedule and of training needs • get feedback from NCOs about training outcomes
06.	<p>Improve Army Documents (Regulations) and Higher Guidance</p> <p>This includes developing doctrine that applies to both peace and war time. Provide only one Army document that guides training and develop doctrine for other specific needs. Higher command should provide consistent guidance.</p> <ul style="list-style-type: none"> • develop documents that can be used for both war and peace • allow only one Army regulation that deals with training • develop Army doctrine for specific needs (e.g., for FA units and for CBT units) • publish new DA Pam 350-37 and AR 350-37 • higher echelons must provide better and more consistent guidance

TABLE 2 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • more specific training goals should be provided • guidance from the different commands should coincide
07.	<p>Improve Administrative Procedures (Automate)</p> <p>Respondents offer several suggestions for the types of computer equipment that is needed, and the types of documents and software that should be available on computer. They also suggest that forms should be standardized, administrative requirements in general should be reduced, and redundant forms should be eliminated.</p> <ul style="list-style-type: none"> • increase allocation of automated equipment • automate contents of manuals, FMs, ARTEPs, and so on • provide computerized forms that are easily accessible • develop computer programs that reduce the amount of repetitive information needed • establish a command database that is accessible to all units • establish computer networks for units • put the training schedule on computer so that it can easily be changed • provide more office space for the training NCO • minimize and reduce administrative requirements • eliminate redundant forms, standardize forms • do not make job books mandatory
08.	<p>Improve Resource Management and Resource Forecasting</p> <p>Units and higher commands should more accurately forecast their resource needs. Materials request services should be more centrally located. Range scheduling should be more accurate. Units should be given a list of available resources to identify their needs.</p> <ul style="list-style-type: none"> • provide better budget forecasting and stick to those plans • keep training aids at a more convenient location • centralize materials request processing • ensure better, more accurate range scheduling

TABLE 2 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • provide more accurate estimates of resource needs (e.g., ammunition) • do not prioritize units when scheduling ranges; or give some units priority over others (e.g., Reserve should have priority over Active Army) • higher headquarters should not loan out the equipment • money should be allocated more reasonably, emphasizing training needs • local units or facilities should be allowed to purchase training aids • provide all units with a list of the training resources available • units should be allowed to use external resources to train • the training NCO should have access to training aids
09.	<p>Increase and Improve Available Resources</p> <p>In general, the number of resources available should be increased; this includes funding, ranges, equipment, training aids and so on. In many instances, the resources should also be improved. For example, MOS libraries should be updated, local ranges expanded, and equipment made more soldier-friendly (user friendly).</p> <ul style="list-style-type: none"> • provide better library references • attempt to provide all necessary resources, land, money, ammunition, and time • make all equipment on MTOE available • improve training aids such as simulators, maps, TASC items • provide more MILES equipment, and more training aids and TASC • update MOS libraries • provide suitable training areas for actual field operations • provide more funds for in-field training, formal schooling, for on-the-job training programs • improve current library system • expand local ranges, move units closer to range facilities

TABLE 2 (continued)

<u>Code</u>	<u>Description and Examples</u>
10.	<p>General Personnel Actions</p> <p>Respondents suggest that the staff should be increased, rewarded when they perform effectively, and fired when they perform poorly.</p> <ul style="list-style-type: none"> • reduce the workload so that it is consistent with manpower reductions • more effort is needed to provide incentive to retain high quality personnel • provide longer job assignments • the number of staff should match the TOE • Reserve units should be managed by full-timers • get more people in to fill vacancies • reduce turnover • all training NCOs should be full-time • fire poor performers (unresponsive people) • eliminate the red tape to hire qualified personnel • increase the number of clerks • adequately staff administrative offices • provide more active duty slots for Reserve personnel
11.	<p>Lock in Training Schedule, Reduce Taskings, and Provide Advance Notice for External Taskings</p> <p>A lock-in time should be enforced for the training schedule. Higher headquarters should not be allowed to make changes and should minimize external taskings and distractors. Higher should also be required to provide advance notice of schedule changes.</p> <ul style="list-style-type: none"> • enforce a three-, four-, five-, or six-week or 90-day lock out • adhere to published plan • restrict higher headquarters from making changes • once the calendar is distributed then division and corps should stick to it • develop contingency plans for inclement weather to avoid rescheduling

TABLE 2 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • headquarters should minimize visits and external taskings • higher command should provide advance notice of changes to the schedule (e.g., four-week advance notice) • higher headquarters should reduce the number of taskings • limit outside requirements • stop demonstrations
12.	<p>Provide Training Programs for Planners and Trainers</p> <p>Special training programs should be provided for training management personnel so that they understand the system and to help manage time better. Trainers should also participate in training programs.</p> <ul style="list-style-type: none"> • provide training programs for trainers so they are aware of scheduling procedures and the tools available and can prepare visual aids • educate subordinate units about administrative tasks • provide mandatory training for those operating computer systems • provide NCOs with classes for identifying training needs • provide leaders with instruction on training management • trainers should be BTMS qualified • training management staff need time management courses
13.	<p>Identify New and Innovative Training Programs and Evaluation Programs</p> <p>Respondents have suggested several new types of training programs and evaluation programs. For example, provide just one standard training program for everyone. Schools should provide units with instructors to explain new equipment. A new on-the-job training program should be implemented.</p> <ul style="list-style-type: none"> • explore alternate, cost-effective ways to train • provide an improved on the job training program • for some subjects require training every two years (MOB briefings) • Reserve should adopt the up-down cycle method of training • incorporate METL/ARTEP into YTP and YTC

TABLE 2 (continued)

<u>Code</u>	<u>Description and Examples</u>
	<ul style="list-style-type: none"> • establish a training base with the local community to use MOS-related skills • provide one standard training program across the board • sectional training should be eliminated and the entire unit should perform training at the same time • a training evaluation program must be implemented • units should be evaluated by how well they adjust to changes in the training schedule • schools should provide units with instructors to explain new equipment • must have institutional changes in approach to basic, advanced, and Command and General Staff College courses • the schools themselves should be made more effective
99	Unable to categorize. Cannot understand the statement or it is not categorizable.

APPENDIX D-2

SUMMARY TABLES OF PROPORTION OF RESPONDENTS
ENCOUNTERING PROBLEMS AND RECOMMENDING SOLUTIONS

APPENDIX D-2

SUMMARY TABLES OF PROPORTION OF RESPONDENTS ENCOUNTERING PROBLEMS AND RECOMMENDING SOLUTIONS

Tables 1-3 present proportions of respondents listing TM solutions by Echelon (Table 1), by Component (Table 2), and by Rank (Table 3). Tables 4-6 present proportions of respondents suggesting TM solutions by Echelon (Table 4), by Component (Table 5), and by Rank (Table 6). Refer to Appendix D-1 for a more detailed description of the TM problem and solution categories.

TABLE 1. Proportion of Respondents Encountering Training Management Problems by Echelon

Problem	Co	Bn	8de	Div+
Communication	.16	.14	.19	.07
TM Inhibitors	.21	.20	.11	.17
Training Requirements	.17	.16	.16	.12
Documentation	.18	.11	.08	.07
Resource Management	.17	.13	.24	.15
Resource Availability	.28	.30	.27	.32
Coordination	.11	.18	.19	.15
Schedule Conflicts	.42	.42	.51	.29
Training vs. Mission	.15	.13	.08	.10
Compliance with Schedule	.04	.15	.05	.10
Quality of Training	.23	.20	.08	.24
Personnel Problems	.13	.15	.14	.22
Time	.04	.07	.05	.02
Number of Respondents	151	142	37	41

TABLE 2. Proportion of Respondents Encountering Training Management Problems by Component

Problem	US Active	Forward Deployed	Reserve
Communication	.14	.10	.21
TM Inhibitors	.13	.24	.22
Training Requirements	.11	.16	.23
Documentation	.13	.07	.20
Resource Management	.16	.16	.15
Resource Availability	.28	.27	.33
Coordination	.20	.13	.09
Schedule Conflicts	.55	.43	.22
Training vs. Mission	.13	.19	.06
Compliance with Schedule	.08	.10	.10
Quality of Training	.17	.17	.30
Personnel Problems	.20	.06	.17
Time	.04	.05	.07
Number of Respondents	143	124	104

TABLE 3. Proportion of Respondents Encountering Training Management Problems by Rank

Problem	Enlisted	Officer
Communication	.15	.14
TM Inhibitors	.20	.18
Training Requirements	.15	.17
Documentation	.20	.08
Resource Management	.13	.18
Resource Availability	.23	.33
Coordination	.18	.12
Schedule Conflicts	.27	.51
Training vs. Mission	.13	.13
Compliance with Schedule	.13	.07
Quality of Training	.17	.23
Personnel Problems	.17	.13
Time	.06	.05
Number of Respondents	149	222

TABLE 4. Proportion of Respondents Suggesting Training
Management Solutions by Echelon

Solution	Co	Bn	Bde	Div+
Planning Efficiency	.12	.11	.10	.18
Prioritize and Enforce Training	.38	.47	.26	.48
Modify TM Program	.21	.09	.10	.05
Adhere to TM Procedures	.03	.09	.19	.05
Improve Communication	.15	.17	.29	.10
Improve TM Guidance	.09	.08	.10	.05
Automate TM Procedures	.16	.17	.13	.20
Improve Resource Management	.18	.14	.32	.15
Make Resources Available	.19	.16	.16	.13
Personnel Improvements	.16	.14	.06	.30
Follow Training Schedule	.32	.30	.26	.20
Educate Trainers and Planners	.06	.12	.03	.28
Update Training Program	.14	.19	.13	.10
Number of Respondents	138	127	31	40

TABLE 5. Proportion of Respondents Suggesting Training Management Solutions by Component

Solution	US Active	Forward Deployed	Reserve
Planning Efficiency	.13	.14	.09
Prioritize and Enforce Training	.31	.50	.44
Modify TM Program	.06	.24	.11
Adhere to TM Procedures	.13	.04	.03
Improve Communication	.14	.16	.20
Improve TM Guidance	.10	.06	.08
Automate TM Procedures	.17	.13	.21
Improve Resource Management	.17	.19	.17
Make Resources Available	.15	.12	.24
Personnel Improvements	.16	.15	.18
Follow Training Schedule	.36	.35	.13
Educate Trainers and Planners	.09	.09	.13
Update Training Program	.09	.15	.24
Number of Respondents	127	110	99

TABLE 6. Proportion of Respondents Suggesting Training Management Solutions by Rank

Solution	Enlisted	Officer
Planning Efficiency	.10	.14
Prioritize and Enforce Training	.38	.44
Modify TM Program	.15	.13
Adhere to TM Procedures	.06	.08
Improve Communication	.19	.15
Improve TM Guidance	.08	.09
Automate TM Procedures	.23	.13
Improve Resource Management	.15	.19
Make Resources Available	.14	.19
Personnel Improvements	.13	.19
Follow Training Schedule	.21	.35
Educate Trainers and Planners	.08	.12
Update Training Program	.15	.16
Number of Respondents	136	200

APPENDIX E

DOCUMENTS USED AND PRODUCED IN THE PRACTICE OF TRAINING MANAGEMENT

APPENDIX E

DOCUMENTS USED AND PRODUCED IN THE PRACTICE OF TRAINING MANAGEMENT

DOCUMENTS USED AND PREPARED

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
01	Army Mission Guidance	AR 350-1 DA Pam 350-38 TOE (Table of Organization & Equipment) MTOE (Modified Table of Org. & Equip.) AR 604-5 AR 190-11
02	Army Training Guidance	Army Regs Gunner (STRAC) Army Training, DA Reg 350-1 Opposing Force Program, AR 350-2 Army Individual Training Evaluation Program, AR 350-37 Army Physical Fitness and Weight Control Program, AR 600-9 Qualification and Instructional Firing with Weapons and Weapons Systems, AR 350-4 NCO Development Program, AR 350-17 DA Messages DA Pam 350-8 AR 220-58, AR 220-50 DA Circ. 350-87-1, ITEP Announcement Higher Hdqts Requirements AR on MOS
03	FORSCOM Training Guidance	Mission Capstone CAPSTONE FORSCOM Form 1-1R FORSCOM REG 350-4 FSC Form 1-1-R APRC, FORSCOM 350-2 1-R FORSCOM PAM 350-5 Higher CAPSTONE Guidance Active Component Training, FORSCOM 350-1 FORSCOM 350-2, Appendix C Five Year Exercise Plan NTC Objectives AT Evaluation

<u>COOE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
04	TRADOC Training Guidance	STP's FM 21 - Series Performance Standards Job Books Common Task Manual FM 101-1, 00-5, 15-7, 3-54B, 3-3 3-4, 3-5, 1-100, 1-140 ARTEP 71-2 Doctrinal FM's Common Task Soldier's Manuals, FM 21-2,3 STP 3-5432-SM STP 54 B32-SM-Tng FM 1-140, Gunnery Requirements ARTEP 43-79 ARTEP 129-56 FM 17-95 FC 17-97-1 FCs FC-11-? FM 252-6 FM 25-2-6 Soldier Tng Publications ARTEP 29-156 STP CTT SQTs (Skills Qualification Tests), 11HSQT, 11 BSQT SMs, Soldier's Manuals CTT, Common Task Test ITPT, Individual Training Proficiency Test MOS Manuals ARTEPS AMTPS TRADOC PAM 350-1 Field Manuals (FMS) Attack Helicopter Battalion FM Helicopter Gunner FM Aircrew Training Manuals Commander's guide for ATMs MNT Reqts FLT Hr Pgm TMs Trainer's Guide
05	Army-Command Training Guidance	AR 350-1 FC 7-54, CAB How to Fight FC 7-53, Assault Gun Company Doctrine FC Form 1R

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
06	Installation Training Guidance	Local Regs, Local Reg 700-2 Local 350-30 Local 350-31 Local 350-1 YTC YTP SQT Testing Local Reg 350-14 Local Pam 350-2 Local Reg 350-3 Reserve Component ITEP Testing DFs Letters Memorandum of Instruction (MOI)
07	Division Mission Guidance	Division War Plans Mission Statement/FM Doctrinal OPLANS Intell Estimates Intell Summaries Division RSOP-Readiness Standard Operating Procedures Division Operations Plans War Plans
08	Division Training Guidance	Bayonet Tng Brief Division (Motorized) Reg. 350-1 Division Master Gunnery Training Requirements G-3 Training Guidance for External Eval. of Crews Division Commanders Training Guidance Division-Directed Training Division Command Training Guidance Division Circular 350-2 Octofoil Focus Training Goals Division Enabling Tasks Division METL Div Battle Tasks/Book Div Focus Local Reg 350-3 Division Cir 725-2 Higher HQ Guidance Ltr Memos Manning Tables Div OPORDS TC's

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
09	Division Long-Range Planning	ROTC Planning Meetings Division Master Training Calendar Division Long-Range Calendar Division Annual Training Guidance Div Long-Range Guidance
49	Division Short-Range Planning	Division Quarterly Training Guidance Division G3 Training Notes Division Quarterly Training Meeting
10	Brigade/MSR/Regiment Mission	Unit Mission BDE Missions Statement BDE Tng Cir
11	Brigade/MSR/Regiment Training Guidance	BDE METL BDE Circular Mission List Bde CIR 350-88-1 Bde CIR 350 Brigade Commander's Training Guidance Brigade Mission Essential Task List (METL) BDE Vision Statement BDE Commander's "Visions" Goals BDE Gunnery LOI BDE Internal SOP BDE Battle Book BDE Commander's Focus Bde Guidance Unit MTOE Brief by Cmdr DIVARTY Trg Guidance
12	Brigade/MSR/Regiment Long-Range Planning	Yearly Tng Calender Training Outlines Bde 5-Year Training Plan Multi-Year Training Plan BDE Training Calendar/Guidance BDE Long Range Calendar/Guidance Brigade Annual Training Calendar BDE Master Training Calendar BDE Long-Range Plan Brigade Annual Training Guidance Bde FY Training Guidance TRG Calendar

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
13	Brigade/MSR/Regiment Short-Range Planning	Section Annexes OP Order Training LOI Draft OPLAN BDE Quarterly Calendar/Guidance BDE Mid-Range Planning BDE Quarterly Training Focus BDE Quarterly Training Meeting YTP YTC
14	Brigade/MSR/Regiment Near-Term Planning	Disposition Form (DF) Suspense Listings BDE Event LOI/MOI BDE Weekly Training Meeting
15	Battalion Mission Guidance	BN Missions Guidance CDR's Guidance LTR Mission Statements
16	Battalion Training Guidance	BN OPORDS/LOIS BN Op Order Bn CIR 350 METL Bn 1-1R (METL) Work Plans Mission List BN Goals BN Mission Essential Task List Letters Specifying BN Training Objectives BN Critical Missions Task List BN Battle Book BN Historical Files BTMS NCODP NCO Development Program BN Tng Circular YTC YTP SOP CMDR Guidance Training Work Plan, Training Plans BN CAPSTONE Guidance Ltr MILPO, DA, FIN SOP or Memo
17	Battalion Long-Range Planning	MSR/SEP Bn Training Schedules Battalion Annual Training Calendar/ Guidance BN Training Calendar BN Long-Range Goals BN Long-Range Calendar

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
		BN Master Training Calendar BN Long-Range Training Meeting YTC
18	Battalion Short-Range Planning	Section Annexes OP Order Training LOI Draft OPLAN Battalion Quarterly Training Guidance Battalion Short Range Calendar BN Quarterly Training Meeting BN Mid-Range Planning YTC BN YTP
19	Battalion Near-Term Planning	Bi-Weekly Calender Bn OPORDS/LOIS Disposition Forms Suspense listings BN LOI/MOI Battalion Monthly Training Calendar Battalion Weekly Training Meeting BN Weekly Training Notes BN Training Plans Last Minute BN S3 Guidance
20	Company Mission Guidance	Company Battle Book Company Tactical SOP Mission List
21	Company Training Guidance	Section METL Company METL Company Goals CO Commander's Outlook Enabling Battle Task List List of Critical & Non-Critical Trng Tasks CO Training Objectives Unit FMs Section Workplans Troop CMD Circulars Troop TNG Circular COTOE Mission List Work Plans Task List OPORD OPLANS TRG Checklist Co Cmdr's Tng Goals LOI YTC

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
22	Company Long-Range Planning	Company Trng Schedule CO Long Range Plan 18 Month CO Trng Guidance Calendar Trg Calendar Long Range Training Calendar LOI
23	Company Short-Range Planning	Company Quarterly Training Calendar/ Guidance Company Short Range Calendar Company Training Board Company Training Plans BTY YTC YTP YTC Training Schedule
24	Company Near-Term Planning	Company Weekly Training Meeting Company Daily Status Report CO Training Brief to BN CO Commander Guidance CO Files Prepare Platoons for Training Verbal Guidance to Leaders Tng LOI LOI/monthly Co Tng LOI
25	Training Schedules	Mil Form 28, 28A Co Periodic Trng Schedules Mil Form 30, Individual Trng Plan Mil Form 31 Outline of Tng Plan Battalion Training Highlights Draft Company Training Schedule 2-4 Week Out Training Schedule Revised Company Training Schedule Company Training Schedule HFL Form 823-DG3 BDE Training Highlights Memo Monthly Training Schedules Work Plans Exercise schedule Platoon Maintenance Schedule Flt. Hr Recommendations Production control MNT Priorities

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
26	Taskings	Division Taskings Brigade Taskings Divarty Taskings Battalion Taskings Directed Event CG Directed Events ADEA Appraisal & Test Worksheets OTEA Worksheets Test and Appraisal Summaries Tasking DF Mission/Tasking Board
27	Training Results	ARTEP After Action Comments Evaluation Report Evaluation Checklist Lessons Learned Evaluation Form Bde Assessment C-75 SIDPERS Reports SQT Schedule ITEP ISR'S TVI/TAV Results IG Results Mortar Gunner Exam Tank Gunner Scores After Action Reports AT Evaluation AAR's Drill Reports Assistance Reports Job Books SQ Tests CTT Tests ARTEP Eval 1-R Eval IG Inspection JB Non-MOS Qual Rpt Cdr Tng Analysis 6A Check List (IG) AGI Reports Physical Security Inspections Tng Inspection Rpt Personnel Observation SQT Test Results SQT Eval Weapons Qualification Results PT Test Results CTT Eval CTT Results Collective Training Results Training Visit Report

CODEDOCUMENT CATEGORYDOCUMENT NAMES

After Action Report
Verbal Results to Unit Leaders
Training Management Evaluation Report
Form
Training Quality Checks
Mission Request & After Action Report
Battalion ARTEP Training Status
BN Individual Training Proficiency
Test Results
BN SQT List (Who needs to take test)
CO SQT List (Who needs to take test)
Company Dragon Night Fire Scorecard
Company Range Report
Individual Soldier Report (ISR)
Subjective Evaluation/Notes on
Training
CO ARTEP Results
Job Books
Training Records, (Previous training
schedules)
T.P. or U. Assessment Matrix
ITEP Results
EDRE Results
Identified Training Weaknesses
Future Training Recommendations
Evaluate Training Readiness
Color Code Task Readiness by Percent
AT Worksheets
ARTEP Worksheets
Inspections
Briefing Charts
Feedback frm Pls & PSGTs
Transmittal disks
Transmittal Letters
Officer & Enlisted Personnel Updates
Log Book Reviews
Higher HQ Evals
363 Form 148R
Staff Visit Forms
Staff Visit Rpts
Training Performance
Training Qual Stats
Training Qual Checks
Log Annex
CRI Evaluation
Fuel Rpt
Ammo Rpt
Quarterly updates for Cmd on Goals and
Objectives

<u>COOE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
		Staff & Cmd updates Section Training Analysis Section Annexes Cdr Training Analysis
28	Readiness Reporting	USR Monthly Status Report DA 2496 Trng Analysis Report 1-R Report of Tng Performance of Reserve Components Man Day Usage Report RMA Control Log (Readiness Management Assembly, Manages Man Day Status) USR Report Personnel Rosters/Rosters 2406 Vehicle Status 2406 Report AR 220-1, 220-50, 220-58 FORSCOM Supplement to AR 220-1 DA Form 2715 Report DA Form 2406 Personnel Worksheets Equipment on Hand Worksheets Commander's Cover Letter Monthly USR Briefing SQT Summary Personnel Repl Proc Casualty reporting Status of Op Res. METL Status Chart Unit Manning Report
29	Training Event Plans	CML FTX FTX Schedule Exercise LOI Past Tng Schedules Mil Form 30 Mil 30-Tng Outline Tng Outlines Drill Mtg Agenda Instruction Notices Major Training Event (FTX, Live Fire) Plans Trng Event MOI's

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
30	Training Evaluation Guidance	CI (Command Inspection) Checklist, FC 20-3 Command Inspection Meetings CI (Command Inspection) Review of Training Eval. Training Meeting Inspection Checklist
31	Funds Management Information	Funds Allocation P-81 Fund Allocation Status COB, Command Operating Budget Expenditure Summaries TMACS TUFMIS AR 350-31 FORSCOM PAM 350-31 9ID LOI for TMACS BN Budget for Classes of Supplies CO Guidance on Budget AR on Fiscal RQMTS Yearly Budget Request Unit Fund Status PBAC Charts PBAC Briefings PBAC
32	Schools Allocation	Weekly Military Schools Performance Report FORSCOM Ltrs Allocating Quotas BNCOC Status (Basic NCO Course) Announce Special Classes Quota Allocations Circ. 350-4, Schedule of Schools STRAMS Off-Post Schools Info. DA Schools Slots Available Division On-Post Schools Allocation Notice Div. Comptroller Schools Budget CASS Course
33	Schools Request	Form 888 Off-Post Schools Request Form On-Post Schools Request DA Form 4187 Approval/Disapprov of Schools Request Request for Training
34	Ammunition Allocations	Division Ammunition Annual Allocation Report Ammo Allocation Brigade Ammunition Allocation Form 82

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
		Battalion FY Expended Ammunition Summary TAMIS Expenditure Report Monthly Reconciliation
35	Ammunition References	Local Reg 700-2 Division Weapons Density DA Pam 710-2 Local Reg. 700-20 Division Pam 350-1 FORSCOM 700-4 DA Ammo Reg. DA Pam 350-85-4, Ammo STRAC Guide TB 9-1300-385 NGB Dir on Ammo Inst. Dir on Ammo Local Ammo Regs.
36	Ammunition Forecasts	Ammo Forecast Army Short Supply Ammo Report Monthly Ammo Forecast Brigade Ammunition Requirements Forecast DA 5514-R TAMIS Forecast Report CO Ammo Forecast
37	Ammunition Requests	DA 581 Ammo Request Ammunition Requests Request for Ammunition DA Form 581
38	Training Aids Forecasts	TASC Forecast TASC Catalog Scheduled MILES Forecast, Local Form 585
39	Training Aids Requests	TASC Request Form Local Form 473 Tng Aid Request Request for MILES Support, Local Form 584 Approved/Disapproved MILES Request Form TASC Information Training Aids List Request for training aids Historical TSL Support

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
40	Aviation Request	Local Form 1063 Army Aviation Support Request Flight Cost Analysis Aircraft Request Approval/Disapproval of Aviation Request
41	Range Control References	Local Reg. 350-30, Range Control Reg. Local Reg. 350-31
42	Range and Training Area Requests	Form 472, 99, 473 Local Range Request RGFL Request Tng Area Request Range Request Facility Request 6-Month Trng Area Conference Monthly Training Area Conference 90-Day Range Scheduling Conference Letter Identifying Range & TAs Range & TA Discussion Installation Range, Facility, and Training Area Request Off-Post Training Area Request Response to Off-Post Training Area Request Request for Training Area Request for Range BN Range Request Approval from Range Control Range Forecast Tng Area Forecasts
43	Range and Training Area	Informal Info. on Range & Training Area Availability from Range Control Cancellation of Training Facility Local Form 2035 Range Control Projected Scheduling Projected Training Range Schedule Range Control Unit Scheduling Form 2-Week Forecast of Training Area Usage Weekly Range Bulletin Headquarters, Corps, and Installation Daily Bulletin

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
		Notice to Airmen (NOTAM) Range/Training Area Control Log Daily Range Schedule Range Control Outreach Program Monthly Range Conference Outreach Program ROTC Coordination Installation Map Installation Land & Range Book
44	Range Usage Report	Monthly Range Usage Report Range and Training Area Mandays Report Information re Range Usage & Restrictions Area Surface Danger Zones
45	Range Control Resources	Resource Requirements Specifications RESOURCES Guidance to Target Makers Supply Orders Request for EOD (Explosive Ordinance Demolition) Support DEH Engineering Workorders
46	Support Requests	CDE (Chemical Defense Equipment Report) DD Form 16-10 Req. for TDY travel for Military Personnel NGB Form 102-10 Req. for orders for non-Active Duty Personnel Exercises Information and Coordination Request State Support Requests Trans Request Ration Request MTT Supt Request (Mobile Tng Team Support Request) Request for Fuel Request for Chemical Items Request for Food Request for Medical Support Request for Equipment Request for Facilities Request for Transportation Personnel Roster Local Form 424 Local Form 744 Request for Battle Simulators Request for Aviation Support NBC Eq Status Report

<u>CODE</u>	<u>DOCUMENT CATEGORY</u>	<u>DOCUMENT NAMES</u>
		CDE Report Vehicle Request Chow Request TSC Service Requests
47	Resource Forecasts	Fuel Forecast Resource Forecast Mid-Range Resource Forecast Ask Commander for Resource Needs BN Resource Forecast CO Additional Resource Requirements Previous Year Resource Expenditure Info. Identify Resource Requirements Resource Allocations Resource Constraints Trans Forecast MTT Forecast TDY Forecast
48	Resource Requests	156-R, FORSCOM Request for Special Equipment needed for Annual Trng Resource Request Commander's Note/Memo to Get a Resource Resource DF Platoon Leader's Resource Requests Ration Request Unit Pubs Order Form Vehicle List
50	Support References	UTES REG RNEG REG 99
60	Army Command Guidance	6A PAM 350 6A PAM 350-5 6A 819
61	National Guard Directives	NGB 64 NGB 102-10
62	State Army Guard Training Guidance	State CIR 350 State National Guard Tng Circular CIDTEP-WA Reg 350-9 State Trg. (Tng) Cir State Tng Cal
90	Not Codable	

APPENDIX F

JOB TITLES OF SURVEY RESPONDENTS AND
INDIVIDUAL RESPONDENT TRAINING
MANAGEMENT COSTS

APPENDIX F

JOB TITLES OF SURVEY RESPONDENTS AND INDIVIDUAL RESPONDENT TRAINING MANAGEMENT COSTS

TABLE 1. Representative Training Management Organizations

The numbers of personnel in the generic TM staff structure may hold any of the following job titles. As the data indicate, some persons outside of these categorizations also perform TM.

1. Company/Battery/Troop/Detachment

<u>Rank</u>	<u>Number</u>	<u>Name(s) of Positions</u>
Officer	1	Commander Company Commander Battery Commander Troop Commander Detachment Commander Executive Officer Training Officer Company XO
Enlisted	2	First Sergeant Training NCO Chief Firing Battery

2. Battalion/Squadron

<u>Rank</u>	<u>Number</u>	<u>Name(s) of Positions</u>
Officer	8	Commander Battalion Commander S-3 Battalion S-3 Battalion Operations Officer Operations Officer S-2/S-3 Security, Plans, and Operations (SP0) Officer S-2 S-3 Air Assistant S-3 Fire Direction Officer Logistics Operations Officer Assistant Operations Officer Assistant S-2/S-3 Support Operations Officer Plans and Operations Officer Flight Operations Officer Budget Officer Communications-Electronics Staff Officer

TABLE 1 (continued)

<u>Rank</u>	<u>Number</u>	<u>Name(s) of Positions</u>
	1	Chemical Officer Chemical Staff Officer NBC Staff Officer Staff Officer Training Specialist
Enlisted	6	Operations Sergeant Operations NCOIC Asst Operations Sergeant Intelligence NCO Operations NCO Fire Control NCO NBC NCO NBC Staff NCO Flight Operations Chief Training Ammunition NCO Taskings NCO SQT Coordinator Tactical Communication Chief Communications Chief Operations Assistant Schools NCO Assistant Security Manager Training NCO Training Sergeant Training Ammunition NCO Taskings NCO Master Gunner SQT Coordinator Operations Assistant Training NCO Training Sergeant Operations Assistant Flight Operations Specialist Training Specialist

3. Major Subordinate Command (Brigade\DIVARTY\DISCOM\Group\CAB (Cav Attack Brigade)

<u>Rank</u>	<u>Number</u>	<u>Name(s) of Positions</u>
Officer	8	Commander Brigade Commander DIVARTY Commander DISCOM Commander Group Commander S-3 S-2 Brigade Operations Officer Group Operations Officer Operations Officer

<u>Rank</u>	<u>Number</u>	<u>Name(s) of Positions</u>
Officer		Security, Plans, and Operations (SPO) Officer S-2/S-3 Assistant S-3 Assistant S-3 Air Assistant Operations Officer Chemical Officer Chemical Staff Officer NBC Officer NBC Staff Officer Fire Direction Officer Assistant Fire Support Coordinator Logistics Operations Officer Support Operations Officer Flight Operations Officer Plans and Operations Officer Budget Officer Communications-Electronics Staff Officer Staff Training Officer Assistant
Enlisted	8	Operations Sergeant Operations Sergeant Major Operations NCOIC Tactical Communications NCO Communications Chief NBC Operations NCO NBC Staff NCO Operations Sergeant Assistant Operations Sergeant Training Ammunition NCO Schools NCO Training Schedules NCO Taskings NCO Master Gunner Assistant S-2/S-3 Operations Sergeant S-2/S-3 Operations Sergeant SQT Coordinator Intelligence NCO Operations Sergeant Assistant Operations Sergeant Training Ammunition NCO Schools NCO Training Schedules NCO Taskings NCO Master Gunner Training NCO Training Sergeant SQT Coordinator Operations Sergeant Assistant Operations Sergeant Training NCO Training Sergeant

<u>Rank</u>	<u>Number</u>	<u>Name(s) of Positions</u>
Enlisted		Operations Assistant
4. <u>Division+</u>		
<u>Rank</u>	<u>Number</u>	<u>Name(s) of Positions</u>
Officer	22	ACofS G-3 ACofS G-2 Division G-3 Division G-2 Division Operations Officer Division Intelligence Officer Deputy G-3 Comptroller Deputy G-2 Deputy G-3 Training Officer Chief Training Division Chemical Officer Assistant G-3 Training Officer Assistant Comptroller G-3 Air G-3 Liaison Officer Assistant G-2 Training Officer Training Officer Intelligence Operations Officer Training Operations Officer Director of Plans and Training Director of Operations Director of Reserve Component Support DPT Training Officer DRCS Training Officer Installation Range Officer Training Audiovisual Support Center (TASC) Chief Installation Ammunition Officer Resource Management Budget Officer DRCS Training Evaluator Range Scheduling Specialist Range Operations Specialist TASC Equipment Loan Specialist Budget Analyst
Enlisted	5	Operations Sergeant Assistant Operations Sergeant MILES Coordinator Training Ammunition Coordinator Taskings Coordinator Schools Coordinator Training Funds Coordinator Training Management Inspector Liaison NCO Chemical NCO

TABLE 2. Job Titles of Personnel Responding to TM Survey

<u>Staff Position</u>	<u>Staff Position Code</u>
Acting Commander/Executive Officer	ACTCDRXO
Adjutant/S1	ADJ-S1
Ammunition NCO	AMMO-NCO
Ammunition Supply Sergeant	AMSUPSGT
Assistant	ASSIST
Assistant Division Chemical Officer	DCHEM-OF
Assistant G-2	AST-G2
Assistant G2, Training	AST-G2TG
Assistant G-3	AST-G3
Assistant G-3	G3-AST
Assistant Operations Officer	AST-OPOF
Assistant Operations S-3	S3-ASTOP
Assistant Operations Sergeant or NCO	AST-OSGT
Assistant Operations Sergeant or NCO	ASST-NCO
Assistant S-3	AS-S3
Assistant S-3	ASST-S3
Assistant S-3	S3-AST
Assistant S-4	ASST-S4
Assistant Security Manager/NCO	SEC-NCO
Assistant Training Officer- Ammo.	ATO-A
Battalion Adjutant	BN-ADJ
Battalion Commander	BN-CMDR
Battalion Maintenance Supervisor	BNMANSUP
Battalion S1	BN-S1
Battalion S4, BN-S4	BN-S4
Battalion Supply Spec	BNSU-SPC
Battery Clerk	CO-CLERK
Battery Commander	BCO
Battery Commander	CO-CMDR
BN Chemical NCO	BNCH-NCO
BN Executive Officer	BNXO
BN Operations Sergeant	BNOP-SGT
BN Supply Sergeant	BNSU-SGT
BN Supply Sergeant	SUP-SER
Brigade Commander	BDE-CMDR
Budget Officer, Budget Management Officer	BDGT-OFF
C-E Staff Officer	CE-OFF
Cargo/Document/NBC/Mobilization Officer	CDNBCM-O
Chemical Officer, Chemical Staff Officer	CHEM-OFF
Chief Administrative NCO	CHFADNCO
Chief Firing Battery	CHF-FIRE
Chief Training Division	CHF-TRGD
Chief Plans & Operations	CHF-P&O
Clerk	CLERK
Clerk Typist	CLERK-T
CM Staff Officer	CM-OFF
Combat Signaler	COMB-SIG
Command Logistics Officer	CMLOG-OF

TABLE 2 (continued)

<u>Staff Position</u>	<u>Staff Position Code</u>
Command Sergeant Major/CSM	CSM
Command Supply NCO	CSUPNCO
Commander	CMDR
Communications Chief	COMM-CHF
Communications-Electronics NCO	COMELNCO
Communications-Electronics Officer	COMEL-OF
Company Clerk	CO-CLERK
Company Commander	CO-CMDR
Company Commander	CCO
Company Executive Officer	CXO
Company XO/Platoon Leader	COXO-PLL
COMSEC Repair Technician	REP-TECH
Comptroller	CMPTRLR
Data Training Resource Manager	DTRM
Division Ammunition NCO	DA-NCO
Deputy G2	DEP-G2
Deputy G3	DEP-G3
Detachment Commander	DET-CMDR
Diesel Engineer	DIES-ENG
Director of Operations	DIR-OPS
Director of Training Management	DTNG-MGT
Division G2	DIV-G2
Division G3 Training	DIVG3TNG
Draftsman	DRAFTING
Drivers' Training NCOIC	DRVNCOIC
Executive Officer, XO	EXEC-OFF
Field Direction Officer	FDO
Field Medical Assistant	MED-ASST
Fire Battery Chief	FBC
Fire Director Center Officer	FIRE-OFF
First Sergeant	1SGT
First Sergeant	1ST-SER
G2 Plans and Exercise	G2-PLANS
G2 Sergeant Major	G2-SGM
G3 Air	G3-AIR
G3 Liason Officer	G3-LIAOF
G3 Operations	G3-OPS
G3 Tactical Operations	G3-TACT
Gunnery Program Coordinator	GNPGMCOR
Gunnery Sergeant	GUN-SGT
Heavy Equipment Repairman	HVEQ-REP
Intelligence Sergeant	INTL-SGT
Intelligence Training NCO	INTTGNCO
Intel/Operations Officer	INTOP-OF
Interrogator	INTRRGTR
Liason NCO	LIAS-NCO
Liason Office Sergeant	LNO-SGT
Logistics Officer	LOG-OFF
Maintenance Officer	MNTC-OFF

TABLE 2 (continued)

<u>Staff Position</u>	<u>Staff Position Code</u>
Master Gunner	MSTR-GUN
Materiel Management NCO	MAT-MGR
Medical NCO	MED-NCO
NBC Element Director	NBC-DIR
NBC NCO, NBC Staff NCO	NBC-NCO
NBC Specialist	NBC-SPC
NBC Staff Officer	NBC-SOFF
NCO in Charge	NCO-IC
NCO of Boats	BOAT-NCO
Operation NCOIC	OP-NCOIC
Operations Assistant/Driver	OPS-ASST
Operations Assistant	OPS-AST
Operations Officer, Operations Duty Officer	OPS-OFF
Operations Sergeant, Operations NCO	OPS-SGT
Operations Training Specialist	OPTNGSPC
PAC NCO	PAC-NCO
PAC Supervisor	PAC-SUPV
Personnel Staff NCO	PERS-NCO
Platoon Leader	PLT-LDR
Platoon Sergeant	PLT-SGT
Power Generator Mechanic	PWR-GEN
Program Manager	PROG-MGR
PSNCO	PS-NCO
Range Control Officer	RCO
Range Officer/Facility Manager	ROFF-FM
Range Operations Specialist	RO-SPEC
S-1	S1
S-2	S2
S 2/3	S2/3
S-3	S3
S-3	S-3
S-4	S4
S1 Adjutant	S1-ADJ
S2 Intelligence Analyst	INTL-ANL
S2 Intelligence Officer	S2-INTOF
S2/3 Logistics Officer	S2/3-LOG
S2/3 Officer	S2/3-OFF
S3 Air	S3-AIR
S4 NCO	S4-NCO
S4 NCOIC	S4-NCOIC
S4 Logistics Officer	S4-LOGOF
Scheduling NCO	SCH-NCO
School NCO	SCL-NCO
School NCO	SCHL-NCO
Section Leader	SEC-LDR
Section Sergeant	SEC-SGT
Security, Plans, Operations	SPO
Squad Leader	SQD-LDR
SQT Coordinator	SQT-COOR
Staff NBC Officer	NBC-OFF

TABLE 2 (continued)

<u>Staff Position</u>	<u>Staff Position Code</u>
Strength Accounting & Management Section Chief	SA&MSC
Supply Account Sergeant	SUACTSGT
Supply/Field Service Officer	SUPF-OFF
Supply NCOIC	SUPNCOIC
Tank Section Sergeant	TANK-SGT
Targeting Officer	TARG-OFF
Training Ammo Officer	TNGAM-OF
Training & Audiovisual Support Officer	TASPT-OF
Training Clerk, Training Management Clerk	TRG-CLRK
Training Inspector	TRG-INSP
Training NCO	TRG-NCO
Training Officer	TRG-OFF
Training Sergeant	TRG-SGT
Training Funds Coordinator	TRG-FUND
Truckmaster	TRK-MSTR
Visual Information Specialist	VI-SPEC

TABLE 3. Time Estimates and Annual Costs for Individual Respondents at Co Level for Installation A

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
CCO	03	.20	\$11,339
CCO	03	.50	\$28,347
CCO	03	.50	\$28,347
CCO	03	.70	\$39,686
BCO	03	.25	\$14,174
CCO	03	.40	\$22,678
CO-CMDR	03	.25	\$14,174
CCO	03	.33	\$18,709
CCO	03	.20	\$11,339
BCO	03	.40	\$22,678
CCO	03	.30	\$17,008
BCO	03	.35	\$19,843
BCO	02	.40	\$17,724
BCO	02	.30	\$13,293
CCO	02	.40	\$17,724
CXO	02	.75	\$33,232
1ST-SER	E8	.35	\$16,222
1ST-SER	E8	.05	\$2,317
FBC	E7	.40	\$15,682
TRG-NCO	E7	.63	\$24,504
FBC	E7	.50	\$19,603
GUN-SER	E6	.40	\$13,388
TRG-NCO	E5	.50	\$14,183
TRG-NCO	E5	1.00	\$28,366
TRG-NCO	E5	.90	\$25,529
TRG-NCO	E5	.65	\$18,438
TRG-NCO	E4	.90	\$21,261
TRG-NCO	E4	.60	\$14,174
TRG-NCO	E4	1.00	\$23,623
TRG-NCO	E3	.70	\$14,225
CO-CLERK	E3	.15	\$3,048

TABLE 4. Time Estimates and Annual Costs for Individual Respondents at Bn Level for Installation A

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
S3	04	.75	\$53,367
FDO	03	.25	\$14,174
S3	03	.90	\$51,025
S3-AST	03	.25	\$14,174
S3	03	.85	\$48,190
CHEM-OFF	02	.80	\$35,447
OPS-OFF	02	.80	\$35,447
S3-AST	02	.60	\$26,585
S3-AIR	02	.95	\$42,094
OPS-SGT	E8	.95	\$44,032
OPS-SGT	E7	.50	\$19,603
CHEM-NCO	E7	.10	\$3,921
OPS-AST	E7	.20	\$7,841
SUP-SER	E7	.20	\$7,841
SCL-NCO	E6	.75	\$25,102
TRG-NCO	E6	1.00	\$33,469
SEC-NCO	E6	.05	\$1,673
OPS-SGT	E5	.90	\$25,529
OPS-AST	E5	.60	\$17,020
SCL-NCO	E5	.95	\$26,948

TABLE 5. Time Estimates and Annual Costs for Individual Respondents at Bde Level for Installation A

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
S-3	04	.50	\$35,578
S3-AST	03	1.00	\$56,694
S3-AST	03	.80	\$45,355
S3-ASTOP	03	.20	\$11,339
CHEM-OFF	03	.75	\$42,521
ATO-A	02	1.00	\$44,309
AMMO-NCO	E7	.60	\$23,524
SCL-NCO	E6	1.00	\$33,469
MSTR-GUN	E5	1.00	\$28,366
TRG-NCO	E5	.50	\$14,183

TABLE 6. Time Estimates and Annual Costs for Individual Respondents at Div Level for Installation A

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
G3-TR	04	1.00	\$71,156
G3-AST	03	.50	\$28,347
DTRM	03	1.00	\$56,694
NCO-IC	E8	.39	\$18,076
DA-NCO	E7	1.00	\$39,206
TRG-INSP	E7	1.00	\$39,206
OPS-NCO	E6	1.00	\$33,469
CLERK-T	E4	.60	\$14,174
DRAFTING	E3	.60	\$12,193

TABLE 7. Time Estimates and Annual Costs for Individual Respondents at Inst Level for Installation A

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
RCO	GS12	.30	\$11,294
SCH-NCO	E7	.80	\$31,365

TABLE 8. Time Estimates and Annual Costs for Individual Respondents at Co Level for Installation B

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
CMDR	03	.10	\$5,669
CO-CMDR	03	.20	\$11,339
DET-CMDR	03	.40	\$22,678
CO-CMDR	03	.05	\$2,835
CD-CMDR	03	.30	\$17,008
PLT-LDR	03	.20	\$11,339
CO-CMDR	03	.65	\$36,851
CMDR	03	.25	\$14,174
CMDR	03	.05	\$2,835
CMDR	03	.30	\$17,008
ACTCDRXO	02	.05	\$2,215
1SGT	E8	.10	\$4,635
PLT-SGT	E7	.80	\$31,365
COMB-SIG	E5	.65	\$18,438
INTRRGTR	E5	.80	\$22,693

TABLE 9. Time Estimates and Annual Costs for Individual Respondents at Bn Level for Installation 8

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
BN-CMDR	06	.10	\$10,183
BN-CMDR	05	.25	\$21,397
CMDR	05	.15	\$12,838
EXEC-OFF	04	.10	\$7,116
S2/3-OFF	04	.25	\$17,789
S3	04	.65	\$46,251
EXEC-OFF	04	.35	\$24,905
S4-LOGOF	03	.10	\$5,669
S1-ADJ	03	.10	\$5,669
S2-INTOF	03	.02	\$1,134
S4-LOGOF	03	.70	\$39,686
S4	03	.60	\$34,016
S2	03	.10	\$5,669
EXEC-OFF	02	.25	\$11,077
S2-INTOF	02	.10	\$4,431
BN-ADJ	02	.70	\$31,016
ASST-S3	02	.70	\$31,016
CHEM-OFF	02	.75	\$33,232
BN-S1	02	.10	\$4,431
S3-AIR	02	.10	\$4,431
CE-OFF	02	.10	\$4,431
S2	02	.40	\$17,724
CHEM-OFF	01	.10	\$3,402
OPS-SGT	E8	.40	\$18,540
PAC-SUPV	E7	.25	\$9,802
NBC-NCO	E7	.70	\$27,444
INTL-SGT	E7	.02	\$ 784
BNSU-SGT	E7	.60	\$23,524
OP-NCOIC	E7	.30	\$11,762
BNSU-SPC	E7	.10	\$3,921
OPS-SGT	E7	.50	\$19,603
OPS-SGT	E7	.95	\$37,246
TRG-NCO	E6	.92	\$30,791
PAC-SUPV	E6	.10	\$3,347
COMM-CHF	E6	.20	\$6,694
PS-NCO	E6	.15	\$5,020
BNCH-NCO	E6	.45	\$15,061
AMMO-NCO	E6	.10	\$3,347
LIAS-NCO	E6	.60	\$20,081
INTL-ANL	E5	.05	\$1,418

TABLE 10. Time Estimates and Annual Costs for Individual Respondents at Bde Level for Installation B

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
BDE-CMDR	06	.40	\$40,731
S3	04	.50	\$35,578
CE-OFF	03	.15	\$8,504

TABLE 11. Time Estimates and Annual Costs for Individual Respondents at Div Level for Installation B

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
DEP-G2	05	.05	\$4,279
DIV-G2	05	.30	\$25,676
AST-G2TG	03	.20	\$11,339
G3-AIR	03	.50	\$28,347
CM-OFF	03	.10	\$5,669
NBC-OFF	03	.10	\$5,669
LIAS-NCO	02	.05	\$2,215
NBC-SPC	E7	.40	\$15,682

TABLE 12. Time Estimates and Annual Costs for Individual Respondents at Inst Level for Installation B

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
CHF-TRGD	05	.50	\$42,793
TRG-OFF	03	.01	\$567
BDGT-OFF	GS12	.10	\$3,765
VI-SPEC	GS11	1.00	\$31,412
PROG-MGR	GM13	.30	\$13,431
SCHL-NCO	E7	.90	\$35,285
SQT-COOR	E7	.10	\$3,921
TRG-SGT	E7	.15	\$5,881

TABLE 13. Time Estimates and Annual Costs for Individual Respondents at Co Level for Installation C

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
CHEM-OFF	03	.80	\$45,355
NBC-DIR	02	.30	\$13,293
OPS-OFF	02	.25	\$11,077
DET-CMDR	02	.80	\$35,447

TABLE 14. Time Estimates and Annual Costs for Individual Respondents at Bn Level for Installation C

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
G3-TACT	04	.80	\$56,925
AST-G2	04	.85	\$60,483
G2-SGM	E9	.50	\$27,943
OP-NCOIC	E7	.80	\$31,365
NBC-NCO	E7	.60	\$23,524

TABLE 15. Time Estimates and Annual Costs for Individual Respondents at Bde Level for Installation C

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
AST-OPOF	04	.90	\$64,040
CE-OFF	03	.10	\$5,669
OPS-OFF	03	.30	\$17,008
OPS-OFF	03	.90	\$51,025
OPS-SGT	E9	.75	\$41,915
AST-OSGT	E8	.60	\$27,809
SCHL-NCO	E7	1.00	\$39,206

TABLE 16. Time Estimates and Annual Costs for Individual Respondents at Div Level for Installation C

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
DCHEM-OF	04	.10	\$7,116
CMPTRLR	04	.10	\$7,116

TABLE 17. Time Estimates and Annual Costs for Individual Respondents at Co Level for Installation D

Staff Position Code	Grade	Proportion of Time Spent on Training Management	Annual Cost
CO-CMDR	03	.20	\$11,339
CMDR	03	.30	\$17,008
CO-CMDR	03	.15	\$8,504
CMDR	03	.35	\$19,843
CO-CMDR	03	.20	\$11,339
CMDR	03	.80	\$45,355
CMDR	03	.10	\$5,669
CO-CMDR	03	.07	\$3,969
CO-CMDR	03	.70	\$39,686
CMDR	03	.40	\$22,678
CO-CMDR	03	.40	\$22,678
CO-CMDR	03	.10	\$5,669
CMDR	03	.05	\$2,835
CO-CMDR	03	.20	\$11,339
CO-CMDR	03	.10	\$5,669
CMDR	03	.25	\$14,174
CMDR	03	.10	\$5,669
CMDR	03	.50	\$28,347
CMDR	03	.06	\$3,402
CO-CMDR	03	.20	\$11,339
CO-CMDR	03	.20	\$11,339
CO-CMDR	03	.50	\$28,347
EXEC-OFF	02	.50	\$22,155
CO-CMDR	02	.10	\$4,431
EXEC-OFF	02	.20	\$8,862
EXEC-OFF	02	.10	\$4,431
COXO-PLL	02	.08	\$3,323
EXEC-OFF	02	.70	\$31,016
PLT-LDR	02	.10	\$4,431
PLT-LDR	02	.20	\$8,862
PLT-LDR	02	.15	\$6,646
EXEC-OFF	02	.40	\$17,724
TRG-OFF	01	.25	\$8,506
MED-ASST	01	.30	\$10,207
1SGT	E8	.25	\$11,587
1SGT	E8	.80	\$37,079
1SGT	E8	.20	\$9,270
TRG-NCO	E8	.20	\$9,270
TRG-NCO	E8	.60	\$27,809
TRG-NCO	E8	.30	\$13,905
MSTR-GUN	E7	.40	\$15,682
PLT-SGT	E7	.40	\$15,682
TRG-CLRK	E7	.90	\$35,285
PLT-SGT	E7	.10	\$3,921
TRG-NCO	E7	.40	\$15,682
GUN-SGT	E6	.50	\$16,735

TABLE 17 (continued)

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
AST-OSGT	E5	.75	\$21,275
TRG-NCO	E5	.45	\$12,765
TRG-NCO	E5	.20	\$5,673
TRG-NCO	E5	.35	\$9,928
TRG-NCO	E5	.98	\$27,799
AST-OSGT	E5	.50	\$14,183
TRG-NCO	E5	.75	\$21,275
TRG-CLRK	E5	1.00	\$28,366
TRG-CLRK	E5	.25	\$7,092
TRG-CLRK	E5	.90	\$25,529
TRG-CLRK	E5	.85	\$24,111
CO-CLERK	E4	.50	\$11,812
TRG-CLRK	E4	.20	\$4,725
TRG-NCO	E4	.75	\$17,717
TRG-NCO	E4	.75	\$17,717
TRG-NCO	E4	.45	\$10,630
CO-CLERK	E2	.20	\$3,852
CO-CLERK	E2	.30	\$5,777

TABLE 18. Time Estimates and Annual Costs for Individual Respondents at Bn Level for Installation D

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
CMDR	05	.25	\$21,397
CMDR	05	.05	\$4,279
BN-CMDR	05	.25	\$21,397
S3	04	.75	\$53,367
EXEC-OFF	04	.20	\$14,231
EXEC-OFF	04	.33	\$23,481
S3	04	.60	\$42,694
S1	03	.25	\$14,174
OPS-OFF	03	.80	\$45,355
COMEL-OF	03	.35	\$19,843
BDGT-OFF	03	.15	\$8,504
ASST-S3	03	1.00	\$56,694
FIRE-OFF	03	.05	\$2,835
S4	03	.05	\$2,835
TARG-OFF	03	.63	\$35,717
S1	03	.95	\$53,859
S4	03	.30	\$17,008
ASST-S3	03	.60	\$34,016
S2/3	03	.50	\$28,347
BN-ADJ	03	.01	\$283
OPS-OFF	03	.90	\$51,025
ASST-S4	02	.10	\$4,431
BN-S1	02	.02	\$886
PLT-LDR	02	.15	\$6,646
CHEM-OFF	02	.65	\$28,801
S2	02	.15	\$6,646
CHEM-OFF	02	.50	\$22,155
S2	02	.15	\$6,646
TRG-FUND	02	.75	\$33,232
S4	02	.10	\$4,431
NBC-OFF	02	.45	\$19,939
CHEM-OFF	01	.30	\$10,207
OPS-SGT	E8	.50	\$23,175
OPS-SGT	E8	.75	\$34,762
OPS-SGT	E7	.60	\$23,524
S1	E7	.10	\$3,921
CHEM-NCO	E7	.75	\$29,405
COMM-CHF	E7	.10	\$3,921
INTL-SGT	E7	.01	\$392
AST-OSGT	E7	.30	\$11,762
PERS-NCO	E7	.40	\$15,682
S4-NCO	E7	.30	\$11,762
INTTGNCO	E7	.15	\$5,881
SUPP-NCO	E7	.51	\$19,995
DRVNCDIC	E6	.10	\$3,347
MSTR-GUN	E6	.60	\$20,081

TABLE 18 (continued)

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
TANK-SGT	E6	.10	\$3,347
AST-OSGT	E6	.25	\$8,367
AMSUPSGT	E6	.95	\$31,796
N8C-NCO	E6	.20	\$6,694
SCHL-NCO	E6	.20	\$6,694
N8C-NCO	E6	.60	\$20,081
SCHL-NCO	E6	.90	\$30,122
BNOP-SGT	E5	.75	\$21,275
PAC-NCO	E5	.35	\$9,928
AMMO-NCO	E5	.10	\$2,837
INTTGNCO	E5	.10	\$2,837
CHEM-NCO	E5	.25	\$7,092
COMELNCO	E5	.10	\$2,837

TABLE 19. Time Estimates and Annual Costs for Individual Respondents at Bde Level for Installation D

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
CMDR	06	.10	\$10,183
S3	04	.70	\$49,809
BDE-X0	04	.05	\$3,558
SPO	04	.15	\$10,673
ASST-S4	03	.30	\$17,008
ASST-S2	03	.10	\$5,669
CMLOG-OFF	03	.01	\$567
CHEM-OFF	02	.20	\$8,862
TNGAM-OFF	02	.50	\$22,155
OPS-SGT	E8	.05	\$2,317
LNO-SGT	E7	.25	\$9,802
INTL-SGT	E7	.01	\$392
NBC-NCO	E7	.80	\$31,365

TABLE 20. Time Estimates and Annual Costs for Individual Respondents at Div Level for Installation D

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
DIVG3TNG	04	.90	\$64,040
DEP-G3	04	.10	\$7,116
AST-G3	03	.01	\$567
OPS-OFF	03	.10	\$5,669
G2-SGM	03	.10	\$5,669
TRG-OFF	02	.60	\$26,585
OPS-SGT	E8	.10	\$4,635
CHFADNCO	E8	.90	\$41,714
MSTR-GUN	E7	.05	\$1,960

TABLE 21. Time Estimates and Annual Costs for Individual Respondents at Co Level for Installation E

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
CMDR	04	.03	\$2,348
CMDR	04	.03	\$2,277
TRG-OFF	03	.60	\$34,016
CO-CMDR	03	.10	\$5,556
CO-CMDR	03	.04	\$2,211
CO-CMDR	03	.12	\$7,030
CO-CMDR	03	.50	\$28,347
CO-CMDR	03	.03	\$1,814
CO-CMDR	03	.04	\$2,211
CO-CMDR	03	.02	\$1,134
CO-CMDR	03	.07	\$3,685
CO-CMDR	03	.11	\$6,293
COXO-PLL	02	.07	\$2,880
PLT-LDR	01	.03	\$1,089
PLT-LDR	01	.02	\$680
DET-CMDR	01	.07	\$2,211
DET-CMDR	W2	.03	\$1,186
1SGT	E8	.09	\$4,218
TRK-MSTR	E7	.20	\$7,841
MSTR-GUN	E7	.65	\$25,484
CHF-FIRE	E7	.70	\$27,444
PLT-SGT	E7	.95	\$37,246
PLT-SGT	E7	.90	\$35,285
PLT-SGT	E7	.80	\$31,365
MED-NCO	E6	1.00	\$33,469
PWR-GEN	E6	.80	\$26,775
SA&MSC	E6	.60	\$20,081
TRG-NCO	E6	.50	\$16,735
BOAT-NCO	E6	.25	\$8,367
TRG-NCO	E6	.90	\$30,122
SEC-LDR	E6	.12	\$3,949
PLT-SGT	E5	.08	\$2,213
DIES-ENG	E5	.12	\$3,347
SQD-LDR	E5	.30	\$8,510

TABLE 22. Time Estimates and Annual Costs for Individual Respondents at Bn Level for Installation E

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
BN-CMDR	05	.10	\$8,387
BN-CMOR	05	.04	\$3,338
TRG-OFF	04	.75	\$53,367
S3	04	.07	\$4,625
EXEC-OFF	04	.03	\$2,348
BN-CMDR	04	.15	\$10,673
ASST-S3	04	.80	\$56,925
OPS-OFF	04	.13	\$9,250
S3	04	.13	\$9,393
EXEC-OFF	04	.01	\$925
EXEC-OFF	04	.25	\$17,789
BN-CMDR	04	.30	\$21,347
ASST-S3	03	1.00	\$56,694
OPS-OFF	03	.05	\$2,948
S4	03	.03	\$1,474
EXEC-OFF	03	.20	\$11,339
ASST-S3	03	.75	\$42,521
MNTC-OFF	03	.20	\$11,339
S3	03	.13	\$7,484
S3-AIR	03	.11	\$5,953
CDNBCM-O	01	.04	\$1,327
CSM	E9	.10	\$5,477
OPS-SGT	E8	.85	\$39,397
OPS-SGT	E8	.65	\$30,127
OPS-SGT	E8	.70	\$32,444
1SGT	E8	.60	\$27,809
MAT-MGR	E7	.30	\$11,762
TRG-NCO	E7	.40	\$15,682
OPS-SGT	E7	1.00	\$39,206
INTL-SGT	E7	.11	\$4,117
INTL-SGT	E7	.07	\$2,548
(not given)	E7	.85	\$33,325
OPS-SGT	E6	.65	\$21,755
(not given)	E6	.60	\$20,081
NBC-NCO	E5	.90	\$25,529

TABLE 23. Time Estimates and Annual Costs for Individual Respondents at Bde Level for Installation E

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
ASST-S3	04	.75	\$53,367
TRG-NC0	E8	.60	\$27,809
OPS-SGT	E7	.25	\$9,802
AST-OSGT	E6	.20	\$6,694
OPS-ASST	E4	.65	\$15,355

TABLE 24. Time Estimates and Annual Costs for Individual Respondents at Inst Level for Installation E

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
DIR-OPS	06	1.00	\$101,827
TRG-OFF	05	1.00	\$85,586

TABLE 25. Time Estimates and Annual Costs for Individual Respondents at Co Level for Installation F

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
CO-CMDR	O3	.03	\$1,474
CO-CMDR	O3	.01	\$454
DET-CMDR	O3	.05	\$2,948
CO-CMDR	O3	.11	\$6,293
CO-CMDR	W2	.05	\$2,372
1SGT	E8	.10	\$4,635
1SGT	E8	.03	\$1,205
1SGT	E7	.09	\$3,607
TRG-NCO	E6	.13	\$4,384
SEC-SGT	E6	.40	\$13,388
HVEQ-REP	E5	.25	\$7,092

TABLE 26. Time Estimates and Annual Costs for Individual Respondents at Bn Level for Installation F

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
BN-CMDR	O5	.02	\$1,712
S2/3-LOG	O4	.05	\$3,558
BNXO	D4	.30	\$21,347
BNS2/S3	O3	.05	\$2,948
SPO	O3	.07	\$3,685
ADJ-S1	O3	.50	\$28,347
BN-S4	O2	.10	\$4,431
OPTNGSPC	GS9	1.00	\$25,693
BN-CSM	E9	.40	\$22,354
BNOP-SGT	E8	.07	\$3,013
BNMANSUP	E7	.10	\$3,921
OPS-SGT	E6	.05	\$1,673
BNOP-SGT	E5	.11	\$2,978

TABLE 27. Time Estimates and Annual Costs for Individual Respondents at Bde Level for Installation F

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
LOG-OFF	04	.20	\$14,231
SUPF-OFF	03	.10	\$5,669
AST-OSGT	E7	.10	\$3,921
TRG-NCO	E7	.11	\$4,117

TABLE 28. Time Estimates and Annual Costs for Individual Respondents at Div Level for Installation F

<u>Staff Position Code</u>	<u>Grade</u>	<u>Proportion of Time Spent on Training Management</u>	<u>Annual Cost</u>
DTNG-MGT	04	.90	\$64,040
INTOP-OF	04	.05	\$3,700
TRG-OFF	03	.75	\$42,521
TRG-OFF	03	.50	\$28,347
TRG-OFF	03	.50	\$28,347
TRG-NCO	E9	.30	\$16,766

APPENDIX G
INSTALLATION DATA COLLECTION

APPENDIX G-1
TRAINING FUNDS MANAGEMENT

APPENDIX G-1

TRAINING FUNDS MANAGEMENT

I. INTRODUCTION

This appendix describes in more detail the funds management systems observed during the data collection. Each installation had a primary system, and some installations had other systems that were used in conjunction with the primary system. The primary systems were TMACS at Installation A, a manual system at Installation B, ERM at Installation C, and TCM at Installation D. Other systems included TUFMIS, Monthly Fuel and Mileage Reporting, BLTM, and BTMS.

What follows is general information related to funds management and to the four installations' funds management systems. This information supplements that in the text of this report. Descriptions are derived from interviews of funds management personnel, usually at the division level, and from published material.

II. FUNDS CONTROLLED BY DIVISIONS AND OTHER UNITS

This section defines the costs that are managed by divisions and other units. Below division level, there is no formal control of training funds. Comptrollers at installation and division centrally control and account for funds. Battalions and separate companies requisition supplies, material, and support for training but do not allocate funds. Battalions and separate companies are given funding targets, which are guidelines for structuring activities. According to doctrine, the allocation of funds to battalions and separate companies is based on training events.

Training events are planned by units. This planning is based on guidance passed down from higher echelons. Unless instructed otherwise, units plan training to achieve the highest level of mission readiness. They develop training plans based on the assumption that adequate resources will be made available for all training tasks. However, units operate in a financially constrained environment; they prioritize events based on guidance from higher echelons and the available level of training resources, particularly training funds. Table 1 displays direct costs controlled by units. These are costs

for which the unit must project and account in their training management system.

TABLE 1. Unit-Controlled Direct Training Costs

Class II Expendable/SSSC Consumables
Class III Packaged Petroleum
Class IV Barrier & Fortification Material
Class IX Organizational Repair Parts

Table 2 displays direct costs generally managed and controlled by installations.

TABLE 2. Installation-Controlled Direct Training Costs

Class I Food
Class II Non-Expendables
Class III Bulk Petroleum
Class V Training Ammunition
Class VIII Medical Supplies
Class IX Direct Support Repair Parts
Temporary Duty
Civilian Contracts
Commercial Transportation
Military Airlift Command Transportation
Range Operations
Training Audiovisual Operation
Flying Hours

III. FUNDS MANAGEMENT SYSTEMS USED IN CONJUNCTION WITH INSTALLATION SYSTEMS

Battalion Training Management System (BTMS)

BTMS is how TM is formally taught in the Army at the battalion and company levels. BTMS is taught in a series of coordinated workshops. Unit trainers and training managers learn to plan, conduct, and evaluate performance-oriented training. BTMS allows training managers to plan and program training by prioritizing events within allocated resources.

Using BTMS guidelines, units develop Mission Essential Task Lists (METL), develop long- and short-range training plans, conduct training meetings, program resources, and publish weekly training schedules. The METL

that results from BTMS is the basis for all training planning. BTMS guidelines state that training plans should not be changed within 35 days of scheduled training. Optimally, training events are to be planned and coordinated at least 90 days prior to execution.

Battalion Level Training Model (BLTM)

Eventually all financial management systems will be required to interface with BLTM. BLTM quantifies training resources so that decision makers at the Department of Army (DA) and major command (MACOM) can annually allocate training funds to achieve and sustain readiness levels. BLTM uses three measures of resources: equipment density, equipment operating hours and miles, and rounds of ammunition. The Army has been improving the BLTM data bases for active component units down to the battalion level. The primary output of BLTM will be operating tempos (OPTEMPO), which are the average number of miles or hours that an item of equipment is expected to operate for a particular level of readiness. OPTEMPO data will become the primary input to the Training Resources Model (TRM), which is a model that Training and Doctrine Command (TRADOC) will use to apply cost factors in BLTM.

Monthly Fuel and Mileage Reports

Monthly Fuel and Mileage Reports are completed each month for various pieces of Army equipment. Miles driven, hours used, and fuel consumed are included in these reports. This report is required by the local installation and also the Army Maintenance Management System (TAMMS). Reports are normally submitted to the Division Assistant Chief of Staff G-4 or the Division Comptroller. One purpose of Monthly Fuel and Mileage reports is to determine the amount of fuel being drawn by units and the amount of funds they should be charged; another is the cumulative vehicle and equipment usage record.

Tactical Unit Financial Management Information System (TUFMIS)

TUFMIS is not a financial management system as its name implies, but rather a system that reports unit performance against funding targets. Unit commanders and staffs use TUFMIS to monitor funding targets for training and

sustainment activities. They do not structure training and other activities to fit within their TUFMIS budget.

Generally, at the Division level, the categories of funds that TUFMIS accounts for are Class II (general supply), Class III (packaged petroleum), Class IV (barrier and fortification material), and Class IX (organizational repair parts). TUFMIS does allow for other fund categories but other categories are not commonly used.

TUFMIS is an automated interface between staff that manages resources, including unit commanders, and the supporting Army logistics system. It allows active component units to monitor financial management data concerning the costs of supply requisitions for training and other unit sustainment activities. Unit supply requisitions processed at the division level accumulate costs that unit commanders and staffs review and manage. TUFMIS interfaces with other automated logistics and financial management systems that process supply requisitions. Those systems are Direct Support Unit Standard Supply System (DS4), Standard Property Book System (SPBS), Standard Army Intermediate Level Supply System (SAILS), Standard Army Financial Inventory Accounting and Reporting System (STARFIARS), and the Standard Finance System (STANFINS) (TM 38-C02-11, April 1987).

IV. DESCRIPTION OF INSTALLATION FUNDS MANAGEMENT SYSTEMS

Installation A

Training Management Control System (TMACS). TMACS has been in the field with active component units for the last five years. It was designed to assist commanders and training management staffs with planning, programming, and budgeting mission training funds (P2) for unit training plans. Using the Common Costing Methodology for Unit Training (CCMUT), TMACS quantifies training and other force sustainment costs based on data on unit events. TMACS records the use of unit training funds and establishes the data base for projected training activity costs. TMACS serves as an indicator of the current ability of units to plan training funds.

TMACS is centrally managed by the Division Comptroller. From the data bases maintained by individual units, an installation or Division Comptroller

will update unit cost factor models and will, where appropriate, use data from TUFMIS and other finance-related sources. The division uses all the doctrinal TMACS funding modules except training ammunition, which is manually forecast and requested through the Division G-3 Staff Section and the Division Ammunition Office (DAO).

TMACS was designed for the programming of training and non-training (force-sustainment) events. According to FORSCOM Pam 350-31, TMACS is easy to operate. When an event is identified, a Training Event Category Code (TECC) is assigned from the list of approved codes and the event is given a program number. Units enter projected resource consumption data, such as miles driven, hours equipment is used, gallons of petroleum consumed, and the cost of repair parts, prior to the event. After the event has been completed, actual values are entered, updating the projected figures. The event is then coded as accomplished.

Updating the TMACS data base once an event is completed is essential for monitoring programmed costs, actual costs, and the impact on events yet to occur. Maintaining accurate program data is also essential for building future budgets from the historical data. However, although units met the initial administrative requirements by programming events, they generally did not update TMACS unless instructed to.

TMACS reports equipment operating cost factors from unit training and sustainment operations plans. Weapons/Equipment System Designator Codes (WESDC) link equipment cost factors to events. By using WESDC, the developers of TMACS drew from an already established procedure for identifying various types of equipment.

To compute cost factors for a particular event, six types of input from unit tables of organization and equipment (TOE) and event planning and execution are required. The six types of input data are equipment density, mileage driven or rounds fired, petroleum usage, organizational maintenance costs, and direct support maintenance costs. Three cost factors are computed: petroleum usage in gallons per mile, hour, or round; organizational maintenance costs per mile, hour, or round; and installation or unit direct support maintenance costs per mile, hour, or round. Training managers then receive management reports consisting of equipment cost factors, unit

equipment tables, training event category codes, unit ammunition tables, element of resource tables, and petroleum cost tables.

The number of miles and equipment hours programmed by Installation A between 1 October 1987 and 31 May 1988 on TMACS was compared with the same data reported in unit Monthly Fuel and Mileage Reports. Table 3 shows an example of mileage data extracted from TMACS Equipment Utilization Summaries and compared with Monthly Fuel and Mileage Reports. The TMACS data are created from event programming that calculates monthly totals. Since the TMACS data were collected after 31 May 1988, time was allowed for updating event data bases; therefore, these data should show the actual number of miles driven.

TABLE 3. Comparison of TMACS Mileage to the Monthly Fuel and Mileage Report Data

<u>Unit</u>	<u>Equipment Utilization Summary Report</u>	<u>Monthly Fuel & Mileage Rep.</u>	<u>% Agreement Between TMACS & Monthly Rep.</u>
1	4464	5333	.84
2	104965	25817	4.07
3	51172	150153	.34
4	101519	62667	1.62
5	14670	41302	.36
6	23193	133579	.17
7	186920	150939	1.23
8	<u>210700</u>	<u>146836</u>	<u>1.43</u>
Total:	701603	716576	Average = 1.26

Note 1: The number of months with no TMACS estimate = 7

Note 2: The number of months with no Fuel & Mileage Report = 30

The total mileage in Table 3 was 701,603 miles; 716,576 miles were reported on the Monthly Fuel and Mileage Reports. Though the difference between the two reports is slight, about 15,000 miles or two percent, there are indications both mileage reporting systems may be inaccurate. In TMACS, seven months out of 64 possible months contained no mileage data. This means that 11 percent of the months did not contain initially programmed or subsequently updated events. Mileage data contained in Monthly Fuel and

Mileage Reports were an even less reliable source of information. In 30 of the 64 possible months, no unit reports were recorded, indicating that 47 percent of the mileage reports were missing and not reported to resource managers. Hypothetically, the missing 30 reports could equal another 635,454 miles; this could have resulted in a possible eight-month total of 1.352 million miles. Thus, TMACS data may be off by as much as 52 percent from actual mileage.

There are some funding categories that TMACS and TUFMIS have in common, such as general supplies and organizational repair parts. For example, while TMACS traces the use and cost of bulk petroleum (MOGAS and Diesel), TUFMIS can be programmed to track packaged petroleum (lubricants and oil). The usefulness of the two systems together is largely predicated on how closely training funds managers want the two systems to function.

The conclusion can be drawn that training and resource managers are not working with a complete training event data base. Training funds resource managers using TMACS have an incomplete data base upon which to base training fund allocation decisions.

TMACS Event Costs. Using TMACS event cost data for Class II (general supply), SSSC, and Class IX (organizational repair parts), the average cost per type of training was computed. Table 4 contains the average costs for individual and collective training. Individual training refers to specialty code, skill level, or duty position training. Individual training usually includes marksmanship; physical fitness; professional development; and, to some degree, squad, crew, and team training. Collective training prepares units to accomplish critical wartime missions.

TABLE 4. TMACS Individual and Collective Training Costs

	<u>N = SAMPLE</u>	<u>AVG COST PER TYPE EVENT</u>
Individual Training	15	\$2355
Collective Training	37	\$8632
Training in General	52	\$6821

Installation B

Manual Event Planning and Scheduling. Although the division had Zenith hardware and TMACS software, Installation B had never implemented an automated training management system. They used a manual training funds management system administered under the staff supervision of the Division Comptroller. The division had manually developed fairly accurate costing data for various training activities but they did not have automated support for program costing, sensitivity analysis, or training funds allocations based on METL development.

Since the beginning of FY88, the division has tracked training funds through means of an internal PBAC (Program Budget Advisory Council). The division was also in the initial stages of developing a BLTM data base for OPTEMPO costing. Aside from PBAC decisions, there was no automation in the Division G-3 Staff Section where the comptroller was assigned. The division was beginning to build a BLTM data base in accordance with the FORSCOM guidance, but recognized that this was not going to be the solution to their daily training funds management problems.

Units manually estimate costs from training plans using a locally developed cost model. The division initially plans general events, such as Joint Readiness Training Center (JRTC), exercise evaluations (EXEVAL), and garrison days (local training and non-training activities). For garrison days, a standard dollar cost appropriate for all divisional units per soldier per day is used. They also used standard cost models for training conducted away from the installation. These remote training costs were further subdivided into two levels of intensity: high and low. High-intensity training included all unit personnel and equipment and involved the use of MILES (Multiple Integrated LASER Engagement System). Low-intensity training included fewer personnel and equipment and does not use MILES instrumentation.

Training funds management was an additional duty assigned to the brigade level Budget Officer. Budget estimates were prepared from calendars and guidance furnished by the brigade level S-3 Staff Officer, usually addressing a three-month period of training and other activities. Training funds management had been centralized at brigade, relieving subordinate battalions

and separate companies of the responsibility for all classes of supply management except Class II (non-expendable general supplies) and Class IX (non-automotive organizational repair parts).

Training Costs. Installation B reported their standard divisional local garrison cost to be \$.65 per soldier per day. This computes to \$35,000 per brigade (three battalions plus one separate company) per month regardless of the type of activity. Standard divisional non-local costs for high-intensity training were \$2700 per battalion per day and, for low-intensity training, \$1800 per battalion per day. These costs include unit-managed training funds and installation-managed training funds.

Installation C

Event Resource Model. The event resourcing model (ERM) is a unit-level training management tool that is under development at Installation C. It is used by training and resource managers at division, brigade, battalion, and company. The initial package of software, hardware, and user training materials began arriving in May 1988. ERM produces long-range calendars, weekly training schedules, coordination reminders, training ammunition forecasts, and event/subevent fund summaries. In addition, ERM is projected to provide printed range and training area requests, transportation requests, and training ammunition requests. Unlike TMACS, ERM does not separate programmed and accomplished events. Once an event is programmed into ERM, it remains until the cost factors are modified or the event is deleted. ERM will eventually interface with BLTM, the Training Resources Model (TRM), and the Training Ammunition Management Information System (TAMIS). ERM will be installed at three units in the United States Army Europe (USAREUR).

ERM is operating without a local area network (LAN), so battalions and separate companies must load diskettes with event data. These diskettes are passed through the brigades for data base update and eventually go to the Division G-3 and Comptroller. The system is expected to be fully implemented by 1 October 1988.

Training plans and schedules are composed of events and subevents. ERM uses TECCs to track and fund training events. TECCs are a common standard

for identifying training events locally at an installation and up through major command (MACOM) level. An event such as a battalion field training exercise (FTX), may consist of preparation time, movement to the training area, task-oriented operational exercises, and a re-deployment. Training schedules may contain subevents ranging from formations to collective and individual training events. Under the current development plan, the ERM training event cost model will include OPTEMPO costs and elements of resource (EOR) event costs. EORs are non-OPTEMPO resource requirements such as transportation, contract support, and travel.

According to the Division Comptroller, subordinate units do account for training costs, and beginning FY89, they will get OPTEMPO rates with which to plan events. For example, they will get a cost rate that is the maximum rate available for a particular event. Currently in the ERM model the Comptroller uses FORSCOM cost factors with some modifications based on local experience.

Installation D

Training Mileage Control Model (TMCN). TMCN is a locally designed training funds management system. The sole purpose of TMCN is to quantify costs associated with directed training by using programmed and actual equipment mileage. The output of TMCN is the cost for each event by Class III (package and bulk petroleum) and Class IX (organizational and direct support repair parts). Monthly, the division compares TMCN output with TUFMIS listings to see how closely unit estimates match expenditures. TMCN managers compute fixed and variable operating costs for the fiscal year. Fixed costs were costs that had to be paid regardless of the specific training event. Variable costs were event training costs.

The Division Comptroller consolidates unit data in the Division Master Calendar, which is itself based on prescribed training in Army and Division regulations. The Comptroller applies Army cost factors to arrive at an estimated cost in terms of Class III (petroleum) and Class IX (organizational repair parts). Subordinate battalions and separate companies receive event printouts from the TMCN Office containing an approved list of training and sustainment events. They, in turn, annotate the printout by indicating the items of equipment, equipment, density, and the average number of miles or

hours the equipment would operate during the event, and return the printout to the TCM Office. Using these annotations, TCM builds event cost data through a series of equipment use calculations. Actual event updating is the same as programming except that units report what equipment they actually took and the number of miles or hours actually used. The resulting figure is again multiplied by Army cost factors to create Class III and Class IX cost data. This iteration is designed to better refine future planning data and to gain an immediate estimate of how much an event is going to cost before TUFMIS begins reporting expenditures.

TCM managers have a more direct method of programming training and sustainment events than managers using TMACS and ERM. Subordinate units are told what to program and are checked for compliance. The only training events specifically tracked by event title are those the division tracks and reports. All other training and sustainment events are grouped into categories such as force sustainment, unit readiness exercises, garrison training, and gunnery types of events and then given an expected frequency rate and placed in the TCM program.

Though TCM has been in the division since October 1987, there were no written instructions as to how to operate it. Unit representatives had been taught by personnel in the Division Resource Management Office and sustainment training was done on an individual basis.

The Division Comptroller and the TCM Office within the Division G-3 Training Section considered TCM to be too labor intensive to capture cost data. Equipment mileage and hour data for items used in the model has to be collected by subordinate battalions and separate companies. Before and after a training event odometer or hour meter readings have to be recorded and reported. Therefore, unit compliance in reporting has been disappointing, according to both offices managing TCM.

TUFMIS Use at Installation D. The TUFMIS program at this installation contained the most extensive number of cost categories observed during data collection. The Division Comptroller used every TUFMIS field available in the software to track training and sustainment activity-related costs with the exception of temporary duty (TDY). Table 5 contains a listing of the Installation D TUFMIS fund categories.

TABLE 5. Installation D TUFMIS Fund Categories

<u>Category</u>	<u>Cost Elements</u>
I	Office Equipment & Furniture
II	Expendable General Supplies/SSSC Non-Expendable Equipment Barrier & Construction Material Locally Procured Supplies
III	Packaged Petroleum (oil and lubricants) Bulk Petroleum (MOGAS and Diesel)
V	Contracted Services
IX	Organizational Repair Parts

Table 5 illustrates that TUFMIS can be used to track costs beyond the normally observed Class II (general supply), Class III (packaged petroleum), Class IV (barrier and construction material), and Class IX (organizational repair parts). The Division Comptroller has added other key cost elements such as SSSC, non-expendable equipment, locally procured supplies, bulk petroleum, and contracted services.

APPENDIX G-2

TRAINING AMMUNITION MANAGEMENT

APPENDIX G-2
TRAINING AMMUNITION MANAGEMENT

Battelle staff collected data on the processes and procedures followed at four Division Ammunition Offices (DAO) or other similarly functioning offices. What follows is a more detailed description of the data collected than is included in the body of the report.

Installation A

Forecasts. Installation A requires the units to submit monthly forecasts to the Division G-3 Training Ammunition Coordinator by the first working day of each month. These forecasts cover training ammunition quantities the units expect to use during the next 12 months. The forecasts are manually completed and submitted on a locally developed, installation form. The forecasts are finalized three months prior to ammunition draw and units can only request ammunition quantities reflected in the finalized forecasts. The DAO manages 11 accounts in the particular division that was surveyed.

Units are required to provide forecast quantities, authorization levels, and remaining ammunition balances on each forecast. The DAO corrects each forecast to ensure that these quantities are correct, by manually reviewing each forecast and correcting entries.

Requests. Installation A requires units (divisional and non-divisional) to submit training ammunition requests on a DA Form 581 at least six working days prior to the date desired for Ammunition Supply Point (ASP) issue. The requests must pass through the G-3 for approval before going to the DAO. The DAO is required to pass the request to the Installation Ammunition Management Office (IAMO) four working days prior to issue. The ASP requires 72 working hours notice before ammunition issue.

Installation B

Forecasts. At Installation B, units also submit monthly forecasts to the DAO. The forecasts are generated by the DAO for subordinate account holders on a spreadsheet with locally developed modifications. The DAO manages the division's allocation, which includes 11 accounts. MSCs pick up their

forecast by the twenty-second of each month and return forecast changes to the DAO by the seventh calendar day of the following month. The DAO states that they do not give units their account status (remaining quantities and authorized quantities) until they come in for the spreadsheet. This is an incentive for the units because they must know their account status to calculate ammunition forecasts. Account holders can adjust forecasted quantities; however, the forecast is locked in 30 days prior to scheduled issue. Account holders do not calculate account balances or write DODIC numbers as is done by units at Installation A. The DAO incorporates all correct changes and generates an automated Division Training Ammunition Forecast which becomes the division forecast to the IAMO.

Requests. At Installation B, units must submit ammunition requests on DA Form 581 ten working days prior to the desired date of ASP issue. Training ammunition requests go directly to the DAO; requests pass through the Division G-3 only if they are late or unforecasted. Unforecasted requests are filled by division excesses if possible, otherwise they are filled by installation excesses.

At Installation B, units with late or unforecasted requests had to state in a justification letter why their training ammunition request was late or unforecasted. The predominant reasons given were changes in training plans and or in commanding or other officers, who had different plans for training than their predecessors.

Installation C

Forecasts. Installation C has a Consolidated Ammunition Management Office (CAMO), rather than a DAO, which receives forecasts from eight division equivalent units and eight small non-divisional units stationed at that location. Division forecasts are submitted to the CAMO on an automated ammunition management system operated by the Directorate of Information Management (DOIM). This system uses an IBM mainframe computer with terminals located at divisional unit headquarters. Non-divisional units submit forecasts manually on a local form or on DA Form 5514-R. Units are required to submit monthly forecasts, projecting ammunition required for the next 12

months. These forecasts must be submitted eight working days before the end of the month.

Installation C allows units to forecast 1.5 times the STRAC tables for common training ammunition items and 1.1 times the STRAC for expensive, critical training ammunition items. This is a departure from the practices observed at other installations, where forecasts are held to the STRAC recommendations or less. According to the Installation Ammunition Office, Installation C has historically experienced an 80% expenditure rate against annual authorizations. The decision to encourage unit forecasting beyond STRAC was based on the premise that, if able to forecast more ammunition than authorized, unit expenditure rates would increase to 90-95%, so an "open-ended" local authorization policy was adopted.

One problem associated with the automated system is that units wait until the last day to submit training ammunition forecasts and then the system becomes overloaded with simultaneous submissions.

Installation C also has a 90-day training ammunition lock-in period. However, units may still increase their training ammunition forecasts by up to 10%. This is the only lock-in period that allows units to request quantities beyond forecast levels.

All of the ammunition forecasting errors were reported by the CAMO to be forecast quantity errors. Units forecast beyond authorization levels. It was reported that with the lifting of the STRAC ceiling, the frequency of this problem has increased. There is no check in the automated system for overforecasting; checking still has to be done manually.

Requests. At Installation C, units submit a DA Form 581 to the CAMO two working days prior to the desired date of draw from the ASP. Unforecasted requests go to the CAMO for intra-division credit release (ammunition is released and reassigned within divisions) or an installation credit release. The term "short-fuse" was used to identify forecasted ammunition requested sooner than originally forecasted. Units must process "short-fuse" training ammunition requests three working days before ASP issue. Unforecasted and "short-fuse" training ammunition requests be approved by division and corps G-3 staff sections.

Installation D

Forecasts. The analysis of training ammunition forecasting at Installation D was performed by interviewing personnel in the office of the Assistant Deputy Chief of Staff, Operations-Training, Training Ammunition Office, at Installation D and Ammunition Supply Point (ASP). Installation D account holders are major or separate major commands that receive training ammunition authorizations directly from a Training Ammunition Management (TAMS) Office.

At Installation D, TAMIS is used to electronically submit ammunition forecasts. TAMIS is the automated system for training ammunition management. It is an analytical tool for managing training ammunition authorizations. Its features include input and training ammunition authorization management reports. Account and subaccount holders possessing TAMIS submit forecasts electronically to the TAMS office. Non-TAMIS account and subaccount holders submit manual forecasts on a training ammunition forecast form. The forecasts at this installation function also as requests for ammunition.

Account and subaccount holders notify supporting area ASPs of their need for training ammunition by submitting requests to the servicing ASP 40 days before a required delivery date, or date when the unit expects to draw the ammunition. TAMIS users post their requests on the automated system and transmit to a servicing ASP with the Installation D TAMS Office also receiving notification. Non-TAMIS users hand deliver or mail their requests. The actual processing for issue is done at all other locations surveyed on a DA Form 581. Forecasts (or requests) not submitted within the 40 day deadline are processed and filled from assets on hand in the servicing ASP.

Requests. A DA Form 581 is required for units to pick up ammunition requested on a 40-day transportation request (TR) from an ASP in Installation D. The DA Form 581 must be presented to the ASP at least 24 hours before the day of issue.

Installation D requires that units request ammunition (in the form of a forecast) 40 days before scheduled issue. Requests submitted less than 40 days from desired date of draw were filled by the ASP if the DODIC was in

stock and did not exceed expected demands within the next 30 days. If the DODIC was not available now or in the immediate future, the request was not filled.

APPENDIX G-3
RANGE MANAGEMENT

APPENDIX G-3

RANGE MANAGEMENT

All installations have local policies that units must follow to use a range. All installations observed require that unit representatives attend range scheduling conferences; each installation has its own policies on how soon ranges must be scheduled.

What follows is a more detailed description of the range requesting, cancellation, and use policies than that included in the text of the report. Utilization and cancellation policies are also discussed.

Installation A

Range Requesting Process. At Installation A, units must submit range and training area requests on a local headquarters form (Range, Facility, and Training Area [TA] Request) to the Range Control Office thirty-six working hours prior to range opening or entering a training area to receive credit for an on time request. The same policy holds true at Installation A for subsequent request revisions and cancellations.

Another feature of Installation A range and training area request procedures is the monthly range conference. At the monthly conference, units reserve ranges and training areas 90 or more days in advance. For their reservation to remain valid, they must follow-up with a local headquarters request not less than 30 days prior to the scheduled date of the range or the reservation is automatically lost. Losing a reservation does not constitute a late request; it is simply a lost opportunity that becomes available to other units who might have a training need.

Range Request Cancellation Process. Range cancellations and revisions are required to be submitted 36 working hours prior to use of the requested range. A form must be submitted to cancel a range request.

Range Utilization. Units are required to call in when they occupy a range or TA. Installation A did not give utilization credit to units

occupying training areas unless they also called in the time they left the range.

Installation B

Range Requesting Process. At Installation B, the requesting process requires fewer actions by the units. Unit representatives attend a weekly range conference and verbally ask for a range or training area at least six weeks in advance. Requesting under the six-week cutoff constitutes a late request.

Installation B range requests are worked out during weekly range conferences without record keeping. Thus, project staff could not collect data on how much request editing and coordinating was required on the part of Range Control.

Range Request Cancellation Process. At Installation B, for a unit to receive credit for cancelling an approved range, training area, or facility request "on-time," the cancellation must be submitted to the Range Control Office, at least 36 working hours prior to the approved scheduled date. Failing to meet the installation cutoff meant the unit is charged for the facility regardless of whether they use it or not.

Range Utilization. For scheduled ranges, units have to call in and report range use. Until recently, Installation B gave utilization credit to units with scheduled training areas whether or not they called Range Control Office. Now, Installation B requires units to also report the time they left the training area.

Installation C

Range Requesting Process. Installation C has an automated range scheduling system called RCASS (Range Control Automated Scheduling System) that is linked with the major subordinate commands (MSC) of the installation. RCASS assists the RCO and MSCs with range scheduling and approving. RCASS was locally developed and is supported by the installation Directorate of Information Management (DOIM). The RCASS software program is currently being rewritten to give RCASS an interactive ability and to provide customer

services such as range selection. The software will also prompt the user to answer questions such as type of range needed, dates desired, and ammunition to be expended. Once all the questions have been answered by the requestor, the computer will select a range and print a request for both the unit and RCO. The revised software should be completed within a year.

Installation C holds range scheduling conferences, hosted by RCO and attended by MSC representatives, the first Tuesday of each month. Requests are made at this time. Within 72 hours, the MSC's must use their terminals to transmit their approved range schedule into RCASS, or lose whatever reservations they have not programmed. This policy is designed to ensure that MSCs still desire what was requested at the monthly conference, since conference attendees are expected to know their MSC requirements 150 days in advance. Ranges are assigned to MSCs according to training priority. The RCO uses a III Corps master calendar and a 13-week rotating unit priority list to determine who has priority.

Range Request Cancellation Process. Installation C's current cancellation policy went into effect in May 1988. Requesting units must cancel a range at least 14 days before the scheduled date of range opening.

Range Utilization. Installation C also requires units to call in when they are occupying a range. Installation C does not track the utilization of training areas. They believe they have too many training areas, and that the number of different units in the training areas are too numerous to warrant tracking training area occupancy rates.

Installation D

Range Requesting Process. The Scheduling Chief, who falls under the Assistant Chief of Staff for Security, Plans, and Operations, conducts a Range Scheduling Conference 120 days before each 6-week period. Until March of 1988, the scheduling was done at a 90-day scheduling conference. A representative from each division or MSC attends this conference and schedules for their division or MSC. There are no particular rules or priorities governing which MSC trains at which particular time. At the 120-day conference, units debate the schedule until dates and ranges are worked out.

Because of limited range space, divisions or MSCs are allotted a certain amount of time to use ranges each year.

The Range Scheduling Chief has developed "Range Packages", which assist and direct units in scheduling the various ranges and facilities needed. Each package gives particular types of units time on the ranges necessary for their unique training needs and assists the units and the schedulers in determining the date requirements for the reservation. There is no paper follow-up request for ranges; if an MSC is on the 120-day schedule, then that unit has requested and received that range.

Range scheduling at this level currently uses two automated systems. The first is the Master Schedule, which produces the Range Schedule for a year. The 120-day Range Conference Schedule is official although some long-range scheduling is attempted (i.e. on a yearly basis). The Scheduling Chief is currently adopting another automated range control system, RFMSS (Range Facilities Management Support System). This system allows for the Master Range Schedule (a one-year schedule) to be fed into RFMSS. RFMSS can monitor range usage and changes in scheduling.

After the long-range scheduling conference is held and a schedule is generated, it is passed on to the training area for the Range Control Officer to manage. There is also a weekly scheduling conference that covers a two-week period that is used to plan two weeks in advance. At this time scheduling changes are made, usually within a division, and battalions are specifically scheduled. The reallocation of cancelled ranges is not done by waiting list or first-come, first-served basis; it is done at this weekly meeting. Units desiring a range must try to get on the schedule at that meeting.

There were no data available on errors or changes to the range request. No paper request is required of the Division or MSC to schedule a range, facility, or TA after they appear on the 90-day schedule.

Range Request Cancellation Process. There is no official range cancellation process. According to the Chief Scheduler, a few do come in the form of a written cancellation. When cancellations do occur they occur at the

weekly scheduling conference. A cancellation, in this case, must be made approximately 14 days in advance.

Range Utilization. As of July 1988 range utilization data at this installation are being tracked via RFMSS. This will aid range management in determining which units are not using the ranges they schedule or which ranges, facilities, or TAs are used. Units must call in to notify the RCO that they are occupying the range.

APPENDIX G-4

TRAINING AIDS AND DEVICES MANAGEMENT

APPENDIX G-4

TRAINING AIDS AND DEVICES MANAGEMENT

I. TRAINING AIDS AND DEVICES MANAGEMENT

Two types of training devices and aids are generally issued: non-expendable and expendable/recoverable items. Non-expendable items are durable, expensive items loaned for a specific period of time, normally the duration of a training event. Expendable/recoverable items are consumable, relatively inexpensive items. Unused expendable/recoverable items are generally issued and are taken back from the customer as soon as possible. The scheduling, requesting and return of non-expendable training devices and aids, such as audio-visual equipment, and expendable/recoverable items were the focus of this aspect of the data collection effort.

Installation A

Account Status Management. Installation A's TASC operation includes access to TAMIS (Training Audiovisual Management Information System) which assists in asset management and customer account management. TAMIS operates on a mainframe computer. All customer accounts are entered into TAMIS. The authorized unit representative must have his or her account verified before checking out TASC equipment.

Equipment Loan Process. Installation A has a five-working-day reservation system. Units are encouraged to call, write, or visit to pre-arrange pick-ups, but they also accept non-reservation, walk-in requests. No matter how Installation A TASC customers ask for items, they must fill out a DA Form 4103, Request for Issue, to take away the item on temporary loan.

Installation B

Account Status Management. Installation B manually manages all TASC accounts. This installation is unique in that TASC has many buildings for equipment issue and the area that manages the accounts is separate from the TASC issue areas. For instance, a unit opens an account in one building, picks up a film in another building, and picks up the film projector in

another building. TASC is presently training its personnel on the use of Zenith PCs, but TASC management is presently not automated.

At the time of data collection, the TASC account manager had been unable to contact units that had expired accounts. Units in the field cannot be contacted by phone; usually letters are sent. However, the account manager's supply of form letters had been depleted for about six months and they did not have the personnel to write their own letters. Therefore, they told us that the number of expired accounts was unusually high.

Equipment Loan Process. Installation B has an informal reservation system. Equipment reservations are usually not made and customers are serviced almost exclusively on a non-reservation, first-come, first-serve, walk-in basis. Customers do call ahead to reserve items but must come to the TASC issue site and fill out a request form to officially reserve an item.

Installation C

Account Status Management. TASC at Installation C is managed by the government but operated by a contractor. The non-expendable training device inventory consists of approximately thirteen thousand items, with an inventory value of \$48 million dollars. The approximate average value of each item is \$3692.

Accounts are all managed by hand. The TASC issue site is consolidated at one location, which makes issuing items without automation assistance much easier. TASC notifies units when their accounts are out of date.

Equipment Loan Process. Installation C has an informal reservation system; however, reservations are accepted. No reservation or walk-in request is accepted without submitting a DA Form 3161, Request for Issue or Turn-in, to TASC. If the item is available, the DA Form 3161 is approved and arrangement for pick up made. The advantage to the customer in reserving an item is that equipment loans are on a first-come, first-served basis.

Installation D

Account Status Management. Locally, Installation D does not have a TASC office, but instead a Training Support Division (TSD). TSD has an inventory of approximately \$1,250,000, for 1,394 pieces of equipment.

TSD has a locally developed automated system that manages account status for issuing equipment used in training and other Army-related activities. Their automated system is on an INTEL computer using the XENIX operating system. The system is a personal computer with expanded memory to handle large files and is networked with other offices under their same directorate.

TSD falls under the Directorate of Planning, Training, Mobilization, and Security (DPTMS). Consequently, TSD manages more than TASC items. TSD describes itself as a peacetime organization responsible for linking local training area management, community training, support library, Training Support Center, Individualized Training Evaluation Program (ITEP), and military testing under centralized control and management. Their automated system is linked with Security, Mobilization, and Continuing Education (under the same directorate). This allows TSD to share account status information with the other areas and to have access to the security and mobilization information on personnel in the community they serve. This type of centralization is unique; generally training aids and devices are separate from these other functions.

TSD manages all types of equipment loans, administers the written part of ITEP and other military tests, keeps all of the films and publications, and manages the Local Training Area (LTA). A training NCO can pick up a VCR, a training cassette, and schedule a classroom all at one location. This type of training resource management is a truly a "one-stop" shop (which appears to be the Army intent in management of TASC-type of items).

TSD also downloads data base information from the local Personnel Services Company for more information on personnel (e.g., current rank and pay). For instance, enlisted personnel of the rank of E-8 and above and officers can check out equipment. Therefore, TSD wants to maintain data on the rank of the personnel who check out equipment.

Equipment Loan Process. The equipment loan process for Installation D is essentially the same as the preceding installations. Items are not commonly reserved in advance. To obtain equipment, the unit can call and reserve equipment in advance or walk in and obtain the equipment. In both cases the account holder must fill out DA Form 4103 (request for equipment) in triplicate. The automated system produces these request forms for the unit; however, they believe it is just as fast to fill them out by hand. To obtain the equipment after the form has been submitted, account status is verified on the computer, expired account status and late-turn in of equipment are checked, and it is verified that the person obtaining the equipment is on the signature card.

The equipment issue area is staffed by contractors, but government civilians are responsible for, and manage the use of resources. In addition to issuing equipment, the contractors advise and consult in the selection, acquisition, and use of media and equipment associated with training.

In certain circumstances, Installation D permanently loans equipment to large units or units who regularly use a certain type of equipment. These units are informed that the equipment may be loaned to other units when that item is not available from the TASC inventory. All equipment that is loaned is entered in their automated system. A manual log is also kept. The data base for the equipment tracks equipment by type, account holder who has borrowed it, and time of turn in. This assists in serving customers who want something that is not in stock. TASC can call units and ask them to turn something in early so another unit can use it. Or, in the case of permanent loans, other units can loan permanently loaned equipment for short periods of time.

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