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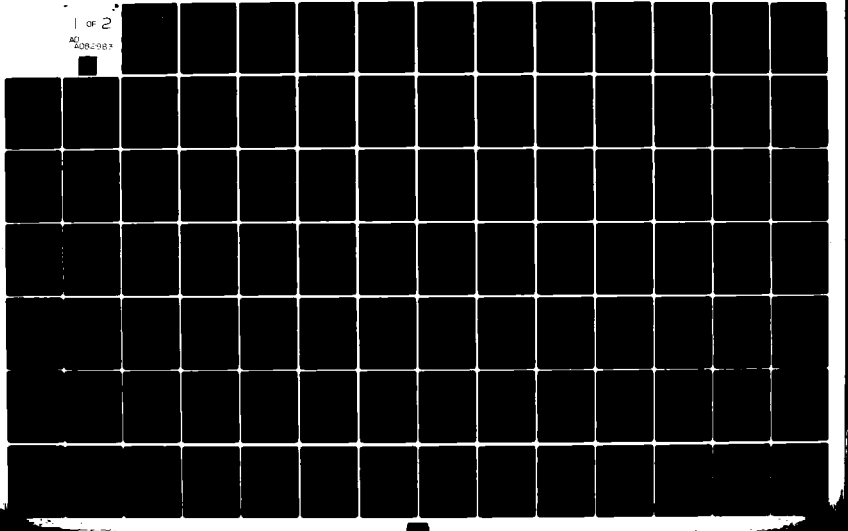

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THE STATUS OF INFANTRY TOW, LAW, AND DRAGON TRAINING IN USAREUR

by

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Combat Unit
Training

Technical Report 77-B

THE STATUS OF INFANTRY TOW, LAW, AND DRAGON TRAINING IN USAREUR

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This is a report on an advanced development research project designed to meet military management requirements for research on a specific management problem. ~~A limited distribution~~ is made, primarily to the operating agencies directly involved.

EXECUTIVE SUMMARY

PURPOSE

A critical USAREUR mission is to develop and maintain a capability of engaging and neutralizing a numerically superior armored force. For the infantry, the primary anti-armor weapons are TOW, LAW and Dragon. This study was to determine the status of training for these weapons in USAREUR, and to recommend changes that would improve training effectiveness.

METHOD

Questionnaires and follow-up interviews were administered in infantry battalions (nine for TOW, eleven for LAW) representing both V and VII Corps. For Dragon, which was introduced only recently in USAREUR, two battalions were surveyed.

FINDINGS

ATTITUDES CONCERNING EFFECTIVENESS

TOW

TOW was perceived as the most effective because of its long range.

LAW

Most company commanders were skeptical of LAW effectiveness because of its limited range and lethality.

Dragon

Dragon was perceived as enhancing combat effectiveness without requiring change in tactics.

PERSONNEL PROBLEMS

TOW

Personnel turbulence was high. Median estimates of annual turnover were 40% of drivers, 50% of assistant gunners, 58% of gunners, 83% of section leaders, and 100% of squad leaders. On any given day, an estimated one-third of personnel were unavailable for training. Some CONUS-trained TOW gunners were not assigned to TOW squads.

LAW

On any given day, an estimated 20% were unavailable for training.

Dragon

No personnel problems were apparent. Gunners were selected without formal criteria and were qualified without apparent difficulty.

TRAINING CONSTRAINTS

TOW and LAW

Training time was deemed insufficient; there were no multiple targets; and more target identification media were desired, especially plastic models.

TOW

Instructors needed additional skills, both specific to TOW and in instructional techniques. More XM70 training sets and battery chargers were needed. XM70 were inoperable an estimated 40% of the time because of malfunctions and maintenance delays. Most tracking ranges were deemed inadequate and ammunition insufficient. TOW TEC lessons were not yet available at the time of the study, and the TV trainer (TVT) was not used.

LAW

Because of limitations in range facilities, firing was restricted to major training areas (MTAs) for most (18 to 21) companies, and many complained of "unnecessary" safety restrictions at MTAs. More ammunition was desired, particularly live and mortar illumination rounds. Some respondents wanted more expended rounds and subcaliber devices. Most companies lacked some training aids; other training aids were available but rarely used. Few companies (33%) used the TEC lessons, and only one had used the TVT.

Dragon

Training opportunities were restricted by limited availability of training equipment; training sets, held by battalions, were unavailable to companies on short notice, and too few field handling trainers limited use of Dragon in field exercises. Ammunition was sufficient for prescribed training. There were no multiple targets. TEC lessons and Dragon adapted TVT were not yet available.

TRAINING PROGRAM DEVELOPMENT

TOW and LAW

Few respondents had lesson plans, and even fewer in accordance with FM 21-6.

TOW

Most companies used FM 23-3 and TC 7-24, but less than half used TC 23-23 and Draft TC 23-20.

LAW

Many respondents ignored basic LAW training references.

Dragon

Respondents said they used the available training materials.

CONDUCT OF TRAINING, EVALUATION

TOW and LAW

Training for both systems was far short of the conditions and standards stated in Draft TC 23-20. Target identification training was presented mostly in the classroom by various techniques.

TOW

All respondents were dissatisfied with the quality and amount of gunner and squad training. Most gunners received intensive training only in preparation for annual live firing. Most TOW squads had no tactical or combined arms training, and most of their company commanders did not know how to employ them.

LAW

No one used the sighting rules specified in TRADOC Bulletin 5, and many company commanders doubted that soldiers would use the LAW sight in combat regardless of training. Few company commanders had conducted tactical training specific to LAW. Very little range estimation training was given.

Dragon

Dragon training was scheduled in accordance with range availability rather than monthly, as specified in the manuals. Tactical training was integrated in field training. Officer and NCO training was generally limited to brief indoctrination and reading manuals.

MAJOR RECOMMENDATIONS

TOW and LAW

1. Inventory training references in companies, provide those missing, and require their use for development of training programs.

2. Determine specific target identification requirements for TOW and LAW personnel and the most effective media and methods for target identification training.

3. Design personnel and time management methods that will permit regular scheduling of TOW and LAW training in local areas.

4. Ensure that TOW and LAW personnel participate in REALTRAIN exercises for realistic training in tactics, multiple target engagement, and combined arms coordination.

5. Set TOW and LAW training and performance standards commensurate with available training resources and require their attainment, and increase the standards as additional resources are provided.

6. Provide training in performance-oriented instruction to training personnel and instructors not already skilled in those techniques.

TOW

1. Establish a school in USAREUR to develop TOW platoon leaders and NCOs (at least the latter) as TOW experts, and assign one such NCO to each TOW squad.

2. Provide specific instruction on TOW employment to infantry company commanders.

3. Provide carrying cases for delicate parts of TOW weapons and XM70s.

4. Provide more battery chargers to each battalion, means for charging batteries in the field, and insulation for TOW battery cases.

5. Provide TOW maintenance capabilities to divisions, and authorize replacement of minor parts by CSCs.

6. Provide sufficient training ammunition for realistic gunner training and qualification.

7. Provide adequate target-tracking ranges with multiple moving targets in local areas, or provide such targets at least in major training areas.

8. Develop a TOW combat theater for set-up in existing garrison facilities to reduce or eliminate the need for XM70 training sets.

9. Use live firing of TOW missiles for accurate assessment of overall gunnery proficiency.

LAW

1. Specify range estimation requirements for LAW personnel, and determine the most effective training techniques for meeting them.

2. Provide a more powerful round for greater range and impact.

3. Provide a subcaliber round that will not damage an unhardened tank.

4. Provide firing ranges with moving targets at 7th Army Training Command or approve local firing ranges that can accommodate moving targets.

5. Ease firing safety constraints by shielding firing stations against backblasts from other stations, or reposition firing points forward, prepare foxholes, and move the control tower to one side of the range.

6. Provide more training ammunition.

DRAGON

1. Ensure that MOS 11D and MOS 11E personnel receive Dragon training.

2. Increase the number and operational availability of Dragon training equipment.

3. Determine the correlation between performance in qualification firing and performance in REALTRAIN exercises.

4. Determine the impact of Dragon availability on company/troop tactics.

5. In further introduction of Dragon, ensure concurrent issue of all associated items and supplies, and provide for leader familiarization with the weapon.

THE STATUS OF INFANTRY TOW, LAW, AND DRAGON TRAINING IN USAREUR

CONTENTS

INTRODUCTION

BACKGROUND

A critical USAREUR mission is to develop and maintain an antiarmor capability of engaging and neutralizing a numerically superior armored force.

This research is limited to training in the three primary infantry antiarmor weapons currently deployed in USAREUR: TOW, LAW, and Dragon. These systems provide long, short, and medium range antiarmor capability. TOW and LAW have been in the USAREUR inventory for several years. At the time of this research, Dragon was being issued to USAREUR units.

Dragon personnel had been trained in CONUS, and as USAREUR units received the system, CONUS-trained cadres were to initiate training programs.

The training programs developed by TRADOC (Training and Doctrine Command) for TOW, LAW, and Dragon had been provided to USAREUR, but apparently they did not directly fit USAREUR requirements or they could not be effectively implemented as designed. There was evidence that units were not using the programs as designed and were not achieving the desired results. At the time this research was conducted, TRADOC had recently revised the training programs for the LAW and TOW systems in response to continuing analysis of their effectiveness, and USAREUR units scheduled to receive the Dragon system had some cadres which had been trained in the system in CONUS. These cadres were to start Dragon training programs in USAREUR.

OBJECTIVES

The purpose of this research was to determine the suitability of prescribed programs for USAREUR infantry antitank training, and to identify USAREUR skill requirements, if any, not being met by these programs and the reasons therefore. Specific major objectives were to determine:

1. The extent to which the prescribed training programs are being followed and the nature of changes or substitute programs being employed by USAREUR units, as indicated by training program development and conduct of training.

2. The availability of resources (time, publications, devices, ranges, etc.) to support antiarmor training, as reflected in personnel problems and training constraints.

3. The efficiency and effectiveness of the training being conducted, as indicated by respondent attitude toward the weapons and by trainee evaluation.

4. Program or system changes that would improve training effectiveness.

TOW TRAINING

METHOD

Two copies of a training questionnaire were distributed to one infantry battalion in nine different brigades. Five brigades were in V Corps and four were in VII Corps. Each battalion was selected from within the brigade at random.

Of the two questionnaires provided to each battalion, one was completed by the combat support company (CSC) TOW platoon leader,[1] the other by an infantry company commander. Each respondent completed his questionnaire independently of the other, but was free to consult with others within his company. When the questionnaires were completed, follow-up interviews were held with the respondents in eight battalions.

Information about TOW training was also obtained during informal interviews with corps, division, and brigade training personnel and with several battalion commanders.

[1]The CSC TOW platoon leader was chosen, rather than the battalion S3, because in most battalions he served in the role of the S3 for TOW training.

FINDINGS

The major findings are summarized in the subparagraphs that follow. Detailed survey data are in Appendix A. The findings are grouped under these headings:

- Attitude Toward TOW
- Personnel Problems
- Training Constraints
- Training Program Development
- Conduct of Training
- Trainee Evaluation

ATTITUDE TOWARD TOW

Most corps, division, and brigade training personnel lauded the TOW as the antiarmor weapon that will be most effective in combat, based on reports of hits during live firings. When the favorable conditions of current TOW firings were pointed out, they moderated their opinions somewhat but cited the TOW's long-range capabilities as sufficient justification for their optimism. A few, admittedly partial to tanks, believed that the TOW is overrated. However, all approved the emphasis being given to the TOW in USAREUR, and most mentioned the need for an ability to engage multiple targets.

Infantry company commanders were far more optimistic than CSC TOW platoon leaders in estimating the probability of getting a first round hit. TOW Platoon Leaders were more concerned than company commanders about effects of enemy fire on gunner performance during the firing of the first round, but both were about equally concerned about enemy fire during firing of the second round. Most TOW platoon leaders expressed concern about ability to maintain the TOW in an operational state because of battery charge and other problems.

Enlisted personnel assigned to TOW squads have a high regard for the weapon's capabilities, are proud to be associated with it, and do not believe that the assignment is a career detriment.

PERSONNEL PROBLEMS

Assignment of CONUS-Trained Gunners

Some TOW gunners trained in CONUS were reported unassigned to TOW duty upon arrival in USAREUR. Because it is difficult to adequately train gunners in USAREUR, respondents felt that loss of these trained personnel was a serious matter.

Turbulence

Turbulence among TOW personnel was high. Estimates of annual median turnover rates per company were 46 percent for drivers, 100 percent for squad leaders, 83 percent for section leaders, 58 percent for gunners, and 50 percent for assistant gunners.

Trainee Availability

In both CSCs and rifle companies, as estimated median 33 percent of the personnel assigned to TOW units were unavailable on any particular day for training in local areas. The major reasons cited were temporary assignment to other duties, medical and dental appointments, educational activities, and other demands on personnel time.

TRAINING CONSTRAINTS

Time

In addition to the uncertain availability of personnel for training, previously mentioned, most company commanders said little time for training was available because of heavy demands on their time for other priorities set by higher headquarters. There was a strong concensus that this compound effect resulted in little or no training in local areas and in inadequate training in major areas.

The estimates obtained of monthly and annual hours devoted to TOW training are unreliable. Many respondents said that because of the erratic nature of the training, their estimates were only guesses. Most respondents wanted time for TOW training doubled, at least.

Trainer and Instructor Personnel

Almost all CSCs and about half of the infantry companies had officer trainers, and virtually all had NCO assistant trainers. About half of the CSCs and almost all of the infantry companies had a designated instructor for each squad. Some company commanders, however, were dissatisfied with the quality of their instructors and expressed the need for a school in USAREUR to train CSC TOW platoon leaders and NCOs as TOW experts, with an NCO expert to be assigned to each squad.

Training Equipment

An immediate need for more XM70 training sets was strongly expressed by respondents. One said there should be one set for each section of two squads.

Operational availability of the XM70 is a major problem. Of the two sets per battalion, on the whole only one was operable about 60 percent of the time, and both were inoperable about 40 percent of the time. In one battalion, only one set was operable 20 percent of the time. This operational rate made the sets almost completely unavailable to TOW squads of the infantry companies.

Among the causes of the low operational rate are the delicate nature of the set, which frequently results in malfunctions, and lack of carrying cases for both the set and the TOW weapon. The XM70s and TOWs were frequently damaged while being moved to and from weapons rooms.

Delays in maintenance, particularly for XM70s, ranged from two weeks to six months. These delays were the result of travel and delay time at the centralized maintenance facilities -- one per corps. To prevent long delays, a division chief of staff and some company commanders said maintenance capabilities should be established in each division. To speed up replacement of minor parts, such as eye-pieces and "C" washers on battery cases, most company commanders said CSCs should be authorized to make such replacements.

Battery charges were also reported as a major problem. The one charger per battalion is insufficient to meet demands, particularly in winter when batteries are least efficient. Most CSCs said capability for charging batteries in the field in needed. Many TOW platoon leaders were concerned that lack of this capability would affect operational availability of the TOW in battle. Uninsulated mounting brackets were also said to cause needless loss of battery charge.

Training Aids and Devices

Besseler Cue See devices were available in half of the companies. However, TEC lessons on TOW were unavailable at the time of the survey. SONY TV devices were available to two-thirds of the companies, but they were not used for TOW training because of lack of interest, lack of qualified operators and too few videotapes. A need was expressed for sand tables designed for TOW tactical instruction and scaled terrain boards of sectors.

Range Facilities

Three-fourths of the CSCs and half of the infantry companies had target tracking ranges, but almost all of them were considered inadequate for gunner training. Ranges with multiple moving targets were unavailable at major training areas. A few respondents said they covered engagement of multiple targets in classroom discussions. Despite increasing emphasis on the need to engage multiple targets, only 44 percent of the CSCs and one of the rifle companies listed multiple-target tracking as a training need.

Ammunition

Most respondents said available ammunition was insufficient for realistic training and gunner qualification. The most critical needs were for TOW blast simulators and mortar illumination. For example, CSCs stated an annual need (on the average) for 5000 blast simulators and about 400 rounds of mortar illumination. Infantry companies wanted proportionately more ammunition than the CSCs.

Virtually all companies wanted sufficient live rounds for familiarization firing at least twice a year. Otherwise, many squads would have inexperienced gunners because of the personnel turbulence rate.

Target Identification Media

The most frequently used target identification media were photographs and vugraphs, but tank models were said to be the most effective and were much in demand. About half of the companies that had models wanted more, and those that had none wanted all they could get. Although suitable models were available in German stores, most companies lacked funds to buy them. A desire was expressed for kits to make mockups of enemy tanks using M60A1 tanks.

TRAINING PROGRAM DEVELOPMENT

Training Publications

Less than half of the companies used TC 23-23 (TOW Heavy Antitank Weapon System, 1970) and Draft TC 23-20 (Unit Antiarmor Training Program, 1975) for preparation of training. Surprisingly, about half of the CSCs had neither of these references. For TOW tactical training, almost all CSCs and half of the infantry companies used FM 23-3 (Tactics, Techniques and Concepts of Antiarmor Warfare, 1972), and three-fourths of all companies also used TC 7-24 (Antiarmor Tactics and Techniques for Mechanized Infantry, 1976). A need for extending distribution of Draft TC 23-20 to squads was strongly expressed.

Lesson Plans

All CSCs and one-third of the infantry companies said they had prepared lesson plans, but only two CSCs and one infantry company had samples to show. The remaining respondents indicated a belief that preparation of lesson plans was an academic exercise and of little practical use. Only the lesson plans of the infantry company were in accordance with FM 21-6. The commander said they were prepared that way because of the insistence of the battalion commander.

CONDUCT OF TRAINING

Gunner and Squad Training

Data derived from the questionnaires indicated that most companies trained gunners monthly or quarterly. However, in follow-up interviews most respondents implied that, in fact, gunners received intensive training only before annual live firing. Three respondents stated this outright. All respondents were dissatisfied with both the quality and amount of gunner and squad training. Reasons given included problems with the XM70 training set,

trainee availability, and inadequate target-tracking ranges. No special attention was given to novice gunners and very little to other squad members.

Conditions and standards for training contained in Draft TC 23-20 were far from fully met. At least one CSC never trained on 14 of the 20 tasks listed in the TC, and most companies had never engaged or tracked multiple targets either stationary or mobile. Companies listed 28 tasks they should train for but did not. This situation resulted from a combination of inadequate facilities, too few operational XM70s, insufficient ammunition, and too little time for training.

Tactical Training

Tactical training was very limited and was accomplished mostly by classroom instruction and limited field work at major training areas and during ARTEP exercises. Occasionally, CSCs assigned TOW squads to infantry companies during local field exercises, but most TOW platoon leaders said their squads were often ignored or left in assembly areas because company commanders did not know how to employ them. A need was stated for training films on TOW tactics and special instruction for commanders on TOW employment.

Combined Arms Training

At the time of the survey, combined arms training had been limited to participation of about one-third of all TOW squads in REALTRAIN exercises conducted by a TRADOC team to train controllers. All respondents were eager to participate in REALTRAIN exercises, and about two-thirds had planned to include their TOW squads in such exercises before the end of 1976.

Range Estimation Training

Some companies did not train in range estimation, and among those who did there was a wide range of training methods. The range reader was available in two-thirds of the companies, but only little more than half used it, primarily for range card preparation.

TRAINEE EVALUATION

Frequency

Gunner qualification was reported as annually by 30 percent of the respondents, semiannually by 11 percent, and quarterly or monthly by 56 percent. The data on monthly qualification are of dubious validity. During interviews, only one company insisted that it qualified gunners monthly. One respondent said, "We're beginning to lie about it." All others who claimed monthly or quarterly qualification stated or implied that, because of operational difficulties with the XM70, they qualified gunners in their own way.

Standards

There was little uniformity in the standards used for gunner qualification. Two of the nine CSCs used the qualification table in TC 23-23; four used the table in Draft TC 23-20; the remaining three used neither table and varied scoring standards to fit the time they had available for gunner qualification. Most infantry companies did not know which qualification table was used, because the firing was conducted by CSCs. There were significant variations among the units in the number of rounds fired, the number of rounds fired with blast simulators, target speed in terms of milliradians per second, and canting the TOW during gunner qualification. In fact, most respondents were unfamiliar with the milliradian concept, and only one of the two CSCs that canted the TOW during gunner qualification did so at the angle specified in Draft TC 23-20.

Live Ammunition Firing

Most companies had a firm policy to always permit the best gunner in the squad to fire the live round as an achievement award. Some respondents said they were justified in that policy because the annual live firings were demonstrations for important persons and that the best gunner is more likely to hit the target. However, a few companies had decided to select the next best gunner for live firing if he has significantly more time to serve than the best gunner.

Miscellaneous

Two-thirds of all respondents said it is more difficult to qualify with the XM70 than to get a hit with a live round. However, none considered training with the XM70 as undesirable.

A few companies had used the REALTRAIN TOW-controller sighting device to evaluate gunner training. However, none believed that the judgment of a controller could be sufficiently reliable for valid gunner qualification.

Two interesting suggestions were made for improvement of gunner training. One was for use of scale models of enemy armored vehicles on HO tracks for indoor tracking. The other was for use of the Besseler Cue See device to aid in training both TOW and Dragon gunners. The device would be used to show films of armored vehicles moving tactically over typical terrain and films of live missiles going down range taken through the weapons' sights. The latter suggestion is described in detail in Annex I to Appendix A.

RECOMMENDATIONS

This section includes a summary of recommendations made by respondents and recommendations based on survey findings for improving the preparation for and conduct of TOW training and gunner qualification.

RESPONDENT RECOMMENDATIONS

1. Assign all CONUS-qualified gunners to TOW squads upon or soon after their arrival in USAREUR.

2. Establish a school in USAREUR to develop TOW platoon leaders and NCOs (at least the latter) as TOW experts, and assign one such NCO to each TOW squad.

3. Provide specific instruction on TOW employment to infantry company commanders.

4. Select the next best gunner to live fire if he has significantly more time to serve than the best gunner.

5. Provide more XM70 training sets to each battalion.

6. Provide carrying cases for delicate parts of TOW weapons and XM70s, particularly the latter.

7. Provide more battery chargers to each battalion, means for charging batteries in the field, and insulation for TOW battery cases.

8. Provide TOW maintenance capabilities to divisions, and authorize replacement of minor parts by CSCs.

9. Provide adequate target-tracking ranges with multiple moving targets in local areas, or provide such targets at least in major training areas.

10. Provide scaled terrain boards of sectors.

11. Provide scaled models of armored vehicles on HO tracks for indoor tracking.

12. Provide kits for making mockups of enemy tanks using M60A1 tanks.

13. Provide films of armored vehicles moving tactically and of missiles in flight, taken through the TOW sight, for use in the Besseler Cue See device.

14. Provide sufficient training ammunition for realistic gunner training and qualification.

STUDY RECOMMENDATIONS

Training Standards and Resources

TOW training and gunner qualification standards should be set in accordance with available resources.

Serious lack of resources has caused, to a large degree, reduction of standards within the companies. Therefore, the problem of resources--time, facilities, equipment, training aids and devices, training materials, qualified instructors, and funds--should be thoroughly analyzed.

Realistically, initial standards should be set in accordance with current resources for attaining them. Merely directing, for example, that gunners will be qualified monthly or quarterly is meaningless without the resources to make conformity possible. Standards can be upgraded as resources are provided.

Scheduling of Training in Local Areas

The problem of uncertain personnel availability and excessive demands on company commanders' time should be studied.

These seem to be management problems inadequately dealt with above company level. On the surface, there appears to be a lack of planning and scheduling that continually forces company commanders into crisis situations. Perhaps, as a division G3 suggested, the priorities that demand company commander time should be re-evaluated. The precise natures of these problems and ways to bring them under control should be determined. Their resolution might permit establishment of regular TOW and other training schedules in local areas, which now appears to be impossible.

Development and Conduct of Training

An inventory of TOW training publications at companies should be made, missing publications should be provided, and their use should be required.

The availability of publications required to support TOW training is inadequate. Some companies, however, did not use some of the basic references they had. Therefore, their use should be required, particularly FM-21-6 for the development and conduct of Army training.

Training in performance-oriented instruction should be given to all trainers and instructors not already skilled in these techniques.

None of the novice gunners and few other new squad members received special attention. A reason for this may be lack of awareness that new personnel need appropriate initial instruction and coaching to help them develop proficiency in required skills. If so, such unawareness could result from lack of knowledge and skill in performance-oriented instruction. Training probably would become more efficient and effective if all trainers and instructors were skilled in these techniques which include the most effective ways to demonstrate, instruct, coach, use peers as instructors, and conduct performance testing.

Improvement of Gunner Training

A systems-engineered TOW combat theater should be developed for gunner training.

This suggestion is an extension of an idea expressed by a survey respondent. A well designed combat theater could be a readily accessible, adequate, and relatively inexpensive substitute for multiple-target outdoor ranges and more XM70s. Such a coordinated system should include, but not be limited to, the following characteristics; (a) permit engagement of multiple, scaled targets moving realistically on a variety of tracks, (b) provide aiming points at vulnerable target areas (not the lower left-hand corner of an infrared source on a target panel), (c) have the means for recording hits at the end of tracking time (which the XM70 does not do), (d) simulate noise on firing, (e) simulate obscuration from firing and down-range smoke, (f) simultaneously accomodate a minimum of two TOW squads, and (g) be capable of ready set-up in existing garrison facilities available to most USAREUR CSCs.

Target Identification

TOW-specific target identification requirements should be determined, and the most effective and efficient means for meeting those requirements should be determined by research.

The large variety of NATO and Warsaw Pact armored vehicles and the fast-moving combat operations anticipated make target identification an important element of antiarmor training. There was a wide diversity of opinion among respondents on target identification requirements, ranging from none ("Shoot anything in our sector") to detailed requirements ("We have to know everything by number and spot it at 3000 meters").

Training in target identification is haphazard. Although most respondents believed that plastic models are the most effective medium (as common sense might dictate), the validity of the belief has yet to be verified in comparison with other media used with various techniques of instruction under appropriate conditions. Even if models prove to be the best medium, the most effective and efficient ways to use them to meet the identification requirements of TOW personnel should be determined.

Tactical and Combined-Arms Training

TOW squad participation in REALTRAIN exercises should be assured to provide realistic training in tactics and combined-arms coordination.

The survey results indicate deficiencies in tactical and combined-arms training of TOW units, stemming primarily from few opportunities for such training and failure of supported units to employ the TOW squads. Perhaps proper tactical employment of TOW units should be made a matter of command interest at all levels to assure that all TOW tactical and combined-arms training opportunities are utilized.

Live Firing

Annual live firing of TOW missiles should be used for accurate assessment of overall gunnery proficiency.

The cost of TOW live firing requires that maximum benefit be obtained from it. Therefore, the present practice of rewarding the best gunners with the privilege of firing live missiles, although supported by most commanders, should be re-examined. Distribution of live missiles to best gunners, while possibly in motivational value, does not permit overall assessment of TOW gunnery proficiency. A form of random gunner selection and multiple missiles per gunner should be used. (The number of live missiles presently authorized would provide an adequate basis for such evaluation.) This procedure, along with development of more realistic firing ranges (currently underway) could provide information on training weaknesses. Such diagnostic data are necessary as a basis for training improvement so that the proficiency of the total gunner population can be increased.

LAW TRAINING

METHOD

Three copies of a questionnaire were distributed to one infantry battalion in 11 brigades. Six of the 11 brigades were in V Corps and five were in VII Corps. Each battalion was selected from within the brigade at random.

Of the three questionnaires provided to each battalion, one was to be completed by the battalion S3 and the other two by infantry company commanders. Each respondent completed the questionnaire independently of the others. However, the S3s were free to consult with their assistants, and the company commanders were free to consult with others within their comapnies.

Responses were received from eight of the 11 battalion S3s and 21 of the 22 company commanders. When the questionnaires were completed, follow-up interviews were held with seven S3s and 19 company commanders. Information about LAW training was also obtained during informal interviews with corps, division, and brigade training personnel and several battalion commanders.

FINDINGS

There are striking differences in the information given by battalion S3s and company commanders in response to many of the same questions. These differences are not believed to be due to sample disparity, because for 16 of the 21 company commanders who responded there were also responses from the S3s of their battalions. These differences suggest that battalion S3s are not as aware of LAW training problems within their units as they could be or perhaps should be.

The major findings are summarized in the paragraphs that follow. Detailed survey data are in Appendix B. The findings are grouped under these headings:

- Attitude toward LAW
- Personnel Problems
- Training Constraints
- Training Program Development
- Conduct of Training
- Trainee Evaluation

ATTITUDE TOWARD LAW

Most of the corps and division training personnel interviewed considered the LAW to be unimportant in USAREUR, and they implied that the current level of training is adequate for its probable limited use. One corps assistant G3 said, "If the enemy gets close enough (for us) to use it, we haven't done our job."

Battalion S3s and company commanders were about equally divided in terms of high and low interest in the LAW. The low interest group based LAW training on its use for contingency missions. The S3s within this group generally agreed that a special training program for the LAW is not needed. However, about one-third of the company commanders in this group wanted more LAW training but doubted that the necessary time would be made available.

The high interest group did not base training primarily on contingency missions but for use in ambushes and by tank hunter-killer teams. However, only three companies had trained teams. All S3s and company commanders in this group planned (or hoped) to increase LAW training.

Some company commanders in both high- and low-interest groups were skeptical about the effectiveness of LAW against heavy armor and utility of the sight. One suggested that a more powerful round be provided to increase the explosive impact on targets at greater ranges.

Despite the skepticism, respondents were generally optimistic about the ability of their personnel to get first- and second-round hits on moving targets under battle conditions. Most respondents believed that their personnel would do much better at ranges up to 300 meters than did well-trained soldiers during a live-firing test conducted by the US Army Infantry Board in 1974.[1]

With second rounds, the optimism of both S3s and commanders increased. S3s believed gunners would not get second-round hits at 300 meters. Commanders, however, were confident of 40 percent hits at 350 meters. Moreover, in comparison with official expectations of LAW performances, S3s believed performance would be much better at ranges from 150 to 250 meters. Commanders believed performance would be much better than official expectations at ranges from 150 to 350 meters.

According to TRADOC Bulletin 5, such optimism reflects a view that LAW requires little or no training. Some of the over optimism in USAREUR may reflect an assumption that performance with 35-mm subcaliber firing will predict live-firing performance. (In USAREUR there has been much more subcaliber than live-firing.) One commander doubted the validity of such an assumption. He said gunners can hit targets at longer ranges with the subcaliber device than with live rounds.

PERSONNEL PROBLEMS

Personnel usually unavailable for scheduled LAW training was estimated at 22 percent by battalion S3s and 13 percent by company commanders. Unavailability was due to temporary assignment to other duties, medical and dental care, education, and other reasons. On any given day, an estimated 20 percent of all personnel were assigned to duties that prevented them from participation in mission-related training.

TRAINING CONSTRAINTS

Training Time

In addition to training time lost to unavailable personnel, company commanders stressed that time for mission-related training was insufficient because priorities were given to other activities. Most complained of "unreasonable" demands on their time because of "overcommitments or last minute demands never listed on any schedule." Such complaints were essentially the same as those described in Chapter II.

Because of uncertain availability of personnel and time, none of the battalions or companies had regular LAW training schedules, except at MTAs.

Efforts were made to obtain estimates of the total hours spent annually on LAW training. Most respondents cooperated reluctantly because, they said, so much of LAW training was integrated with other infantry training that they could not accurately separate time given to LAW. Almost all the estimates obtained were admittedly guesses. Median estimates given by S3s were twice as large as those given by company commanders.

There was considerable variation in desires on the allocation of time for LAW training. Most respondents wanted subcaliber firing increased about 50 percent; one company commander wanted it decreased 20 percent; about one-third wanted it unchanged. Nearly all respondents wanted live firing increased about 25 percent, with the remainder desiring no change. Most respondents desired no change in the time devoted to tactical training, but a few wanted it decreased about 25 percent, and about one-fourth wanted it increased about 35 percent.

Trainer and Instructor Personnel

Most companies (15 of 21, 71%) had at least one principal (officer) trainer. Eleven (52%) had at least one NCOIC (assistant trainer), and the median number of NCO instructors per company was four. There were considerable differences between responses of the battalion S3s and company commanders on the number of designated instructors and on who conducted LAW training (See Appendix B).

[1] "Training with LAW", TRADOC Bulletin 5, June 1976.

Training Equipment

There was considerable variation in the availability of expended LAWs and M190 subcaliber devices.

Expended LAWs. The estimated median number in battalions was 60 (range: 3-110). In companies, the median was 10 (range: 2-100). Problems with expended LAWs were normal wear during mechanical training, damage by inexperienced personnel, and no replacements available. Two commanders called for more.

M190 subcaliber device. The estimated median number in battalions was eight (range: 6-20). In companies, the median was two (range: 2-10). About half of the companies did not know how many were available to them, because the devices were held by their battalions. One company wanted more devices. One S3 said no one in his battalion could assemble the devices and make them work properly. Others said the primer-well cover is sometimes blown off, and the cover latch often falls off when the cotter pin breaks. Most battalions (5 of 8, 62%) and five companies (24%) said all their devices were operable. In the remaining three battalions (38%) operability was about 50 percent. In two additional companies (10%) operability was 50 percent and 80 percent. The remaining 14 companies (67%), not having possession of the devices, did not know about operability.

Training Devices

Besseler Cue See. Seven battalion S3s (88%) said their battalions had this device, and they believed it was used. But only 11 company commanders (52%) acknowledged its availability, and only eight (38%) used it and not necessarily for LAW training. Lack of ready availability to companies and lack of timely maintenance were the major reasons for non-use of this device.

TEC lessons. Six battalions (75%) had LAW TEC lessons, and five battalion S3s (62%) said they were used. However, only seven company commanders (33%) acknowledged their use. The inconvenience of sending trainers to the battalion training room was the major reason for not using TEC lessons.

Sony TVT. Six battalions (75%) had the TVT, but only two S3s (25%) said it was used--primarily for replays of old videotapes. Only one company commander (5%) had used it for LAW training (to demonstrate tank hunter-killer team techniques). Reasons for not using the TVT were lack of qualified operators, insufficient videotapes, and power supply problems.

Training Aids

Front sight templates. The median number was zero for both battalions and companies. However, some battalions had as many as 30 and some companies as many as 40.

Target silhouette sheets. Six companies (29%) had them, but only four (19%) used them.

LAW sight chart. Sixteen companies (71%) had it, but only 11 (52%) used it.

LAW backblast diagram. Thirteen companies (62%) had it, but only 10 (48%) used it.

LAW Sight Device AE DVC 9-061. None of the battalion S3s knew of the LAW sight device, but all wanted it when it was shown to them. Two companies (10%) had a few and wanted more. One commander said it gives a quick readout on whether one is sighting properly. The other said his soldiers used it in preliminary training before live firing. This was counter to the opinion of a division G3 that the device probably is not worth its cost.

Range reader. Seven battalions (88%) had the range reader, and six S3s (62%) said it was used. Sixteen companies (76%) acknowledged having it, but only 12 (57%) used it. One commander said it was difficult to read because of the amount of information on it.

Target Identification Media

Only six battalion S3s (75%) and 17 company commanders (81%) reported having some type of target identification media, and only five S3s (62%) and 15 commanders (71%) said they were used. The most widely available media were flash cards and photographs. The most wanted medium was plastic models; only seven companies (33%) had them. Most respondents thought plastic models are the most effective target identification medium. One battalion S3 said his battalion scored highly on tests based only on pictures and silhouettes but did only half as well when tested with plastic models.

Desired Training Aids and Devices

In addition to demand for more LAW sight devices and plastic models, respondents called for hardening kits for tanks or armored personnel carriers (APCs), more expended LAWs, more 35mm subcaliber devices, and more sight charts. New items wanted were a subcaliber round that can be fired at an unhardened tank without damaging it and films of target engagement for use in the Besseler Cue See device.

Range Facilities

Only two battalions (25%) and three companies (14%) had LAW firing ranges outside of MTAs. All S3s and seven company commanders (33%) said their ranges were inadequate for LAW training. S3s complained of too little time at MTAs, difficulties of working with range control, inability to fire at night, too few firing points, and no moving targets. Company commanders shared the S3s' complaints and also complained about target distances. One said, "It's foolish to fire at 300 meters" and suggested that subcaliber firing areas with moving targets should be provided by 7th Army Training Command or that local ranges should be improved to allow for such firing.

Safety Restrictions

Half of battalion S3s and one-third of company commanders said current safety restrictions must be retained regardless of their effect on training realism. The other four S3s and 14 company commanders (67%) believed that changes were required to reduce "unnecessary" interruption of firing and loss of time. Among suggestions for overcoming safety restraints were:

1. Shield firing stations against backblasts from other stations.

2. Make the person in charge of training his unit also responsible for safety.

3. Thoroughly train gunners in the selection of firing positions and hold them responsible for performing safely.

4. Reposition firing points forward, prepare foxholes, and move the control tower from the center of the range to one side.

Ammunition Availability

There was wide variation in responses on the adequacy of ammunition available for training. As a rule, battalion S3s tended to be better satisfied than company commanders that enough ammunition was being provided for LAW training. Most company commanders and battalion S3s agreed that there was a need for more M72A2 LAW 66mm and more 40mm M203 illumination ammunition.

Thirteen company commanders (62%) and four battalion S3s (50%) complained strongly about ammunition not being available when needed. S3s mentioned the problems of projecting ammunition needs 75 days in advance when the availability of ranges was not yet known. Some company commanders complained that the ammunition actually issued was often less than expected, and training plans had to be changed at the last moment. Most ammunition supply problems were with live rounds.

TRAINING PROGRAM DEVELOPMENT

Training Publications

Almost all respondents said they had the basic LAW training references, but some said they were not used. Of those who did use references for preparation of training programs, least use was made by battalion S3s. References most used by company commanders were FM 23-33 (66mm HEAT Rocket, M72A1, M72A2, and M72, 1970), TC 7-24 (Antiarmor Tactics and Techniques for Mechanized Infantry, 1976), Draft TC 23-20 (Unit Antiarmor Training Program, 1976), and FM 23-3 (Tactics, Techniques and Concepts of Antiarmor Warfare, 1972).

Lesson Plans

Only two battalion S3s (25%) and ten company commanders (48%) said they had prepared lesson plans, but only one S3 and one commander could show copies, and only those shown by the commander were in accordance with FM 21-6.

CONDUCT OF TRAINING

LAW training in USAREUR did not meet the standards prescribed in Draft TC 23-20. Details follow.

Tasks and Standards

Of the 11 LAW tasks listed in Draft TC 23-20, at least two of the 21 companies surveyed (10%) had never trained on any of the tasks; four companies (19%) had never trained on range estimation, night target engagement or engagement of a moving target; and three companies (14%) had never trained on safety and misfire procedures, engagement of a single stationary target, engagement of multiple stationary targets, and LAW tactics. Many conditions and standards in Draft TC 23-20 could not be met in USAREUR because of lack of facilities, insufficient ammunition, and other reasons.

Training Frequency

Fifteen companies (71%) had conducted LAW training within the previous three months. Three (14%) had last conducted training within four to nine months. Commanders of the remaining three companies did not know when LAW training had last been conducted. The most recent training had been conducted by half of the companies at MTAs and by the other half in garrison.

At MTAs, training consisted of Expert Infantryman Badge (EIB) qualification tasks and subcaliber and live firing. Three of these companies also trained in tank hunter-killer team tactics. The number of men per company who participated in LAW training at MTAs ranged from 15 to 100, with a median of 45. Training in garrison covered mechanical operation, firing positions, and aiming. The number of men per company trained in garrison ranged from 15 to 100, with a median of 65.

Sight Use

About one-fourth of the company commanders said most soldiers distrust the LAW sight, and they doubted that it would be used in combat. One commander said his best gunners, regardless of instruction, *do not use the sight*. They aim along the tube with both eyes open and adjust the weapon in accordance with their judgment of target range and speed. Several commanders stated that proper use of the sight can be learned only through repeated subcaliber and live firing.

Most training in sight use consisted of classroom discussion with reviews just before subcaliber and live firing. Trainees were tested by requiring them to explain the sight picture to be used when given both target ranges and speeds. Although more than one-fourth of the company commanders said they used TRADOC Bulletin 5, none used the new LAW sighting rules contained in that bulletin.

Range and Speed Estimation

Although accuracy in estimating distances to targets is essential for proper use of the LAW sight, very little training was given in estimating distances to vehicles. Most of such training was conducted at MTAs, and specific targets used were silhouettes of personnel. Most company commanders seemed to believe that range estimation requirements for LAW firing did not differ from those required for rifle firing. About half of the companies announced the range to target during firing exercises; none gave only the target size as specified in Draft TC 23-20.

Target Identification

Target identification training was conducted primarily in classrooms using photographs, 35mm slides, and vugraph transparancies. Class sizes were generally large -- up to 50 men. A few companies had intensive drills for squad-size groups. Flashcards were sometimes used in the field for informal testing and remedial instruction. Only one company reported use of plastic models on the ground for viewing through binoculars. Several companies trained only at MTA target identification stations.

A few respondents said the only target identification requirement should be ability to recognize enemy targets, but most said ability to discriminate between friendly and enemy vehicles should be the minimum requirement. Some also wanted ability to identify enemy vehicles by number.

Tactical Training

Only three battalion S3s (38%) and two company commanders (10%) reported specific LAW-related tactical training. This training covered selection of firing positions, simulated firing from such positions, and tank hunter-killer team tactics. Except for mention by one battalion S3 of participation in a battalion ARTEP evaluation, all other respondents indicated no special tactical training involving coordination with other units.

TRAINEE EVALUATION

Standards

There were no uniform standards or frequency requirements in evaluating gunners. Seven battalion S3s (88%) said the annual EIB test was used. The other S3 mentioned a quarterly test covering tactical use and operational performance. However, eight company commanders (38%) said no LAW tests were given; six (28%) reported using the EIB test annually, and one used it quarterly; three (14%) gave performance tests before live firing (primarily on operational safety); two (10%) reported tests involving target identification, aiming, and range estimation; and one said MOS tests were given after LAW firing.

Only one battalion S3 (12%) and three company commanders (14%) said their units fired the LAW familiarization tables in the field manual. Three S3s (38%) and seven commanders (33%) were unaware of these tables. The remaining respondents said the tables were not used because of inadequate ranges, insufficient ammunition, and lack of proper targets. Two commanders (10%) said they had not fired either 35mm rockets or live rounds.

Respondents listed 21 criteria they used for evaluating performance with the LAW. Following are those most frequently mentioned:

- Ability to hit the target with a live round
- Ability to operate the LAW
- Range estimation
- Sight reticle knowledge
- Target identification

Targets

Four battalion S3s (50%) and 11 company commanders (52%) reported firing subcaliber rockets at only stationary targets. Eight companies (38%) had fired at moving targets: a hardened tank (three companies), a hardened APC (two companies), a tank silhouette (one company), and panels (two companies). Most stationary targets were panels, but one commander reported using a 55 gallon drum. Panel sizes varied from 20 square feet (4'x5') to 242 square feet (11' x 22'), with most being 84 square feet (6' x 14').

One of the three companies that had fired at a hardened tank planned to discontinue the practice because of costly damage to road wheels and vision blocks. The other two companies planned to continue this firing despite protests of the tank unit commander. Twelve companies that had not fired at tanks wanted to do so, but neither tanks nor hardening kits were available.

Conduct of Firing

Ranges during firing to both stationary and moving targets varied from 25 meters to 500 meters. The median minimum and maximum ranges were about 100 and 200 meters, respectively. Only four of the eight companies that fired on moving targets said their targets moved both farther away and nearer during subcaliber firing.

None of the companies announced only the size of targets during engagements, as specified in LAW firing doctrine. Four companies (19%) gave both target size and range; six (28%) gave only the range; the remaining companies gave neither.

The companies varied widely in their use of pair, sequence, and volley firing. No company had used all three, although five S3s (62%) said the companies in their battalions had done so. Twelve (57%) had done pair firing, four had planned to, and five had no such plan. Ten had done sequence firing, four planned to, and seven had not. Six had done volley firing, seven planned to, and eight had not.

The amount of ammunition available for firing varied. In the companies firing the subcaliber device, the number of rounds available per man ranged from one to five. The supply of live rounds was limited, and a few men fired two to three annually. Most company commanders reported that only one live round per squad was fired annually. One company commander, however, reported 125 live rounds fired by ten men.

RECOMMENDATIONS

This section includes a summary of recommendations made by respondents and recommendations based on survey findings for improving the preparation for and conduct of LAW training.

RESPONDENT RECOMMENDATIONS

1. Provide a more powerful LAW round for greater range and impact.

2. Provide a subcaliber round that will not damage an unhardened tank.

3. Provide firing ranges with moving targets at 7th Army Training Command or approve local firing ranges that can accommodate moving targets.

4. Ease firing safety constraints by shielding firing stations against backblasts from other stations; or reposition firing points forward, prepare foxholes, and move the control tower to one side of the range.

5. Provide more tank-hardening kits for tanks or APCs.

6. Provide more expended LAWs.

7. Provide more 35mm subcaliber firing devices.

8. Provide more ammunition for training--35mm rockets, live rounds, and mortar illumination rounds.

9. Provide more target identification media, particularly plastic models of tanks and vehicles.

10. Provide more graphic training aids.

11. Provide more sight charts.

12. Provide more sight devices AE DVC 9-061.

13. Provide films of actual target engagement for use in the Besseler Cue See device.

14. Provide LAW TEC lessons to units that do not have them.

15. Make the Besseler Cue See devices more readily accessible to companies and provide for their maintenance.

16. Provide more videotapes for the TVT and an adequate number of qualified operator personnel.

STUDY RECOMMENDATIONS

Six suggestions made in Chapter II, "TOW Training", are also supported by the survey data on LAW training:

1. Inventory training references in companies, provide those missing, and require their use for development of LAW training programs.

2. Determine specific target identification requirements for LAW personnel and the most effective media and methods for target identification training.

3. Study the personnel availability and company commander time problems and ways to resolve them to make regular scheduling of LAW training possible in local areas.

4. Ensure that LAW personnel participate in REALTRAIN exercises for realistic training in tactics, multiple target engagement, and combined-arms coordination.

5. Set LAW training and performance standards commensurate with available training resources and require their attainment, and increase the standards as additional resources are provided.

Since there was confusion among survey respondents about the role of the LAW in USAREUR and about how it is to be employed, perhaps its probable employment in each sector should be established (if this has not already been done). This would provide realistic bases for tailoring training programs for particular unit needs. Then the resulting training practices should be monitored to ensure effective application of the established doctrine.

6. Training personnel and instructors not already skilled in performance-oriented instruction should be provided the training.

TRADOC Bulletin 5 mentions new training materials and methods, based upon new sighting rules, to be available soon. However, regardless of how adequate training materials, procedures, and tests may be, they still must be applied by skilled instructors, and rigorous testing standards must be required for the training to produce desired results. In other words, training must be continued until trainees meet a go/no-go test criterion, then

remedial training and testing to the same criterion should be provided at regular intervals to maintain proficiency.

One additional suggestion pertains to range estimation training:

LAW-specific range estimation requirements and the most effective training techniques should be determined so that a training program can be developed and implemented in USAREUR.

The new sight rules mentioned above require that LAW gunners be trained in range-to-target estimation to a criterion of no more than 10 percent error.

DRAGON TRAINING

METHOD

Questionnaires were distributed to one armored cavalry squadron and one infantry battalion. When completed, the questionnaires were followed up by interviews with the respondents. Interviews were conducted with the battalion and squadron commanders, two assistant S3s (one brigade and one battalion), a battalion S3, a battalion Dragon training NCO, a company commander, and two platoon leaders.

The sample was limited, because at the time of the survey the Dragon system had not been widely distributed within USAREUR. For this reason, definitive conclusions on the status of Dragon training in USAREUR cannot be drawn from these data. However, the sample was sufficient to identify a variety of issues meriting further research, development, and management support.

FINDINGS

The major findings are summarized in the paragraphs that follow. Detailed survey data are in Appendix C. The findings are grouped under these headings:

- Personnel
- Equipment
- Gunnery
- Tactics
- Introduction of the Dragon

PERSONNEL

Dragon gunners trained by the units surveyed were selected without any particularly restrictive criteria. The washout rate among those selected was very low. These results suggest that the Dragon was meeting its design criterion for use by the ordinary soldier.

The units considered the Dragon to be manned by designated personnel, not by assigned dedicated personnel. At the time of the survey, however, this was not a particularly meaningful distinction, because the number of qualified gunners did not significantly exceed the number of trackers.

One unit reported that previously its scouts had been trained in CONUS as MOS 11Bs and had received the Dragon C2 additional skill designation. Currently, its scouts are drawn from CONUS-trained MOS 11Ds and MOS 11Es who apparently do not receive Dragon training in advanced individual training.

EQUIPMENT

In regard to trackers and training equipment, the data indicate the following:

1. The equipment is fragile, lacks protective cases for use in the field, and as a consequence is subject to frequent damage.

2. The tracker is difficult to use at night, and lack of a night sight was a major concern to the units.

3. Availability of training equipment limited training opportunities. Because training sets were maintained at battalion level, access to the equipment on short notice was limited, and units away from the post (e.g., on border patrol) were unable to use the monitors. Because field-handling trainers were limited, unit field exercises could not fully duplicate the handling of Dragon rounds under combat conditions.

4. There was enough training ammunition for the firing courses now prescribed. However, more may have been needed if (a) combat-like distractors were used in training, and (b) the Dragon were employed in REALTRAIN exercises.

5. TEC lessons and the Dragon-adapted TVT were not yet available.

GUNNERY TRAINING

In general, the results obtained by the units demonstrated that training to qualify Dragon gunners was not a major problem. While the cavalry and infantry units approached the assignment of training responsibilities quite differently, they both produced qualified gunners and back-up gunners for all their assigned trackers.

In the current qualification courses, the targets tracked are single rather than multiple, often fixed-range rather than moving tactically, clear field rather than terrain driving, and relatively free of distractions that can be expected in a combat environment. Further, the actual vulnerability of the gunner to return fire and the consequences for firing positions and firing practices are not reflected in the training and qualification practices.

Steering of the live missile may be a problem with the Dragon. It was perceived as such by all respondents, and those with live fire experience viewed it as a contributing factor in first-round misses. Some respondents attributed their success in live firing to continued reminders to the gunner not to fly the missile. If further firing data demonstrate that this technique does not suffice, then a training device that provides a sight picture of both target and missile (or similar distractor) may be necessary to ensure that gunners' first rounds in combat are not wasted.

In practice, the schedule for gunnery training was established primarily by range availability (determined at the battalion level) rather than by the requirement for monthly familiarization firing as stated in the manuals. Some respondents expressed doubt that monthly qualification is feasible in USAREUR because of time and range constraints.

The cost-effectiveness of the current annual live firing exercises is uncertain because of the lack of random sampling of gunners to fire and lack of fidelity between the qualification course and the expected battlefield conditions.

TACTICAL TRAINING

Tactical training for Dragon gunners was viewed by the units as an integral part of the continuing field training effort of the unit, not as a separate and distinct effort. From the respondents' perspective, the new weapon system had been integrated into current missions and tactics with ease. In general the respondents saw the Dragon as an enhancement of combat effectiveness that could be achieved through a straightforward integration without change in existing tactics.

Compared to the hit probabilities for expert gunners cited in Draft TC 23-20, respondents tended to overestimate the Dragon's capabilities at short and intermediate ranges. Some also tended to underestimate the probabilities at longer ranges (e.g., one said it should not be fired much beyond 800 meters unless at the rear of a target). The typical responses and the curve from TC 23-20 are compared in Fig. 1.

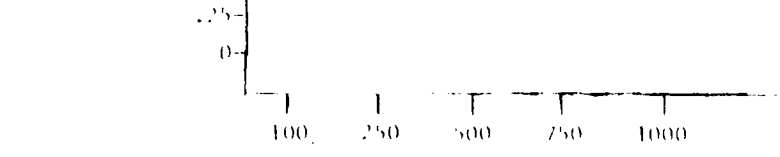

Figure 1. Estimates of First Round Hit Probabilities.

If the hit probabilities cited in Draft TC 23-20 represent reliable expectations for expert gunners, then the respondents indicate possible selection of firing positions and fields of fire that will not fully take advantage of the weapon's capabilities.

For most officer and NCO leaders, either there had been no Dragon training or it was limited to manuals and brief indoctrination. Few had hands-on experiences with the weapon, very few had tactical training in Dragon deployment, and none had tactical training in a casualty-assessment environment.

Reliable data on time devoted to Dragon tactical training was unobtainable. However, the following aspects of tactical training were described by a number of respondents as not having being done: battle drill, preparing field firing positions, engaging multiple targets, pair and volley firing, and night target engagement. These respondents suggested that leaders, gunners, and other unit members need opportunities to apply the full range of tactical skills required.

Target recognition was described by all respondents as receiving too little attention and as lacking in training aids. The consensus was that satisfactory target recognition is the ability to discriminate between friend and foe under combat conditions as maximum weapon range and that current capabilities are short of that level.

In general, the current status of Dragon tactical training reflects (a) the short time the system has been in the units, and (b) the fact that tactical skills are far less easily measured -- and therefore a less visible priority -- than individual gunnery/qualification skills. Dragon gunnery has so far received the bulk of the Dragon training effort.

DRAGON INTRODUCTION

Respondents identified proper coordination as the major need in introduction of the Dragon. One unit underwent initial training well before receiving the equipment; the other had the equipment well before the training. Neither saw its arrangement as satisfactory.

Initial training support varied. In the armored cavalry unit, a single NCO was trained on the Dragon in CONUS before his unit received the weapon. Nevertheless, the unit qualified more than one expert per tracker, plus back-up first class gunners, and then performed well in first-round live firings. The infantry battalion was supported by a division gunnery course and a Dragon training committee, and familiarization had been conducted for some platoon and company commanders.

Respondents suggested the use of a mobile training team coordinated with the arrival of the equipment. The team would provide training in tactics as well as gunnery and would acquaint a larger group of leaders, as well as the troops, on the use, capabilities, and limitations of the Dragon system. Both units also emphasized the need for a full supply of training literature, pyrotechnics, and equipment concurrently with the end-items.

RECOMMENDATIONS

PERSONNEL

TRADOC should be requested to review the advanced individual training given to MOS 11D and MOS 11E personnel who are to fill scout positions in USAREUR to ensure that they receive Dragon training.

Apparently the cavalry unit no longer received CONUS-trained Dragon gunners.

EQUIPMENT

HQ USAREUR should take measures to increase the numbers and operational availability of the Dragon and associated training equipment.

A staff study should be made to develop specific measures within USAREUR purview, or to be recommended to the Department of the Army, that will increase the availability and reliability of the system. Possible measures include (a) changing the Basis of Issue to provide trainers at the company level and more field-handling trainers, and (b) providing

protective cases. In general the quantity and availability of training equipment merits careful study.

GUNNERY TRAINING

A study should be made to determine the correlation between performance in qualification-course firing and in a casualty-assessment environment in which both the weapon's lethality and the gunner's vulnerability are reflected in real-time simulated casualties (REALTRAIN type of exercises).

The apparent tactical deficiencies in current qualification courses have been described previously. The effectiveness of these qualification courses has not yet been demonstrated by the surveyed units, other than in theoretical terms. Non-casualty assessment forms of field training exercises and command post exercises are inadequate to test proficiency in tactical use of weapons. Exercises such as REALTRAIN are necessary to determine whether the skills represented in the current qualification courses are adequate and transferable to a casualty-assessment type of environment.

A comparable survey of Dragon training should be made about one year after introduction of Dragon has been substantially completed.

Dragon training in the two units sampled was a priority item because it represented initial training on a newly introduced system. The training procedures and proficiency status should be re-examined when the Dragon system is "well established" in USAREUR. Such a survey should disclose whether monthly qualification is being maintained and whether the resources made available are adequate to support a satisfactory level of proficiency.

TACTICS

Further research should be conducted to determine the impact of Dragon availability on company/troop tactics.

This research should be conducted by testing unit tactics in a casualty-assessment environment (REALTRAIN type of exercises). The tests should pit current tactics of Dragon-equipped units against the countermeasures and tactics that can be expected to be used by an appropriate enemy unit. The tests would provide empirical evidence of the extent to which the Dragon's capabilities and vulnerabilities have been effectively integrated into unit tactics and training. The TOW has been in use much longer than the Dragon, yet the results of REALTRAIN exercises in USAREUR in 1975-1976 indicate that tactically the TOW was the least mastered weapon system involved.

INTRODUCTION OF DRAGON

The further introduction of Dragon, or other comparable weapons systems, should be coordinated to ensure (a) concurrent issue of all associated items and supplies, (b) provisions for familiarization by leaders, and (c) appropriate tactical training.

Both of the units surveyed emphasized the need for providing the full range of equipment, pyrotechnics, and manuals at the time the weapon is issued. Experience has shown that whatever arrives first gets the most use. Items that are issued later tend to be less used because unit practices have already been established.

Familiarization firing by leaders and appropriate tactical training at the very outset help prevent establishment of undesirable practices resulting from inadequate and faulty information.

APPENDIX A

SUMMARY OF TOW INTERVIEW AND QUESTIONNAIRE DATA

CONTENTS

APPENDIX A. SUMMARY OF TOW INTERVIEW AND QUESTIONNAIRE DATA

This appendix provides the questions from the TOW Training Questionnaire and a summary of the responses to each item gathered from both the questionnaire and the follow-up interviews.

PERSONNEL

SQUAD SELECTION

Q. Rank in order of importance (from 1 to 6) the following criteria for selection of TOW squad members: promotion, MOS trained, longevity, interest in TOW, desire to change, and availability.

Table 1 shows how the majority of companies ranked the TOW squad selection criteria.

Table 1

HOW THE MAJORITY OF COMPANIES RANKED
TOW SQUAD SELECTION CRITERIA

Rank	Combat Support Companies	Infantry Companies
1	MOS trained	MOS trained
2	Availability	Interest in TOW
3	Interest in TOW	Longevity
4	Desire to change	Availability
5	Longevity	Promotion
6	Promotion	Desire to change

As Table 1 shows, the CSCs and infantry companies agree on only one criterion (MOS trained). All infantry companies ranked that criterion as number one, whereas only 75 percent of CSC did so. The high priority given to the selection of MOS trained personnel was both of necessity and preference. All TOW squad members must have MOS 11B ratings, but some are qualified as TOW gunners in CONUS training and given the P4 additional skill designator. However, according to two CSCs, not all MOS 11B personnel having the P4 skill designator were being assigned to TOW squads upon their arrival in USAREUR. This caused these two CSCs to rank "availability" of personnel as the most important selection criterion, and each dropped "MOS trained" to second and third ranks, respectively.

ESPRIT DE CORPS

"Interest in TOW", ranked third by CSCs and second by infantry companies (Table 1), is more important for morale than for squad selection. All companies said TOW personnel are proud of being associated with TOWs. They view the weapon as both highly important and "exotic" because of its missile lethality and its general high regard among commanders. Several TOW platoon leaders (CSCs) noted that even the drug abusers that had been assigned as TOW personnel were impressed with the weapon, although they continued to be a problem and most were eventually discharged. Most squad members are sensitive about the behavior of their peers and insist on discipline. One platoon leader said, "When someone gets high, goofs off, or otherwise misbehaves, my men tell me he shouldn't be a TOW man. They tell him, too." According to TOW platoon leaders and infantry company commanders, no one assigned to the TOW feels it is a detriment to his Army career.

PERSONNEL TURBULENCE

Q. How many men have been assigned to each TOW position during the past 12 months?

Table 2 shows the mean and median numbers of individuals that were assigned during a 12-month period to each of the five TOW positions: Section Leader, Squad Leader, Gunner, Assistant Gunner, and Driver.

Table 2

THE NUMBER OF ASSIGNMENTS TO TOW POSITIONS IN A 12-MONTH PERIOD

	Squad Position														
	Section Leader			Squad Leader			Gunner			Asst. Gunner			Driver		
Companies	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
CS	0-8	4	4	1-10	6	6	1-12	8	8	0-13	6	6	0-12	6	5
Inf.	0-6	2	1	1-4	2	3	0-6	2	1	0-4	1	1	0-4	2	1

Since CSCs have six TOW sections and 12 squads, and infantry companies have only one section and two squads, the numbers of position assignments were converted in Table 3 to percentages of the number of TOW positions available in each kind of company.

Table 3

ASSIGNMENTS TO TOW POSITIONS IN A 12-MONTH PERIOD
AS PERCENTAGES OF THE NUMBER OF TOW POSITIONS AVAILABLE

	Squad Position														
	Section Leader			Squad Leader			Gunner			Asst. Gunner			Driver		
Companies	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
CS	0-133%	67%	67%	8-83%	50%	50%	8-100%	67%	67%	0-108%	50%	50%	0-100%	50%	42%
Inf.	0-600%	200%	100%	50-200%	100%	150%	0-300%	100%	50%	0-200%	50%	50%	0-200%	100%	50%

Table 3 shows that the median proportional turnover in Section Leaders, Squad Leaders and Drivers was greater for infantry companies then for CSCs. Turnover of assistant gunners was equal in the two groups of companies, but CSCs lost 17 percent more gunners during the 12-month period than did infantry companies.

TRAINING HISTORY

PERSONNEL AVAILABILITY

Training Time Lost

Q. About what percent of the training time were TOW personnel unavailable for training?

Combat support company TOW squad members lost proportionately more training time than did infantry companies. As Table 4 shows, the median absenteeism in CSCs for grades E2 through E7 ranged from 15 percent to 25 percent of training time.

Table 4

PERCENT OF TRAINING TIME TOW PERSONNEL WERE UNAVAILABLE FOR TRAINING

	Grades																	
	E7			E6			E5			E4			E3			E2		
Companies	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
CS	0-100%	36%	20%	2-60%	31%	25%	0-60%	24%	25%	0-50%	22%	15%	0-50%	22%	15%	0-50%	24%	20%
Inf.	N/A[a]	N/A	N/A	0-70%	29%	30%	0-70%	21%	10%	0-70%	18%	10%	0-70%	1%	5%	0-70%	17%	5%

[a]Infantry companies did not have E7s in TOW squads.

Median absenteeism in infantry companies ranged from five percent to 30 percent for grades E2 through E6 (infantry company TOW squads did not have E7s). In the four lower grades, absenteeism in CSCs exceeded that in infantry companies from five to 15 percent. In infantry companies, however, E6s lost five percent more training time than they did in CSCs.

Lost training time was accounted for by four major factors: (a) temporary detail of personnel to other than TOW duties (guard, CQ runner, etc.); (b) Permanent assignment to other than TOW duties; (c) medical and dental appointments and drug and alcohol abuse counselling; and (d) education, race relations, language classes, etc.

Assignment to Other Duties

Q. On any particular day, what percent of TOW personnel are likely to be temporarily assigned to activities other than TOW duties?

Table 5 shows the percentages of personnel temporarily and permanently assigned to other duties. The median percentages temporarily assigned were 35 percent for CSCs and 30 percent for infantry companies. Median percentages permanently assigned to other duties were two percent for CSCs and zero percent for infantry companies. The mean percentages, however, were seven percent for CSCs and two percent for infantry companies.

Table 5

PERCENT OF TOW PERSONNEL
ASSIGNED TO OTHER DUTIES

Companies	Temporarily Assigned On Any Particular Day			Permanently Assigned To Other Duties		
	Range	Mean	Median	Range	Mean	Median
CF	10-55%	34%	35%	0-30%	7%	2%
Inf.	10-60%	32%	30%	0-16%	2%	0%

Demands on personnel for other duties were stressed by all companies as a major preventor of training. A CSC TOW platoon leader said, "Today is an example. We had planned to do target tracking, but this morning we were ordered to support another company as the aggressor." Another said, "You'd think when we go to MTAs we'd be let alone, but even there we're riddled with details." A third had a better experience: "Once a year they let us alone -- so much so that you'd think we aren't even here."

An infantry company commander wished for more division or brigade training programs: "When we try to do something they always interfere. When they lay on training, it gets done, but that isn't often enough."

The uncertainty of events made regular scheduling of TOW training infeasible. Only one CSC said it had a regular schedule but readily admitted that it seldom matched reality.

Medical and Dental Appointments

Medical and dental appointments are a continual source of training frustration, a CSC TOW platoon leader said, "Even if I had time and no details, I still couldn't get all my men together because of appointments. We've tried to get all appointments on one day a week, but it never works out." An infantry company commander said, "Sometimes I begin to think the medical corps runs the Army. They, like many other support personnel, demand that we be available at their convenience. In effect, therefore, we end up supporting the support personnel." Another company commander said, "I was late for this (interview) appointment because I was held up by the old man. The other day I took my men to the field. Ten had afternoon appointments. I said to hell with it, I have them here and we're going to train. Now I'm in trouble." A third company commander said, "Look at what you get in trouble for and you'll see what's important to the Army. Only once a year does anyone care when training gets fouled up, and that's when you're getting ready for annual tests."

Educational Activities

Time spent on educational activities during duty hours was mentioned by most companies as time unavailable for training, but company commanders and TOW platoon leaders were about equally divided in their feelings about it. One side felt that some of the time given to education could be better spent on training. The remainder seemed to think that education is also needed for soldier improvement, so they did not stress the time it required as undesirable.

Insufficient Personnel

"You can't train men you don't have." This comment introduced another problem--manning below levels authorized for TOWs. One CSC had only 26 men (two 3-man squads and 10 2-man squads), another had 31 (seven 3-man squads and five 2-man squads) and a third had 32 (eight 3-man squads and four 2-man squads). One infantry company had only two 3-man squads and no E6s.

GUNNER TRAINING

Frequency of Gunner Training

Q. How often do you train for gunner proficiency?

As shown in Table 6, nearly all training of gunners and assistant gunners was done monthly or quarterly, but much of this training was done by "dry" tracking (without the XM70 training set).

Table 6

FREQUENCY OF TOW GUNNERY SUSTAINMENT TRAINING

		Frequency[a]					
Trainees	Companies	M	Q	SA	A	O	N
Gunner	CS	67%	33%	---	---	---	---
	Inf.	67%	11%	---	22%	---	---
Asst. Gunner	CS	56%	33%	11%	---	---	---
	Inf.	67%	11%	---	---	22%	---
All Other Squad Members	CS	56%	---	---	---	22%	22%
	Inf.	33%	11%	---	---	11%	44%

[a]M = Monthly Q = Quarterly SA = Semi-Annually A = Annually

O = Only when training time allows or the batteries retain their charge

N = Never

A CSC platoon leader said, "When we don't have an XM70 or the batteries don't hold out, the gunner says whether he thinks he hit the target. But how do you know?" Another said, "My best gunners usually are fresh out of AIT (Advanced Individual Training). Here, they steadily decline. The best we can do is try to arrest the decline." A third TOW platoon leader and two infantry company commanders said in effect that they really trained only once a year, just before live-firing.

Novice Gunner Training

Q. In gunner training, do you distinguish between the training of old and new personnel?

None of the companies distinguished between the training of novice gunners and sustainment training of experienced personnel.

TOW SQUAD TRAINING

Time Required to Develop Squad Proficiency

Q. How many hours are required to develop a proficient TOW squad?

Estimates of training time required to develop a proficient TOW squad varied widely. As Table 7 shows, estimates by CSCs ranged from 40 to 160 hours and by infantry companies from 40 to 200 hours.

Table 7

NUMBER OF HOURS REQUIRED TO DEVELOP A PROFICIENT TOW SQUAD

	Number of Hours		
Companies	Range	Mean	Median
CS	40-160	100	80
Inf.	40-200	90	60

CSCs - N = 9

Inf. Co. - N = 7 (Two did not respond.)

Two infantry company commanders said they had no idea of how long the process took and would not hazard to guess. The medians in Table 7 show that CSC TOW platoon leaders thought that squad proficiency training required more time (80 hours) than did infantry company commanders (60 hours).

Training of New Squad Members

Q. In squad training, do you distinguish between the training of old and new personnel?

New squad personnel, except those trained as gunners, received special attention from only one CSC (11%) and three infantry companies (33%). When feasible, those companies gave initial training to novices apart from experienced squad members. All others assigned them

tasks along with experienced personnel. Most survey participants thought the latter technique was the most effective because, they said, peer pressure increased motivation of novices to learn.

CROSS TRAINING

Q. How many different persons received training (were cross-trained) in each of the following positions during the past 12 months: section leaders, squad leaders, gunners, assistant gunners and drivers?

Table 8 shows the ranges, means, and medians of the number of squad members who were cross trained during a 12-month period.

Table 8

THE NUMBER OF MEN CROSS TRAINED IN TOW SQUAD POSITIONS DURING A 12-MONTH PERIOD

	TOW Squad Positions														
	Section Leader			Squad Leader			Gunners			Assistant Gunners			Drivers		
Companies	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
CS	0-44	11	9	0-42	15	7	0-44	20	18	0-42	18	5	0-47	20	17
Inf.	0-6	1	1	0-4	2	2	1-7	3	4	0-7	3	3	0-6	2	2

Since a CSC has 12 TOW squads and a rifle company has only two, for easier comparison of the groups of companies, the median number of men cross trained in each position (Table 8) are shown in Table 9 as percentages (proportions) of the number of positions in each kind of company.

Table 9

THE MEDIAN NUMBER OF MEN CROSS TRAINED FOR EACH TOW SQUAD POSITION, AS PERCENTAGES OF THE NUMBER OF SUCH POSITIONS

	TOW Squad Positions				
Companies	Section Leaders	Squad Leaders	Gunners	Assistant Gunners	Drivers
CS	150%[a]	58%	150%	42%	142%
Inf.	100%	100%	200%	150%	100%

[a]For example, this figure (150%) signifies that nine men from other positions were also trained for the six available section-leader positions.

Thus, Table 9 shows that infantry companies cross-trained proportionately more squad members as squad leaders, gunners, and assistant gunners then did CSCs, but that CSCs trained proportionately more squad members as section leaders and drivers.

TRAINING TASKS AND FREQUENCIES

All but one of the training tasks discussed in this section were taken from the TOW training program presented in Draft TC 23-20. The one exception is TOW Communications, listed and discussed below.

TOW Communications

Q. What is the frequency and total annual hours of TOW squad communications training?

As Table 10 shows over half of all companies trained squad leaders, gunners and drivers in communications on a monthly basis. Two CSCs (22%) and four infantry companies (44%) trained assistant gunners monthly.

Table 10

TOW SQUAD COMMUNICATIONS TRAINING--FREQUENCY AND ANNUAL HOURS

		Frequency[a]					Annual Hours		
Position	Companies	M	Q	SA	A	N	Range	Mean	Median
Squad Leader	CS	56%	22%	11%	11%	---	2-96	26	11
	Inf.	67%	22%	11%	---	---	10-200	59	34
Gunner	CS	56%	11%	22%	11%	---	2-96	25	7
	Inf.	56%	22%	---	---	22%	10-200	65	48
Assist. Gunner	CS	22%	33%	22%	11%	11%	5-96	25	8
	Inf.	44%	33%	---	---	22%	10-200	57	36
Driver	CS	56%	22%	11%	11%	---	2-96	26	11
	Inf.	56%	33%	---	---	11%	10-200	66	48

[a]M = Monthly Q = Quarterly SA = Semi-annually A = Annually N = Never

The remaining companies trained all squad members quarterly, semi-annually or annually, except two CSCs (22%) which never trained gunners and assistant gunners in communications, and one infantry company which never trained assistant gunners and drivers.

Total annual hours of communications training ranges from two to 96 for CSCs and from 10 to 200 for infantry companies. Infantry companies said they spend more than three to six times as many median hours than did CSCs.

Target Identification

Q. What percent of total target identification training time do you spend on these target categories: (a) tanks and vehicles, (b) aircraft, and (c) weapons, equipment and personnel?

Q. What are the real requirements for target identification? Should soldiers be able to recognize tanks, vehicles and weapons of both friend and foe? Should they also know model numbers?

Table 11 shows time spent on target categories. Infantry companies spent more time than CSCs on tank and vehicle target identification, but CSCs spent more time than infantry companies on weapons, equipment, and personnel.

Table 11

PERCENTAGES OF TARGET IDENTIFICATION TRAINING TIME SPENT ON TARGET CATEGORIES

Target Categories		Companies					
		Combat Support			Infantry		
		Range	Mean	Median	Range	Mean	Median
Tanks/Vehicles	Enemy	25-75%	46%	40%	40-80%	61%	60%
	Friendly	10-50%	28%	25%	10-30%	19%	20%
Aircraft	Enemy	0-25%	5%	5%	0-10%	5%	5%
	Friendly	0-5%	3%	5%	0-10%	5%	5%
Weapons/Equipment/ Personnel	Enemy	0-25%	10%	10%	0-20%	5%	0%
	Friendly	0-20%	8%	10%	5-10%	5%	5%

All companies spent more time on enemy than on friendly tanks and vehicles, but the time was about evenly divided between friends and enemies in other target categories.

About target identification requirements, an infantry company commander said, "I've resolved the problem of what to identify. My TOWs have orders to shoot anything in our sector. If friendlies wander in, that's it." A CSC TOW platoon leader said his battalion will fight far away from other NATO units, so he saw no critical need to train on identification of friendly vehicles. All other companies disagreed, insisting that both friend and foe must be recognized.

A TOW platoon leader said it would be enough to distinguish friend from foe, but his division tests required them to know tank model numbers. Another said it was a waste of time to drill soldiers on model numbers, because they can remember only a few.

Infantry company commanders were about equally divided on the friend-foe/model-number issue. Some said being able to call an object a friend or foe was most important. Others were much more demanding and stressed the importance of intelligence. One summed up this position by saying, "We have to know everything we might see by number and be able to spot it at 3,000 meters--tanks, aircraft, weapons, and equipment, in that order."

Major Task Categories

The tasks from Draft TC 23-20 are listed in Table 12 in three major categories: Gunnery, Squad Proficiency, and Tactics.

Q. How often do you train on the tasks (listed in Table 12)?

The least training was represented by one CSC that had never trained on 14 of the 20 tasks listed in Table I.7, while one infantry company had never trained on four of these tasks.

Table I.7

SQUAD TRAINING FREQUENCY AND ANNUAL HOURS SPENT ON SELECTED TASKS

		Squad Proficiency[a]								
		Training Frequency[b]						Annual Hours Per Task		
Training Tasks	Companies	W	M	Q	SA	A	N	Range	Mean	Median	Percent Nevertrained
Place TOW weapon into operation	CS	56%	22%	22%				4-130	56	52	0
	Inf	44%	44%	11%				48-200	117	104	0
Place training set into operation	CS	11%	56%	22%	11%			2-150	28	12	0%
	Inf		11%	33%	11%		22%	12-36	19	18	44
Assemble TOW on vehicle carrier	CS	44%	44%	11%				20-130	47	50	0%
	Inf	56%	33%	11%				50-200	93	96	0%
Perform TOW crew drill (vehicle)	CS	11%	56%	22%			11%	5-50	33	26	0%
	Inf	33%	44%	22%				30-156	80	72	0%
Perform TOW crew drill (ground)	CS	11%	56%	22%			11%	5-50	33	26	0%
	Inf	33%	44%	22%				28-130	86	89	0%
Perform operator maintenance (TOW & vet)	CS	67%	11%	11%		11%		5-150	86	50	0%
	Inf	78%	11%	11%				48-200	118	96	0%
Perform TOW fire	CS		56%	44%				4-60	26	28	0%
	Inf	11%	22%	67%				12-96	38	36	0%
Perform vehicle recovery	CS		33%	44%			22%	16-200	78	52	0%
	Inf		56%	44%				12-50	67	72	0%
Operate fan set	CS	11%	56%	33%	11%		33%	4-52	30	26	0%
	Inf	22%	44%	22%	11%			2-96	46	36	0%
Fire TOW range	CS	11%	22%	33%	11%		22%	4-96	42	36	0%
	Inf	22%	33%	33%	11%			12-200	114	72	0%
Fire TOW tracker only	CS		44%	33%	11%		11%	4-96	34	32	0%
	Inf	33%	22%	33%	11%			4-200	111	86	0%
Fire TOW stationary targets	CS		56%	33%			11%	4-96	34	32	0%
	Inf	33%	44%	22%				12-200	67	49	0%
Engage single stationary target	CS		33%	22%		11%	33%	4-150	52	34	33%
	Inf		44%	56%				4-200	54	24	0%
Track single stationary target	CS		56%	22%	11%		11%	4-150	49	32	0%
	Inf	11%	33%	56%				16-200	73	54	0%
Engage multiple stationary targets	CS		11%	33%			56%	4-52	33	30	33%
	Inf	33%	33%	67%			33%	12-200	58	36	0%
Track multiple moving targets	CS			11%	11%		78%	2-12	7	7	0%
	Inf	11%	11%	0%			22%	12-200	66	36	56%
Conduct TOW firings	CS		11%	33%	11%	11%	33%	6-288	130	84	0%
	Inf		33%	11%	11%	44%		6-96	47	52	56%
Night target tracking	CS			44%	22%	11%	22%	4-24	12	7	56%
	Inf			44%	11%	22%	22%	4-50	18	13	56%
Fire TOW	CS		22%	56%	11%		11%	4-150	52	50	0%
	Inf	22%	56%	22%				2-48	14	12	0%

[a] W = Weekly, M = Monthly, Q = Quarterly, SA = Semi-Annually, N = Never

Specifically among CSCs, one (11%) had never performed TOW crew drill on a vehicle or on the ground, identified targets, prepared range cards, executed fire commands, tracked a single moving target, or qualified gunners; two, (22%) had never had drivers position vehicles, and had never estimated ranges or tracked targets at night; three (33%) had never engaged a single stationary target; five (56%) had never engaged multiple stationary targets, and seven (78%) had never tracked multiple moving targets.

Among infantry companies, one (11%) had never engaged multiple stationary targets or tracked multiple moving targets and two (22%) had never placed the training set (XM70) into operation or tracked targets at night.

As to the frequency of training being done, most companies in both groups did most of their training monthly and quarterly. Overall, more CSCs than infantry companies trained monthly and semi-annually; more infantry companies than CSCs trained weekly, quarterly, and annually.

ADDITIONAL TRAINING NEEDS

Q. What training should you do that you do not do? (Please list in order of priority).

All companies responded to this question by listing at least one item of training that should be done that was not being done. All responses and the priorities given are shown in Table 13.

Perhaps the data might be more useful when presented as percentages of companies that mentioned each item of training need. This is done in Table 14.

Of the 28 types of training that companies said are not done that should be done, some aspect of target tracking was listed by 14 companies (78%), nine of which were CSCs.

Live-firing was mentioned by eight of all companies (44%). Six of these were simply calls for more live-firing. One wanted night firing, and another wanted tactical firing.

Officer use of the TOW was listed by eight companies, seven of them CSCs (78%). During interviews, the TOW platoon leaders of these CSCs and the one infantry company commander said officers seem unaware of what to do with TOWs attached to infantry platoons. A TOW platoon leader said that in one instance his TOW squads had to dismount and carry the weapon a long distance. Another said infantry companies too often fail to provide food for his TOW squads. A third said that some companies just leave the TOWs in the assembly area. The company commander said he needed to learn TOW tactical employment.

Tracking of multiple targets was a training need of four CSCs (44%) but of none of the infantry companies. As mentioned above, however, in connection with Table 12, eight infantry companies (89%) said they already track multiple targets. But during interviews, only two insisted that they did.

TOW tactical employment, both in the classroom and field, was needed by four CSCs (44%) and two infantry companies (22%).

Land navigation was listed by three CSCs (33%), and two infantry companies (22%) said they need GDP training.

NCO special training to make them TOW experts was strongly stressed by two companies. Both said USAREUR should establish an intensive program to provide these badly needed instructors who should be available to all TOW sections.

As Table 14 shows, each of the other training needs not specifically mentioned here were listed by only one company.

TRAINEE EVALUATION

ESTIMATED TOW GUNNER PERFORMANCE

Q. Under the interference and distractions of actual battle conditions, how likely is it that your TOW squads would get: (a) a first-round hit? (b) a second round hit?

Table 13

NEEDED TOW TRAINING -- PERCENT OF COMPANIES THAT ASSIGNED PRIORITIES TO ADDITIONAL TRAINING NEEDS

	Combat Support Companies				Infantry Companies				
	Priorities				Priorities				
Types of Training	1	2	3	4	1	2	3	4	5
Air-mobile operations	---	---	---	---	---	---	11%	---	---
Artillery fire adjustment	---	---	---	11%	---	---	---	---	---
Combined arms with enemy target mockups	---	---	11%	---	---	---	---	---	---
Command and control	11%	---	---	---	---	---	---	---	---
Crew drill--dismounted	---	11%	---	---	---	---	---	---	---
Crew drill--mounted	---	---	11%	---	---	---	---	---	---
Cross training with other NATO units	---	---	---	---	---	---	---	11%	---
Displacement techniques	---	---	11%	---	---	---	---	---	---
GDP Training	--	---	---	---	---	11%	11%	---	---
Land navigation	---	11%	11%	11%	---	---	---	---	---
Live-firing--more	11%	---	---	---	44%	11%	---	---	---
Live-firing--night	---	11%	---	---	---	---	---	---	---
Live firing--tactical	---	---	---	---	11%	---	---	---	---
More of what we do but better	11%	---	---	---	---	---	---	---	---
More tank/vehicle identification	11%	---	---	---	---	---	---	---	---
NCO special training to make them TOW experts	---	11%	---	---	---	---	11%	---	---
Officer use of TOW	---	11%	33%	33%	---	11%	---	---	---
REALTRAIN	---	---	11%	---	---	11%	---	---	---
TOW Tactical Employment (Classroom & Field)	11%	11%	---	22%	---	11%	11%	---	---
TOW Offensive Course	---	---	---	---	---	---	---	---	11%
Tracking -- battlefield simulation	11%	---	---	---	---	---	---	---	---
Tracking -- more with XM70	---	---	---	---	11%	11%	---	---	---
Tracking -- mortar illumination	11%	---	---	---	---	---	---	---	---
Tracking -- multiple ranges	---	11%	---	---	---	---	---	---	---
Tracking multiple targets	22%	11%	---	11%	---	---	---	---	---
Tracking -- NBC environment	---	---	11%	---	---	---	---	---	---
Tracking -- night & limited visibility	---	11%	---	---	11%	---	---	11%	---
Training with infantry platoons	---	---	---	---	11%	---	---	---	---

Table 14

NEEDED TRAINING -- PERCENT OF COMPANIES
INDICATING EACH NEED

Types of Training	Companies	
	CSCs	Inf.
Air-mobile operations	---	11%
Artillery fire adjustment	11%	---
Combined arms with enemy target mockups	11%	---
Command and control	11	---
Crew drill -- dismounted	11%	---
Crew drill -- mounted	11%	---
Cross training with other NATO units	---	11%
Displacement techniques	11%	---
GDP Training	---	22%
Land navigation	33%	---
Live firing -- more	11%	55%
Live firing -- night	11%	---
Live firing - tactical	---	11%
More of what we do but better	11%	11%
More tank/vehicle identification	11%	---
NCO special training to make them TOW experts	11%	11%
Officer use of TOW	78%	11%
REALTRAIN	11%	11%
TOW Tactical employment (Classroom & Field)	44%	22%
TOW offensive course	---	11%
Tracking -- battlefield simulation	11%	---
Tracking -- more with XM70	---	22%
Tracking -- mortal illumination	11%	---
Tracking -- multiple ranges	11%	---
Tracking -- multiple targets	44%	---
Tracking - NBC environment	11%	---
Tracking -- night & limited visibility	11%	22%
Training with infantry platoons	---	11%

Infantry companies were more confident than CSCs in the abilities of their TOW squads to get both first- and second-round hits under actual battle conditions. As Table 15 shows, six infantry companies (67%) were highly confident that they would get first-round hits, whereas only two CSCs (22%) were that certain. Seven infantry companies (78%) thought it very likely that they would also get second-round hits as compared with six CSCs (67%) that were as confident.

Table 15

TOW HIT PROBABILITY -- ESTIMATES OF FIRST-AND SECOND-ROUND TOW HITS UNDER ACTUAL BATTLE CONDITIONS

	Probability--1st Rd Hit			Probability--2nd Rd Hit		
Companies	1.0	.8	.6	1.0	.8	.6
CS	22%	56%	22%	67%	22%	11%
Inf.	67%	33%	---	78%	11%	11%

Most CSC TOW platoon leaders increased their estimates of second-round hits on the assumptions that gunners will have recovered somewhat from initial battle shock and will have profited from firing and guiding the first missile. One, however, anticipating return enemy fire, was very pessimistic. "After the first round," he said, "I don't want to be anywhere near a TOW. We all will soon have had it." Although most infantry company commanders were more optimistic than TOW platoon leaders, some, in anticipation of enemy fire, were more cautious about estimating the probabilities of second-round hits. This was more apparent during interviews than in Table 16.

Table 16

NUMBER OF TOW GUNNERS, BY CLASSES OF QUALIFICATION

	TOW Gunner Classes											
	Expert			1st Class			2d Class			All Classes		
Companies	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
CS	2-14	5	4	0-18	7	6	3-18	8	8	12-27	19	19
Inf.	0-6	3	3	1-7	3	3	0	0	0	1-10	6	8

In general, as might be expected all companies were uncertain about what actually would happen with TOWs if war should come, but there was determination to employ as well as possible the weapons' capabilities. One infantry company commander said, "Given the long range and fire power, we'll clean their plow."

NUMBER OF QUALIFIED GUNNERS

Q. How many qualified TOW gunners do you have in each class: Expert, 1st Class, 2d Class?

Two CSCs (22%) and one infantry company (11%) said they did not know how many qualified gunners they had. The number of gunners reported by the other companies are in Table 16.

The number of all classes of gunners (Table 16) shows that only seven of the 12 squads in an average CSC could have assistant gunners, whereas the two TOW squads of the average infantry company could have three gunners per squad.

The number of gunners reported by each company, however, showed that two CSCs had only 12 gunners, enough for each squad to have a gunner but no assistant gunner; two CSCs had 19 gunners, enough for seven assistant gunners; one had 20 gunners, enough for eight assistant gunners; and two had 24 and 27, enough for all their squads to have assistant gunners.

One infantry company had only one qualified gunner, one fewer than necessary to give each of its TOW squads a gunner. Another had only two qualified gunners, and a third had four, enough for each squad to have a gunner and an assistant gunner. The remaining six infantry companies had from seven to 10 qualified gunners.

NUMBER OF MONTHS SINCE GUNNER QUALIFICATION

Q. How many months has it been since each present crew member attempted gunner qualification?

One CSC (11%) had never attempted to qualify squad leaders and drivers as gunners and an infantry company (11%) had never tried to qualify squad leaders, assistant gunners, and drivers as gunners.

Otherwise, as shown in Table 17, the median number of months since attempted gunner qualification was from one to three. The shortest time since attempted qualification was one month, and the longest time was 14 months.

Table 17

NUMBER OF MONTHS SINCE TOW SQUAD MEMBERS ATTEMPTED GUNNER QUALIFICATION

	Positions											
	Squad Leaders			Gunners			Asst. Gunners			Drivers		
Companies	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
CS	N[a]-14	3	3	1-14	3	2	1-14	3	2	N-14	3	3
Inf.	N-12	4	3	1-14	5	1	N-12	4	1	N-12	4	3

[a]N = Had never attempted to qualify: one Combat Support Company and one rifle company.

NUMBER OF SQUAD LEADERS WHO HAD CONDUCTED GUNNER QUALIFICATION

Q. How many of your TOW squad leaders have conducted TOW gunnery qualification in the position of squad leader?

As shown in Table 18, 44 percent of CSCs and 66 percent of infantry companies had TOW squad leaders who had never conducted TOW gunner qualification.

Table 18

PERCENT OF COMPANIES HAVING
TOW SQUAD LEADERS WHO HAD NEVER
CONDUCTED TOW GUNNER QUALIFICATION

	Number of Squad Leaders		
Companies	1	2	3
CS	11%	22%	11%
Inf.	44%	22%	---

In one CSC (11%) the majority of squad leaders lacked this experience, and all the squad leaders in two infantry companies (22%) lacked the experience. Stated positively, in over half of the CSCs (56%) and a third of the infantry companies, all TOW squad leaders had conducted TOW gunnery qualification.

FREQUENCY OF GUNNER QUALIFICATION

Q. How often do you qualify squad members in TOW gunnery?

As Table 19 shows, more than half of all companies attempted to qualify or requalify gunners and assistant gunners monthly or quarterly.

Table 19

FREQUENCY OF TOW GUNNER QUALIFICATION

Qualification Candidates	Companies	Frequency[a]					
		M	Q	SA	A	O	N
Gunner	CS	33%	22%	11%	33%	---	---
	Inf.	44%	11%	11%	33%	---	---
Asst. Gunner	CS	33%	22%	11%	33%	---	---
	Inf.	44%	11%	11%	11%	---	22%
All Other Squad Members	CS	22%	---	---	11%	22%	44%
	Inf.	11%	11%	---	---	11%	67%

[a]M = Monthly Q = Quarterly SA = Semi-annually A = Annually

O = Only when time allows or batteries retain their charge N = Never

In V Corps, three CSCs (33%) and four infantry companies (44%) said they tried to requalify gunners and assistant gunners monthly because they had been directed to do so, but only one CSC insisted that it actually did so on the XM70 training set. One CSC TOW platoon leader said, "We're beginning to lie about it. We just can't keep an XM70 in operation long enough for qualification every month." Another TOW platoon leader said, "We try to qualify gunners every month, but we often have to do it in our own way; we don't always have an XM70 in operation." A TOW platoon leader in VII Corps said, "When we were told we were to qualify every quarter, I laughed. We don't have either the time or equipment to do that." Another said, "If any outfit actually qualifies gunners more than once a year, it does more than we can."

When the commander of the CSC that qualified gunners every month on the XM70 was asked how he managed to keep the training sets always ready, he said, "We have friends at the maintenance depot. We get fast replacement on the XM70."

"And the other companies having sets in for repair have to wait"?

"Yes."

Most infantry company commanders, not having the XM70 training sets in their companies, relied on CSCs for qualification of their gunners.

As for qualification of squad members other than those designated as gunners, Table 19 shows that most never attempted qualification. Some were qualified only when time or retention of battery charges allowed.

GUNNER QUALIFICATION

Gunner Qualification Firing Table

Q. Which of the following sets of scores do you use in qualifying TOW gunners?

a.

Task	Expert	1st Class	2d Class	Unqualified
A	449-375	374-325	324-275	274-0
B	500-450	449-413	412-375	374-0
C	449-375	374-325	324-275	274-0

b.

Task	Expert	1st Class	2d Class	Unqualified
A	898-750	749-650	649-550	549-0
B	1000-900	899-826	825-750	749-0
C	898-750	749-650	649-550	549-0

The first firing table is an extrapolation of information taken from TC 23-20 and the second is from Draft TC 23-23. In Table 20, these firing tables are identified by their published sources.

As Table 20 shows, of the six CSCs (66%) using one or the other firing table, the one from Draft TC 23-20 was favored two to one. Two CSCs (22%) however, said they never used neither table.

Table 20

PERCENT OF COMPANIES USING QUALIFICATION FIRING TABLE FROM TC 23-23 AND TC 23-20 DRAFT

Companies	Source of Firing Table			
	TC 23-23	TC 23-20 Draft	Neither	Did Not Know
CS	22%	44%	22%	11%
Inf.	33%	11%	---	56%

When asked what table they used, the TOW platoon leaders said their scoring standards varied in accordance with the time they had for gunner qualification. One CSC TOW platoon leader had never qualified gunners so did not know what table had been used.

Among infantry company commanders, three (33%) used the firing table from Draft TC 23-20 and one (11%) the tables from TC 23-23. The remaining five company commanders (56%) said they did not know what firing table was used because all their gunners were qualified by the CSCs.

Number of Qualifying Rounds

Q. In your gunner qualification firing table, how many rounds in each task (A, B, and C) are fired at targets going left to right and right to left?

Responses to this question (shown in Table 21) were surprisingly varied. Only four CSCs and three infantry companies fired the five rounds per task specified in Draft TC 23-20. Two CSCs fired 10 rounds per task; one fired two rounds in Tasks A and C, but eight rounds in Task B; and another fired only one round in Task B (none in the other tasks). An infantry company also had an odd firing schedule: two rounds in Tasks A and B and five rounds in Task C.

Number of Rounds Fired with Blast Simulator

Q. How many rounds in each task (A,B, and C) are fired with the M80 blast simulator?

The responses were tabulated in Table 22 in accordance with when the companies said they used M80 blast simulators during gunner qualification: monthly, semi-annually, annually, or whenever M80s were available.

Table 21

THE NUMBER OF ROUNDS FIRED (TARGET-TRACKING TRIALS)
IN EACH TASK OF THE TOW GUNNER QUALIFICATION TABLE

Companies	Percent of Companies	Task Trials-Left to Right A	B	C	Task Trials-Right to Left A	B	C
CS	11%	0	1	0	0	1	0
	11%	2	8	2	2	8	2
	44%	5	5	5	5	5	5
	22%	10	10	10	10	10	10
	11%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Inf.	11%	2	2	5	2	2	5
	33%	5	5	5	5	5	5
	56%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

Table 22

THE NUMBER OF M80 TOW BLAST SIMULATORS FIRED
DURING EACH GUNNER QUALIFICATION TASK

Companies	Qualification Frequency	Number of M80s Fired in Each Task 1	2-3	10	Did Not Know
CS	Monthly	---	---	11%[a]	---
	Semi-Annually	---	---	11%	---
	Annually	22%	---	---	---
	When M80s Were Available	11%	22%	11%	11%
Inf.	Whem M80s Were Available	---	---	11%	89%

[a]This one CSC had 4,000 M80 blast simulators on hand. All other companies had an insufficient supply.

At the time of the survey, one CSC had 4,000 M80s on hand. In this one company, each person attempting to qualify or requalify as a gunner fired 30 M80 rounds (10 for each of the three qualification tasks) every month. In another CSC, each gunner candidate fired 30 M80 rounds twice yearly. Two CSCs fired one round per task per gunner once each year, and two CSCs fired two to three rounds per task when M80 blast simulators were available. Only one infantry company reported firing of blast simulators--10 for each task when they were available. The remaining companies (one CSC and eight infantry companies) did not know when, if ever, they fired with M80 blast simulators.

Ranges to Target

Q. At what range is the target for each task (A, B, and C) when qualification firing?

In all instances the distances to target reported by each company were the same for all of its qualification tasks. As Table 23 shows, the target distances ranged from 350 meters to 1,800 meters. A third of the CSCs and over half of the infantry companies did not know the ranges.

Table 23

TOW GUNNER QUALIFICATION-RANGES TO TARGET

Companies	Ranges in Meters					
	350	400-450	500-1200	600-1000	1800	Did Not Know
CS	11%	22%	11%	11%	11%	33%
Inf.	---	---	---	44%	---	56%

The ranges of target distances in Table 23, e.g. 500-1200, means that target distance for a given qualification period could have been at 500 meters or any other distance up to 1,200 meters. Only two companies, both CSCs, had fixed target ranges for gunner qualification--one at 350 meters and the other at 1,800 meters.

Speed of Moving Targets

Q. At what MR/sec are the targets moving for qualification firing during tasks A, B, and C?

It became clear during interviews that few companies (six of 18 total) understood the milliradian-per-second concept.

In Table 24, these are the four CSCs (44%) and two infantry companies (22%) which indicated correctly what the milliradians per second should be, and were, for their qualification tasks: 5, 15 and 25 for tasks A, B and C respectively.

Table 24

TOW GUNNER QUALIFICATION--TARGET SPEEDS IN MILLIRADIANS PER SECOND

Companies	Tasks and Milliradians Per Second												Did Not Know
	A	B	C	A	B	C	A	B	C	A	B	C	
	12	12	12	5	10	15	5	15	25	10	15	25	
CS		11%			22%			44%			---		22%
Inf.		---			---			22%			11%		67%

Two CSCs (22%) and six infantry companies readily admitted they did not know the milliradians per second at which their targets moved. The remainder, though they stated the odd milliradian-per-second numbers in Table 24, said during interviews they were thinking in terms of miles per hour.

Canting of TOW Launcher

Q. In qualifying gunners, do you cant the TOW launcher to either the left or the right?

As Table 25 shows, only three companies said they cant the TOW launcher for gunner qualification, and one of those said it does not cant the launcher in all instances.

Table 25

TOW GUNNER QUALIFICATION--PERCENT OF COMPANIES THAT CANT THE TOW LAUNCHER

Companies	Cant of TOW			Did Not Know
	Zero Degrees	10 Degrees	20 Degrees	
CS	67%	11%	11%[a]	11%
Inf.	56%	11%	---	33%

[a]Does not cant the TOW in all instances.

Scoring and Refiring of Missile Excursions

Q. Do you score a missile excursion as zero?

Q. Do you allow refiring of missile excursions?

As Table 26 shows, only three companies (one CSC and two infantry) stated they did not score a missile excursion as zero, although three other companies said they did not know.

Table 26

TOW GUNNER QUALIFICATION--SCORING
OF MISSILE EXCURSION AS ZERO

Companies	Missile Excursion Scored As Zero		
	Yes	No	Did Not Know
CS	78%	11%	11%
Inf.	56%	22%	22%

The same three companies that were lenient in scoring by ignoring missile excursions also always allowed refiring of missile excursions, as shown in Table 27.

Table 27

TOW GUNNER QUALIFICATION--PERMISSION
TO REFIRE MISSILE EXCURSIONS

Companies	Missile Refiring Permitted			
	Always	Sometimes	Never	Did Not Know
CS	11%	44%	33%	11%
Inf.	22%	44%	11%	22%

Four companies, however (three CSCs and one infantry), never allowed refiring a missile excursion regardless of the circumstances. But four CSCs and four infantry companies considered the causes of excursions and allowed refiring when the cause could not be attributed to the gunner's fault.

Difficulty of Qualification With the XM70

Q. Is it easier or harder to qualify gunners with the XM70 than it is to effectively live-fire the TOW?

Most companies (67%) agreed that it is harder to qualify as a TOW gunner with the XM70 training set than it is to effectively live-fire the TOW.

But as Table 28 shows, one CSC (11%) and two infantry companies (22%) think it is easier to qualify with the XM70, and one CSC thinks it is neither easier nor harder. Two companies had no opinion.

Table 28

DIFFICULTY OF GUNNER QUALIFICATION WITH XM70 TRAINING SET AS COMPARED WITH LIVE FIRING

Companies	Comparative Difficulty			
	Easier	Harder	Neither Easier Nor Harder	No Opinion
CS	11%	67%	11%	11%
Inf.	22%	67%	---	11%

The majority thinks that gunners who qualify with the XM70 are overtrained. They agree that the XM70 infra-red source is very small in comparison with a bulky target and much harder to track, and that to get the highest score the gunner must keep the cross-hairs of his sight on the lower left-hand corner of the infra-red source, "A trick," a TOW platoon leader said, "that some guys never learn."

The few who think it harder to effectively live-fire the TOW said it is due to gunner reaction to the actual back-blast, smoke obscuration, and visibility of the missile down range. They also said the presence of high-level observers adds needlessly to gunner tension. These things, they said cause some gunners, though highly qualified on the XM70, to lose the missile by grounding or excursion, or to miss the target because they try to "fly" the missile rather than keep their sights on the target.

ANNUAL TOW FIRING

Q. How many months has it been since you last live-fired the TOW?

As Table 29 shows, the number of months since companies last live-fired the TOWs ranged from one to 11 months.

Table 29

NUMBER OF MONTHS SINCE LAST TOW LIVE FIRING

Companies	Months						
	1	2	3	7	8	9	11
CS	11%	22%	33%	11%	11%	11%	---
Inf.	11%	11%	33%		22%	11%	11%

Q. Of the gunners who live-fired the TOW, how many fired it for the first time?

Table 30 shows that the number of gunners who live-fired the TOW the first time ranged from five to 11 in seven CSCs (78%) (less than half of the total 12) to all 12 in two CSCs (22%).

Table 30

THE NUMBER OF GUNNERS WHO LIVE-FIRED
THE TOW THE FIRST TIME, REPORTED BY COMPANIES

Companies	Number of Gunners								
	0	1	2	5	6	8	10	11	12
CS	---	---	---	11%	11%	11%	33%	11%	22%
Inf.	22%	33%	44%	---	---	---	---	---	---

All the gunners in four infantry companies (44%) and half the gunners in three companies (33%) fired the TOW for the first time, but all gunners in two companies (22%) had live-fired previously.

Q. Where did you fire the TOW?

As Table 31 shows, most companies fired at either Grafenwoehr or Hoenfels. One CSC fired at both of those places, and two infantry companies fired at Wildflecken.

Table 31

AREAS WHERE TOWS WERE LIVE-FIRED

Firing Areas	Combat Support Companies	Infantry Companies
Grafenwoehr	56%	67%
Hoenfels	22%	22%
Both Graf. & Hoen.	11%	---
Wildflecken	11%	11%

Q. How far was it (in meters) from your firing point to the target?

Target distances ranged from 1,700 to 3,000 meters, and the mean and median distances were the same: 2,400 meters.

Q. Did you fire during the day or night or both?

Q. Did you fire mounted, dismounted, or from both positions?

As Table 32 shows, most companies -- five CSCs (56%) and six infantry companies (67%)--fired only in daylight, but four CSCs (44%) and three infantry companies (33%) fired in both daylight and dark.

Table 32

TOW LIVE FIRING PERIODS AND FIRING MODES

Companies	Firing Period		Firing Mode	
	Day Only	Day and Night	Mounted Only	Mounted and Dismounted
CS	56%	44%	44%	56%
Inf.	67%	33%	89%	11%

Five CSCs (56%) and one infantry company (11%) fired from both the mounted and dismounted mode. The remainder fired only when mounted.

Q. How much terrain drop-off was there immediately in front of your firing position?

Estimates of terrain drop-off in front of firing positions ranged from a 15-degree downward slope with the target on a hill to a 300-meter rapid fall-away. In other words, the terrain presented little danger of the gunners grounding missiles because of initial flinching or smoke obscuration.

Q. Were you given enough time on the range?

All companies said they had ample time.

Q. What other firing conditions do you think are important?

All those who responded commented not on conditions as they were for them but as they thought they might be better. Those who had not fired at night thought they would have benefited most from night firing. Those who had fired at night under alternating neon searchlight illumination thought they could have seen the targets better under mortar illumination. One CSC platoon leader said if each TOW squad were required to fire their own weapon rather than the one provided, their incentive for operator maintenance would be increased. An infantry company commander thought live firing would be more realistic if the action occurred under simulated battlefield conditions--already positioned and, when dismounted, on a concrete slab. Also, he said, there should be noises of gunfire and vehicles moving in the vicinity of TOW-firing points.

Q. Given the limitation on live TOW missiles, how do you decide which man fires?

Q. Do you think there is a better way of distributing live firing opportunities among gunners?

All companies but two CSCs said the gunner in each squad who had the highest XM70 qualification score was selected to fire the live missile regardless of the number of live missiles he had fired previously. The two exceptional CSCs said if the best gunner in a squad has little time left to serve, the next best gunner is selected to fire. Another CSC and an infantry company said they had decided to henceforth select the next best gunner in each squad if the best gunner had fired previously.

None of the companies would either suggest or consider any other method of favoring gunners with the live firing privilege.

Q. To you, what is the value of annual TOW live firing?

All companies unequivocally stated that the greatest value in live firing was the high regard for and confidence in the weapon that demonstrations of fire power give to TOW personnel. For these reasons alone, all companies said the live firings are indispensible. Most would like their squads to live fire at least twice per year. The heightening of gunner morale for those whose missiles hit the target was also a strongly supported value, but several interviewees remarked that it was a devastating experience for those who missed the target.

ESTIMATED TOW SQUAD PERFORMANCE

Q. How fast (on average) can you TOW squads execute correct drill procedures and place the TOW into operation: (a) on the vehicle carrier? (b) on the ground?

Two CSC TOW platoon leaders and one infantry company commander had no idea of how fast their squads could perform accurate drill procedures and place the TOW into operation. The estimates of the remainder are summarized in Table 33. On the vehicle, the median time for infantry companies was a little less (by two seconds) than for CSCs, but five seconds more than CSCs when performing on the ground.

Table 33

ESTIMATED TIME REQUIRED TO EXECUTE
TOW DRILL PROCEDURES AND PLACE TOW INTO OPERATION

	Seconds by Mode					
	On Vehicle			On Ground		
Companies	Range	Mean	Median	Range	Mean	Median
CS	11-240	57	22	10-210	54	22
Inf.	9-60	24	20	12-90	35	27

CSCs - N = 7 (Two did not know.)

Inf. Co. - N = 8 (One did not know.)

TOW SQUAD TESTS

Q. What TOW squad tests/examinations do you administer prior to gunner qualification and prior to live firing?

Prior to TOW gunner qualification, two-thirds of all companies (as Table 34 shows) administered written tests to TOW squads, and eight CSCs (89%) and all infantry companies administered squad performance tests.

Table 34

TYPES OF TESTS ADMINISTERED TO TOW SQUADS
PRIOR TO GUNNER QUALIFICATION AND LIVE FIRING

COMPANIES	Prior to Gunner Qualification		Prior to Live Firing	
	Written Test	Performance Test	Written Test	Performance Test
CS	67%	89%	57%	89%
Inf.	67%	100%	57%	89%

Prior to live firing, only five companies in each group (57%) administered written tests, but eight in each group (89%) administered performance tests.

Those who gave TOW squads written tests said the TRADOC tests did not cover some things they considered important, such as equipment maintenance, navigation, tactical employment, and employment of indirect fire. Two CSC TOW platoon leaders said they supplemented their written tests with items from the infantry school (Fort Benning). They said friends had sent them those materials. Although copies of tests were specifically requested, none of the companies responded; all had excuses of some sort for not showing the tests.

TRAINING CONSTRAINTS

TRAINING TIME

Q. What is the average number of hours scheduled per squad per month for TOW training?

Q. What percent of TOW training time do your squads spend in: (a) TOW gunnery, (b) TOW squad proficiency, (c) TOW tactics, (d) other.

Q. On the average, how often do you train on the tasks (listed in Table 12), and what was the total number of hours spent on each task during the last 12 months?

Q. Do you think the time devoted to the following categories should be increased or decreased: (a) TOW gunnery, (b) TOW squad proficiency, (c) other?

Time Estimates

Since TOW training time is unevenly distributed throughout the year, most companies were reluctant to be specific about average training hours per month or total annual hours spent on specific training tasks. Although all companies were persuaded to estimate the

average number of hours spent in training per month (Table 35), the percent of time spent

Table 35

AVERAGE TOW TRAINING TIME PER MONTH -- OVERALL ESTIMATE

	Average Hours Per Month		
Companies	Range	Mean	Median
CS	12-70	32	20
Inf.	8-100	38	36

in major TOW training categories (Table 36), and the frequency of training on specific tasks (Table 12), two CSC TOW platoon leaders (22%), and three infantry company commanders (33%) refused to estimate the annual time spent on any specific task (Table 12).

Table 36

PERCENT OF TOW TRAINING TIME SPENT
IN MAJOR TRAINING CATEGORIES

	Major Training Categories											
	Gunnery			Squad Proficiency			Tactics			Other[a]		
Companies	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
CS	10-60%	38%	40%	10-35%	23%	25%	10-50%	22%	10%	0-70%	17%	10%
Inf.	2-75%	33%	16%	15-50%	27%	20%	2-68%	32%	20%	0-30%	8%	0%

[a]General military subjects

They refused on grounds that their estimates could not be accurate and would, therefore, be meaningless. As shown in the "Percent Respondents" column of Table 12, as few as two persons gave time estimates on a specific task because they were the only ones who trained on that task, but some declined to estimate time on tasks they trained on.

Average Hours Per Month

Average hours per month spent in major TOW training categories are shown in Table 37 as derived from the first time estimate (average monthly hours, (Table 35)) and the second estimate (Table 12) -- annual hours spent on specific tasks.

As Table 37 shows, the second time estimate by CSCs was, overall, more than two times greater than the first estimate. The second infantry company estimate, overall, was more than three times greater than the first.

Table 37

AVERAGE TOW TRAINING HOURS PER MONTH, BY MAJOR CATEGORY -- DERIVED FROM FIRST AND SECOND ESTIMATES

		Major Training Categories			
Companies	Time Estimates	Gunnery	Squad Proficiency	Tactics	All Categories
CS	First[a]	12	7	7	26
	Second[b]	24	30	8	62
Inf.	First[a]	13	10	12	35
	Second[b]	59	53	10	122

[a]To derive "first time estimates" the mean hours per month in Table 35 were multiplied by the mean percentages of time spent in each major training category, Table 36.

[b]To derive "second time estimates" the mean hours per month spent in each major training category were calculated from the data in Table 12.

The attitudes of the survey participants made it clear that they had more confidence in their first time estimate than in the second, but it was also clear that their confidence in the first estimate was quite small.

Insufficient Training Time

Most infantry company commanders and some CSC TOW platoon leaders stated that, in addition to the problem of trainee availability discussed earlier, insufficient time is available for training. The following quotations are from company commanders:

"Apparently decentralized training means that division and brigade assume you have no training to do, so they demand your time for other things."

"Training is just one of eight to 10 balls we try to keep in the air. We do it when we can, which isn't saying much."

"Let's face it. We don't do any real training around here. We just stir the straw around. There's no time."

A division G3 said, "I'm afraid that the real degrade in antitank training is the administrative tasks we have given the young commanders. We should look at those tasks and try to strip out the gimcrackery things that require time that could better be spent elsewhere."

Desire to Increase Training Time

Only a few CSC and infantry companies wanted training time unchanged in one major training category or another.

But as Table 38 shows, most companies wanted training at least doubled in all major categories.

Table 38

DESIRED PERCENT INCREASE IN TOW TRAINING TIME, BY MAJOR CATEGORY

	Training Categories											
	Gunnery			Crew Proficiency			Tactics			Other[a]		
Companies	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
CS	0-300%	178%	100%	0-300%	156%	100%	0-500	161%	100%	0-100	33%	0%
Inf.	0-600%	183%	100%	0-300%	128%	100%	0-300	122%	100%	0-250	50%	0%

[a]General military subjects.

TRAINING PERSONNEL

Q. Who conducts TOW instruction?

Q. Do you have a principal (officer) trainer and an NCOIC (assistant trainer)?

Q. How many instructors do you have?

Conductors of Training

In CSCs, as Table 39 shows, those who conducted TOW training range from the TOW Platoon Leader down to Squad Leaders. In infantry companies, those chiefly responsible for TOW training range from the Platoon Sergeant and Section Leader down to Squad Leaders.

Table 39

CONDUCTORS OF TOW TRAINING

	Positions of Instructors					
Companies	Plt Ldr	Plt Ldr & Plt Sgt	Plt Sgt & Sec Ldr	Sec Ldr	Sec Ldr & SL[a]	SL
CS	11%	33%	33%	11%	11%	---
Inf.	---	---	11%	78%	---	11%

[a]SL = Squad Leader

Trainers and Instructors

Table 40 shows that eight CSCs (89%) and four infantry companies (44%) had a principal officer trainer, and each of all CSCs (100%) and eight infantry companies (89%) had an NCOIC assistant trainer. So in the higher levels of training personnel, more CSCs than infantry companies were provided for better.

As to instructors, five CSCs (56%) and seven infantry companies (78%) had one instructor for each 4-man TOW squad. The numbers of instructors for these companies, as

shown in Table 40, were 12 for each of the five CSCs and two for each of the seven infantry companies.

Table 40

NUMBER OF TRAINERS AND INSTRUCTORS

Companies	Number of Instructors							One Officer Trainer	One NCOIC Asst. Trainer
	12	8	7	4	3	2	1		
CS	56%	11%	11%	11%	11%	---	---	89%	100
Inf.	---	---	---	---	---	78%	22%	44%	89

The number of instructors in the remaining four CSCs ranged from three to eight (an average of five for the 12 squads of each company), and the remaining two infantry companies had only one instructor for the two squads of each company. So, proportionately, the infantry companies were better supplied with instructors than were the CSCs, but neither group had its full complement.

RANGE FACILITIES

Q. Do you have a TOW tracking range? If so, how far away is it?

Q. Is the range adequate for TOW gunner training?

Q. Do you have TOW target-tracking practice at ranges of 2,500 to 3,000 meters?

Seven CSCs (78%) and four infantry companies (44%) had TOW-tracking ranges. But Table 41 shows that only two CSCs (22%) and only one infantry company (11%) considered their ranges adequate for TOW gunner training.

Table 41

PERCENT OF COMPANIES HAVING ADEQUATE TARGET TRACKING RANGES

Companies	Range Distance in Miles			Range is Adequate
	.5	1	3	
CS	22%	33%	22%	22%
Inf.	11%	33%	---	11%

The distance of the tracking ranges from garrison were, for CSCs, from one-half to three miles, and for infantry companies, from one-half to one mile.

The only ranges available for target tracking at ranges from 2,500 to 3,000 meters are in the major training areas, which are available to companies for all training and testing purposes no more than four times per year.

TRAINING EQUIPMENT

Q. How many of the following pieces of equipment do you have, and what percent of time are they operational? (TOW weapons M220A, Training Sets XM70, TOW carriers, and TOW Battery Chargers).

Complements of Equipment

As Table 42 shows all companies had their regular complements of equipment, and CSCs and infantry companies were essentially equal in the percentages of time that the equipment they have in common (TOW weapons and carriers) was operational. Only CSCs have the two XM70 training sets and the one battery charger per battalion.

Table 42

NUMBERS OF TOW TRAINING EQUIPMENT PER COMPANY
AND PERCENT OF TIME IT IS OPERATIONAL

Equipment	Numbers Per Company		Percent Time Operational					
			CSCs			Inf. Cos.		
	CS	Inf.	Range	Mean	Median	Range	Mean	Median
TOW Weapons M220A	12	2	78-95¢	89%	90%	40-100%	84%	95%
Training Sets XM70[a]	2	0	20-85%	60%	60%	N/A	N/A	N/A
TOW Carriers	12	2	65-98%	77%	92%	50-100%	90%	95%
TOW Battery Chargers	1	0	50-100%	86%	92%	N/A	N/A	N/A

[a]Percent time operational for XM70 Training Sets applies to only one set. That is, 60% operational means that only one set was operational 60% of the time, while the other set was non-operationa.

Too Few Training Sets

If all XM70s were continuously operational the number available might be adequate for TOW gunner training needs, but as Table 42 shows, only one XM70 in each set of two was available an average of only 60 percent of the time. One CSC had only one set in operation only 20 percent of the time. An infantry commander of 14 months said he had never seen an XM70 training set, and most said that when their squads trained with the XM70 it had been in conjunction with CSC training. A CSC TOW platoon leader said that although infantry companies knew they were welcome to join the CSC in training, they seldom did. An infantry company commander said he could never get his TOW squads together when the CSC was ready to train.

Now that the scouts in each battalion have TOW weapons but no training set or battery charger, the problem of insufficiency of these equipments have increased.

Too Few Battery Chargers

Each battalion has 42 TOW batteries (two per weapon) and one battery charger that can accommodate only two batteries at a time. The frequent failure of batteries to hold charges well (especially during winter) causes additional concern. Most CSC platoon leaders said insulated mounts (battery holders) should be provided to prevent charge

leakage. For the same reason, most also cautioned about placing batteries on the ground. When target tracking with the XM70 training set the drain on batteries is much greater, and this greatly concerns some CSC platoon leaders. One said, "When we track, the batteries are gone, and with a charger that takes only two batteries there's no way to get the charge back very soon. If the enemy attacked, we'd have no TOW." Another said, "If we had to fight with only one charger, we wouldn't be able to fire all the TOWs." A third said, "Chargers don't always work well, especially at MTAs (major training areas). I think its because of voltage fluctuation." A fourth said, "One of my NCOs does nothing but charge batteries." Still another said, "We have to have some way of charging batteries in the field, either from a generator or from the power supply of the APCs (armored personnel carriers). And becuase of limited battery time, each (TOW) section should have a charger."

EQUIPMENT MAINTENANCE

Q. What maintenance problems do you have with TOW weapons, XM70 training sets, and the battery charger?

TOW Weapon Maintenance Problems

Most maintenance problems with TOW weapons were broken eye (sight) pieces, cracked or maladjusted target-tracking control knobs, and loss of battery-case "C" washers and wing nuts. Obscuration of sights by accumulation of humidity was a relatively infrequent but bothersome problem. In two instances, damage to the missile guidance system was mentioned. One weapon could not be bore-sighted, and the reason apparently could not be found by maintenance personnel. Two CSCs had had problems with tripods not working well, and one mentioned that the alligator clips of the M80 blast simulator mechanism were sometimes blown off. All companies agreed that damage to TOW weapons and XM70 training sets was often done during transport to and from the weapons rooms. The lack of carrying cases and the delicacy of the apparatus, particularly of the XM70, were cited as major factors in equipment damage. Vibration of APCs was also a villain. "It shakes everything loose," a TOW platoon leader said, "and all my NCOs have asked for jeeps to replace the APCs."

XM70 Maintenance Problems

Maintenance problems with the XM70 training set were numerous and critical. Frequently mentioned were failure of the cross-hair indicator and counter to work, failure of the ready-flag to appear, breakage of electrical cable plug-in devices, and failure of the infra-red power supply modulator system. A CSC platoon leader said the power supply modulator system has only about a 30-hour life.

Battery Charger Maintenance Problems

Battery chargers are rather hardy. Table 42 shows that the median operational time was 92 percent. Only one CSC complained strongly. One side of its battery charger had been inoperable for several months, and a replacement was not available.

TIME REQUIRED FOR MAINTENANCE

Q. Where do you send your equipment for repair, and how long does it take to get it back?

Q. Are there unreasonable restrictions set on TOW operator maintenance?

Locations of Maintenance Units

TOW equipment is repaired in Hanau (for V Corps) and Nuernberg (for VII Corps). For replacement of sight eye-pieces, most of the V Corps CSCs took the equipment to Hanau and returned with it the same day. In VII Corps, some battalions were visited about every six

weeks by a mobile preventive-maintenance crew from Nuernberg, which effectively took care of minor problems.

Because of delays in TOW maintenance discussed below, a chief of staff at division level asked that the researchers include his request for TOW maintenance capabilities in the divisions. This was also stated as a need by a CSC platoon leader and an infantry company commander.

Delays in Maintenance

For repairs or replacements other than mentioned above, battalions in both Corps had to wait for two weeks to six months for repairs or replacements, especially of XM70 training equipment. The one exception was the battalion mentioned earlier that got immediate replacement of XM70 equipment because it had friends among the maintenance personnel.

Purging TOW sights of moisture seemed to take a needlessly long time. A CSC TOW platoon leader in each corps said the problem was insufficient adapter nipples. Each maintenance group was said to have had an ample number of nitrogen gas tanks but only two adapter nipples, which limited the purging of sights to only two at a time. A TOW platoon leader said, "Little things like that seem ridiculous. If someone would wise up, we'd be spared a lot of trouble and frustration. To avoid so much down-time, I'm torn between turning a sight in as soon as it gets pink and can be quickly purged or waiting until it is ruined so I can get it replaced."

Operator Maintenance Restrictions

Six CSCs (67%) and four infantry companies (44%) said some restrictions on operator maintenance are unreasonable. They said they should be allowed to replace sight eyepieces, dust covers, locking rings, allen screws, cotter pins, and "C" washers and wing nuts on equipment and should also be allowed to replace missile-rack pads and straps. Although most infantry companies refer their maintenance problems to the CSCs, a company commander said, "It seems like a senseless waste of time to send equipment over a hundred miles just for replacement of "C" washers and wing nuts."

AMMUNITION AVAILABILITY

Q. Do you have enough or too much of the following ammunition: blast simulators M80; smoke pots 30-lb., mortar illumination 81-mm, hand smoke grenades, artillery simulators, and cartridge blank caliber 7.62-mm? If you do not have enough of any item, please state the amount you need.

As Table 43 shows, more infantry companies than CSCs said they needed more blast simulators, smoke pots, and mortar illumination. An equal number want more hand smoke grenades and artillery simulators. More CSCs than infantry companies want more cartridge blank caliber 7.62-mm.

Table 43

AMMUNITION--PERCENT OF COMPANIES INDICATING "NOT ENOUGH" AND AMOUNTS NEEDED

	Companies	Percent of Companies Indicating "Not Enough"	Range	Mean	Median	Percent of Companies Indicating Amounts
Blast Simulators M80	CS	67%	600-12,000	5,480	5,000	56%
	Inf.	89%	50- 1,560	670	400	33%
Smoke Pots 30-lb.	CS	67%	4-20	10	9	44%
	Inf.	89%	5-10	8	8	33%
Mortar Illumination 81-mm	CS	44%	320-524	422	422	22%
	Inf.	78%	100-500	300	300	22%
Hand Smoke Grenades	CS	67%	120-500	257	204	44%
	Inf.	67%	48-260	154	154	22%
Artillery Simulators	CS	89%	120-800	368	222	56%
	Inf.	89%	100-1,040	570	570	22%
Cartridge Blank Cal. 7.62-mm	CS	56%	----	---	---	0%
	Inf.	44%	----	---	---	0%

Of those companies saying they need more ammunition, only a few stated the amounts needed (see Table 43). Most were pessimistic. A company commander said, "Why bother? I don't think we'll get any more; there isn't enough money."

Fewer infantry companies than CSCs stated needs, but their appetite for ammunition (except for blast simulators) was proportionately much greater. This might indicate a higher degree of deprivation among infantry companies or a lower degree of awareness of actual needs for adequate TOW training. One infantry company commander said, "Overall, the ammunition allotted to a battalion is about right for my company."

Almost all companies felt that the ammunition available to them should be more in balance with that given to tank companies. This feeling was especially true about live rounds. A company commander expressed the prevailing thought: "Antiarmor is supposed to save us, but tanks get all the priorities. In comparison, we get nothing."

TRAINING AIDS AND DEVICES

Q. Which of these training devices do you have and use: Besseler Cue See, Sony TVT, and Range Reader GTA 71-1-1?

Q. How do you use these devices?

Q. What problems do you have with them?

Q. Which TOW TEC lessons do you have?

Besseler Cue See

Table 44 shows that six CSCs (67%) and four infantry companies (44%) had the Besseler device, but none of the CSCs and only two infantry companies (22%) used it for any training purpose.

Table 44

COMPANIES THAT HAD AND USED TRAINING DEVICES OTHER THAN THE XM70 TRAINING SET

	Training Devices					
	Besseler Cue See		Sony TVT		Range Reader	
Companies	Had	Used	Had	Used	Had	Used
CS	67%	---	78%	11%	67%	33%
Inf.	44%	22%	56%	---	67%	44%

TEC Lessons

Nine TOW TEC lessons were listed in the questionnaire, some of which the researchers thought might be available but none were at the time of the training survey. Regardless, one TOW platoon leader said he had several of the lessons but did not use them because they were obsolete. The two infantry companies that indicated use of TEC lessons (in the Besseler device) meant for training other than TOW training.

Sony TVT

Seven CSCs (78%) and five infantry companies (56%) were aware that their battalions had the TVT (Table 44), but only one CSC had used it "to show replays of good and bad areas of training." Most companies said video-recording tape was not available for their use, and two said no one in their battalion was qualified to operate the TVT. A Battalion S-3 said the five videotapes allotted were too few to meet the demand, and for this reason companies soon assumed that for all practical purposes the TVT did not exist.

Range Reader

Six companies (67%) in each group (Table 44) had the range reader, but only three CSCs (33%) and four infantry companies (44%) used it. An infantry company commander said his TOW squads used the device only on major problems and on Army Training Evaluation Program (ARTEP) exercises. The remaining companies used it primarily, directly on the map, for range card preparation. A TOW platoon leader said there is too much information on the device for it to be used quickly and easily. All other users seemed pleased with it.

Indoor Tracking Device

A device recently invented by an infantry lieutenant was being used in two battalions in the survey. This device, intended for indoor TOW target tracking practice during inclement weather, consists of a board on which is mounted a REALTRAIN scope sight and a flashlight that projects an arrowhead. In use, the board is mounted on a TOW sight in a room. On the board the scope sight is reversed so that the "target" wall seems distant.

Usually, on the wall an undulating line is drawn as the target line and another line, having the same undulations, is drawn several feet above the target line. When the scope sight is exactly on the target line, the flashlight is adjusted so the arrowhead is exactly on the counter part of the upper line. As the gunner tracks the target line, a monitor observes the arrowhead to see how well the practicing gunner stays on the target line. The lieutenant said the device can also be used for tracking scale model targets on a table. An infantry company commander said, "The indoor tracker is really good. You can get competition among your crews and continue to train them even during extremely bad weather." A TOW platoon leader said a gunner had to strain unnaturally to use the REALTRAIN scope mounted on a board. For that reason, he planned to use only the flashlight arrowhead for monitoring and let the gunner use the regular TOW sight. Since the TOW has a 13 power sight and cannot be reversed, this plan seems infeasible for indoor tracking, unless a very long room is available.

Target Identification Media

Q. For target identification training, which of the following media do you have and use — plastic models, flash cards, silhouettes, photographs, 35 mm slides, overhead projector, opaque projector? Are they effective?

Q. Which of the media you do not have would you like to have?

As Table [illegible] shows, a maximum of six CSCs (67%) and seven infantry companies (78%) acknowledged possession and use of target identification media.

Table [illegible]

TARGET IDENTIFICATION MEDIA — PERCENT OF COMPANIES [illegible]

[illegible]

		Use					Effective[b]			Percent That Want Media[b]
	Company	Tanks	Vehicle	Aircraft	[illegible]	[illegible]	Positive	Negative	Do Not Know	
Plastic Models	CSC	56%	33%		56%	56%	[illegible]			67%
	Inf	33%	33%	[illegible]	33%	33%	[illegible]			56%
Flash Cards	[illegible]	[illegible]	[illegible]	11%	11%	[illegible]		[illegible]	[illegible]	[illegible]
	Inf	[illegible]	[illegible]	[illegible]	44%	44%	[illegible]	[illegible]		[illegible]
Silhouettes	CSC	11%	11%	11%	[illegible]	[illegible]			100%	44%
	Inf		11%		11%	11%		100%		11%
Photographs	CSC	44%	33%	33%	67%	67%	67%	[illegible]	[illegible]	[illegible]
	Inf	11%	44%	[illegible]	67%	67%	33%		[illegible]	33%
35 mm Slides	CSC	[illegible]	[illegible]	[illegible]	11%	11%	[illegible]	[illegible]		44%
	Inf	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]			56%
Overhead Projector	[illegible]	56%	56%	[illegible]	67%	67%	67%	[illegible]		[illegible]
	Inf	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
Opaque Projector	CSC	[illegible]	[illegible]	[illegible]	11%				[illegible]	[illegible]
	Inf	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	100%			

[a] Percent of companies that have the media. In two instances, a company that had a medium did not use it because it was judged ineffective.

[b] In two [illegible] the percent of [illegible] exceed the percent [illegible] have the media. [illegible]

Except for one company in each group, those who had media used it, but in only one instance did all possessors of a medium acknowledge it as effective. The most effective medium was plastic models of tanks and vehicles. All companies that did not have plastic models want

them, and three CSCs that have some want more. Also, three CSCs that already have some overhead transparencies want more. Most of the companies that had photographs doubted that all current models were represented.

A Battalion S3 stressed the importance of plastic models. He said despite diligent training on target identification with other media, his battalion lost many points when it was tested by division personnel with plastic models. Those who had scored highly in battalion tests failed to recognize many vehicles represented by models.

Ways in which companies use target identification media and company suggestions for improving target identification training are below in the Training Methods and Techniques section.

Additional Training Aids and Devices

Q. What additional training aids or devices (charts, mockups, simulation devices, etc.) should be provided for TOW training immediately and long term?

At the head of the needed immediately list was more XM70 training sets. Several companies in each group repeatedly called for more. One CSC TOW platoon leader said each TOW section should have an XM70. "This may sound like overkill," he said, "But we can't maintain the skill of gunners with what we have. Most of my best gunners come out of A.I.T. (Advanced Individual Training). The best we can do here is try to maintain their skill, but it steadily degrades."

In addition to the immediate need for target identification media listed in Table 37, the following items were called for:

1. Better target identification charts
2. Training films on TOW tactics
3. Graphic aid showing TOW components
4. Cut away of TOW missile showing components
5. Better sand tables for tactical training
6. More M80 blast simulators
7. More TC 23-20s (one for each TOW squad)

Aids and Devices Needed Long Term

Although most companies said the tendency of some gunners to "fly" the missile when live-firing was not a problem, an infantry company commander and a brigade-level assistant S3 thought a film of a missile firing, taken through a TOW sight and shown in the Besseler Cue See device, would both reduce the shock of live-firing and gunner fascination with the missile as it goes down range.

Another idea for use of the Besseler Cue See for training TOW and Dragon gunners was suggested by an assistant division G3. His written suggestion is an annex of this appendix (Annex 1).

The following items were mentioned by other survey participants as needed in the long term:

1. Scaled terrain boards of sectors.
2. Mockups of enemy tanks or kits for making mockups out of M60A1 tanks.
3. Positioning of the XM70 infra-red source so that gunners must track the center of a target's mass.
4. A lower-cost TOW live-round simulator, similar to the LAW subcaliber 35-mm rocket.

TRAINING GUIDANCE

Q. What guidance have you received through directives, mission statements, or other documents pertaining to TOW training?

Q. Is your training program based primarily on unit contingency mission?

Q. Who establishes the TOW training schedule for your unit?

TRAINING GUIDELINES

Companies in V Corps had received the directive from corps headquarters to qualify all TOW personnel with the TOW trainer (XM70) every 30 days. As late as April 1976, this requirement had been reaffirmed by V Corps divisions. Other guidelines pertained to training to meet mission requirements.

Companies in VII Corps understood that they were expected by their division to qualify TOW gunners quarterly. A VII Corps infantry division letter established TOW training policies that required: (a) TOW squads to be trained in the techniques of fire, crew drill, and marksmanship as described in TC 23-23, (b) completion at least quarterly of Instructional Firing Tables 9-1 through 9-5 in TC 23-23, and (c) firing of the instructional firing tables with the blast simulator. This letter also required that the TOW launcher be canted about six degrees during target tracking exercises with the XM70 training set, urged prompt and proper maintenance of XM70s, and required that TOW personnel be trained in night firing to culminate in conduct of Familiarization Night Firing Table 9-6 in TC 23-23.

If there were other recent directives pertaining to TOW training they were not mentioned by the companies included in this survey.

CONTINGENCY MISSION TRAINING

Eight companies (89%) in each group said their TOW training is based primarily on unit contingency missions. In one battalion, the CSC TOW platoon leader said none of the companies trained on contingency missions, but the infantry company commander in that battalion said, "When I train we do but not when the men are trained by combat support."

All companies talked about their need to spend more time in GDP sectors to familiarize themselves with the terrain in relation to defense plans. Three companies mentioned spending weekends with TOW NCOs in GDP areas. A brigade commander said if he had the gasoline his brigade would do most of its training in GDP areas.

ESTABLISHERS OF TRAINING SCHEDULES

As Table 46 shows, most CSCs (67%) established their own TOW training schedules, but only two infantry companies (27%) did so.

Table 46

ORGANIZATIONS ESTABLISHING TOW TRAINING SCHEDULE

Organizations	Companies	
	CS	Inf.
Brigade, Battalion, and Company	---	11%
Brigade and Company	11%	---
Battalion and Company	11%	44%
Battalion	11%	22%
Company	67%	22%

One infantry company said brigade established semi-annual schedules, battalion the quarterly schedules, and that it controlled the monthly schedules. Five companies shared schedule control with their battalions, one shared with brigade, and three were controlled by their battalions.

The six CSCs that had company control were relied on by their battalions for the scheduling of all CSC TOW training in the local areas and the scheduling of all battalion TOW training in major training areas. In other words, the CSC platoon leaders in those battalions served, for TOW training, in the role of the assistant S3 for training.

As reported earlier, because of the unreliability of trainee availability none of the companies had an effective regular training schedule.

In one battalion, the S3 complained that all training was so dominated by brigade that no sooner had the battalion established a training program required by brigade then the program was drastically changed. The result, he said, was continual confusion and frustration.

TRAINING REFERENCE MATERIALS

Q. Which of these references (listed in Table 47) are you familiar with or have and use? Which do your TOW squads have?

As Table 47 shows, more infantry companies than CSCs had and used more references.

Table 47

TOW TRAINING REFERENCES -- FAMILIARITY, AVAILABILITY, AND USED BY COMPANIES

	Combat Support Companies				Infantry Companies			
	Only Familiar With	Have	Use	TOW Squads Have	Only Familiar With	Have	Use	TOW Squads Have
FM [illegible]	---	89%	78%	22	---	89	78	11%
FM 23-1	---	89%	89%	33%	---	56%	44%	56%
TM 9-1425-470-[illegible]	11%	89%	78%	11%	---	78%	78%	67%
TM 9-1425-470-ESC	11%	78%	78%	33%	---	89%	89%	56%
TM 6130-470-12	---	44%	44%	---	11%	44%	44%	22%
TM 9-6930-470-12	---	78%	78%	22%	11%	33%	33%	11%
TC 7-24	11%	67%	67%	---	22%	78%	78%	56%
TC 23-20 (Draft)	---	56%	44%	---	---	67%	67%	33%
TC 23-23 w/C1&C2	33%	56%	44%	11%	11%	78%	78%	44%
ST 7-193 FY75	22%	44%	44%	22%	11%	89%	78%	44%
USAREUR Pam. 30-60-11	22%	33%	22%	11%	11%	44%	44%	22%
TRADOC Training Bulletin #1	11%	56%	44%	11%	22%	44%	33%	11%
TRADOC Training Bulletin #2	22%	22%	11%	---	---	33%	33%	11%
TRADOC Training Bulletin #3	11%	22%	11	---	---	33%	33%	11%
TRADOC Training Bulletin #5	---	33	22%	---	---	22%	22%	11%
TRADOC Training Bulletin #8	--	33	22%	---	11%	11%	11%	11%
FM 71-1	11	---	---	---	11	33%	22%	22%
FM 71-2	11%	---	---	---	11%	22%	22%	11%

On the average, one infantry company had and used all the references, but all CSCs lacked two of them. Also, at least one CSC did not use 10 of the references it had, whereas at least one infantry company did not use four of its references. TOW Squads of the infantry companies had more of the references than did those of CSCs.

TRAINING PROGRAM DEVELOPMENT

RESOURCE MATERIALS

Q. Which of the references (in Table 47) did you use in developing your TOW training program? What did you get from each?

The researchers thought this question was fair, but none of the companies responded adequately. During interviews, most survey participants said in effect that the references used and the contents taken from each were those appropriate to the tasks to be trained. Those who used TC 23-23 (See Table 47) indicated it was their primary source, and those who used Draft TC 23-20 said they were pleased with it and planned to base more of their training on it. For tactics, TC 7-24 was mentioned by most companies which had it. Table 47 shows that all companies which had TC 7-24 also used it.

LESSON PLANS

Q. Have you prepared lesson plans? Please give us copies.

All CSCs and three (33%) infantry companies said they had prepared lesson plans, but only two CSCs and one infantry company showed samples. Neither of the CSC lesson plans were in accordance with FM 21-6, but those prepared by the infantry company were. The commander of this company said he had specific orders from his battalion commander to use FM 21-6 for the preparation and conduct of all training. Another infantry company commander said he used lesson plans from the "Fort Benning packet," but did not show them. When asked how he got those materials, he said a friend sent them to him. When a third CSC TOW platoon leader who said he had prepared lesson plans was pressed for copies he said, "I don have anything typed up. I'm more interested in what my guys do out there than I am in neatly typed lesson plans." All other CSC TOW platoon leaders said they were not immediately able to retrieve lesson plans from files--the personnel that knew the files were not available.

TRAINING METHODS AND TECHNIQUES

SQUAD PROFICIENCY

Q. For squad proficiency, how and where do you train?

Methods and locations of squad proficiency training were essentially the same for both groups of companies--instructor demonstrations and practical crew drill exercises in the garrison, local field, and major training areas. Most companies rotated members in the different squad positions. As already noted in Table 12, one CSC had never conducted crew drill.

GUNNERY

Q. In target engagement practice, what are the ranges of stationary and moving targets?

Q. Do moving targets move farther and nearer while traversing laterally? appear from cover? disappear intermittently behind terrain or other objects?

Q. During gunnery practice, do you fire small arms blank ammunition? use smoke? use artillery simulation? use TOW blast simulators?

Target Ranges

For gunnery training, according to Table 48, CSCs tracked targets at ranges from 200 to 2,750 meters and infantry companies at ranges from 300 to 3,000 meters.

Table 48

TOW GUNNERY TRAINING -- RANGES OF TARGETS

	Stationary Targets			Moving Targets		
	Ranges in Meters			Ranges in Meters		
Companies	Range	Mean	Median	Range	Mean	Median
CS	200-2,750	1,200	800	200-2,000	1,000	800
Inf.	1,000-2,000	1,200	1,100	300-3,000	1,400	1,000

Median ranges for infantry companies were 300 meters more for stationary targets, and 200 meters more for moving targets than for CSCs.

Target-Tracking Conditions

Overall, as Table 49 shows, more infantry companies than CSCs had variable moving-target and environmental conditions. But only five infantry companies (56%) and four CSCs (44%) had variable target conditions.

Table 49

TOW GUNNERY TRAINING CONDITIONS

	Moving-Target Conditions			Other Conditions			
Companies	Appear from Cover	Move Further and Nearer	Disappear Intermittently	Small Arms Fire	Smoke	Artillery Simulation	TOW Blast Simulation[a]
CS	44%	22%	44%	0%	0%	11%	100%
Inf.	56%	11%	56%	11	22%	22%	100%

[a]Only one CSC always fired M80 blast simulators and had 4,000 on hand. All other companies had an insufficient supply and fired them only while the supply lasted.

Apart from all companies firing TOW blast simulators when they had them, a maximum of two infantry companies (22%) and only one CSC (11%) had other environmental conditions.

REALTRAIN Device Used to Monitor Tracking

Q. Have you used or tried to use the REALTRAIN TOW--controller sighting device to evaluate TOW gunner tracking? If so, how well did it work?

One CSC (11%) and two infantry companies (22%) had attempted to use the REALTRAIN TOW--controller sighting device to evaluate gunner tracking. All these said, in effect, that it worked moderately well, and all doubted whether the judgment of a monitor (controller) would ever be accepted as reliable enough for the qualification of gunners. Three CSCs and two infantry companies that had not tried the device to evaluate gunner tracking thought it might work, but these also questioned the reliability of a human monitor. A company commander said strict rules for and training of monitors might make them acceptably reliable. A CSC and an infantry company said such an arrangement would not work well, because the monitor (controller) would interfere with the gunner.

LIVE-FIRING PROBLEMS

Q. Some say that TOW gunners tend to "fly" the live missile rather than concentrate on the target. What percent of your TOW gunners have this problem? How do you attempt to counter this tendency?

Most training personnel at division level thought gunner fascination with the missile was a prevalent problem, but only one company (infantry) thought it was serious and suggested (as mentioned earlier) that a film of a live missile down range taken through a TOW sight might be helfpul. All other companies said they overcame this tendency by continually reminding gunners to ignore the missile and concentrate on the target.

An infantry company commander, who claimed to have fired more TOW missiles than any other man in the Army, said intensive gunner concentration on the target is the key to successful gunner training. He said he had never failed to qualify a trainee as a gunner. "I do it," he said, "by repeating continuously in the trainee's ear, 'Concentrate, concentrate, concentrate', really concentrate for an hour with the XM70 and you'll be mentally exhausted, but you'll be a good gunner." This captain also said that at first he was strongly opposed to the XM70; now, he thinks it would be very difficult to produce a device that can equal it as a trainer of TOW gunners. He regrets that he does not have more ready access to an XM70 for his TOW squads.

TARGET IDENTIFICATION

Q. How do you use the media (listed in Table 37) in target identification training?

Q. How can target identification training be improved?

Use of Target-Identification Media

Most companies used projecturals, charts, and photographs in classroom situations and flash cards (if they had them) with small groups and individuals in the field. The most common specific technique was to point out and have trainees learn the distinctive characteristics of different targets--the suspensions, turrets, cupolas, main guns. Flash cards were also used to drill individuals as needed and to introduce competition within small groups.

Those who had plastic models used them in various terrain and defilade positions on sandtables or in local training areas. Trainees had to observe and identify the models by use of binoculars. One CSC placed the models on terrain at 85 meters and required identification of them through the TOW sight.

Improvement of Identification Training

To improve target identification training, most companies called for plastic models. Those who had some models wanted more and those who had none wanted all they could get. Most said they would use the models in local training areas in tactical situations. One CSC TOW platoon leader said models could be used best on sector terrain boards scaled to match the scale of the models.

An infantry company commander said the best way to improve target identification

training would be to show soldiers the real thing in tactical maneuvers or have films of enemy tanks or vehicles moving on terrain. Another thought actual-size silhouettes at long distances in training areas would be most helpful, and a third said American tanks and vehicles could be mocked-up to look like enemy targets and that kites for this purpose should be made available.

MULTIPLE-TARGET ENGAGEMENT

Q. How do you train for TOW engagement of multiple targets?

Six CSCs (67%) and seven infantry companies (78%) did not train at all for multiple target engagement.

One CSC showed target formations on a chalkboard and sandtable and discussed the problems and what should be done about them. Another said the only time they had dealt with mulitple targets was during an Army Training and Evaluation Program (ARTEP) exercise. Each TOW had its sector of fire, but if one did not see a target in its sector, others would alert it by radio or arm signal. The third said they had classroom sessions on target reference points and patterns of fire. The two infantry companies that said they trained on engagement of multiple targets also had classroom sessions on target reference points and patterns of fire.

RANGE ESTIMATION AND CARD PREPARATION

Q. How do you train for range estimation and range card preparation?

Range Estimation

Only two CSC and two infantry companies trained for range estimation. One of the infantry company commanders said it was not necessary for TOWs. If a target was close enough to recognize, he said, it would be within TOW range. The others said they had no time for it. In Table 12, these infantry companies indicated that they did train for range estimation.

Among those companies who trained, the football-field, telephone-pole, and finger methods were used, or maps were used for estimating or for verifying ranges estimated by other methods, mostly the latter. One CSC concentrated on teaching TOW squad members what 3,000 meters looks like on different kinds of terrain. Two companies used milspec binoculars. And the following methods were mentioned by one company each:

1. Distances from 1,000 to 4,500 meters were staked out for TOW gunners to estimate.

2. Range estimation verified by pacing the distance.

3. Terrain analysis to identify terrain features up to 3,000 meters.

Range Card Preparation

One CSC and two infantry companies did not train for range card preparation, but in Table 12 the infantry companies indicated that they did so.

All other companies used the same training methods--lecture and field practical exercises. Most of these companies said practice in range card preparation occured each time they went to the field.

TACTICAL TRAINING

Q. How do you conduct TOW tactical training?

Most of the eight companies in each group that had TOW tactical training had classroom

discussions and field exercises in major training areas. Four companies mentioned participation in battalion and company tactical operations during ARTEP exercises which involved defensive maneuvers in relation to aggressors.

COMBINED-ARMS OPERATIONS

Q. How often do your TOW squads train with other units or organizations (listed in Table 50)?

Q. How do you train TOW squads to coordinate with other units?

According to Table 50, at least one CSC and one infantry company trained often with other units: tanks, artillery, engineers, cavalry, but most companies in both groups seldom or never trained with other units or organizations.

Table 50

COMBINED ARMS TRAINING--FREQUENCY
OF TOW SQUAD TRAINING WITH OTHER GROUPS

		Other Units or Organizations					
Frequency	Companies	Tanks	Artillery	Engineers	Air Force	Cavalry	Air Cavalry
Often	CS	33%	11%	11%	---	11%	---
	Inf.	33%	11%	11%	---	11%	---
Seldom	CS	56%	11%	11%	---	11%	11%
	Inf.	56%	22%	33%	---	22%	44%
Never	CS	11%	89%	44%	78%	78%	56%
	Inf.	11%	67%	57%	100%	67%	89%

Seven CSC (78%) said most of their TOW training to coordinate with other units was done by attaching TOW squads to infantry line companies for field exercises. Seven infantry companies said most of their TOW squads had experience only with infantry units. However, most companies said again, as earlier, that only few company officers know what to do with TOWs.

PLANNED CHANGES IN METHODS AND TECHNIQUES

Q. Do you plan to make changes in your TOW training methods or techniques?

Five CSCs (56%) and three infantry companies (33%) said they planned changes in TOW training. The changes hoped for by the infantry companies were more target tracking, more target identification training, and "more of what we're doing only better." Two CSCs said they were ready to improve TOW training when better training aids and manuals become available, and a third planned intensive sector tactical training for NCOs.

One CSC had specific plans for a different method of TOW gunner training. As described by the TOW platoon leader, the plan was to set up a TOW combat theater that would have plastic tank models moving on HO tracks. These targets were to be set up in a scaled environment and tracked through TOW sights. All money for the project was to be contributed by TOW platoon personnel. Because of this uncertain financial arrangement the platoon leader, though optimistic, was not certain the idea could take actual form.

The fifth CSC had plans for a multiple-target tracking range. Although the land area had been approved, the TOW platoon leader said details had to be clarified and approved. Basically, the idea was to provide three targets moving simultaneously.

One target would be beyond 3,000 meters; another would appear from cover but disappear behind some obstacle before a TOW missile could reach it, and the third target would be both within range and vulnerable. Obviously, only those TOW squads which choose the vulnerable target would be correct--if they make hits.

PARTICIPATION IN REALTRAIN

Q. Do you have your REALTRAIN equipment?

Q. Have you trained controllers? If so, how many were trained by the Mobile Training Team? How many were trained by your own personnel?

Q. Have you conducted a REALTRAIN exercise involving your TOW crews? If so, do you plan to conduct another REALTRAIN exercise in 1976? If not, have you a REALTRAIN exercise planned for 1976?

At the time of the survey, six companies in each group (67%) had very recently received their REALTRAIN equipment, and the remaining companies were expecting it.

Four CSCs (44%) and six line companies (67%) had REALTRAIN controllers trained by the TRADOC Mobile Training Team, but only one CSC and two line companies had trained additional (second generation) controllers. (See Table 51.)

Table 51

NUMBER OF REALTRAIN CONTROLLERS TRAINED BY THE MOBILE TRAINING TEAM AND WITHIN COMPANIES

	Trained by Mobile Training Team				Trained Within Companies			
Companies	Total	Range	Mean	Median	Total	Range	Mean	Median
CS	7	0-2	1	0	10	0-10	1	0
Inf.	16	0-6	2	1	11	5-6	1	0

TOW squads of three CSCs (33%) and four infantry companies (44%) had participated in the REALTRAIN exercises conducted by the TRADOC Mobile Training Team. Two of these CSCs and three of the infantry companies planned to participate in another REALTRAIN exercise during the remainder of 1976. Of those companies whose TOW squads had not been involved in REALTRAIN exercises, four CSCs (44%) and three infantry companies (33%) planned to participate in a REALTRAIN exercise during the remainder of 1976.

ANNEX 1

TOW AND DRAGON TRAINING
USING THE BESSELER CUE SEE DEVICE
AS SUGGESTED BY
AN ASSISTANT DIVISION G3

ATSH-ATF

TOW and Dragon Training Using the Besseler Cue See

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CPT Lewis Orus (Rm 310A)

C, ATF

22 Jul 76
CPT Guthrie/fmg/545-2021

1. Purpose: The purpose of this DF is to propose an idea for the training of TOW and Dragon gunners to acquire and track targets by use of the Besseler Cue See.

2. Background: Although the TOW and Dragon weapon systems are simple to operate, the acquiring and remaining of gunner tracking proficiency requires considerable training as well as associated resources (time, facilities, personnel, and equipment). Existing TOW/Dragon training devices (the M70 and the LETS) are among the best devices available; nevertheless, they require range facilities, target vehicles with an IR source, personnel, troop movement time, etc. This proposal deals with using the TOW or Dragon sight and the Besseler Cue See for tracking practice and thereby allowing for economic indoor practice.

3. Concept: Use the TEC program's hardware (8 per test battalion) to display armored vehicles moving cross-country (out of woodlines, through rubble, over rolling terrain, with front, side and oblique views of multiple targets). The displayed targets would be tracked by the gunner using the actual TOW or Dragon sight or a model of the sight. More specific factors of the concept are as follows:

a. Use the Besseler Cue See or TV cassette player.

b. Display mvoing targets.

(1) For TOW: 2,000 - 3,000 meters.

(2) For Dragon: 200 - 1,000 meters.

c. Each film clip needs to run for:

(1) TOW: 20 - 30 seconds.

(2) Dragon: 10 - 20 seconds.

d. Ten to twenty different film clips need to be used for variety and to prevent gunners from memorizing the tapes.

e. Models of Soviet armored vehicles moved about on a terrain board would add realism to the exercise and provide target recognition practice if desired.

f. Smoke, dust, artillery fire, main gun firing would add realism for the gunner.

g. Soviet doctrine could be displayed (long and short halts, reconnaissance vehicles appearing first, followed by tanks, etc.).

h. The film clips would not require sound tracks although a pulsed tape is required to advance the radio cassette. "Battle sounds" of tanks and explosives could be used in conjunction with fire commands appropriate to each film clip.

4. Unresolved Questions:

a. The actual TOW or Dragon sight might be used with or without the entire weapon system. If the sight only is used, a pedestal might have to be devised on which to mount the sight.

b. A plastic model of the TOW or Dragon sight may have to be manufactured. If so, the model TOW sight should duplicate the T&D aspect of the acuual TOW sight; the eye piece would have to be the same as would the safety lens and the trigger.

c. Dependent on the distance between the Besseler Cue See screen and the sight, a hood from the sight to the screen may be used to reduce outside light thus making the image brighter.

d. TOW crew drill could be conducted if the entire weapon system is used.

e. It may be possible to use the M70 training device for scoring purposes but this is a highly technical problem--the M70 responds to corrections made in reference to the IR source. Whether the displayed target can emit an IR source is questionable and, I suspect, impractical. Nevertheless, at the end of a tracking exercise the grader can look through the sight to determine if it is on target.

f. The development of a model sight offers two distinct advantages. First, the sight could have two eyepieces--one for the gunner and one for the grader (or for a TV camera). Second, the sight could have clear glass lens for observing the display screen; the film clip would have to be produced using a 35mm lens comparable to the optic power of the TOW or Dragon sights.

5. Should you find this proposal worthy of further study and desire additional information, please contact me.

C.B. GUTHRIE
Captain, Infantry
Antiarmor Task Force

APPENDIX B

SUMMARY OF LAW INTERVIEW AND QUESTIONNAIRE DATA

CONTENTS

APPENDIX B

SUMMARY OF LAW INTERVIEW AND QUESTIONNAIRE DATA

This appendix contains the questions from the LAW Training Questionnaire and information gathered from the questionnaire and follow-up interviews.

LAW TRAINING HISTORY

TRAINEE AVAILABILITY

Training Time Lost

Q. When you last conducted LAW training, what percent of LAW personnel were unavailable for training?

Battalion S3s said more personnel lost LAW training time than did company commanders. As Table 1 shows, S3 estimates of trainee absenteeism ranged from zero to 90 percent.

Table 1

LAW TRAINING -- PERCENT OF PERSONNEL UNAVAILABLE WHEN TRAINING WAS LAST CONDUCTED

	Percent Personnel Unavailable		
Respondents[a]	Range	Mean	Median
Bn S3s	0-90%[b]	22%	10%
Inf. Cos	0-60%	13%	6%

[a] Bn S3s - N = 7 (One did not know.)
Inf. Cos - N = 18 (Three did not know.)

[b] Zero percent means all personnel were available.

Estimates by company commanders were from zero to 60 percent. Median estimates of LAW training time lost were 10 percent per battalion and six percent per company.

Lost time was accounted for by temporary detail to other duties, extended assignment to other duties, medical and dental appointments and drug and alcohol abuse counseling (CDAAC), and by education, race relations classes, language classes, etc.

Assignment to Other Duties

Q. On any particular day, what percent of your personnel are likely to be temporarily assigned to other activities? What percent are extensively assigned to other duties?

[illegible] shows the percentages of personnel assigned to other duties.

Table 2

PERCENT OF PERSONNEL ASSIGNED TO OTHER DUTIES

Respondents[1]	Temporarily Detailed			Indefinitely Detailed		
	Range	Mean	Median	Range	Mean	Median
Bn S3s	0-35%	18%	15%	0-2%	0.4%	0%
Int Cos	5-95%	28%	20%	0-5%	1.0	0%

[1]Bn S3s - N = 6 (Two did not know)

Int Cos - N = 17 (Four did not know)

The median percentages of personnel temporarily assigned to other duties were estimated at 15 percent by S3s and 20 percent by companies. The median percent of personnel indefinitely assigned to other duties, as estimated by both S3s and companies, was zero. The mean percentages, however, were four-tenths of one percent for S3s and one percent for companies.

Although indefinite assignments were minimal, all respondents said temporary details and other factors hamper personnel availability for training.

An S3 said, "Too much time is taken for CDAAC, education, and erratic medical and dental appointments. We also have men who've never been to the field, even platoon sergeants and squad leaders; they're kept on temporary medical exemption. And the battalion must support the installation 60 days a year. These and other things keep men unavailable. The most we've ever had in the field is 70 percent of the battalion."

A company commander said, "You'd have to spend time with me to realize the problem. Every day it's details and more details -- driver reassignments, battalion patrol, painters, [illegible] cutters, blood donors, can-do travel, etc., etc., etc. If I could ever get all my personnel together for several days, we'd get some training done." Another said, "In the past 18 months, the skill of my personnel had deteriorated. If we could get one week once a while dedicated to LAW training in the local area we might be all right. We can't, as scheduled details prevent that." A third stressed the bother of unscheduled demands. He said, "Appointments, school, community facility time schedules and such other things are not coordinated with unit training."

[illegible] Exercising LAWs

. Did each soldier in your unit receive LAW training during basic combat training?

As Table 3 shows, six battalion S3s (75%) and five company commanders (24%) did not know whether the soldiers in their units had received LAW training during BCT.

Table 3

PERCENT RESPONDENTS INDICATING WHETHER SOLDIERS WERE TRAINED IN LAW DURING BCT

Respondents	Trained in Law During BCT		
	Yes	No	Did Not Know
Bn S3s	12%	12%	75%
Inf Cos	48%	28%	24%

Only one S3 (12%) and 10 companies (48%) said their soldiers had received such training.

THE MOST RECENT TRAINING

Q. How long has it been since you last conducted LAW training? Where was it conducted? How was it conducted? How many men were trained?

Months Since Last Training

As Table 4 shows, the time since units had conducted LAW training ranged from one to 10 months, but most training had been done within the last three months.

Table 4

PERCENT RESPONDENTS INDICATING MONTHS SINCE UNITS CONDUCTED LAW TRAINING

Respondents	Number of Months						
	1	3	5	6	9	10	Did Not Know
Bn S3s	25%	38%	---	12%	---	12%	12%
Inf Cos	38%	33%	5%	5%	5%	---	14%

One S3 (12%) and three company commanders (14%) did not know when they last conducted LAW training.

Training Locations

The most recent LAW training had been conducted at major training areas by 88 percent of battalions and 43 percent of companies. The remaining companies that responded (43%) had trained in garrison.

Conduct of Training

The S3s and companies that had conducted the most recent training at MIAs said the

training consisted of EIB tasks and live firing. Three of these companies (14%) had employed tank hunter-killer team concepts. The training done in garrison was on operation and misfire procedures, firing positions, and aiming.

Number of Men Trained

Only four S3s (50%) and six company commanders (29%) recalled the number of men trained at MTAs. The number trained in battalions ranged from 20 to 400 men. The median number was 250. In companies, the number ranged from 15 to 100 men. The median number per company was 45.

In garrison, the number of men trained in companies ranged from 15 to 100. The median number was 65.

TRAINING FREQUENCY

General Training Frequency

Q. In general, how often do you conduct LAW training?

Seven S3s (87%) and 18 company commanders (86%) indicated general LAW training frequency. As Table 5 shows, most S3s and commanders said they trained quarterly.

Table 5

GENERAL LAW TRAINING FREQUENCY

Respondents	Period[a]				
	M	Q	SA	A	Did Not Know
Bn S3s	25%	63%	---	---	12%
Inf Cos	5%	57%	14%	10%	14%

[a] M = Monthly, Q = Quarterly, SA = Semi-Annually, A = Annually

Two battalions (25%) and one company (5%) trained monthly. Also, three companies (14%) trained only semi-annually, two (10%) annually.

Specific-Task Training Frequency

Q. How often do you train on the tasks (listed in Table 6)?

The tasks listed in Table 6 were taken from the LAW training program in Draft TC 23-20.

The "No Response" column in Table 6 shows that three battalion S3s (38%) declined to indicate training frequencies on all tasks; they could not be that specific about any of them.

Table 6

LAW TRAINING -- FREQUENCY AND ANNUAL HOURS SPENT ON SPECIFIC TASKS

Training Tasks	Respondents	Training Frequency[a] M	Q	SA	A	N	No Response	Total Annual Hours/Task Range	Mean	Median	Percent Respondents
LAW safety & misfire procedures	Bn S3s	12%	38%	12	---	---	38%	4-32	11	4	50%
	R. Cos	19%	28%	24%	14%	---	15%	1-36	10	8	62%
Study of LAW tactical employment	Bn S3s	38%	12%	---	12	---	38%	4-96	34	18	50%
	R. Cos	14%	43%	24%	10%	---	10%	1-36	8	5	67%
Study of LAW firing positions	Bn S3s	25%	25%	12%	---	---	38%	4-96	25	8	62%
	R. Cos	10%	52%	19%	5%	5%	10%	2-36	7	4	62%
Study of LAW aiming techniques	Bn S3s	12%	38%	12%	---	---	38%	1-96	23	4	62%
	R. Cos	5%	57%	19%	5%	5%	10%	1-8	4	4	62%
Target Identification	Bn S3s	25%	12%	12%	12%	---	38%	2-96	28	12	62%
	R. Cos	24%	28%	33%	5%	---	10%	2-24	7	5	67%
Range Estimation	Bn S3s	---	62	---	---	---	38%	8-16	11	8	62%
	R. Cos	---	24%	38%	19%	---	19%	1/2-10	4	4	57%
Engagement of single stationary target	Bn S3s	---	50%	---	---	12%	38%	2-16	6	4	50%
	R. Cos	---	28%	19%	19%	19%	15%	1/2-8	4	4	43%
Engagement of multiple stationary targets	Bn S3s	---	12%	---	---	50%	38%	2-2	2	2	12%
	R. Cos	---	14%	33%	24%	14%	15%	1/2-6	3	3	57%
Engagement of single moving target	Bn S3s	---	12%	---	---	50%	38%	2-2	2	2	12%
	R. Cos	---	10%	10%	14%	48%	19%	1-6	3	3	19%
Night target engagement	Bn S3s	12%	12%	---	12%	25%	38%	1/2-12	7	8	38%
	R. Cos	---	10%	14%	---	57%	19%	2-4	3	3	10%
Field tactics	Bn S3s	50%	---	---	---	12%	38%	10-140	80	36	50%
	R. Cos	33%	38%	5%	10%	---	15%	4-180	41	9	48%

M = Monthly, Q = Quarterly, SA = Semi-Annually, A = Annually, N = Never

For the same reason, from two (10%) to nine (19%) company commanders declined to state training frequencies on various tasks.

The least training was represented by one S3. His battalion never trained on five of the eleven tasks listed in Table 6. Among companies, the least training was indicated by two commanders. They never trained on four tasks.

Specifically among battalions, one (12%) had never engaged multiple stationary targets or trained in field tactics; two (25%) had never engaged targets at night; and four (50%) had never engaged multiple stationary targets or a single moving target.

Among companies, three (15%) had never engaged multiple stationary targets; four (19%) had never engaged a single stationary target; ten (48%) had never engaged a single moving target; and twelve (57%) had never engaged targets at night.

As to training frequency, S3s and commanders indicated that most training on the first five tasks and the last one in Table 6 was done monthly or quarterly. On the remaining five tasks, most training was done quarterly or semi-annually. Two companies (10%), however, trained on all tasks only annually.

According to Table 5, no battalion conducted LAW training semi-annually or annually, but according to Table 6, some did so on some tasks.

TARGET IDENTIFICATION

Q. What percent of target identification training time do you spend on these target

categories: (a) tanks and vehicles, (b) aircraft, and (c) weapons, equipment, and personnel?

Q. What are the real requirements for target identification? Should soldiers be able to recognize tanks, vehicles, and weapons of both friend and foe? Should they also know model numbers?

Time Spent on Target Categories

Table 7 shows the percentages of target identification training spent on target categories. According to the table, commanders estimated more time spent on tanks and vehicles than did battalion S3s. Both companies and battalions spent about the same time on enemy and friendly aircraft, but both groups spent more time on enemy targets in the other two categories.

Table 7

TARGET IDENTIFICATION -- PERCENT OF TRAINING BY CATEGORIES

Targets		Respondents					
		Bn S3s			Inf Cos		
		Range	Mean	Median	Range	Mean	Median
Tanks & Vehicles	Enemy	25-70%	42%	30%	18-75%	39%	40%
	Friendly	10-30%	18%	15%	6-50%	19%	15%
Aircraft	Enemy	0-25%	9%	10%	0-25%	8%	10%
	Friendly	0-20%	8%	10%	0-15%	7%	10%
Weapons/Equipment/ Personnel	Enemy	0-10%	14%	20%	0-75%	19%	20%
	Friendly	0-25%	9%	5%	0-25%	8%	10%

Target Identification Requirements

Five S3s (62%) stated target identification requirements. All agreed that soldiers must recognize both enemy and friendly targets, but two said it is also vital to go beyond recognition of forms. One said, "Enemy tanks are harder to recognize than enemy vehicles. We require soldiers to learn both the characteristics and model numbers to be sure that something is retained." The other said, "It's essential that soldiers know the characteristics and points of weakness of enemy targets."

Thirteen company commanders (62%) stated target identification requirements. Of these four (18%) said only recognition of enemy targets should be required. But one (5%) said they must know enemy targets thoroughly --tanks, personnel carriers, weapons, trucks, uniforms, and aircraft.

Nine commanders (43%) said it is essential to recognize both friend and foe. One of these added, "Soldiers must be able to distinguish between enemy and friendly silhouettes, wheel suspensions, and tank turrets." Another said, "At the barest minimum we must be able to say, 'That's a Russian tank, a British tank, a German tank, or whatever."

FIRING OF FAMILIARIZATION TABLES

Q. Do you fire the LAW familiarization tables that are in the field manual? If not, what are your reasons?

One S3 (12%) and three company commanders (14%) said their units fire the LAW familiarization tables. Three S3s (38%) and seven commanders (33%) indicated unawareness of them. Among the remainders in both groups, the following reasons for not firing the tables are given below in order of the number of times they were mentioned:

1. Inadequate range (nine respondents - 31%)
2. Insufficient ammunition (seven respondents - 24%)
3. Inadequate targets (two respondents - 7%)
4. No live-fire training (one respondent - 3%)

TRAINEE EVALUATION

ESTIMATED FIRING EFFECTIVENESS

Q. Under actual battle conditions, please estimate the average probabilities that your LAW personnel would get first- and second-round hits on moving targets (at the ranges shown in Figures 1 and 2).

The estimates of LAW firing effectiveness made by battalion S3s and company commanders are plotted in Figures 1 and 2. Figure 1 shows the first-round hit probabilities, and Figure 2 shows the second-round hit probabilities.

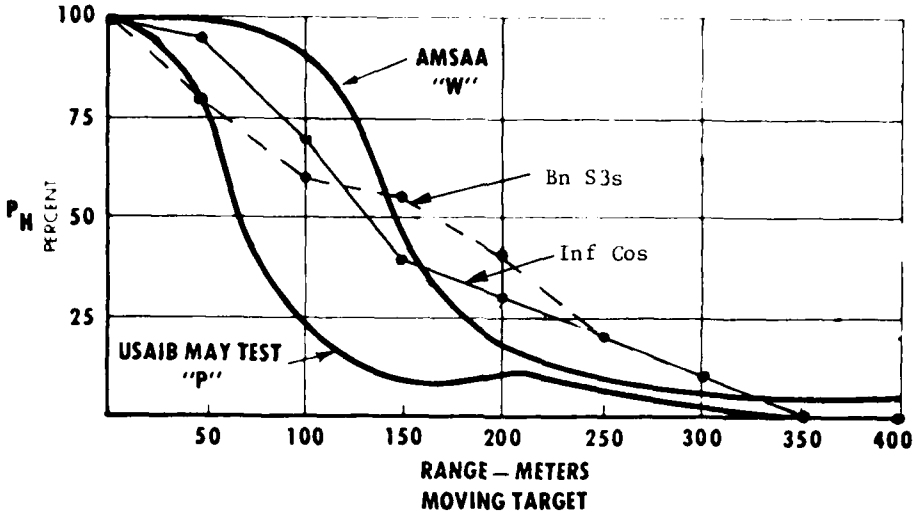

Figure 1. Estimates of First-Round Hit Probabilities

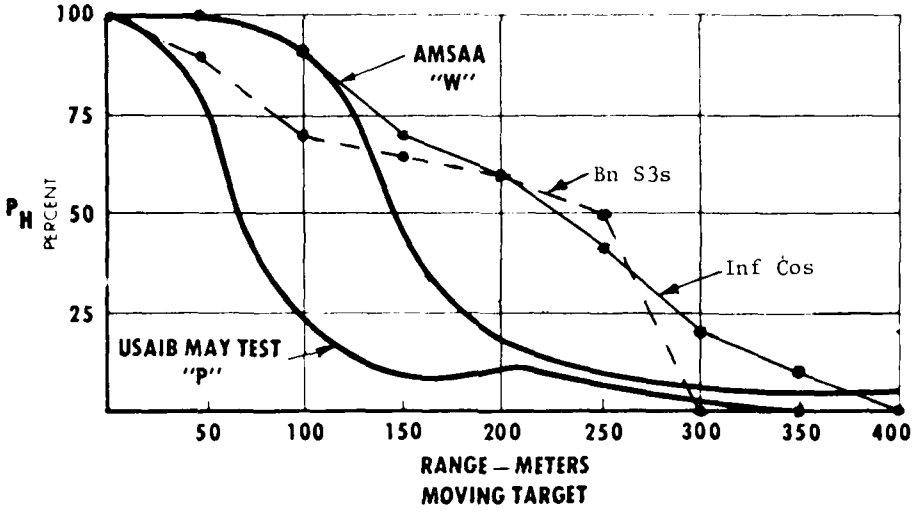

Figure 2. Estimates of Second-Round Hit Probabilities

The graph design in both figures was taken from TRADOC Bulletin 5, together with the AMSAA and USAIB May Test curves, shown in heavy lines in both figures.

The AMSAA curve in the figures shows expected LAW-firing performance against moving targets. The USAIB May Test curve shows the actual live-firing performance of soldiers randomly selected for LAW training and testing at Fort Benning. As stated in TRADOC Bulletin 5, "These soldiers probably received the best training the Army could provide and their firing results represent an optimistic view of soldier capability Army-wide."

As both Figure 1 and Figure 2 show, the respondents in this survey believed that LAW personnel could fire better than the soldiers actually fired in the USAIB May Test. They also believed that with first rounds (Figure 1) their personnel would do better than AMSAA expectations at ranges from 150 to 300 meters. With second rounds, company commanders thought their personnel would match AMSAA expectations at 50 to 100 meters and greatly exceed them at ranges from 150 to 350 meters. Battalion S3s were less optimistic but believed their gunners would far exceed AMSAA expectations at ranges from 150 to 250 meters.

EVALUATION CRITERIA

Q. *What measures of effectiveness or criteria do you use to evaluate the proficiency of LAW personnel? Please list in order of priority.*

Six battalion S3s (75%) and 17 company commanders (81%) listed at least one criterion. Most listed five criteria in order of priority. The number that did not list five criteria are shown at the bottom of Table 8.

Table 8

LAW EVALUATION CRITERIA -- PERCENT RESPONDENTS WHO LISTED THEM BY PRIORITY

Evaluation Criteria	Battalion S3s[a] Priority					Company Commanders[b] Priority				
	1	2	3	4	5	1	2	3	4	5
Ability to hit target (live round)	25%	12%	---	12%	---	43	12%	5	---	---
Ability to hit target (35 mm subcaliber)	---	---	---	---	---	---	14%	---	---	---
Ability to hit target (at vulnerable point)	---	---	---	---	[illegible]	5%	---	---	---	---
Ability to put LAW into operation	25%	---	12%	---	---	10%	5%	19	---	---
Ability to put LAW into operation immediately	---	---	---	---	---	10	19	[illegible]	5	5
Ability to take LAW out of operation	25%	---	12%	---	---	10%	5	19	---	[illegible]
Assembly (not refer to knowledge)	---	---	12%	[illegible]	---	5%	5	5	[illegible]	[illegible]
Correct firing positions	---	---	12%	---	[illegible]	---	[illegible]	---	5	[illegible]
Correct trigger squeeze firing	---	---	---	12%	[illegible]	---	14	---	---	[illegible]
Fire control commands	---	---	---	---	[illegible]	[illegible]	---	[illegible]	[illegible]	[illegible]
Gunner responsiveness to commands (controlability)	---	---	---	---	---	---	[illegible]	---	[illegible]	[illegible]
Knowledge-weapon capabilities limitations	---	[illegible]	---	---	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Knowledge-methods of engagement	---	---	12%	---	---	[illegible]	[illegible]	---	---	[illegible]
Misfire procedures	---	---	---	---	---	---	[illegible]	[illegible]	[illegible]	[illegible]
Proper pair and volley fire	---	---	---	---	[illegible]	---	[illegible]	[illegible]	[illegible]	[illegible]
Rate of fire	---	---	---	---	---	---	[illegible]	[illegible]	[illegible]	[illegible]
Range estimation	25%	[illegible]	---	---	---	---	[illegible]	[illegible]	[illegible]	[illegible]
Range estimation (speed of)	---	[illegible]	---	[illegible]	---	---	---	[illegible]	[illegible]	[illegible]
Selection of firing positions	---	---	---	---	---	---	---	[illegible]	[illegible]	[illegible]
Tactical employment	---	---	---	---	[illegible]	---	[illegible]	[illegible]	[illegible]	[illegible]
Target identification	---	---	---	---	---	---	[illegible]	[illegible]	[illegible]	[illegible]

[a]Two Bn S3s did not respond; one listed only one criterion; one listed only two criteria.

[b]Four Int. Cos did not respond, one listed only one criterion; three listed only two, one listed only three, three listed only four.

Table 9 was prepared to make it easier to note percentages of companies that listed each criterion, so the percentages shown in Table 9 are without regard to priority.

Table 9

LAW EVALUATION CRITERIA -- PERCENT RESPONDENTS
WHO LISTED THEM (SHOWN WITHOUT REGARD FOR PRIORITY)

Evaluation Criteria	Bn S3s	Inf. Cos
Ability to hit target (live round)	50%	57%
Ability to hit target (35-mm subcaliber)	---	14%
Ability to hit target (at vulnerable point)	---	5%
Ability to put LAW into operation	38%	33%
Ability to put LAW into operation immediately	---	43%
Ability to take LAW out of operation	38%	33%
Aiming (sight reticle knowledge)	25%	19%
Correct firing positions	25%	5%
Correct trigger squeeze/firing	12%	14%
Fire control/commands	12%	---
Gunner Responsiveness to commands (controlability)	---	5%
Knowledge-weapon capabilities/limitations	12%	14%
Knowledge-methods of engagement	12%	---
Misfire procedures	---	10%
Proper pair and volley fire	12%	5%
Rate of fire	---	5%
Range estimation	38%	24%
Range estimation (speed of)	12%	---
Selection of firing positions	---	5%
Tactical employment	12%	14%
Target identification	---	19%

Ability to hit a target, either with a live round or a 35-mm subcaliber rocket, was listed by 19 respondents -- four battalion S3s (50%) and 15 company commanders (71%) -- but this criterion was given first priority by only two S3s (25%) and nine commanders (43%). One commander (5%) gave first priority to ability to hit a target at a vulnerable point.

Ability to put the LAW into operation and take it out of operation was listed by ten respondents -- three S3s (38%) and seven commanders (33%). Two S3s (25%) and two commanders (10%) gave these criteria first priority. Ability to put the LAW into operation immediately was listed by an additional nine commanders (43%), two of which (10%) gave it first priority.

Range Estimation was listed by eight respondents -- three S3s (38%) and five commanders (24%), but only two S3s (25%) gave it first priority.

Aiming -- sight reticle knowledge was listed by six respondents -- two S3s (25%) and four commanders (19%), but only one commander gave it first priority.

None of the other criteria listed in Table 8 not mentioned here were of first priority.

LAW TESTS

Q. What tests or examinations pertaining to the LAW do you administer?

Seven battalion S3s (87%) responded. Six listed the EIB test administered annually. The other said his battion, once each quarters, used a tactial employment check list and a LAW operation performance test with a go/no-go criterion.

Eight company commanders (38%) administered no LAW test. Among the remainder, six (29%) mentioned EIB test administered annually, one (5%) the EIB test administered semi-annually. Three (14%) administered performance tests before live-firing on LAW activation, misfire, and firing procedures. Of the remaining three commanders (14%), one mentioned a target identification test, another an aiming test (using the sight template) and a range estimation test, and the third said MOS tests were administered after LAW training.

TRAINING CONSTRAINTS

TRAINING TIME

Q. What are the total hours scheduled per year for LAW training?

Q. What was the total number of hours spent on the tasks (listed in Table 6) during the past 12 months?

Q. By what percent would you like to increase or decrease the time spent on the following categories: (a) subcaliber firing, (b) live-firing, (c) tactics, (d) other?

Time Estimates

Although seven battalion S3s (87%) and 18 company commanders (86%) were persuaded to estimate the total annual hours spent, overall, on LAW training, three battalion S3s (33%) and seven company commanders (33%) refused to estimate the annual time spent on any specific task (Table 6). They said LAW training is so integrated with other infantry training that it would be impossible to give accurate estimates. The "Percent Respondents" column in Table 6 shows that among those who attempted to cooperate, some declined to estimate time spent on some tasks they said they trained on.

Total Annual Hours

Total annual hours spent on LAW training, as first estimated overall and as estimated a second time in relation to specific tasks (Table 6), are shown together in Table 10.

As Table 10 shows, the second time estimates by both S3s and commanders were more than double their first estimates. Also, the estimates of S3s, both the first and second time, were twice as large as those of commanders.

Table 10

LAW TRAINING -- TOTAL ANNUAL HOURS

	Time Estimates[a]	Annual Hours			
		Range	Mean	Median	Percent Respondents
Bn S3s	First	12-96	45	42	87%
	Second	40-704	229	106	50%
Inf. Cos	First	4-44	23	22	86%
	Second	16-354	94	52	48%

[a]First time estimates were given for all LAW training. Second time estimates were made later in the training questionnaire on specific tasks listed in Table 6.

As intimated earlier, both groups had more confidence in their first time estimates than in the second, but they also had little confidence in the first.

Insufficient Training Time

As can be inferred from the problem of trainee availability discussed earlier, time for training is insufficient. But another aspect of the time problem was stressed by company commanders. Most mentioned in one way or another what one called "unreasonable" demands on their time. Another expressed the general feeling, "You name it, we get it. Spend two hours with me and you'll see crisis management in action. Be sure to come early in the morning and stay for the last two hours of any day. Then stay two more hours and you'll see how we have to juggle the unexpected -- over-commitments or last minute demands never listed on any time schedule. We're split several directions every day, not only with priority projects but with just plain reaction without planning or direction. So there's no time to train, and not just for LAW alone." A third, after commenting on demands that take his time, said, "Training the soldier is almost always the last priority."

A battalion commander said, "The job of company commander in USAREUR has to be the toughest job anywhere. It's harder here to manage a company than it is a battalion. Nowhere else in the Army do you have to have a huge guide for company commanders."

Desire to Increase or Decrease Training Time

Table II shows the percentages of respondents who wanted to increase, decrease, or maintain training time in each of four categories: subcaliber firing, live firing, tactics, and other. The "other" category includes tasks listed in Table 6 in addition to the three categories listed in Table II.

[illegible]

	Subcaliber Firing				Live Firing				Tactics				Other			
Response	Sample (%)	Median (%)	Mean (%)	Range (%)	Sample (%)	Median (%)	Mean (%)	Range (%)	Sample (%)	Median (%)	Mean (%)	Range (%)	Sample (%)	Median (%)	Mean (%)	Range (%)
Increase	38	25	31	5-100	75	25	28	5-200	38	35	35	5-100	12	25	25	5-50
	90	25	31	5-100	90	200	83	5-200	25	40	40	5-75	14	30	30	5-50
Decrease	5	50	50	50-50	5	50	50	50-50	25	12	12	5-20	12	50	50	50-50
	5	50	50	50-50	5	50	50	50-50	5	50	50	50-50	14	50	50	50-50
No change	33				5				38				75			
	5				5				70				71			

Subcaliber Firing. As Table II shows, five battalion S3s (62%) and 14 company commanders (62%) wanted to increase subcaliber firing. The range of desired increase was 25 to two percent. One commander (5%) wanted to decrease it; he thinks the time and money should be spent on live firing. One-third of all respondents wanted no change.

Live Firing. Six S3s (75%) and 19 commanders (90%) wanted to increase live-firing, some up to 200 percent. But the median increase desired per battalion was 25%, and per company, 28 percent. Two S3s (25%) and two commanders (10%) wanted the amount of live firing unchanged.

Tactics. Three S3s (38%) and one-fourth of commanders wanted to increase tactics to median 35 percent. Two S3s (25%) and one commander (5%) wanted tactics decreased 12 percent and 50 percent respectively. But 38 percent of S3s and 70 percent of commanders wanted time spent on tactics unchanged.

Other. Most S3s and commanders wanted time spent on other LAW training tasks unchanged. One S3 (12%) and three commanders (14%) wanted it increased somewhat, and two S3s (25%) and three commanders (14%) wanted time on other tasks decreased a median 50 percent.

TRAINING PERSONNEL

a. Who conducts LAW instruction in your unit?

b. How many of these personnel do you have: (a) principal (officer) trainers, (b) NCOIC (assistant trainers), (c) NCO (assistant trainers)?

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THE STATUS OF INFANTRY TOW, LAW, AND DRAGON TRAINING IN USAREUR--ETC(U)
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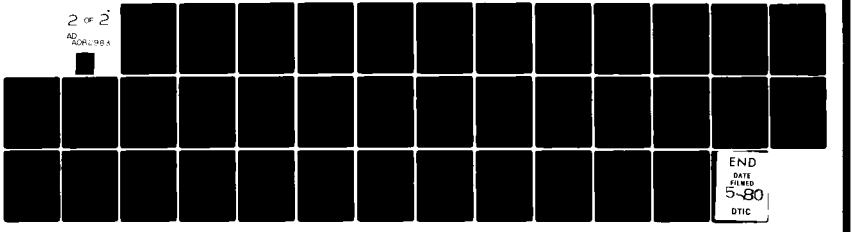

Conductors of Training

As Table 12 shows, most company commanders (52%) said LAW training was conducted by both officers and NCOs; in 38 percent of companies it was conducted only by NCOs. Most battalion S3s (63%) thought it was conducted by both officers and NCOs, and 25 percent said it was done only by NCOs.

Table 12

THOSE WHO CONDUCT LAW TRAINING,
PERCENT OF RESPONDENTS INDICATING RANK OR GRADE

	Rank or Grade		
Respondents	Officers & NCOs	NCOs Only	No Response
Bn S3s	63%	25%	12%
Inf Cos	52%	38%	10%

Number of Training Personnel

At Table 13 shows, most companies (71%) had one principal (officer) trainer; one (5%) had two; another (5%) had three. Of the five battalion S3s who responded, all (62%) said there was one principal trainer.

Table 13

LAW TRAINING PERSONNEL -- PERCENT
OF RESPONDENTS INDICATING NUMBER OF EACH TYPE

Respondents	Number	Training Personnel: Principal Trainers (Officers)	NCOIC Asst. Trainers	NCO Asst. Trainers
Bn S3s	1	62%	38%	---
	2	---	---	---
	3	---	12%	12%
	4	---	12%	38%
	5	---	---	12%
	NR[a]	38%	38%	38%
Inf. Cos	0	---	5%	5%
	1	71%	52%	5%
	2	5%	14%	5%
	3	5%	5%	33%
	4	---	5%	5%
	5	---	5%	10%
	6	---	---	5%
	9	---	---	5%
	10	---	---	5%
	30	---	---	5%
	NR	19%	14%	19%

[a]NR = No response.

The number of NCOIC assistant trainers in companies ranged from zero to five. Most (52%) had only one. Three S3s (38%) said there was one; one (12%) said three; another (12%) said four.

The number of NCO assistant trainers in companies ranged from zero to 30. Seven companies (33%) had three. The median number per company was four. Most S3s who responded (38%) said there were four.

All S3s who did not respond (38%) said they did not know the number of training personnel in any category. The commanders who did not respond said they were uncertain of the number.

RANGE FACILITIES

Q. Do you have a LAW live-firing range? If so, is it adequate for LAW training?

Only two battalion S3s (25%) had a live-fire range. Five (62%) said they could fire only at MTAs. One (5%) said his battalion had not been firing the LAW.

All S3s said ranges available to them were inadequate for one or more of the following reasons: "The range impinges on the tank range, and we aren't given enough priority"; "We can't fire at night"; "There's only one firing point, and we can't integrate other fires"; "All targets are stationary."

One S3 commented on several range problems. "Our local area", he said, "isn't large enough for a whole company, and at MTAs we get only very short periods when we are in control. In one MTA, I have to work with strange ranges and must tailor our needs to fit them rather than work on some of our major problems. And we don't get enough time. Division takes three weeks to test us, which is more than we get to train, so we're pretty well stymied".

Another S3 said, "Up there the range is completely controlled by Germans. We have to get permission for everything. We actually spend more time working with range control than we spend working with the battalions".

Sixteen company commanders (76%) had LAW firing ranges, but 13 of the ranges (62%) were at MTAs. As to range adequacy, nine (43%) said adequate; seven (33%) said inadequate, for one or more of the following reasons: "The maximum range is too short to get the target moving fast enough within the safety area"; "No moving targets"; "Too many MTA scheduling problems"; "Too many safety restrictions"; "It's too far away".

TRAINING EQUIPMENT

The lists of training equipment in this section were taken from the LAW training program in Draft TC 23-20.

Q. Do you have one expended LAW per firing point? One M190 subcaliber device per firing point? One LAW front sight template per student? One actual front sight per platoon? How many of each of these do you have?

Expended LAWs

One battalion S3 said there were enough expended LAWs in his unit for all firing points but said there were only three in the battalion. The two company commanders interviewed in that battalion said they each had 10. Another S3 said there were only four in his battalion and not enough for each firing point. The two commanders in that battalion had 33 between them. Two S3s and one commander did not know how many they had.

Overall, Table 14 shows that the median number of expended LAWs per battalion was 60. The median number per company was 10.

Table 14

TRAINING EQUIPMENT -- NUMBERS IN BATTALIONS & COMPANIES

	Bs S3s				Inf. Cos			
	No. in Battalions				No. in Companies			
Equipment	Range	Mean	Median	Did Not Know	Range	Mean	Median	Did Not Know
Expended Laws	3-110	56	60	25%	2-100	20	10	5%
M190 Subcaliber Devices	6-20	10	8	---	0-10	2	2	28%
Front Sight Templates	0-30	7	0	75%	0-40	3	0	86%
Actual Front Sights	3-110	56	60	25%	2-100	20	10	5%

M190 Subcaliber Devices

Three S3s (38%) said they did not have a subcaliber device for each firing point. Two of these battalions had seven; the other had eight. Three other S3s (38%) said they had one device for each firing point. One of these had six; the other two had eight each. The remaining two battalions had 11 and 20 subcaliber devices respectively.

As Table 14 shows, the median number of subcaliber devices was eight per battalion and two per company. Ten companies (48%) said the devices were held by their battalions, and they did not know the numbers.

Front Sight Templates

Three S3s (38%) said they had one front sight template per student, but one of these did not know how many were in his battalion. The other two of these battalions had 12 and 30 respectively. The remaining five S3s (62%) said they did not know if there were any sight templates in their battalions.

Only three companies (14%) had sight templates. One had one; another had 16; the third had 40.

As Table 14 shows, the median number of templates per battalion and company was zero.

Actual Front Sights

As might be expected, all S3s and company commanders reported as many actual front sights as they had expended LAWs.

Two company commanders who had but few expended LAWs and actual front sights said they had no idea of how to get more. One said he thought expended LAWs had to be turned in to get live ones.

Other Training Equipment

For the sake of completeness, the remaining equipment items listed for LAW training Draft TC 23-20 were listed in the questionnaire, and they are also listed in Table 15, which shows the percentages of battalions and companies that had the equipment.

Table 15.

OTHER TRAINING EQUIPMENT -- PERCENT OF RESPONDENTS REPORTING POSSESSION

Training Equipment	Bn S3s	Inf Cos
One manned tank per platoon	12%	5%
One moving armor silhouette per platoon	12%	5%
One An/PRC 77 w/equipment per platoon	75%	85%
One tank w/xenon searchlight per platoon	12%	19%
One M203 grenade launcher per platoon	75%	81%

EQUIPMENT MAINTENANCE

Q. What percent of your M190 subcaliber devices are operational?

Q. What maintenance problems do you have with your subcaliber devices and other training equipment?

M190 Subcaliber Devices

As Table 16 shows, among the eight battalions and 11 companies that had subcaliber devices (Table 14), none were operational in one battalion (12%) and one company (5%). The battalion S3 said no one had been able to assemble the devices and make them work. The company commander said they do not repair the devices because they never use them.

Table 16

PERCENT OF M190 SUBCALIBER DEVICES OPERATIONAL, INDICATED BY PERCENT OF RESPONDENTS WHO HAD THEM[a]

Percent M190 Devices Operational	Bn S3s	Inf Cos
0%	12%	9%
45%	12%	---
50%	12%	9%
80%	---	9%
100%	64%	27%
Did Not Know	---	46%

[a]Bn S3s - N = 8

Inf. Cos. - N = 11

The subcaliber devices in five battalions (64%) were 100 percent operational. Device operability in the remaining two battalions was 45 percent and 50 percent.

Five company commanders (46%) said the operating condition of their devices was unknown, but three (27%) said all of theirs worked. Operability in the remaining two companies (18%) was 50 percent and 80 percent.

As to maintenance problems, one commander said the well cover for the primer on the subcaliber device sometimes blows out. Another said the rear-cover latch often falls off because the cotterpin breaks easily. Other problems mentioned with expended LAWs were wear from use and damage by inexperienced operators.

AMMUNITION AVAILABILITY

Q. Do you have enough of the ammunition (listed in Table 17)? If not, please state the amount you need.

Q. Have you had problems getting ammunition for LAW training when you need them?

Ammunition Sufficiency

M73 35-mm Rockets. As Table 17 shows most battalion S3s (75%) and company commanders (57%) were satisfied with current allotments, but two S3s (25%) and seven commanders (38%) wanted more.

Table 17

AMMUNITION -- SUFFICIENCY FOR LAW TRAINING

Respondents	Sufficiency	Ammunition			
		M73 35mm Rockets	M72A2 LAW, 66mm	81mm Mortar Illumination	40mm, M203, Illumination
Bn S3s	Enough	75%	25%	50%	---
	Not Enough	25%	75%	25%	75%
	No Response	---	---	25%	25%
Inf Cos	Enough	57%	5%	48%	---
	Not Enough	33%	81%	38%	81%
	No Response	10%	14%	14%	19%

M72A2 LAW, 66-mm. Only two S3s (25%) and one commander had enough of these live rounds. Six S3s (75%) and 17 commanders (81%) wanted more.

81-mm Mortar Illumination. Four S3s (50%) and 10 commanders (48%) were satisfied with what they got, but two S3s (25%) and eight commanders (38%) wanted more.

40-mm, M203, Illumination. The S3s and commanders who did not respond to this item said they believed it is not available for training in USAREUR. Regardless, 75% of S3s and 81% of commanders wanted it.

Amounts of Ammunition Wanted

Only those battalions and companies that wanted more ammunition in each category of Table 17 stated the amounts wanted. These amounts are summarized in Table 18.

Table 18

AMOUNTS OF AMMUNITION WANTED

Respondents[a]	M73 35-mm Rockets			M72A2 LAW, 66-mm			81-mm Mortar Illum.			40-mm, M203, Illum.		
	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range	Mean	Median
Bn S3s	2,000	2,000	2,000	100-2,000	860	1,000	180-425	260	330	150-2,000	680	300
Inf. Cos	170-2,000	800	900	18-600	280	340	60-600	270	350	100-900	490	380

[a]Amounts were stated only by those who wanted more ammunition in each category (See Table 17).

M73 35-mm Rockets. As Table 18 shows, a median of 2,000 rounds per battalion and 900 rounds per company were wanted.

M72A2 LAW, 66-mm. A median of 1,000 rounds per battalion and 350 per company were wanted.

81-mm Mortar Illumination. A median of 330 rounds per battalion and 350 per company were wanted.

40-mm, M203, Illumination. A median of 300 rounds per battalion and 380 per company were wanted.

Proportionately, companies wanted more of all types of ammunition than did battalions. This was particularly true of illumination rounds.

Problems in Getting Ammunition

Four S3s (50%) and 13 commanders (62%) had problems in getting ammunition when they needed it.

An S3 said, "We must project our needs 75 to 80 days in advance. This isn't realistic, because we don't know range availabilities. If we could project only 30 or even 45 days in advance we could specify accurately the ammo we need." Another said, "We project our needs but don't always get what we ask for. We tell company commanders what we've requested. They base their training schedules on that, and if we don't get the ammo, it screws up training." A third said, "Problems? I'll give you an example. For the last MTA period we requested 400 rounds of M72A2 ammunition for the battalion. We got ten--repeat ten rounds." A fourth said, "Last time out we got the whole range but no ammo."

A company commander said, "You can't time ammo with range availability. We're told things are there. Sure--they're there--then they aren't." Another said, "Ammo isn't always available. Often training areas present themselves late, but short-fuse attempts to get needed munitions often fail." A third said, "It's a ready-availability problem. I must order ammo 75 days ahead of time. Meantime, if someone decides to LAW train, we have to scrounge from other units outside our brigade -- if we can." A fourth said, "Annual allocation is insufficient to meet demands of personnel turnover. Six months after firing, half the people are gone. We need enough ammo to train new people." A fifth said, "I haven't seen any live LAW ammo since I've been in Europe. It definitely would benefit training if we could get some. Subcaliber is available, but I haven't trained with that." Comments of other dissatisfied commanders also stressed uncertainty of ammunition availability.

SAFETY CONSTRAINTS

Q. Do safety restraints affect realism in LAW training? If so, how would you overcome them?

Four battalion S3s (50%) said firmly that safety restrictions must be retained despite the affect on training realism. The remaining 50% were less rigid. One said, "LAW personnel usually can't fire until all other firing has ceased. Then the gunner has to move with the safety officer to a preselected location, not one of his own choice. Then he fires on a stationary target. The only way to ease the stringent safety regulations is to accept the fact that realistic training requires a certain risk." Another said, "An adequate range should be made available in the local area where we can exercise the control we think is necessary for realistic but safe training." A third said essentially the same thing. The fourth said, "APCs (armored personnel carriers) must be protected. We could do that with some plywood, but we don't have the money."

Seven company commanders (33%) were satisfied with present safety restrictions. The following quotations are from of those dissatisfied:

"Targets are too far away. It's foolish to fire at 300 meters. We should fire on mvoing targets at close range. The solution? Have 7th Army Training Center provide subcaliber combat areas with moving targets or local ranges approved for subcaliber firing." Three other commanders also said there should be combat areas or approved local ranges.

"It's bad for your record if someone gets hurt, so there's too much administration. Most safety restrictions could be overcome by shielding a station against backblasts from other stations. It's a technical problem that could be worked out."

"Safety is overblown. We always get hassled by range control. Unimaginative restraints can be overcome by making the person in charge of training his unit responsible for safety."

"Restrictions now require numerous stops of personnel to insure safety. Safety personnel should strive to allow as much tactical free-play as possible."

"Present problems can be easily overcome if the safety officers refrain from interfering except when absolutely necessary to prevent an unsafe situation."

"We get no live rounds because gunners are in the open. We should get live rounds and fire from foxholes."

"Controlled positions prevent free-play in the selection of firing positions. This makes training static, canned. Soldiers should be well trained in the selection of firing positions and then be held responsible for performing safely." Another commander expressed the same ideas.

"I'd reposition firing points forward, prepare foxholes, and move the control tower to the side; it's now in the middle and on the firing line."

TRAINING AIDS AND DEVICES

Training Devices

Q. Which of these training devices do you have and use: Besseler Cue See, Sony TVT, Range Reader GTA 71-1-1, and LAW sight device AE DVC 9-061?

Q. What problems do you have with them?

Q. Which LAW TEC lessons do you have?

Besseler Cue See. Table 19 shows that seven battalions (88%) and 11 companies (52%) had the Besseler device. The battalion S3s said also the devices were used for LAW training, but only eight companies (38%) agreed. Most companies were not aware of the device being available in the battalion training room.

Table 19

TRAINING DEVICES -- BATTALIONS AND COMPANIES
THAT HAD AND USED THEM

	Devices[a]							
	Besseler Cue See		Sony TVT		Range Reader GTA 71-1-1		LAW Sight Device AE DVC 9-061	
Respondents[a]	Had	Used	Had	Used	Had	Used	Had	Used
Bn S3s	88%	88%	75%	25%	88%	62%.	38%	25%
Inf. Cos	52%	38%	62%	24%	76%	57%	29%	14%

[a]In each category, 12 percent of Bn S3s and five percent of Inf Cos did not respond.

One commander who did not use it said it was too much bother to send trainees to the training room. Another said it was boring. A third said it was unreliable, and there was no one to maintain it.

TEC Lessons. As Table 20 shows, six battalions (75%) and 12 companies (57%) had the LAW TEC lessons, but only five battalions (62%) and seven companies (33%) said they used them.

Table 20

TEC LESSONS -- BATTALIONS AND COMPANIES
THAT HAD AND USED THEM

	LAW Tec Lessons	
Respondents[a]	Had	Used
Bn S3s	75%	62%
Inf. Cos	57%	33%

[a]Twelve percent of BN S3s and five percent of Inf. Cos did not respond.

These data do not agree with the use of the Besseler device for LAW training reported in Table 19. Three S3s and one commander who said they used the Besseler device also said they did not have the LAW lessons for it. Apparently they used the device for purposes other than LAW training.

Sony TVT. As Table 19 shows, six battalions (75%) had the Sony TVT, but only two (25%) said they used it. One of these S3s said, "It is used at all levels of training in most classes and field problems to record activities so personnel can see what they had done." During an interview, the other S3 explained that the TVT had been used but was not currently in use because of insufficient video tapes. All S3s who had the device said five video tapes were not enough to make its use feasible, except for occasional playback of old tapes. One said lack of sufficient tapes caused companies to assume that the device was unavailable. One non-user said companies were not interested. Two said there was no one qualified to operate the devices.

Thirteen companies (62%) said they knew the TVT was available in their battalions, but only five had used it. One had shown tank hunter-killer team techniques. Four others had also shown old tapes, but none were on LAW training. Among non-users, one commander said there was no one to operate the camera. Another said the power supply is a constant problem; it would not hold a charge for the time needed; a third said there was no electrical source at training sites or LAW ranges. The remainder indicated little or no interest. One of these said, "It's a good idea, but it's too much bother."

Range Reader. Table 19 shows that seven S3s (88%) and 16 companies (76%) had the range reader. Five S3s said it was used in their battalion mainly for range card preparation. One said it was used in a REALTRAIN exercise by TOW squads but did not know if it had been used in LAW training.

Sixteen companies (76%) had the range reader, but only 12 (57%) used it, and in the following ways:

1. As a training aid during field exercises.
2. To determine appropriate anti-tank weapons for various ranges.
3. For planning and teaching anti-tank weapons employment.
4. For training in the selection of firing positions.
5. To assist the unit in setting up defensive positions.
6. To stress the effective range of the LAW.

Only one commander had a complaint about the range reader. He said the amount of information on it makes it difficult to read.

LAW Sight Device AE DVC 9-061. Three battalion S3s and six company commanders indicated in the questionnaire that they had the LAW sight device, but during follow-up interviews (when they were shown the device), it became clear that the S3s and four commanders thought the questionnaire items referred to the front sight template. All, however, were impressed with the device and wanted it.

Some corps and division training personnel were familiar with it but seemed to think it had small value. A division G3 thought it hardly worth the cost. He said, "A soldier will quickly learn from memory to position the target on the reticle and then toss it aside." A division assistant G3 said, "I think it may have motivational value. When a soldier uses it and finds that he can't easily score, he may work harder at learning to use the sight reticle." Another assistant G3 said, "The only way to learn the reticle is to aim, fire, and see where you hit."

The two companies that had the device had only a few but wanted more. One said, "NCOs like it. It gives a quick readout on whether you're sighting properly, and it familiarizes you with what the target/sight picture should be." The other said it was used in preliminary stations before live firing.

Training Aids

W. Which of the training aids (listed in Table 21) do you have and use?

Target silhouette sheets. As Table 21 shows, only one battalion (12%) had and used them. Six companies (29%) had them, but only four (19%) used them.

Table 21

LAW TRAINING AIDS -- BATTALIONS AND COMPANIES THAT HAD AND USED THEM

Respondents[a]	Training Aids					
	Target Silhouette Sheets		LAW Sight Chart		LAW Backblast Diagram	
	Had	Used	Had	Used	Had	Used
Bn S3s	12%	12%	75%	62%	62%	50%
Inf Cos	29%	19%	71%	57%	62%	48%

[a] In each category, 12 percent of Bn S3s and five percent of Inf Cos did not respond.

LAW sight chart. Six battalions (75%) had this aid, but only five (67%) used it. Seventy-one percent of companies had it, but only 57% used it.

LAW backblast diagram. Sixty-two percent of battalions and companies had it, but only 50% of battalions and 48% of companies used it.

Target Identification Media

Q. For target identification training, which of the media (listed in Table 22) do you have and use? Are they effective?

Q. Which of the media do you not have but would like to have?

As Table 22 shows, a maximum of six battalions (75%) and 17 companies (81%) had target identification media, but only a maximum of five battalions (62%) and 15 companies (71%) used it. Plastic models of tanks and vehicles were considered the most effective medium.

Table 22

TARGET IDENTIFICATION MEDIA -- BATTALIONS AND COMPANIES THAT HAD AND USED THEM

Media	Respondents	Images					Effectiveness[a]		
		Tanks	Vehicles	Aircraft	Had	Used	Positive	Negative	Did Not Know
Plastic Models	Bn S3s	25%	12%	---	25%	25%	100%	---	---
	Inf. Cos	33%	24%	10%	33%	28%	86%	---	14%
Flash Cards	Bn S3s	25%	25%	50%	75%	62%	57%	---	43%
	Inf. Cos	38%	33%	62%	81%	62%	69%	---	31%
Silhouettes	Bn S3s	50%	38%	38%	62%	50%	86%	---	14%
	Inf. Cos	43%	24%	19%	48%	48%	50%	---	50%
Photographs	Bn S3s	50%	50%	25%	50%	38%	50%	---	50%
	Inf. Cos	57%	52%	42%	76%	71%	56%	---	44%
35mm Slides	Bn S3s	12%	12%	---	38%	38%	67%	---	33%
	Inf. Cos	14%	14%	10%	28%	19%	50%	---	50%
Overhead Projector	Bn S3s	25%	25%	12%	62%	38%	60%	---	40%
	Inf. Cos	24%	24%	10%	38%	38%	50%	12%	38%
Opaque Projector	Bn S3s	---	---	---	12%	12%	---	---	100%
	Inf. Cos	10%	10%	10%	24%	14%	20%	---	80%

[a]Percent of respondents that had the media.

A battalion S3 said plastic models are essential. His battalion scored highly in their target identification tests which included only pictures and silhouettes, but they scored an average of only 50% when tested by division personnel with plastic models. He said learning from the media they used in training does not transfer to three-dimensional targets (models).

Target Identification Media Wanted. As Table 23 shows, the most wanted target identification medium was plastic models. Next in demand were silhouettes, followed closely by flash cards. Demand was equal for photographs and 35-mm slides.

Table 23

BATTALIONS AND COMPANIES THAT WANT
TARGET IDENTIFICATION MEDIA

	Media				
Respondents[a]	Plastic Models	Flash Cards	Photos	Silhouettes	Slides
BN S3s	62%	25%	12%	25%	12%
Inf Cos	76%	24%	33%	28%	33%

Ways in which target identification media were used and suggestions for improving target identification training are below in the Training Methods and Techniques section.

Additional Training Aids and Devices

Q. What additional training aids or devices (charts, mockups, simulation devices, etc.) should be provided for LAW training immediately or long term?

All battalion S3s said they needed immediately the LAW sight device AE DBC 9-061; they had none. One wanted more 35-mm subcaliber devices. Another wanted a hardening kit for either a tank or an armored personnel carrier (M113), preferrably the latter.

Following is a list of immediate needs stated by company commanders:

1. More expended LAWs. (Two commanders).
2. A hardening kit for an M113 armored personnel carrier.
3. More 35-mm subcaliber devices.
4. More graphic training aids.
5. More sight charts.
6. LAW TEC lessons ("We have none.").

Long term, an S3 wanted a more durable 35-mm subcaliber or similar device. Long-term needs stated by commanders were:

1. An indoor target range.
2. A subcaliber device that will permit actually putting the LAW into operation.
3. A subcaliber round (perhaps .22 caliber) that can be fired at an unhardened tank without damaging it (Two commanders).
4. Films of target engagement using actual Warsaw Pact targets for use in the Besseler Cue See.

Despite the nature of the question, many S3s and commanders repeated desires for local firing ranges and more ammunition.

TRAINING GUIDANCE

Q. What guidance have you received through directives, mission statements, or other documents pertaining to LAW training?

Q. Is your LAW training based primarily on unit contingency missions?

Q. Who establishes the LAW training schedule for your unit?

TRAINING GUIDELINES

Seven battalion S3s (88%) mentioned communications pertaining mainly to the importance of the LAW and the need for training. Following are the communications, each one mentioned by a different S3:

1. "Antitank Training" (USARUER letter), 5 Aug 75.
2. "Antitank Training Note" (from a division), 13 Aug 75.
3. "Anti-Armor Training Program" (from a brigade), no date given.
4. "Anti-Armor Training" (USAREUR letter), 10 Sep 75.
5. "Use of Subcaliber M73 Rocket in Local Training Areas" (USARUER letter) 8 Oct 75.
6. "Cutting Edge Criteria" (a division directive specifying that there must be two qualified gunners per squad for the squad to be considered combat ready), no date given.
7. A talk on the importance of the LAW in the unit's mission (by ADC-A), no date given.

Only three company commanders (14%) knew of any particular guidance other than that available in training references and general Army publications. One said, "We are directed to fire at least twice per year at an MTA." Another mentioned EIB test requirements. The third said, "We're required by division to apply the "cutting edge' concept."

CONTINGENCY MISSION TRAINING

Four battalion S3s (50%) and 11 company commanders (52%) said their LAW training is based primarily on unit contingency missions. In interviews, most of these respondents either said or implied that if everything went in accordance with contingency plans there would be no use for the LAW because the ranges would be too great. In these units, therefore, training on LAW was not given a high priority. One S3 said, "No one comes down from above to see what we're doing with the LAW." Another said, "There should be no special training program for the LAW any more than there should be a separate program for the hand grenade." A third said, "We should do mechanical training--putting the LAW into operation--and subcaliber firing."

At corps level an assistant G3 said, "When I was in a field unit we never trained on the LAW. If the enemy gets close enough to use it, we haven't done our job."

Company commanders in the "contingency mission training" group commented on the little interest in the weapon. One said, "There's no significant push on the LAW." Another said, "If the LAW were considered important, we'd get to train more." A third said, "The lack of interest is unjustified. I think we'll have to use it in our GDP area." About one-third of commanders in this low-interest group agreed.

Among the company commanders whose LAW training was not primarily based on unit contingency missions, the tank hunter-killer team concept and ambush techniques were favored. Three companies had trained hunter-killer teams, and others wanted to. One commander summed up their comments, "The LAW is an important weapon. We'll have to use it, and it should be used in ambush and in five-man tank-killer teams. This is what I call active defense. We'll have to fire at short range and force the enemy to dismount. And we'll have to fire with protective masks. We aren't training for this, but I hope to be doing it both day and night."

ESTABLISHERS OF TRAINING SCHEDULES

As Table 24 shows, most battalion S3s and company commanders said LAW training schedules were established above company level, because most LAW training was done at MTAs.

Table 24

LAW TRAINING SCHEDULES - ORGANIZATIONS THAT ESTABLISH THEM

Respondents[a]	Organization			
	Division, Battalion, and Company	Battalion and Company	Battalion	Company
Bn S3s	12%	38%	12%	38%
Inf Cos	---	33%	24%	38%

[a]One Inf Co (5%) did not respond.

The one S3 (12%) who shared scheduling with his division said, "Most of our training is decentralized in word only because it is done in MTAs where others have most of the control." Another said, "Although we say we schedule LAW training, it actually is scheduled and controlled at division level, and we get what we don't need. We should request the facilities for the kind of training we need."

Training Schedules

Q. Do you have a regular LAW training schedule?

None of the battalions and only two companies (10%) said they had a regular training schedule. During interviews, however, the two company commanders explained that by "regular" they meant training scheduled at MTAs. They said uncertainty of personnel availability prevented regular scheduling of LAW training either in garrison or local training areas. What was done in local areas was integrated with platoon and squad training.

TRAINING REFERENCE MATERIALS

Q. Which of the references (listed in Table 25) are you familiar with or have and use?

As Table 25 shows, none of the battalions or companies had all references, and one company (on average) did not use any of the references it had. Only two references were used by all battalions that had them.

Table 25

LAW REFERENCE MATERIALS -- PERCENT OF RESPONDENTS ONLY FAMILIAR WITH OR THAT HAD AND USED THEM

	Respondents[a]					
	Bn S3s			Inf Cos		
Reference	Only Familiar With	Had	Used	Only Familiar With	Had	Used
FM 21-6	---	88%	75%	---	86%	76%
FM 23-3	---	75%	75%	---	76%	62%
FM 23-33	---	88%	75%	---	90%	76%
TC 7-24	---	88%	62%	---	86%	81%
TC 23-20 (Draft)	---	75%	62%	---	57%	52%
TM 9-1340-203-20	12%	38%	25%	19%	29%	10%
TM 9-1340-214-10	12%	38%	25%	5%	48%	38%
TM 9-1240-214-12	---	75%	38%	5%	43%	29%
ST 7-193-FY 75	12%	62%	50%	10%	48%	43%
USAREUR Pam. 30-60-11	---	38%	25%	14%	33%	29%
TRADOC Training Bulletin #5	---	75%	50%	10%	43%	29%
FM 71-1	---	25%	25%	14%	29%	14%
FM 71-2	12%	12%	12%	5%	10%	10%

[a]One Bn S3 (12%) and one Inf Co (5%) did not respond.

TRAINING PROGRAM DEVELOPMENT

RESOURCE MATERIALS

Q. Which of the references (listed in Table 25) did you use in developing your LAW training program?

As Table 26 shows, six of the 13 references listed in Table 25 were used, overall, by one battalion or another. One company used 10. Two S3s (25%) had used none of the references, saying LAW programs were developed by companies. Conversely, two commanders (10%) had used none, saying LAW programs were developed by battalion training personnel.

Table 26

REFERENCES USED BY BATTALIONS AND COMPANIES
IN PREPARING LAW TRAINING PROGRAMS

References	Respondents	
	Bn S3s[a]	Inf Cos[b]
FM 21-6	12%	14%
FM 23-3	12%	19%
FM 23-33 w/C1 and C2	12%	38%
TC 7-24	12%	38%
TC 23-20	12%	24%
TM 9-1340-203-20		5%
TM 9-1340-214-10		5%
ST 7-193-FY 75		5%
USAREUR Pam. 30-60-11		5%
FM 71-1	12%	10%

[a]Two Bn S3s (25%) said companies prepare LAW training programs.

[b]Two company commanders (10%) said battalions prepare LAW training programs.

The most used references among companies were FM 23-33 and TC 7-24. The next most used were TC 23-20 and FM 23-3. In addition to listing two or three references used, two companies (10%) said they had used all 13 (listed in Table 25) at one time or another to enhance portions of their LAW training.

LESSON PLANS

Two battalion S3s (25%) said they had prepared lesson plans, but one had not kept a file, and lesson plans of the other were not in accordance with FM 21-6. Ten companies (48%) said they had prepared lesson plans, but only one had copies available. These were in accordance with FM 21-6. He used this reference, he said, because his battalion commander required it.

TARGET IDENTIFICATION

Q. How do you use the media (listed in Table 22) in target identification training?

Q. How can target identification training be improved?

Use of Target Identification Media

Despite the media possession and use data in Table 22, most companies used photographs, 35-mm slides, and overhead-projector transparencies in classrooms with discussion of target characteristics and most vulnerable areas, followed by tests. One company used cut-up target charts as visuals. Three companies intensively drilled squad-size groups. Most groups were larger, up to 50 persons. Two battalions and three companies used MTA range concurrent stations for identification training. Only one battalion and one company mentioned the use of plastic models. The battalion used them on sandtables. The company put them on the ground and used binoculars for viewing.

Improvement of Identification Training

All eight battalion S3s and 16 company commanders (76%) made the following suggestions for improving target identification training:

1. Provide a complete set of plastic models to be used on the ground at scaled distances for viewing with binoculars (Six respondents).
2. Provide actual Warsaw Pact tanks and vehicles or mockups in the local areas--at least at MTAs (Six respondents).
3. Give more training and make it intensive with squad-size groups (Three respondents).
4. Provide more photographs of actual Warsaw Pact vehicles. (Two respondents).
5. Increase repetition (Two respondents).
6. Provide films of Warsaw Pact vehicles to be used with stop-action.
7. Provide larger flashcards and full-size silhouettes. The silhouettes could also be used for sighting at known distances.
8. Provide large, composite charts and more silhouettes.
9. Integrate identification training with field problems.
10. Increase aircraft recognition for field platoons.

MULTIPLE-TARGET ENGAGEMENT

Q. How do you train for LAW engagement of multiple targets?

Six battalions (75%) and 12 companies (57%) did not train for multiple-target engagement, but one commander said, "We talk about it in classes." An S3 said, "Range limitations restrict this kind of training, and we have only stationary targets."

Of the two battalions that trained for multiple engagement, the S3s said:

"During defensive training, aggressors attack, and defensive squad and platoon leaders control simulated LAW firing. They also discuss what should happen before the action and review what happened after the action."

"Gunners first engage the targets (by simulation) in the sector for which they are responsible, then they are controlled by commands and instructions as to which targets to engage."

Commanders of the nine companies (88%) that trained multiple-target engagement said:

"Once a year at an MTA we follow the SOP (standing operating procedure) in FM 23-33 and field platoon SOP in TC 7-24."

"We follow SOP in FM 23-33."

"Men organized into teams follow SOPs. Coordination of target engagement is established by squad leaders and platoon leaders."

"Our men work as a team to complement and cover each other."
"We use sector points and a sector officer for control."
"We train to shoot the closest target first, by volley fire." (Three commanders). One added, "And by tactical decision making."
"Gunners engage the closest target first, provided they can effectively fire a second and third round at other targets."

COORDINATION WITH OTHER UNITS

Q. How do you train for coordination with other units?

Only three battalions (38%) and seven companies (33%) trained for coordination with other units. The battalion S3s said:

"During training, the importance of tying in LAWs with other weapons on flanks is stressed. Safety requires that back-blast areas be kept clear, and LAW personnel must notify adjacent personnel that they are near LAW firing positions."
"We train for coordination with other units during ARTEP and company tests at MTAs."
"We train with tanks."
Commanders of the seven companies that trained for unit coordination said:
"This is part of normal defensive coordination in the field." (Two commanders).
"We follow SOP to coordinate firing with the units at left and right." (Two commanders).
"At an MTA once a year we follow tactical employment doctrine, but we need conceptual materials to prepare leaders for this."
"Coordination is effected through company commanders."
"Squad leaders and platoon leaders control coordination."

FIELD TACTICAL TRAINING

Q. How do you conduct LAW field tactical training?

Five battalions (62%) and nineteen companies (90%) said they did not conduct LAW field tactical training other than given in platoon tactical training.
The S3s of the three battalions (38%) that gave this training said:
"Men carrying expended LAWs select firing positions and simulate firing on targets. The positions are checked by squad and platoon leaders." (Two S3s).
"Mainly, we give ambush training to tank-killer teams."
Commanders of the two companies (10%) that did LAW field tactical training said:
"We train as tank-killer teams during usual field tactical training."
"This is done concurrently during firing at MTAs."

RANGE ESTIMATION

Five battalions (62%) and ten companies (48%) trained for range estimation. The battalion S3s said:
"We train soldiers to estimate ranges by having them note the support sizes of targets in relation to the sight stadia lines."
"We mainly use paced-off distances for estimation, and this is integrated with platoon field training. Squad leaders and platoon leaders use the map and range finder for selecting LAW firing positions within the range of targets in the kill zone."

TRAINING CONTENT AND FREQUENCY

TRAINING SCHEDULE

Q. Do you have a regular Dragon training schedule?

The notion of a regular training schedule for Dragon seemed to apply only to the battalion level or higher. Range availability was the major determinant (in turn often established by a live fire requirement), and range scheduling was done at battalion level.

Q. In practice, how frequently do you train on the following tasks: What would you estimate as the total number of hours per year devoted to each of the tasks?

The frequency of training on various Dragon tasks was complicated by the lack of special Dragon training other than gunnery; most respondents saw tactical aspects of Dragon training as simply a part of more generalized training in the field. Thus, most tactical functions were performed whenever the unit was in the field--often said to be at least monthly.

Tasks cited by more than one respondent as never being done include: battle drill, preparing field firing positions, engaging multiple stationary targets, and night target engagements.

TARGET RECOGNITION

Q. Of the time spent in target identification training, roughly how is it split among the following categories (listed)?

Vehicle recognition training was described by all respondents as infrequent. Of the time spent, the combined responses provide the apportionment shown in Table 2.

"Range estimation is incorporated in field training, map reading, and land navigation exercises."

"At MTAs we use the range estimation facilities and use the usual field-expedient techniques in the local area."

"Once a year we set up personnel silhouettes at known distances and have soldiers estimate the ranges."

The company commanders said:

"For range estimation, we use the finger, football field, telephone pole, and flash-bang methods. In the field the flash-bang method is most often used."

"In classes with graphic training aids we teach hand methods and use them in the field." (Two other companies also used the classroom and field practice).

"Range estimation is taught during tactical classes in the classroom."

"We use the range estimation station at the MTA."

"Soldiers estimate measured distances in the field." (Two companies).

"Soldiers learn to position a standard-size vehicle in relation to the stadia lines on the sight."

SUBCALIBER AND LIVE FIRING

SUBCALIBER FIRING

Q. Do you fire subcaliber devices at a stationary target, a moving target, or both?

Q. What is your moving target?

Q. If you have fired at a hardened tank, do you plan to continue doing so? If you have not fired at a hardened tank, do you plan to?

Target Types

As Table 27 shows, four battalions (50%) and 11 companies (52%) had fired only at stationary targets.

Table 27

LAW SUBCALIBER FIRING ON STATIONARY AND MOVING TARGETS

Respondents	Targets Fired On			
	Moving Only	Stationary Only	Both Moving and Stationary	None
Bn S3s	25%	50%	12%	12%[a]
Inf Cos	10%	52%	28%	10%

[a] Had not been firing the subcaliber device.

Three battalions (38%) and eight companies (38%) had fired at moving targets. One of these battalions (12%) and six companies (28%) had also fired at stationary targets. The remaining battalion (12%) and two companies (10%) had not been firing the subcaliber device.

Specific Kinds of Targets

Table 28 shows that two battalions (25%) and three companies (14%) had fired at a hardened tank. Most of the remaining moving targets were panels; one was a tank silhouette. All stationary targets, except one, were panels; the exception was an oil drum.

Table 28

LAW SUBCALIBER FIRING ON SPECIFIC KINDS OF TARGETS

Respondents[a]	Moving Targets			Stat. Targets	
	Tank or APC	Tank Silhouette	Panel	Panel	Oil Drum
Bn S3s	25%	---	12%	50%	---
Inf Cos	24%	5%	14%	48%	5%

[a] One Bn S3 (12%) and two Inf Cos (10%) did not respond; they had not been doing subcaliber firing.

Two companies said their moving target was a hardened M113 armored personnel carrier (APC).

One of the S3s whose battalions had fired on a hardened tank said they would not fire at it again because the tank company objected to the damage. The cost was about $1,000 to road wheels and vision blocks. The other S3 said his battalion would continue firing at their tank (provided by brigade) despite complaints of costly damage by the tank company commander. During an interview with the tank company commander he said, "It isn't only the damage. In effect, I've lost a tank. The hardening kit isn't as simple to install

as some think. Parts of it actually have to be tack-welded to the tank. The kit should be simplified so it can be set on the tank by a crane and bolted in place." He also spoke of tanker frustration while being fired upon. "You can't fire back. The tanker should at least be able to fire the Hoffman device. This would also make LAW training more realistic."

Two other S3s said they hope to use the tank hardening kit. Ten company commanders (48%) who had not fired on a tank were eager to do so. The remainder said, unless there was a change, either hardening kits or tanks would not be available to them. One said, "Tankers don't like to work with the infantry."

Target Movement

Q. Do moving targets move farther and nearer while traversing laterally.

The two battalions (25%) that fired at hardened tanks and four companies (19%), two of which had fired at hardened APCs, said their targets moved farther and nearer during subcaliber firing. One S3 said the movement of the tank was preplanned. One company commander said his moving target moved at a "predictable slant." Movers of other targets had general instructions for direction within certain boundaries.

Target Size

Q. Other than tanks and APCs, what is the height and width of your targets?

As Table 29 shows, targets ranged in size from a 55-gallon oil drum to 11 ft x 22 ft. One panel target was only 4 ft x 5 ft, and several others were not much longer.

Table 29

SUBCALIBER FIRING--SPECIFIC TARGET SIZES

Target Size (Height x Width) In Feet	Bn S3s	Inf. Cos
11 x 22	25%	5%
8 x 13	12%	---
8 x 6	---	10%
7 x 9	---	5%
6 x 20	---	5%
6 x 14	---	5%
6 x 12	---	5%
6 x 8	---	5%
6 x 4	---	5%
5 x 6	12%	5%
5 x 5	---	5%
4 x 5	---	5%
55-gal Drum	---	10%
No Response	50%	24%

Minimum and Maximum Target Ranges

Q. In target engagement practice, what are the minimum and maximum target ranges?

Table 30 shows that targets were as near as 25 meters and as far as 500 meters. For stationary targets, the median ranges were a minimum of 100 meters and a maximum of 250 meters.

Table 30

TARGET ENGAGEMENT--MINIMUM AND MAXIMUM TARGET RANGES

	Respondents[a]	Target Ranges in Meters					
		Minimum			Maximum		
		Range	Mean	Median	Range	Mean	Median
Stationary Targets	Bn S3s	50-100	86	100	200-400	275	250
	Inf Cos	25-200	94	100	200-500	268	250
Moving Targets	Bn S3s	35-100	62	58	150-300	200	175
	Inf Cos	25-225	118	100	150-500	216	200

[a]Bn S3s - N = 6 (Two did not respond.)

Inf Cos - N = 18 (Three did not respond.)

For moving targets, the median ranges in battalions were a minimum of 58 meters and a maximum of 175 meters. In companies, the median moving-target ranges were a minimum of 100 meters and a maximum of 200 meters.

Target Size and Range Information Given

As Table 31 shows, only one battalion (12%) and none of the companies announced only the size of targets during target engagement, but four battalions (50%) and six companies (29%) announced only the range. Four companies (19%) gave both target size and range. The remainder did neither.

Table 31

TARGET ENGAGEMENT--BATTALIONS AND COMPANIES ANNOUNCING TARGET SIZE AND RANGE

Respondents	Information				
	Target Size Only	Range Only	Both	Neither	No Response
Bn S3s	12%	50%	---	25%	12%
Inf Cos	---	29%	19%	38%	14%

Pair, Sequence, and Volley Firing

Q. Do you train for pair firing, sequence firing, and volley firing? If not, do you plan to do so?

As Table 32 shows, five battalions (62%) had done pair, sequence, and volley firing. Another battalion planned to do pair and sequence firing but not volley firing.

Table 32

TARGET ENGAGEMENT--BATTALIONS AND COMPANIES DOING OR PLANNING TO DO PAIR, SEQUENCE, AND VOLLEY FIRING

	Firing Mode								
	Pair Firing			Sequence Firing			Volley Firing		
Respondents	Doing	Plan to Do	Neither	Doing	Plan to Do	Neither	Doing	Plan to Do	Neither
Bn S3s	62%	12%	26%	62%	12%	26%	62%	---	38%
Inf. Cos	57%	19%	24%	48%	32%	19%	29%	33%	38%

Among companies, 12 (57%) had done pair firing, and four (19%) planned to. Ten (48%) had done sequence firing, and four (19%) planned to. Six (29%) had done volley firing, and seven (33%) planned to.

PLANNED CHANGES IN TRAINING

Five battalions (62%) and 11 companies (52%) planned or hoped for changes in LAW training. Following were plans of the S3s:

1. Greater effort to train LAW personnel in types of engagement and methods of LAW employment; an attempt to get more live rounds to develop greater soldier confidence in LAW.
2. More emphasis on firing subcaliber and live firing, tactics, fire control, weapons positioning, and target identification.
3. A long-term anti-tank program to include most recent TRADOC materials.
4. A local subcaliber range; triple subcaliber rounds to 5,000 (10 per man, three times a year); double live rounds to 1,000 (two per man twice a year).
5. A technical scenario built into planning of firing with range control.

Following were plans or desires of company commanders for improving LAW training:

1. Maximize subcaliber firing on a moving target (hopefully a tank); maximize integration of LAW in platoon tactical training; increase target identification training.
2. Increase subcaliber firing; strive for a moving target; try to increase live firing.
3. Tank hunter-killer team training; increase subcaliber firing.
4. Attempt to get a moving target; increase emphasis on LAW training.
5. Emphasize volley and sequence firing and squad leader and platoon leader control.
6. More tactical environment training.
7. Tank-killer team training-the gamut.
8. Battalion plans: annual program of mechanical training (8 hours); field tactical training (24 hours); subcaliber firing (8 hours).
9. More emphasis on anti-tank training.
10. Company controlled LAW training.

APPENDIX C

SUMMARY OF DRAGON INTERVIEW AND QUESTIONNAIRE DATA

CONTENTS

APPENDIX C. SUMMARY OF DRAGON INTERVIEW AND QUESTIONNAIRE DATA

This appendix contains the questions from the Dragon Training Questionnaire and information gathered from the questionnaire and follow-up interviews.

DRAGON TRAINING HISTORY

INTRODUCTION OF DRAGON

Q. About when did each of the following arrive in your unit: (a) CONUS-trained Dragon gunners, (b) first Dragon weapons, (c) full allocation of weapons, (d) training equipment (LET, monitor, target)?

Weapons and training equipment arrived at the same time in both the cavalry and infantry units, although neither had received its full allocation.

A few CONUS-trained gunners (with C2 additional skill indicators) arrived at the cavalry unit before the Dragon weapons, but none had arrived at the infantry unit.

Apparently, the cavalry unit no longer received CONUS-trained Dragon gunners. Previously, scout crew members were drawn from MOS 11B personnel; currently they are drawn from MOS 11Ds, (66%) and MOS 11Es (33%) whose CONUS training evidently does not include Dragon.

Q. Was any introductory training for your unit's leaders provided when Dragon was introduced?

Respondents differed, but it seems clear that no training specifically for unit leaders was provided as part of the Dragon introduction. The cavalry unit sent an NCO to Fort Benning for training as a Dragon instructor, and he became the squadron's Dragon cadre. The infantry unit had sent a cadre that included some officers to the Second Armored Division's Dragon gunnery course.

Q. Was any introductory training for the unit's soldiers provided when Dragon was introduced?

Introductory training for soldiers in the cavalry unit was a briefing during Reforger. For selected infantry personnel, it was the Second Armored Division's gunnery course.

PERSONNEL ASSIGNMENTS

Q. Does your unit designate gunners for the Dragon as a relatively permanent assignment?

Both units designate gunners. However, so few gunners had been trained, the designated/dedicated distinction was somewhat moot.

Q. What are the most important factors in deciding whom to designate as the Dragon gunners?

The major selection factor in designating gunners was job assignment--e.g., on a scout crew. Previous training and ability ranked next, but this was seldom applied in practice; very few had CONUS training, and very few had washed out during qualification. Interest and availability operated mainly as negative considerations, and promotion was not a factor.

Q. What other permanent assignments are most common for the designated gunners?

In the cavalry unit, scout crews--including driver, track commander, and crew--were the Dragon gunners. In the infantry unit gunners were scouts, riflemen, and M203 gunners (most common for designated gunners).

Q. Does your unit designate Dragon Team members?

The concept of a "team" for the Dragon applied mainly in the case of cavalry scout crews. In the infantry unit, the "team" consisted of one or two extras per squad.

Q. Considering turbulence factors such as promotion and rotation, if a Dragon gunner were designated today, about how long would he remain a designated Dragon gunner?

The cavalry unit expected gunners, on average, to be stable for more than a year, and longer in the case of scout track commanders. The infantry unit expected six months or more as the norm.

PERSONNEL TRAINING AND GUNNER QUALIFICATION HISTORY

Q. How many of the soldiers in your unit have qualified and/or fired?

In both units, gunners who had gone through training and qualification firing had been primarily just those necessary to man the trackers available. Most of those who had done familiarization firing were those who attempted to qualify but did not.
The number of individuals who qualified in both units are shown in Table 1.

Table 1

NUMBER OF INDIVIDUALS WHO FIRED AND QUALIFIED

FIRING STATUS	CAVALRY	INFANTRY
Expert	15	12
1st class	4	20
2nd class	--	30
Not qualified	1	15
Never fired	430	783
Total unit	430	860

Q. On the average how often do and should gunners fire for qualification?

The frequency of firing for qualification had not been established; gunners in both units had done so only once. Most respondents said qualification should be every six months.

Q. How often do and should gunners fire for familiarization?

Only a brigade-level respondent said familiarization firing should be done monthly. Others indicated three to six months as the desirable frequency. One wanted to substitue qualification every four months for familiarization firing.

Q. How many of the unit leaders have fired the Dragon?

In the cavalry unit, none of the leaders had fired, except for two squad leaders who qualified. In the infantry unit, half of the company commanders, one-fourth of the platoon

leaders, and one-third of the platoon sergeants had fired for familiarization. Of the infantry squad leaders, one-fourth had qualified and one-sixth had fired for familiarization. Thus, direct familiarity with the weapon was much higher in the infantry unit, perhaps a consequence of the emphasis lent by the Second Armored Division Dragon course.

Q. How recently has Dragon training been conducted for your unit?

For both units, Dragon training--interpreted as gunnery training--had been conducted by the NCO who had been sent to the Fort Benning course; in the infantry unit, it was conducted by the Second Armored Division committee.

Q. Has your unit live-fired the Dragon? How was firing conducted?

Only the cavalry unit had live fired, immediately after the training mentioned above. It did so at Grafenwoehr with 18 gunners who had qualified. The firing was at a tank panel moving 10 mph at 750 to 850 meters with good visibility. Very few distractors, other than firing on nearby ranges, were present.

The infantry unit's policy was to select gunners who qualify as experts for firing at Grafenwoehr.

TRAINEE EVALUATION

HIT PROBABILITY

Q. If your unit went into battle tomorrow, how would you estimate the probabilities of the Dragon gunners getting first- and second-round hits on moving targets? Consider in your estimates the distractors they would encounter in actual combat. Please indicate probabilities for the ranges of 50 to 2,000 meters.

Amsuming that first-round hit probabilities for expert gunners stated in Draft TC 23-20 are correct, most respondents grossly overestimated the probabilities. Most estimated probabilities from .9 to 1.0 for all ranges up to 500 meters, falling off gradually up to 1,000 meters then dropping to zero beyond maximum range. A few saw the probabilities as increasing up to .7 or .8 at 750 meters then dropping again. Only one put the 50-meter probability at 0. Estimating a non-zero probability for targets below minimum range seemed to be a simple oversight, because respondents all knew the 65-meter minimum range. More significant is the pattern of giving high probabilities to hits at 100 and 250 meters, generally overestimating probabilities at longer ranges, and expecting a drop as the ranges approached the maximum.

Because first-round probabilities were estimated so high, there was little room for second-round estimates to be raised much. At most, the second-round hit probability was estimated as .1 or .2 higher at the longer ranges.

One respondent thought second-round probabilities would be the same; another thought they would be lower because of return fire.

PROFICIENCY MEASURES

Q. In your judgment, what are the most important measures of a Dragon gunner's proficiency? (Please list in priority order.)

All responses on gunner-proficiency measures identified personal characteristics rather than gunnery behaviors or achievements. All mentioned the need for steady concentration, such as an expert and combat-wise rifleman would have.

Several mentioned soldier strength and coordination; one pointed out that the weapon is best fired by a medium height soldier--neither too tall nor too short--to use the weapon smoothly.

Q. What tests or examinations on Dragon do you administer? When are they administered?

The tests administered were primarily for gunner qualification. A Cavalry NCO mentioned proficiency tests, and an infantry company commander mentioned preparation of range cards and identification of firing positions when in the field.

GUNNER QUALIFICATION

Q. In gunner qualification, what scores are used?

All cited the standard qualification table scores for expert, 1st class, etc. However, absence of a dug-in position for standing fire prevented one unit from using that table.

Q. Do you fire LSS familiarization?

Only one had the equipment for LSS (Table XIII, TC 23-24).

Q. In your judgment, how does qualification firing compare with firing in combat? What changes would you suggest?

All but one saw qualification firing as easier than combat firing and saw a strong need for greater realism--smoke, noise, concussion, return fire, less than ideal visibility, and tactically moving targets.

TRAINING CONSTRAINTS

TRAINING AND INSTRUCTOR PERSONNEL

Q. Who conducts Dragon training for your unit?

Those who conduct training were described differently by personnel at different levels in a unit. Generally it was done by either a section leader or a platoon leader.

Q. How many Dragon instructors are there?

Dragon trainer and instructor roles were not identified consistently. For example, a battalion might indicate there was one for the battalion and none below, while companies in the same unit would indicate none in the battalion and several at company level.

In general, it seemed that trainer roles were assigned informally, on a basis of prior training or availability.

TRAINING FACILITIES

Q. Do you have access to a Dragon tracking range?

The cavalry unit had access to an adequate Dragon range about 50 kilometers away. The infantry unit had access to a TOW range in their local area.

Q. Do you have a moving target?

The cavalry unit's target was fixed at the weapon's maximum range; the infantry unit's target was fixed at 250 meters. Both units saw wide variation in range as much better than the fixed 250 meters specified in TC 23-24.

Q. Do you have multiple moving targets?

Neigher unit had multiple moving targets. One unit said tracking cannot be done with two IR sources visible to a tracking system at the same time.

TRAINING EQUIPMENT AND MAINTENANCE PROBLEMS

Q. How many pieces of the following (listed) equipment do you have for your unit? About how much of the time is each operational?

The cavalry unit had two LETs and monitors and one IR target for 14 trackers. The infantry unit had three LETs and monitors and four IR targets (two TOW and two Dragon) for 31 trackers. In both units, the training equipment was kept at battalion level. At battalion and company levels, percentages of time that equipment was operational was not estimated, but brigade personnel said operability of trackers was 90 percent; for LETs it was 50%; and for monitors and IR targets it was 70 percent.

Q. What maintenance problems do you have with any of the equipment?

Maintenance problems included calibration of trackers, firing pins on LETs, weak brackets and springs on field-handling trainers, and cable connectors on the target set.

Suggestions for improvement included replacement of screw-down connectors with clips on the target sets to prevent loose connections that damage the equipment; charging the training sets nightly; and providing protective cases for the equipment. The last point seems especially significant, as many instances of damage apparently occurred during transport of the unprotected equipment to and from the field.

Q. In your judgment are there unreasonable restrictions on Dragon operator/organizational maintenance?

No unreasonable maintenance restrictions were apparent.

Q. When you send equipment and training sets for repairs, how long does it take to get them back?

Data on maintenance experience was slight, but one example was a pair of LETs that had been in for repairs over two months and had not been returned.

AMMUNITION AVAILABILITY

Q. Do you have the right amounts of training ammunition? Have you had any problems getting ammunition for Dragon training?

Limitations on ammunition were apparent only at the brigade level. However, use of distractors during firing may require re-evaluation of needed amounts.

SAFETY

Q. What safety restraints affect realism in Dragon training? How would you overcome these restraints?

Safety restrictions were an important factor in live firing only. Range restrictions apparently curtailed the use of distractors and prevented firing from the wood line. Firing positions more like expected combat positions were desirable.

TRAINEE AVAILABILITY

Q. On any particular day, what percent of your Dragon gunners are likely to be available for training?

Estimates of Dragon gunner availability on any given day ranged from 50 to 75 percent. Their remaining times was taken up by activities such as border commitments (cavalry),

duty company (infantry), field exercises, and many off-line activities such as PREP and CDAAC.

Q. The most recent time Dragon training was conducted, about what percent of gunners were available to participate?

All gunners were available--but those available were also the only gunners trained.

TRAINING TIME

Q. What is the total time (in hours) scheduled by your unit for Dragon training?

Taken as gunnery training, training time was estimated at 32 to 40 hours per year.

Q. What percent of scheduled Dragon training is spent in the following main categories: Dragon Gunner, Squad drill, Dragon tactics, other?

Taken as training specifically for Dragon gunners, most of the training time was given to gunner, very little to squad drill, and perhaps 10 percent to tactics.

Q. What percent of scheduled Dragon training should be spent in the same main categories?

Changes suggested for the apportionment of time were not major, but mainly represented a somewhat greater emphasis--20 percent rather than 10 percent for example--on tactics specifically for Dragon gunners.

OTHER PROBLEMS

Q. What else (other than already mentioned) limits or interferes with training efforts in Dragon gunnery and Dragon tactics?

The infantry unit cited none. The cavalry unit cited the "usual" time problems, and a Cavalry NCO strongly cited lack of command support.

TRAINING AIDS AND DEVICES

Q. Which of these training devices do you have and use for Dragon training: Besseler Cue See, Sony TVT, and Range Reader. How do you use these devices? What problems do you have with these devices?

None of the training devices were available at company level. TEC lessons and the TVT for Dragon had not been issued. The Range Reader had not been distributed down to company level, nor would respondents have used it if it were available.

Q. What ideas do you have for using the Besseler Cue See or TVT in other ways, especially for Dragon training?

Anticipated uses included field applications of the TVT, both in field training exercises and live firing, and TEC lessons for introductory and refresher training.

Q. In your view, what additional training aids or devices should be provided for Dragon training?

Needs included: plastic tank models, more field-handling trainers, a night sight, and an electronic Dragon game.

TRAINING GUIDANCE

Q. What level establishes the Dragon training schedule for your Unit?

All indicated the battalion or a combination of battalion/company levels as establishing the training schedule.

Q. What guidance have you received through directives, mission statements, letters (or other documents) pertaining to Dragon training?

Most cited the training manuals as the main source of training guidance. The NCO who had been to Fort Benning also cited the instructor's packet.

Q. Is your Dragon training program based primarily on the unit's contingency missions?

None saw Dragon training as based primarily on unit contingency missions, though the reasons differed. The cavalry unit saw its border mission and basic cavalry mission as very close to contingency requirements, thus necessitating no additional training specially to meet those requirements. For the infantry, there was not one but many possible contingency missions, hence training had to be more generalized.

Q. Which of these references do you have? With which ones are you familiar? Which ones do you continue to use?

The FMs, TMs, and TCs relevent to Dragon all seemed to be available and in use. The TRADOC and USAREUR materials were not consistently available or in use.

Q. Which reference materials are supplied to Dragon gunners in your unit?

Training materials were generally limited in number and maintained in the training or arms room, rather than distributed to the gunners or platoons.

Q. Please list other references not given above which you have and use for Dragon training guidance.

Other references mentioned included TC 71-1 and the instructor's packet from Fort Benning.

TRAINING PROGRAM DEVELOPMENT

Q. Which of the references listed above did you use in developing your Dragon training program? What was the main value of each?

The main reference used was TC 23-24. Also mentioned were TC 7-24 and Draft TC 23-20.

Q. Have you prepared written lesson plans?

Both units had lesson plans that were drawn from either the Fort Benning instructor's packet or Draft TC 23-20.

TRAINING CONTENT AND FREQUENCY

SCHEDULING

Q. Do you have a regular Dragon training schedule?

The notion of a "regular" training schedule for Dragon seems to apply only to the

Battalion level or higher. Range availability is the major determinant (in turn often established by a live fire requirement), and range scheduling is done at Battalion level.

Q. In practice, how frequently do you train on the following tasks?

What would you estimate as the total number of hours per year devoted to each of the tasks?

The frequency of training in various Dragon tasks is complicated by the lack of "special" Dragon training other than gunnery; most saw tactical aspects of Dragon training as simply a part of more generalized training in the field. Thus, most tactical functions are performed whenever the unit is in the field--often cited as at least monthly.

The tasks cited by more than one respondent as never being done include: battle drill, preparing field firing positions, engaging multiple stationary targets, pair or volley firing, and night target engagements.

TARGET RECOGNITION

Q. Of the time spent in target identification training, roughly how is it split among the following categories (listed)?

Vehicle recognition training was described by all as infrequent. Of the times spent, the combined responses provide the apportionment shown in Table 2.

Table 2

ALLOCATION OF TARGET RECOGNITION TRAINING TIME

TARGET TYPE	FRIENDLY	ENEMY	TOTAL
Tanks, vehicles	23%	38%	61
Aircraft	4%	9%	13
Weapons, equipment, personnel	9%	18%	26
Total	36%	64%	100%

COMBINED ARMS

Q. How often do your Dragon personnel train with types of units other than your own?

For the cavalry unit, training with other types of units never occurs, except "seldom" with Air Cavalry. For the infantry unit, responses were: "never," Air Force; "seldom," infantry, cavalry, artillery, and air cavalry; "often," armor and engineers.

TRAINING METHODS AND TECHNIQUES

TARGET RECOGNITION

Q. In training for target identification, there are many possible training aids for each type of target. For each item listed, indicate whether you have used it. Also indicate those you think are effective.

The most commonly used media for target identification were photographs, sometimes

in booklet form, followed by silhouettes and overhead-projector transparencies. The most requested training medium was plastic models, which were not available to the units. An exception was one respondent who acknowledged the value of the three-dimensional models but favored 35-mm slides for their greater ease of maintenance and updating.

Q. How do you use the items you indicated in target identification training?

Short classes or drill sessions were the most common approach to target recognition. Also mentioned were the practical training opportunities available in border duty and in connection with military STAKES training.

Q. How do you think target recogniton training can be improved?

Respondents indicated that target recognition can be improved by (a) giving it more training emphasis, and (b) providing the training aids currently lacking, such as models.

Q. What are the real requirements for target recognition, i.e., precisely which objects should soldiers be trained to recognize? Friend and Foe? Foe only? Under what conditions?

All respondents viewed recognition of both friend and foe as critical, and the consensus was that the main objective should be recognition under combat conditions at maximum weapon range.

TACTICAL SKILLS

Q. How do your Dragon personnel train to engage multiple targets?

Multiple target engagement was emphasized in only one of the units. Their approach was to provide practice in designating kill zones, establishing fire priorities (e.g., front or rear of vehicles), and channeling enemy vehicles.

Q. How do you train to coordinate with other units?

Coordination with other units was not considered a factor by the cavalry unit. The infantry unit considered it a leadership function, not a troop training function.

Q. How do you conduct Dragon field tactical training?

Dragon field tactical training did not exist as something separate from other field training and unique to Dragon. When available, field-handling trainers were taken on field exercises, and the training sometimes included target identification, and preparation of firing positions and escape routes.

Q. How do you train for range estimation?

For range estimation respondents in both units mentioned use of maps in the field and sight stadia line. For cavalry gunners, the weapon range was a new consideration; previously, coordinates had been the concern, rather than range to target. The infantry unit also mentioned range estimation practice on firing ranges, including the rifle range.

Q. How do you train for night engagements?

Although both units conducted field training exercises at night, night sighting for the Dragon was extremely limited. Positive illumination (mortars, flares, etc.) apparently was more effective than searchlight illumination. The need for a night sight was strongly stressed.

Q. How do Dragon personnel train for radio communications?

Classes on radio security and procedure were the common method for training in radio communications. In addition, border patrols provided the cavalry unit with opportunities for practice. The infantry unit also mentioned use of wire in defensive positions.

Q. How do they train for non-radio communications?

Training for non-radio communications was limited. When done it included hand and arm signals, and some use of voice.

REALTRAIN

Q. Does your unit have trained REALTRAIN controllers? Do you have your REALTRAIN equipment? Do you have training ammunition for REALTRAIN? Have you conducted a REALTRAIN exercise involving the Dragon? Do you plan to conduct REALTRAIN exercises in the next six months? How does (will) the controller operate with the Dragon?

Only the cavalry unit had trained REALTRAIN controllers. The infantry unit did not have REALTRAIN equipment and had neither experience with nor near-term plans for conducting REALTRAIN.

The cavalry unit had not conducted REALTRAIN but expected to do so--without all training ammunition--within the next six months.

The precise way a controller would operate with the Dragon was unknown by either unit.

LIVE FIRING

Q. In live firing of missiles such as TOW and Dragon, some observers have noted a tendency to "fly" or "steer" the missile, rather than concentrate on the target. Do you see this as a problem? What percent of gunners would you expect to encounter this problem? Does your training deal with it? Do you think a training aid or device might help prevent this tendency?

Perceptions of the problem of steering the live missile were the same in both units, although only one unit had live fired. Half of the respondents thought it would be a problem with 10 percent of the gunners; the other half estimated 50 percent.

For those who saw the problem as infrequent, the problem with the second round would not be appreciably different. For those who saw it as a common problem, with the second round it was expected to be much reduced--to 10 percent of gunners rather than 50 percent.

All respondents said their training strongly emphasized the need to track the target rather than steer the missile. One platoon in particular felt this had been effective, for they hit with five of five rounds during their first live firing.

The main suggestion, besides continued emphasis, was for new training devices. These included the amusement gallery machine mentioned above: tracking on a screen on which both moving targets and missiles are projected. Other suggestions were a laser and subcaliber devices for gunner training.

OTHER METHODS AND TECHNIQUES

CONTINUING TRAINING

Q. Are there other methods for conducting Dragon training that you would recommend? Please describe them.

The major suggestions for other methods were related to use of the Dragon in realistic combat conditions. Gunnery and tactical training were far from being integrated. One suggestion was to track IR target sources in field training exercises instead of or in addition to the tracking-range environment.

Q. Do you see any need for changes in your Dragon training methods or techniques? Please describe them?

The major need for change identified by respondents are summarized as follows:

1. Provide command support for Dragon training.
2. Increase gunner qualification standards (i.e., 42 out of 60 should not be a qualifying score).
3. Provide concentrated spaced training--as opposed to either infrequent crash programs or relatively frequent short programs.
4. Provide more cross training so that more troops can fire more weapons. The probability that this ability will be needed in USAREUR was thought to be high.

PROBLEMS OF DRAGON INTRODUCTION

Q. Looking back on the introduction of the Dragon in your unit, if another new weapons system were introduced next year, what would you recommend doing differently than was done with the Dragon?

The major issue in introduction of the Dragon was coordination. One unit had equipment long before it had the materials and opportunity for training gunners; the result was that training was given a priority only just before live firing, and the impact of the training was limited in scope. In the other unit, people were trained well in advance of equipment availability--the reverse situation--and this also, was seen as unsatisfactory.

Both units suggested the mobile training team approach, to be coordinated with arrival of the equipment, to provide training in tactics as well as gunnery, and to indoctrinate a larger group of leaders as well as troops.

Both units also emphasized the need for providing a full range of equipment, pyrotechnics, and factually correct manuals at the time equipment is available. Whatever arrives initially is what will get the main use; if training aids, pyrotechnics, or documentation of methods are missing in the introduction, they are much less likely to be used later, because unit practices will already have been established.