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SMALL ARMS WEAPON SYSTEMS [redacted] (SAWS).

PART TWO: ANNEXES.

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U. S. ARMY COMBAT DEVELOPMENTS COMMAND
EXPERIMENTATION COMMAND FORT ORD, CALIFORNIA

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SMALL ARMS WEAPON SYSTEM (SAWS)
FIELD EXPERIMENT

In Two Parts

PART TWO: ANNEXES

HEADQUARTERS
UNITED STATES ARMY COMBAT DEVELOPMENTS COMMAND
EXPERIMENTATION COMMAND
Fort Ord, California

SMALL ARMS WEAPON SYSTEMS (SAWS) FIELD EXPERIMENT

(CDCEC 65-4)

10 May 1966

APPROVED:

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Major General, United States Army
Commanding

AUTHORITY

1. Letter, CDCRE-E, HQ, USACDC, 23 February 1965, subject: US Army Combat Developments Command Experimentation Center Experiment - Small Arms Weapon Systems (SAWS)

2. Directive, US Army Combat Developments Command, 5 March 1965, subject: Army Small Arms Weapon Systems Program (SAWS)

3. Outline Plan USACDCEC Experiment 65-4, Small Arms Weapon Systems (SAWS) (U), July 1965

4. Letter, CDCRE-E, HQ, USACDC, 7 September 1965, subject: Outline Plan, Small Arms Weapon Systems (SAWS) Experiment

CORRELATION

The Small Arms Weapon Systems (SAWS) Experiment is identified as USACDC Action Control No. M3523 and supports the following:

a.	Army Concept Program	Army 75
b.	Army Tasks	1: High Intensity Conflict 2: Mid Intensity Conflict 3: Low Intensity Conflict Type I 4: Low Intensity Conflict Type II 7: Complementing Allied Landpower
c.	Phase	Evaluation
d.	Functions	Firepower

CONTRACTUAL AGREEMENT

Scientific Support

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SQUAD ORGANIZATION AND OPERATIONAL POLICIES

Annex A

SQUAD ORGANIZATION AND OPERATIONAL POLICIES

This annex describes the squad organization and presents the operational policies of the experimentation squads in tabular form.

The directive required that the fire effectiveness of candidate weapons be determined within an organizational and tactical context. It specified that this was to be done by determining the fire effectiveness of rifle and machinegun squads armed with the candidate and Soviet weapons. The same representative tactical situations were to be used while holding organization constant and using the best firing techniques for each weapon.

The squad was selected as the organizational level of the experiment because:

1) It is the smallest discrete tactical organization

2) Instrumentation and safety limitations precluded a live firing experiment on a platoon or larger unit basis

3) Larger units and indirect fire support weapons (for example, mortars and artillery, given the present characteristics of these weapons) were not essential within the context of the experiment to identify the best small arms weapon system

4) Variables introduced by the use of larger units with associated indirect fire support weapons would have introduced experimentation error great enough to obscure any differences attributable to the candidate weapons

5) Conduct of the experiment on the basis of rifle and machinegun squads would permit computation of platoon fire effectiveness by synthesis--this is possible because data for the component squads were obtained individually in all combat situations from the same target arrays with proper reference to time.

Selection of a two fire team (nine-man) rifle squad provided duplication of special functions that are typical of the squad, such as those of the automatic rifleman, and permitted economy of experimentation

subjects, weapons, and ammunition. As in the case of rifle squads, a two element (seven-man, two machinegun) organization for the machinegun squad was both more useful experimentally and is similar to traditional and current policies in assignment of machineguns in pairs. A conventional machinegun team size that was adequate for carrying the system weight of the heaviest candidate weapon was thereby provided.

Squad organization was held constant throughout the experiment. A valid comparison of weapon effectiveness could not have been made in the time available if weapon mixes and organizations had both varied. Within the practical limitations on variations in organization, the weapon system that was superior with a median organization would likely be the best system with any organization. A best organization might have improved the per-man effectiveness or efficiency of a particular small arms weapon system, but it would not likely have changed the ordering of the weapons.

The directive specified that the best organization for the superior weapon system be determined under Project IRUS.

In all the situations, experimentation subjects wore or carried helmets, pistol belts, first-aid cases and dressings, full canteens, ammunition pouches, combat packs with suspenders, entrenching tools, bayonets, and magazines or bandoleers.

Although the median squad organization applied to all squad weapon mixes does not affect the rank ordering of weapons, such a rank ordering can be sensitive to the firing techniques employed. Thus, for each weapon in each situation, it was necessary to identify the best firing techniques applicable. Unfortunately many intrarelated factors had to be considered. The most important elements were:

1) Burst size (length)

2) Ammunition mix

3) Sight settings

4) Position assumed by firer

5) Support for weapon (for example, bipod)

These elements, which are in a sense part of the techniques of fire and basic loads per weapon, have been termed "operational policies." The operational policies as they applied to each weapon and each situation in the field experiment are tabulated in Tables A-1 through A-20.

The operational policies generally originated in doctrine or approved techniques of fire when available. For the Colt, Stoner, and particularly

the Soviet weapons, such required information often was either not available or of questioned validity. Exploratory firing was conducted with individual firers, pairs of soldiers, and up to full squads to collect enough data for a decision on alternate firing techniques; for example, a choice between a two or three-round burst. It was often necessary to make a compromise among different elements. For example, with the 5.56mm weapons, more near misses (gross measure of suppression) can be scored with a four-round burst than with a two-round burst in a given situation. At the same time, the larger burst size and attendant increase in near misses are attained at the expense of higher ammunition consumption. Not only were tradeoffs considered in each situation, but when possible, like type weapons (the Colt and Stoner weapons) were employed under the same operational policies. The magnitude of the exploratory firing can be appreciated by noting the ammunition consumed. Table 5-1 shows the ammunition expended for each weapon type. Of the 2,306,940 rounds fired in the experiment, 372,342 (16 percent) were used to support exploratory firing.

As shown in Tables A-1 through A-20, each rifle squad weapon mix consisted of two parts, except as noted. The weapons in the second part (rifles, automatic rifles, or machineguns) were at automatic rifle (AR) system weights. Not shown in these tables are two additional mixes of nine M14 rifles and nine M16E1 rifles each. These mixes were formed and used to determine the learning that occurred when squads were repeatedly exposed to the same situation. Each squad fired Situation 8 three times, using the same operational policies as shown in Table A-9.

Table A-1

OPERATIONAL POLICIES RIFLE SQUAD IN LINE ASSAULT (Situation 1, Range A)

Squad Weapon Mix	Squads Used per Mix	Basic[A] Load (per weapon)	Ammunition Mix[B]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Marching, shoulder-pointed	N/A	M14 has no bipod
2 M14s		295	All tracer					
7 M14E2s	6	80	Ball	2 rd	Battlesight 250m zero	Marching, shoulder-pointed	N/A	Bipod folded back
2 M14E2s		240	1 ball to 1 tracer					
7 M16E1s	6	300	Ball	2 rd	Shortrange battlesight 250m zero[C]	Marching, shoulder-pointed	N/A	Bipod belt-carried
2 M16E1s		755	1 ball to 1 tracer					
7 Stoner rifles	6	186	Ball	2 rd	Shortrange battlesight 250m zero[C]	Marching, shoulder-pointed	N/A	Bipod belt-carried
2 Stoner rifles		546	1 ball to 1 tracer					
7 AK47s	5[D]	120	Ball[E]	Semi-auto	Battlesight 250m zero	Marching, shoulder-pointed	N/A	AK47 has no bipod
2 AK47s		332						
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Marching, shoulder-pointed	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd				Bipod folded back
7 M16E1s	6	300	Ball	2 rd	Shortrange battlesight 250m zero[C]	Marching, shoulder-pointed	N/A	Bipod belt-carried
2 Colt ARs		724	1 ball to 1 tracer					
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero[C]	Marching, shoulder-pointed	N/A	Bipod belt-carried
2 Stoner ARs		492	1 ball to 1 tracer		Battlesight 250m zero			

[A] To hold the weight carried by the M60 gunner to AR systems weight, while holding squad size (nine men) constant, two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[B] M14s and M14E2s used 20-round magazines, M16E1s, Colt automatic rifles, Stoner rifles, automatic rifles, and the AK47s used 30-round magazines. M60 machinegun used 100-round bandoleers, Stoner machinegun used 150-round bandoleers, RPD used 100-round drums

[C] The rifle sight was set with the short side of the L-type battlesight up.

[D] Due to a shortage of AK47s each AK47 squad used the same nine weapons.

[E] No tracer ammunition was available.

[F] Carried between gunner and assistant gunner.

[G] Initially, no tracer ammunition was available, however, a second series was conducted in January 1966 to compare the AK47 in automatic fire.

Table A-1 (Concluded)

OPERATIONAL POLICIES RIFLE SQUAD IN LINE ASSAULT (Situation 1, Range A)

Squad Weapon Mix	Squads Used per Mix	Basic[a] Load (per weapon)	Ammunition Mix[a]	Burst Length	Sight Setting	Position	Support	Remarks
5 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Marching, shoulder-pointed	N/A	M14 has no bipod
2 M60 MGs		294[g]	3 ball to 1 tracer	4 rd	Zeroed at 400m rear sight on 300m	Marching, underarm	Sling	Bipod folded back
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero[c]	Marching, shoulder-pointed	N/A	Bipod belt-carried
2 Stoner MGs		600	3 ball to 1 tracer	4 rd	Zeroed at 400m battlesight 200m	Marching, underarm	Sling	
7 AK47s	5[b]	120	Ball	Semi-auto	Battlesight 250m zero	Marching, shoulder-pointed	N/A	AK47 has no bipod
2 RPDs		300		4 rd	Zeroed at 300m rear sight on 300m	Marching, underarm	Sling	Bipod folded back
7 M16E1s	4	300	Ball	2 rd	Shortrange battlesight 250m zero[c]	Marching, shoulder-pointed	N/A	Bipod belt-carried
2 Stoner MGs		600	3 ball to 1 tracer	4 rd	Zeroed at 400m battlesight 200m	Marching, underarm	Sling	
9 Colt ARs	4	268	Ball	Semi-auto	Shortrange battlesight 250m zero[c]	Marching, shoulder-pointed	N/A	Bipod belt-carried
				2 rd				
9 M16E1s	4	300		Semi-auto				
				2 rd				
7 AK47s[f]	3	120	Ball	2 rd	Battlesight 250m zero	Marching, shoulder-pointed	N/A	AK47 has no bipod
2 AK47s[f]		332	1 ball to 1 tracer					
7 AK47s[f]	2	120	Ball	Semi-auto				
2 AK47s[f]		332	All tracer					

NOTES

1 Operational Policy. There were nine lanes. Squad leader was in lane five; automatic rifles, machineguns and rifles representing automatic rifles, were in lanes two and eight, from right to left. Other squad members were in the remaining lanes, right to left, in decreasing order of their marksmanship scores. Firers in lanes one through four fired on the right half of the squad sector, and five through nine on the left half of the squad sector, or directly at a target when they saw one. Most firers did not use sights in marching fire as they were instructed to point rather than to aim through the sights. However, these are the settings that were placed on the weapons.

2 M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-2

OPERATIONAL POLICIES RIFLE SQUAD AS BASE OF FIRE SUPPORTING THE ASSAULT
(Situation 2, Range A)

Squad Weapon Mix	Squads Used per Mix	Basic Load[a] (per weapon)	Ammunition Mix [b]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	M14 has no bipod
2 M14s		295	All tracer					
7 M14E2s	6	80	Ball	2 rd	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	Bipod and hinged butt plate	
2 M14E2s		260	1 ball to 1 tracer					
7 M16E1s	6	300	Ball	2 rd	Shortrange battlesight[c] 250m zero	Hasty foxhole, shoulder-aimed	Bipod	
2 M16E1s		759	1 ball to 1 tracer					
7 Stoner rifles	6	150	Ball	2 rd	Shortrange battlesight 250m zero[c]	Hasty foxhole, shoulder-aimed	Bipod	
2 Stoner rifles		546	1 ball to 1 tracer					
7 AK47s	5[d]	120	Ball [e]	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	AK47 has no bipod
2 AK47s		332						
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod and hinged butt plate	
7 M16E1s	6	300	Ball	2 rd	Shortrange battlesight 250m zero[c]	Hasty foxhole, shoulder-aimed	Bipod	
2 Colt ARs		724	1 ball to 1 tracer					

[a] To hold the weight carried by the M60 gunner to AR systems weight, while holding squad size (nine men) constant, two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[b] M14s and M14E2s used 20-round magazines, M16E1s, Colt automatic rifles, Stoner rifles, automatic rifles, and the AK47s used 30-round magazines. M60 machinegun used 100-round bandoleers. Stoner machinegun used 150-round bandoleers. RPD used 100-round drums.

[c] The rifle sight was set with the short side of the L-type battlesight up.

[d] Due to a shortage of AK47s, each AK47 squad used the same nine weapons.

[e] No tracer ammunition was available.

[f] Carried between gunner and assistant gunner.

Table A-2 (Concluded)

OPERATIONAL POLICIES RIFLE SQUAD AS BASE OF FIRE SUPPORTING THE ASSAULT (Situation 2, Range A)

Squad Weapon Mix	Squads Used per Mix	Basic Load (per weapon) [a]	Ammunition Mix [b]	Burst Length	Sight Setting	Position	Support	Remarks
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero [c]	Hasty foxhole, shoulder-aimed	Bipod	
2 Stoner ARs		492	1 ball to 1 tracer		Zeroed at 250m rear sight on 300m			
5 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	M14 has no bipod
2 M60 MGs		294 [f]	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 300m		Bipod and hinged butt plate	
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero [c]	Hasty foxhole, shoulder-aimed	Bipod	
2 Stoner MGs		600	4 ball to 1 tracer	6 rd	Zeroed at 400m battlesight 200m			
7 AK47s	5 [g]	120	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	AK47 has no bipod
2 RPDs		300		6 rd	Zeroed at 300m rear sight on 300m		Bipod	
7 M16E1s	4	300	Ball	2 rd	Shortrange battlesight 250m zero [c]	Hasty foxhole, shoulder-aimed	Bipod	
2 Stoner MGs		600	4 ball to 1 tracer	6 rd	Zeroed at 400m battlesight 200m			
9 Colt ARs	4	268	Ball	Semi-auto	Shortrange battlesight 250m zero [c]	Hasty foxhole, shoulder-aimed	Bipod	
				2 rd				
9 M16E1s	4	360		Semi-auto				
				2 rd				

NOTES

1 Operational Policy. There were nine positions. Squad leader was in position five; automatic rifles, machineguns and rifles representing automatic rifles, were in positions three and seven (from right to left). Other squad members were in the remaining positions (right to left) in decreasing order of their marksmanship scores. Riflemen in positions one through four fired on the right half of the target arrays, and five through nine on the left half of the target arrays, with assigned fire priorities first to targets of opportunity and second to an even distribution of fire. The assigned fire priorities of ARs and machineguns were first priority to automatic weapons targets, second to other targets of opportunity, and third to an even distribution of fire. The two ARs or machineguns traversed from opposite flanks of the array to its center. MGs changed barrels after firing 1 minute 45 seconds on the left target array. The time required to change barrels was administrative; however, it was recorded. The total firing time for each array was two minutes. The M60 machinegunner assistant was permitted to assist the gunner in target acquisition.

2 M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-3

OPERATIONAL POLICIES MACHINEGUN SQUAD IN FIRE SUPPORT OF THE ASSAULT (Situation 3, Range A)

Squad Weapon Mix	Squad Used per Mix	Basic Load [A] (per weapon)	Ammunition Mix	Burst Length	Sight Setting	Position	Support	Remarks
2 M60 bipod MGs	6	1000	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 300m	Hasty foxhole, shoulder-aimed	Bipod	
2 M60 tripod MGs	6	800	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 300m	Hasty foxhole, shoulder-aimed	Tripod using traversing and elevating mechanism[B]	
2 Stoner bipod MGs	6	2850	4 ball to 1 tracer	6 rd	Zeroed at 400m battlesight 200m	Hasty foxhole, shoulder-aimed	Bipod	
2 Stoner tripod MGs	6	2298	4 ball to 1 tracer	6 rd	Zeroed at 400m battlesight 200m	Hasty foxhole, shoulder-aimed	Tripod using traversing and elevating mechanism[B]	
2 RPD MGs	5	1000	4 ball to 1 tracer	6 rd	Zeroed at 300m rear sight on 300m	Hasty foxhole, shoulder-aimed	Bipod	
2 DPM MGs	4	752	Ball [C]	6 rd	Zeroed at 300m rear sight on 300m	Hasty foxhole, shoulder-aimed	Bipod	

[A] M60s used 200-round ammunition boxes, Stoner machineguns used 900-round ammunition boxes; the DPM used 47-round drums; the RPD used 100-round drums.

[B] Gunner wore glove on left hand while using traversing and elevating mechanism.

[C] Initially, no tracer ammunition was available, however, due to a high rate of malfunctions with the ammunition and drums, this mix was fired again.

NOTES

1 Operational Policy. Assigned fire priorities were first to automatic weapons targets, second to other targets of opportunity, and third to an even distribution of fire. The two machineguns traversed from opposite flanks of the target array to its center. Barrels were changed (except for the DPM) after firing for 1 minute and 45 seconds on the left target array. DPM barrel was allowed to cool before firing was resumed. The time to change barrels was administrative; however, it was recorded. Machineguns were in positions three and seven and fired for a total of two minutes on each target array.

2 Each machinegunner assistant and ammunition bearer carried a .45 caliber pistol with hip holster and three magazines.

Table A-4

OPERATIONAL POLICIES RIFLE SQUAD IN APPROACH TO CONTACT (Situation 4, Range B)

Squad Weapon Mix	Squads Used per Mix	Basic[a] Load (per weapon)	Ammunition Mix [b]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Quick-fire	N/A	M14 has no bipod
2 M14s		295	All tracer					
7 M14E2s	6	80	Ball	2 rd	Battlesight 250m zero	Quick-fire	N/A	Bipod folded back
2 M14E2s		260	1 ball to 1 tracer					
7 M16E1s	6	300	Ball	2 rd	Shortrange battlesight 250m zero [c]	Quick-fire	N/A	Bipod belt-carried
2 M16E1s		759	1 ball to 1 tracer					
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero [c]	Quick-fire	N/A	Bipod belt-carried
2 Stoner rifles		546	1 ball to 1 tracer					
7 AK47s	5 [d]	120	Ball [e]	Semi-auto	Battlesight 250m zero	Quick-fire	N/A	AK47 has no bipod
2 AK47s		332						
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Quick-fire	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd				Bipod folded back
7 M16E1s	6	300	Ball	2 rd	Shortrange battlesight 250m zero [c]	Quick-fire	N/A	Bipod belt-carried
2 Colt ARs		724	1 ball to 1 tracer					
7 Stoner ARs	6	180	Ball	2 rd	Shortrange battlesight 250m zero [c]	Quick-fire	N/A	Bipod belt-carried
2 Stoner ARs		492	1 ball to 1 tracer		Battlesight 250m zero			
5 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Quick-fire	N/A	M14 has no bipod
2 M60 MGs		294 [f]	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 300m	Underarm	Sling	Bipod down

[a] To keep the weight carried by the M60 gunner at AR systems weight, while keeping squad size (nine men) constant, two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[b] M14s and M14E2s used 20-round magazines, M16E1s, Colt automatic rifles, Stoner rifles, automatic rifles, and the AK47s used 30-round magazines. M60 machinegun used 100-round bandoleers, Stoner machinegun used 150-round bandoleers, RPD used 100-round drums.

[c] The rifle sight was set with the short side of the L-type battlesight up.

[d] Due to a shortage of AK47s, each AK47 squad used the same nine weapons.

[e] No tracer ammunition was available.

[f] Carried between gunner and assistant gunner.

[g] Initially, no tracer ammunition was available; however, a second series was conducted in January 1966 to evaluate the AK47 in automatic fire.

Table A-4 (Concluded)

OPERATIONAL POLICIES RIFLE SQUAD IN APPROACH TO CONTACT (Situation 4, Range B)

Squad Weapon Mix	Squads Used per Mix	Basic Load[A] (per weapon)	Ammunition Mix[B]	Burst Length	Sight Setting	Position	Support	Remarks
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero[C]	Quick-fire	N/A	Bipod belt-carried
2 Stoner MGs		600	4 ball to 1 tracer	6 rd	Zeroed at 400m battle-sight 200m	Underarm	Sling	Bipod down
7 AK47s	5[D]	120	Ball	Semi-auto	Battlesight 250m zero	Quick-fire	N/A	AK47 has no bipod
2 RPDs		300		6 rd	Zeroed at 300m rear sight on 300m	Underarm	Sling	Bipod down
7 M16E1s	4	300	Ball	2 rd	Shortrange battlesight 250m zero[C]	Quick-fire	N/A	Bipod belt-carried
2 Stoner MGs		600	4 ball to 1 tracer	6 rd	Zeroed at 400m battle-sight 200m	Underarm	Sling	Bipod down
9 Colt ARs	4	268	Ball	Semi-auto 2 rd	Shortrange battlesight 250m zero[C]	Quick-fire	N/A	Bipod belt-carried
9 M16E1s	4	300		Semi-auto 2 rd				
7 AK47s[E]	3	120	Ball	2 rd	Battlesight 250m zero	Quick-fire	N/A	AK47 has no bipod
2 AK47s[E]		332	1 ball to 1 tracer					
7 AK47s[E]	2	120	Ball	Semi-auto				
2 AK47s[E]		332	All tracer					

NOTES

1 Operational Policy. There were nine lanes. Squad leader was in lane five; automatic rifles, machineguns and rifles representing automatic rifles, were in lanes three and seven (from right to left). Other squad members were in the remaining lanes (right to left) in decreasing order of their marksmanship scores. The firers were instructed that they could either point or aim, so long as the weapon butt was in the shoulder. Target exposure times, however, were deliberately short to cause the men to point. Firers engaged targets as they saw them.

2 M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-5

OPERATIONAL POLICIES RIFLE SQUAD AS BASE OF FIRE SUPPORTING THE ADVANCE
(Situation 5, Range B)

Squad Weapon Mix [A]	Squads Used per Mix	Basic Load (per weapon) [B, C]	Ammunition Mix [D]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Prone, shoulder-aimed	N/A	M14 has no bipod
2 M14s		295	All tracer					
7 M14E2s	6	80	Ball	Semi-auto	Battlesight 250m zero	Prone, shoulder-aimed	Bipod	
2 M14E2s		260	All tracer					
7 M16E1s	6	300	Ball	Semi-auto	Longrange battlesight 250m zero [E]	Prone, shoulder-aimed	Bipod	
2 M16E1s		759	All tracer					
7 Stoner rifles	6	180	Ball	Semi-auto	Longrange battlesight 250m zero [E]	Prone, shoulder-aimed	Bipod	
2 Stoner rifles		546	All tracer					
7 AK47s	5 [F]	120	Ball [G]	Semi-auto	Zeroed at 250m rear sight on 400m and 500m respectively for target arrays X and Y	Prone, shoulder-aimed	N/A	AK47 has no bipod
2 AK47s		332						
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Prone, shoulder-aimed	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod and hinged butt plate	
7 M16E1s	6	300	Ball	Semi-auto	Longrange battlesight 250m zero [E]	Prone, shoulder-aimed	Bipod	
2 Colt ARs		124	1 ball to 1 tracer	2 rd				
7 Stoner rifles	6	180	Ball	Semi-auto	Longrange battlesight 250m zero [E]	Prone, shoulder-aimed	Bipod	
2 Stoner ARs		492	1 ball to 1 tracer	2 rd	Zeroed at 250m rear sight on 300m and 400m respectively for target arrays X and Y			

[A] The machinegun squads, as listed in Table A-6, also fired this situation.

[B] To keep the weight carried by the M60 gunner to AR systems weight, while keeping squad size constant (nine men), two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[C] A separate basic load was issued for firing on each target array.

[D] M14 and M14E2 used 20-round magazines, M16E1, Colt automatic rifles, Stoner rifle, Stoner automatic rifle, and AK47 used 30-round magazines. M60 machinegun used 100-round bandoleers; Stoner machinegun used 150-round bandoleers; RPD used 100-round drums.

[E] The rifle sight was set with the long side of the L-type battlesight up.

[F] Due to a shortage of AK47s, each AK47 squad used the same nine weapons.

[G] No tracer ammunition was available.

[H] Carried between gunner and assistant gunner.

Table A-5 (Concluded)

OPERATIONAL POLICIES RIFLE SQUAD AS BASE OF FIRE SUPPORTING THE ADVANCE (Situation 5, Range B)

Squad Weapon Mix[a]	Squads Used per Mix	Basic Load (per weapon)	Ammunition Mix[b]	Burst Length	Sight Setting	Position	Support	Remarks
5 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Prone, shoulder-aimed	N/A	M14 has no bipod
2 M60 MGs		294[h]	1 ball 1 tracer	2 rd	Zeroed at 400m rear sight on 400m		Bipod	
7 Stoner rifles	6	180	Ball	Semi-auto	Longrange battlesight 250m zero[c]	Prone, shoulder-aimed	Bipod	
2 Stoner MGs		600	1 ball to 1 tracer	2 rd	Zeroed at 400m battlesight 200m			
7 AK47s	5[f]	120	Ball	Semi-auto	Zeroed at 250m rear sight on 400m and 500m respectively for target arrays X and Y	Prone, shoulder-aimed	N/A	AK47 has no bipod
2 RPDs		300		2 rd	Zeroed at 300m rear sight on 400m and 500m respectively for target arrays X and Y		Bipod	
7 M16E1s	4	300	Ball	Semi-auto	Longrange battlesight 250m zero[c]	Prone, shoulder-aimed	Bipod	
2 Stoner MGs		600	1 ball to 1 tracer	2 rd	Zeroed at 400m battlesight 200m			
9 Colt ARs	4	268	Ball	Semi-auto 2 rd	Longrange battlesight 250m zero[c]	Prone, shoulder-aimed	Bipod	
9 M16E1s	4	300		Semi-auto 2 rd				

NOTES

1 Operational Policy. There were nine positions. Squad leader was in position five; automatic rifles, machineguns and rifles representing automatic rifles, were in positions three and seven (from right to left). Other squad members were in the remaining positions (right to left), in decreasing order of their marksmanship scores. Riflemen in positions one through four fired on the right half of the target arrays and five through nine on the left half of the target arrays with assigned fire priorities first to targets of opportunity and second to an even distribution of fire. The assigned fire priorities of ARs and machineguns were first priority to automatic weapons targets, second to other targets of opportunity, and third to an even distribution of fire. The two ARs or machineguns traversed from opposite flanks of the array to its center. After firing for two minutes on target array X, the squad's MGs changed barrels. The time required to change barrels was administrative; however, it was recorded. The squad then fired for two minutes on target array Y. The M60 machinegunner assistant was permitted to assist the gunner in target acquisition.

2 M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-6

OPERATIONAL POLICIES MACHINEGUN SQUAD IN FIRE SUPPORT OF THE ADVANCE (Situation 6, Range B)

Squad Weapon Mix	Squads Used per Mix	Basic Load[A] (per weapon)	Ammunition Mix[B]	Burst Length	Sight Setting	Position	Support	Remarks
2 M60 bipod MGs	6	1000	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 400m for target array Z and 600m for target arrays X and Y	Prone, shoulder-aimed	Bipod with hinged butt plate	
2 M60 tripod MGs	6	800	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 400m for target array Z and 600m for target arrays X and Y	Prone, shoulder-aimed	Tripod with hinged butt plate	Free gun
2 Stoner bipod MGs	6	2850	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 400m for target array Z and 600m for target arrays X and Y	Prone, shoulder-aimed	Bipod	
2 Stoner tripod MGs	6	2298	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 400m for target array Z and 600m for target arrays X and Y	Prone, shoulder-aimed	Tripod	Free gun
2 RPD MGs	5	800	4 ball to 1 tracer	6 rd	Zeroed at 300m rear sight on 600m, 700m, and 400m respectively for target arrays X, Y, and Z	Prone, shoulder-aimed	Bipod	
2 DPM MGs	4	752	Ball	6 rd	Zeroed at 300m rear sight on 600m for X and Y target arrays and 400m for Z	Prone, shoulder-aimed	Bipod	

[A] A separate basic load was issued for firing on each target array.

[B] M60 used 200-round ammunition boxes, Stoner machineguns used 900-round ammunition boxes; DPM used 47-round drums, the RPD used 100-round drums.

NOTES

1 Operational Policy. Assigned fire priorities were first to automatic weapons targets, second to other targets of opportunity, and third to an even distribution of fire. The two machineguns traversed from opposite flanks of the target array to its center. The squad fired for two minutes each on target arrays Z, X and Y, respectively. Barrels were changed (except for the DPM) after firing on target arrays Z and X. DPM barrel was allowed to cool before firing on the next array. The time to change barrels was administrative; however, it was recorded.

2 Each machinegunner assistant and ammunition bearer carried a .45 caliber pistol with hip holster and three magazines.

Table A-7

OPERATIONAL POLICIES RIFLE SQUAD IN DEFENSE AGAINST ATTACK (SERIES ONE)
(Situation 7, Range C)

Squad Weapon Mix	Squads Used per Mix	Basic Load[a] (per weapon)	Ammunition Mix[b]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	M14 has no bipod
2 M14s		295	All tracer					
7 M14E2s	6	80	Ball	2 rd	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	Bipod	
2 M14E2s		260	1 ball to 1 tracer					
7 M16E1s	6	300	Ball	2 rd	Shortrange battlesight 250m zero[c]	Hasty foxhole, shoulder-aimed	N/A	Bipod belt-carried
2 M16E1s		759	1 ball to 1 tracer					
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero[c]	Hasty foxhole, shoulder-aimed	N/A	Bipod belt-carried
2 Stoner rifles		546	1 ball to 1 tracer					
7 AK47s	5[d]	120	Ball[e]	2 rd	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	AK47 has no bipod
2 AK47s		332						
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod	
7 M16E1s	6	300	Ball	2 rd	Shortrange battlesight 250m zero[c]	Hasty foxhole, shoulder-aimed	N/A	Bipod belt-carried
2 Colt ARs		724	1 ball to 1 tracer				Bipod	

[a] To hold the weight carried by the M60 gunner to AR systems weight, while holding squad size (nine men) constant, two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[b] M14s and M14E2s used 20-round magazines; M16E1s, Colt Automatic rifles, Stoner rifles, automatic rifles, and the AK47s used 30-round magazines. M60 machinegun used 100-round bandoleers, Stoner machinegun used 150-round bandoleers; RPD used 100-round drums.

[c] The rifle sight was set with the short side of the L-type battlesight up.

[d] Due to a shortage of AK47s, each AK47 squad used the same nine weapons.

[e] No tracer ammunition was available.

[f] Carried between gunner and assistant gunner.

Table A-7 (Concluded)

OPERATIONAL POLICIES RIFLE SQUAD IN DEFENSE AGAINST ATTACK (SERIES ONE) (Situation 7, Range C)

Squad Weapon Mix	Squads Used per Mix	Basic Load[A] (per weapon)	Ammunition Mix[B]	Burst Length	Sight Setting	Position	Support	Remarks
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero[C]	Hasty foxhole, shoulder-aimed	N/A	Bipod belt-carried
2 Stoner ARs		492	1 ball to 1 tracer		Battlesight 250m zero		Bipod	
5 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder, aimed	N/A	M14 has no bipod
2 M60 MGs		294[F]	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m		Bipod	
7 Stoner rifles	6	180	Ball	2 rd	Shortrange battlesight 250m zero[C]	Hasty foxhole, shoulder-aimed	N/A	Bipod belt-carried
2 Stoner MGs		600	1 ball to 1 tracer		Zeroed at 400m battlesight 200m		Bipod	
7 AK47s	5[D]	120	Ball	2 rd	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	AK47 has no bipod
2 RPDs		300	1 ball to 1 tracer		Zeroed at 300m rear sight on 300m		Bipod	
7 M16E1s	4	300	Ball	2 rd	Shortrange battlesight 250m zero[C]	Hasty foxhole, shoulder-aimed	N/A	Bipod belt-carried
2 Stoner MGs		600	1 ball to 1 tracer		Zeroed at 400m battlesight 200m		Bipod	
9 Colt ARs	4	268	Ball	Semi-auto	Shortrange battlesight 250m zero[C]	Hasty foxhole, shoulder-aimed	N/A	Bipod belt-carried
				2 rd				
9 M16E1s	4	300		Semi-auto				
				2 rd				

NOTES

1 Operational Policy. There were nine positions. Squad leader was in position five, automatic rifles, machineguns and rifles representing automatic rifles were in positions four and seven (from right to left). Other squad members were in the remaining positions (right to left), in decreasing order of their marksmanship scores. Firers fired at targets as they saw them. The M60 machinegunner assistant was permitted to assist the gunner in target acquisition.

2 M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-8

OPERATIONAL POLICIES RIFLE SQUAD IN DEFENSE AGAINST ATTACK (SERIES TWO) (Situation 7, Range C)

Squad Weapon Mix	Squads Used per Mix [a]	Basic Load [b] (per weapon)	Ammunition Mix [c]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	(3) 6 (3)	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed, prone	N/A	M14 has no bipod
2 M14s		295	All tracer					
7 M14s		100	Ball	2 rd				
2 M14s		295	1 ball to 1 tracer					
7 M14s	(3) 6 (3)	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed, prone	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod	
7 M14s		100	Ball	2 rd			N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer				Bipod	
7 M16E1s	(3) 6 (3)	300	Ball	Semi-auto	Shortrange battlesight 250m zero [g]	Hasty foxhole, shoulder-aimed, prone	N/A	Bipod belt-carried
2 M16E1s		759	All tracer					
7 M16E1s		300	Ball	2 rd				
2 M16E1s		759	1 ball to 1 tracer					
7 M16E1s	(3) 6 (3)	300	Ball	Semi-auto	Shortrange battlesight 250m zero [g]	Hasty foxhole, shoulder-aimed, prone	N/A	Bipod belt-carried
2 Colt ARs		724	1 ball to 1 tracer	2 rd			Bipod	
7 M16E1s		300	Ball	2 rd			N/A	Bipod belt-carried
2 Colt ARs		724	1 ball to 1 tracer				Bipod	
7 Stoner rifles	(3) 6 (3)	180	Ball	Semi-auto	Shortrange battlesight 250m zero [g]	Hasty foxhole, shoulder-aimed, prone	N/A	Bipod belt-carried
2 Stoner rifles		546	All tracer					
7 Stoner rifles		180	Ball	2 rd				
2 Stoner rifles		546	1 ball to 1 tracer					

[a] Three of the squads fired semiautomatic, the other three squads fired automatic, except for the AK47 mix where three and two were used

[b] To keep the weight carried by the M60 gunner to AR systems weight, while keeping squad size (nine men) constant two of the seven riflemen were used as assistant machinegunners to carry ammunition

[c] M14s and M14E2s used 20-round magazines, M16E1s Colt automatic rifles Stoner rifles, automatic rifles and the AK47s used 30-round magazines. M60 machinegun used 100-round bandoleers, stoner machinegun used 150-round bandoleers

[g] The rifle sight was set with the short side of the L-type battlesight up

[f] Carried between gunner and assistant gunner

[e] Due to a shortage of AK47s each AK47 squad used the same nine weapons

[d] No tracer ammunition was available

Table A-8 (Concluded)

OPERATIONAL POLICIES RIFLE SQUAD IN DEFENSE AGAINST ATTACK (SERIES TWO) (Situation 7, Range C)

Squad Weapon Mix	Squads Used per Mix[A]	Basic Load[B] (per weapon)	Ammunition Mix[C]	Burst Length	Sight Setting	Position	Support	Remarks
7 Stoner rifles	(3)	180	Ball	Semi-auto	Short-range battlesight 250m zero[D]	Hasty foxhole, shoulder-aimed, prone	N/A	Bipod belt-carried
2 Stoner ARs		492	1 ball : 1 tracer	2 rd	Battlesight 250m zero		Bipod	
7 Stoner rifles	6	140	Ball	2 rd	Short-range battlesight 250m zero[D]		N/A	Bipod belt-carried
2 Stoner ARs	(3)	492	1 ball to 1 tracer		Battlesight 250m zero		Bipod	
5 M14s	(3)	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole shoulder-aimed, prone	N-A	M14 has no bipod
2 M60 MGs		254[E]	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m		Bipod	
7 M14s	6	100	Ball	Semi-auto	Battlesight 250m zero		N-A	M14 has no bipod
2 M60 MGs	(3)	254[E]	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m		Bipod	
7 M14E2s	(3)	90	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed, prone	Bipod	
2 M14E2s		260	All tracer					
7 M14E2s	6	80	Ball	2 rd				
2 M14E2s	(3)	260	1 ball to 1 tracer					
7 Stoner rifles	(3)	180	Ball	2 rd	Short-range battlesight 250m zero[D]	Hasty foxhole, shoulder-aimed, prone	None	Bipod belt-carried
2 Stoner MGs		600	4 ball to 1 tracer	6 rd	Zeroed at 400m battlesight on 200m		Bipod	
7 Stoner rifles	6	180	Ball	2 rd	Short-range battlesight 250m zero[D]		None	Bipod belt-carried
2 Stoner MGs	(3)	600	1 ball to 1 tracer		Zeroed at 400m battlesight on 200m		Bipod	
7 AK47s	(3)	120	Ball[G]	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed, prone	N/A	AK47 has no bipod
2 AK47s		332						
7 AK47s	5[F]	120		2 rd				
2 AK47s	(2)	332						

NOTES

1 Operational Policy. Because time permitted, a second cycle was fired on Range C, with the squads previously used. This was done to compare semiautomatic fire and automatic fire. There were nine positions. Squad leader was in position five, automatic rifles, machineguns and rifles representing automatic rifles were in positions four and seven (from right to left). Other squad members were in the remaining positions (right to left), in decreasing order of their marksmanship scores. Firers fired at targets as they saw them.

2 M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-9

OPERATIONAL POLICIES RIFLE SQUAD IN NIGHT DEFENSE AGAINST ATTACK (SERIES ONE) (Situation 8, Range C)

Squad Weapon Mix	Squads Used per Mix	Basic Load[A] (per weapon)	Ammunition Mix[B]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	6	100	All tracer	Semi-auto	Battlesight 250m zero	Hasty fox-hole, shoulder-pointed	N/A	M14 has no bipod
2 M14s		295						
7 M14E2s	6	80	1 ball to 1 tracer	2 rd	Battlesight 250m zero	Hasty fox-hole, shoulder-pointed	Bipod	
2 M14E2s		260						
7 M16E1s	6	300	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero[C]	Hasty fox-hole, shoulder-pointed	Bipod	
2 M16E1s		759						
7 Stoner rifles	6	180	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero[C]	Hasty fox-hole, shoulder-pointed	Bipod	
2 Stoner rifles		546						
7 AK47s	5[D]	120	1 ball to[E] 1 tracer	2 rd	Battlesight 250m zero	Hasty fox-hole, shoulder-pointed	N/A	AK47 has no bipod
2 AK47s		332						
7 M14s	6	100	All tracer	Semi-auto	Battlesight 250m zero	Hasty fox-hole, shoulder-pointed	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod	
7 M16E1s	6	300	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero[C]	Hasty fox-hole, shoulder-pointed	Bipod	
2 Colt ARs		724						
7 Stoner rifles	6	180	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero[C]	Hasty fox-hole, shoulder-pointed	Bipod	
2 Stoner ARs		492			Battlesight 250m zero			

[A] To keep the weight carried by the M60 gunner to AR systems weight, while keeping squad size constant (nine men), two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[B] M14 and M14E2 used 20-round magazines; M16E1, Colt automatic rifles, Stoner rifle, Stoner automatic rifle, and AK47 used 30-round magazines. M60 machinegun used 100-round bandoleers, Stoner machinegun used 150-round bandoleers, RPD used 100-round drums.

[C] The rifle sight was set with the short side of the L-type battlesight up.

[D] Due to a shortage of AK47s, each AK47 squad used the same nine weapons.

[E] Due to a shortage of tracer ammunition, two squads fired all ball.

[F] Carried between gunner and assistant gunner.

Table A-9 (Concluded)

OPERATIONAL POLICIES RIFLE SQUAD IN NIGHT DEFENSE AGAINST ATTACK (SERIES ONE) (Situation 8, Range C)

Squad Weapon Mix	Squads Used per Mix	Basic Load [a] (per weapon)	Ammunition Mix [a]	Burst Length	Sight Setting	Position	Support	Remarks
5 M14s	6	100	All tracer	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	M14 has no bipod
2 M60 MGs		294 [b]	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m		Bipod	
7 Stoner rifles	6	180	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero [c]	Hasty foxhole, shoulder-pointed	Bipod	
2 Stoner MGs		600			Zeroed at 400m rear sight on 300m			
7 AK47s	5 [d]	120	1 ball to 1 tracer	2 rd	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	AK47 has no bipod
2 RPDs		300			Zeroed at 300m rear sight on 300m		Bipod	
7 M16E1s	4	300	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero [c]	Hasty foxhole, shoulder-pointed	Bipod	
2 Stoner MGs		600			Zeroed at 400m battlesight 200m			
9 Colt AKs	4	268	All tracer	Semi-auto	Shortrange battlesight 250m zero [c]	Hasty foxhole, shoulder-pointed	Bipod	
			1 ball to 1 tracer	2 rd				
9 M16E1s	4	300	All tracer	Semi-auto				
			1 ball to 1 tracer	2 rd				

NOTES

1 Operational Policy. There were nine positions, squad leader was in position five, automatic rifle, machineguns and rifles representing automatic rifles were in positions four and seven (from right to left). Other squad members were in the remaining positions (right to left), in decreasing order of their marksmanship scores. Firers fired at targets when they observed simulator flashes. Firers did not use their sights in night firing because they could not be seen, however, these are the settings placed on the weapons Of the five AK47 squads, only three fired tracer ammunition. The M60 machinegunner assistant was permitted to assist the gunner in target acquisition

2 M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-10

OPERATIONAL POLICIES RIFLE SQUAD IN NIGHT DEFENSE AGAINST ATTACK (SERIES TWO) (Situation 8, Range C)

Squad Weapon Mix	Squads Used per Mix [A]	Basic Load [B] (per weapon)	Ammunition Mix [C]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	(3)	100	All tracer	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	M14 has no bipod
2 M14s		295						
7 M14s	6	100	1 ball to 1 tracer	2 rd				
2 M14s	(3)	295						
7 M14s	(3)	100	Tracer	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod	
7 M14s	6	100	1 ball to 1 tracer	2 rd			N/A	M14 has no bipod
2 M14E2s	(3)	260					Bipod	
7 M16E1s	(3)	300	All tracer	Semi-auto	Shortrange battlesight 250m zero [D]	Hasty foxhole, shoulder-pointed	Bipod	
2 M16E1s		759						
7 M16E1s	6	300	1 ball to 1 tracer	2 rd				
2 M16E1s	(3)	759						
7 M16E1s	(3)	300	Tracer	Semi-auto	Shortrange battlesight 250m zero [D]	Hasty foxhole, shoulder-pointed	Bipod	
2 Colt ARs		724	1 ball to 1 tracer	2 rd				
7 M16E1s	6	300	1 ball to 1 tracer	2 rd				
2 Colt ARs	(3)	724						
7 Stoner rifles	(3)	150	All tracer	Semi-auto	Shortrange battlesight 250m zero [D]	Hasty foxhole, shoulder-pointed	Bipod	
2 Stoner rifles		546						
7 Stoner rifles	6	150	1 ball to 1 tracer	2 rd				
2 Stoner rifles	(3)	546						

[A] Three of the squads fired semiautomatic and the other three squads fired automatic.

[B] To keep the weight carried by the M60 gunner to AR systems weight, while keeping squad size (nine men), constant, two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[C] M14s and M14E2s used 20-round magazines; M16E1s, Colt automatic rifles, Stoner rifles, automatic rifles, and the AK47s used 30-round magazines. M60 machinegun used 100-round bandoleers, Stoner machinegun used 150-round bandoleers.

[D] The rifle sight was set with the short side of the L-type battlesight up.

[E] Carried between gunner and assistant gunner

[F] Due to a shortage of AK47s, each AK47 squad used the same nine weapons.

[G] No tracer ammunition was available.

Table A-10 (Concluded)

OPERATIONAL POLICIES RIFLE SQUAD IN NIGHT DEFENSE AGAINST ATTACK (SERIES TWO) (Situation 8, Range C)

Squad Weapon Mix	Squads Used per Mix [A]	Basic Load [B] (per weapon)	Ammunition Mix [C]	Burst Length	Sight Setting	Position	Support	Remarks
7 Stoner rifles	(3)	180	All tracer	Semi-auto	Shortrange battlesight 250m zero [D]	Hasty foxhole, shoulder-pointed	Bipod	
2 Stoner ARs		492	1 ball to 1 tracer	2 rd	Battlesight 250m zero			
7 Stoner rifles	6	180	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero [D]			
2 Stoner ARs	(3)	492			Battlesight 250m zero			
5 M14s	(3)	100	All tracer	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	M14 has no bipod
2 M60 MGs		294 [E]	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m		Bipod	
7 M14s	6	100	1 ball to 1 tracer	2 rd	Battlesight 250m zero		N/A	M14 has no bipod
2 M60 MGs	(3)	294 [E]			Zeroed at 400m rear sight on 300m		Bipod	
7 M14E2s	(3)	80	All tracer	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	Bipod	
2 M14E2s		260						
M14E2s	6	80	1 ball to 1 tracer	2 rd				
2 M14E2s	(3)	260						
7 Stoner rifles	(3)	180	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero [D]	Hasty foxhole, shoulder-pointed	Bipod	
2 Stoner MGs		600	4 ball to 1 tracer	6 rd	Zeroed at 400m battlesight on 200m			
7 Stoner rifles	6	180	1 ball to 1 tracer	2 rd	Shortrange battlesight 250m zero [D]			
2 Stoner MGs	(3)	600			Zeroed at 400m battlesight on 200m			
7 AK47s	(2)	120	Ball [G]	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	AK47 has no bipod
2 AK47s		332						
7 AK47s	5 [F]	120		2 rd				
2 AK47s	(3)	332						

NOTES

1 Operational Policy. Because time permitted, a second cycle was fired on Range C, with the squads previously used. This was done to compare semiautomatic fire and automatic fire. There were nine positions. Squad leader was in position five, automatic rifles, machineguns and rifles representing automatic rifles were in positions four and seven (from right to left). Other squad members were in the remaining positions (right to left), in decreasing order of their marksmanship scores. Firers fired at targets when they observed simulator flashes. Firers did not use sights in night firing because they could not be seen, however, these are the settings that were placed on the weapons.

2 M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-11

OPERATIONAL POLICIES MACHINEGUN SQUAD IN DEFENSE AGAINST ATTACK (Situation 9, Range C)

Squad Weapon Mix	Squads Used per Mix	Basic Load (per weapon)	Ammunition Mix [A]	Burst Length	Sight Setting	Position	Support	Remarks
2 M60 bipod MGs	6	1123	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m	Hasty foxhole, shoulder-aimed	Bipod	
2 M60 tripod MGs	6	900	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m	Hasty foxhole, shoulder-aimed	Tripod with hinged butt plate	Free gun
2 Stoner bipod MGs	6	3059	1 ball to 1 tracer	2 rd	Zeroed at 400m battlesight 200m	Hasty foxhole, shoulder-aimed	Bipod	
2 Stoner tripod MGs	6	2545	1 ball to 1 tracer	2 rd	Zeroed at 400m battlesight 200m	Hasty foxhole, shoulder-aimed	Tripod	Free gun
2 RPD MGs	5	800	1 ball to 1 tracer	2 rd	Zeroed at 300m rear sight on 300m	Hasty foxhole, shoulder-aimed	Bipod	
2 DPM MGs [B]	4	752	Ball	2 rd	Zeroed at 300m rear sight on 300m	Hasty foxhole, shoulder-aimed	Bipod	

[A] M60 used 100-round bandoleers; Stoner machinegunners used 150-round bandoleers; DPM used 47-round drums, and RPD used 100-round drums.

[B] Due to a high rate of malfunctions with ammunition and drums, this mix was fired again.

NOTES

1 Operational Policy. Machineguns were in foxholes four and seven and fired on targets as they saw them

2 Each machinegunner assistant and ammunition bearer carried a .45 caliber pistol with hip holster and three magazines.

Table A-12

OPERATIONAL POLICIES RIFLE SQUAD IN LINE ASSAULT (DUPLEX) (Situation 1, Range A)

Squad Weapon Mix	Squads Used per Mix	Basic Load* (per weapon)	Ammunition Mix	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	(3)	100	Ball	Semi-auto	Battlesight 250m zero	Marching, shoulder-pointed	N/A	M14 has no bipod
2 M14s		295						
7 M14s	6	100	Duplex					
2 M14s	(3)	295						
7 M14s	(3)	100	Ball	Semi-auto	Battlesight 250m zero	Marching, shoulder-pointed	N/A	M14 has no bipod
2 M14E2s		260		2 rd				Bipod folded back
7 M14s	6	100	Duplex	Semi-auto				M14 has no bipod
2 M14E2s	(3)	260		2 rd				Bipod folded back
7 M14E2s	(3)	80	Ball	2 rd	Battlesight 250m zero	Marching, shoulder-pointed	N/A	Bipod folded back
2 M14E2s		260						
7 M14E2s	6	80	Duplex					
2 M14E2s	(3)	260						

* M14 and M14E2 used 20-round magazines.

NOTE

Operational Policy. There were nine lanes. Squad leader was in lane five, automatic rifles and rifles representing automatic rifles were in lanes two and eight (from right to left). Other squad members were in the remaining lanes (right to left), in decreasing order of their marksmanship scores. Firers in lanes one through four fired on the right half of the squad sector, and five through nine on the left half of the squad sector, or directly at a target when they saw one. Most firers did not use sights in marching fire as they were instructed to point rather than to aim through the sights However, these are the settings that were placed on the weapons.

Table A-13

OPERATIONAL POLICIES RIFLE SQUAD AS BASE OF FIRE SUPPORTING THE ASSAULT (DUPLEX)
(Situation 2, Range A)

Squad Weapon Mix	Squads Used per Mix	Basic Load * (per weapon)	Ammunition Mix	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	(3)	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	M14 has no bipod
2 M14s		295						
7 M14s	6 (3)	100	Duplex					
2 M14s		295						
7 M14s	(3)	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N/A	M14 has no bipod
2 M14E2s		260		2 rd			Bipod and hinged butt plate	
7 M14s	6 (3)	100	Duplex	Semi-auto			N/A	M14 has no bipod
2 M14E2s		260		2 rd			Bipod and hinged butt plate	
7 M14E2s	(3)	80	Ball	2 rd	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	Bipod and hinged butt plate	
2 M14E2s		260						
7 M14E2s	6 (3)	80	Duplex					
2 M14E2s		260						

* M14 and M14E2 used 20-round magazines.

NOTE

Operational Policy. There were nine positions. Squad leader was in position five, automatic rifles, and rifles representing automatic rifles, were in positions three and seven (from right to left). Other squad members were in the remaining positions (right to left) in decreasing order of their marksmanship scores. Riflemen in positions one through four fired on the right half of the target arrays, and five through nine on the left half of the target arrays with assigned fire priorities first to targets of opportunity and second to an even distribution of fire. The assigned fire priorities of ARs were first to automatic weapons targets, second to other targets of opportunity, and third to an even distribution of fire. The two ARs traversed from opposite flanks of the array to its center. Squads fired for two minutes on each target array.

Table A-14

OPERATIONAL POLICIES MACHINEGUN SQUAD IN FIRE SUPPORT OF THE ASSAULT (DUPLEX) (Situation 3, Range A)

Squad Weapon Mix	Squads Used per Mix	Basic Load [A] (per weapon)	Ammunition Mix	Burst Length	Sight Setting	Position	Support	Remarks
2 M60 bipod MGs	(3)	1000	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 300m	Hasty fox-hole, shoulder-aimed	Bipod	
2 M60 bipod MGs	6 (3)		4 duplex to 1 tracer					
2 M60 tri-pod MGs	(3)	800	4 ball to 1 tracer				Tripod using traversing and elevating mechanism [B]	
2 M60 tri-pod MGs	6 (3)		4 duplex to 1 tracer					

[A] Machineguns used 200-round ammunition boxes.

[B] Gunner wore glove on left hand while using traversing and elevating mechanism.

NOTES

1 Operational Policy. Assigned fire priorities were first to automatic weapons targets, second to other targets of opportunity, and third to an even distribution of fire. The two machineguns traversed from opposite flanks of the array to its center. Barrels were changed after firing for 1 minute and 45 seconds on the left target array. This time was administrative although the time to change barrels was recorded. Machineguns were in positions three and seven and fired for a total of two minutes on each target array.

2 Each machinegunner assistant and ammunition bearer carried a .45 caliber pistol with hip holster and three magazines.

Table A-15

OPERATIONAL POLICIES RIFLE SQUAD IN APPROACH TO CONTACT (DUPLEX) (Situation 4, Range B)

Squad Weapon Mix	Squads Used per Mix	Basic Load* (per weapon)	Ammunition Mix	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	(3) 6 (3)	100	Ball	Semi-auto	Battlesight 250m zero	Quick-fire	N A	M14 has no bipod
2 M14s		295	All tracer					
7 M14s		100	Duplex					
2 M14s		295	All tracer					
7 M14s	(3) 6 (3)	100	Ball	Semi-auto	Battlesight 250m zero	Quick-fire	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd				Bipod folded back
7 M14s		100	Duplex	Semi-auto				M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd				Bipod folded back
7 M14E2s	(3) 6 (3)	80	Ball	2 rd	Battlesight 250m zero	Quick-fire	N/A	Bipod folded back
2 M14E2s		260	1 ball to 1 tracer					
7 M14E2s		80	Duplex					
2 M14E2s		260	1 ball to 1 tracer					

* M14 and M14E2 used 20-round magazines.

NOTE

Operational Policy. There were nine lanes. Squad leader was in lane five, automatic rifles, and rifles representing automatic rifles, were in lanes three and seven (from right to left). Other squad members were in the remaining lanes (right to left), in decreasing order of their marksmanship scores. The firers were instructed that they could either point or aim so long as the weapon butt was in the shoulder. However, target exposure times were deliberately short to cause the men to point. Firers engaged targets as they saw them.

Table A-16

OPERATIONAL POLICIES RIFLE SQUAD AS BASE OF FIRE SUPPORTING THE ADVANCE (DUPLEX) (Situation 5, Range B)

Squad Weapon Mix	Squads Used per Mix	Basic Load* (per weapon)	Ammunition Mix	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	(3) 6 (3)	100	Ball	Semi-auto	Battlesight 250m zero	Prone, shoulder-aimed	N/A	M14 has no bipod
2 M14s		295	All tracer					
7 M14s		100	Duplex					
2 M14s		295	All tracer					
7 M14s	(3) 6 (3)	100	Ball	Semi-auto	Battlesight 250m zero	Prone, shoulder-aimed	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod and hinged butt plate	
7 M14s		100	Duplex	Semi-auto			N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod and hinged butt plate	
7 M14E2s	(3) 6 (3)	80	Ball	Semi-auto	Battlesight 250m zero	Prone, shoulder-aimed	Bipod and hinged butt plate	
2 M14L2s		260	All tracer					
7 M14E2s		80	Duplex					
2 M14E2s		260	All tracer					

* M14 and M14E2 used 20-round magazines.

NOTE

Operational Policy. There were nine positions. Squad leader was in position five, automatic rifles, and rifles representing automatic rifles, were in positions three and seven (from right to left). Other squad members were in the remaining positions (right to left), in decreasing order of their marksmanship scores. Riflemen in positions one through four fired on the right half of the target arrays, and five through nine on the left half of the target arrays with assigned fire priorities first to targets of opportunity and second to an even distribution of fire. The assigned fire priorities of ARs was first to automatic weapons targets, second to other targets of opportunity, and third to an even distribution of fire. The two ARs traversed from opposite flanks of the array to its center. Squads fired for two minutes on each target array.

Table A-17

OPERATIONAL POLICIES MACHINEGUN SQUAD IN FIRE SUPPORT OF THE ADVANCE (DUPLEX) (Situation 6, Range B)

Squad Weapon Mix	Squads Used per Mix	Basic Load* (per weapon)	Ammunition Mix	Burst Length	Sight Setting	Position	Support	Remarks
2 M60 bipod MGs	6	1000	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 400m for target array Z and 600m for target arrays X and Y	Prone, shoulder-aimed	Bipod with hinged butt plate	
2 M60 bipod MGs			Duplex		Zeroed at 400m rear sight on 400m, 700m and 900m respectively for target arrays Z, X, and Y			
2 M60 tripod MGs	6	600	4 ball to 1 tracer	6 rd	Zeroed at 400m rear sight on 400m for target array Z and 600m for target arrays Z, X, and Y	Prone, shoulder-aimed	Tripod with hinged butt plate	Free gun
2 M60 tripod MGs			Duplex		Zeroed at 400m rear sight on 400m, 700m and 900m respectively for target arrays Z, X, and Y			

* A separate basic load was issued for firing on each target array.

NOTES

1. Operational Policy. The assigned fire priorities were first to automatic weapons targets, second to other targets of opportunity and third to an even distribution of fire. The two machineguns traversed from opposite flanks of the array to its center. The squad fired for two minutes each on target arrays Z, X, and Y, respectively. Barrels were changed between target arrays. The time to change barrels was administrative, however, it was recorded.

2. Each machinegunner assistant and ammunition bearer carried a .45 caliber pistol with hip holster and three magazines.

Table A-18

OPERATIONAL POLICIES RIFLE SQUAD IN DEFENSE AGAINST ATTACK (DUPLEX) (Situation 7, Range C)

Squad Weapon Mix	Squads Used per [A] Mix	Basic [B] Load (per weapon)	Ammunition Mix [C]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	(3)	100	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N A	M14 has no bipod
7 M14s		295	All tracer					
M14s	6	100	Duplex					
2 M14s	(3)	295	All tracer					
7 M14E2s	(3)	40	Ball	2 rd	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	Bipod	
2 M14E2s		260	1 ball to 1 tracer					
7 M14E2s	6	80	Duplex					
2 M14E2s	(3)	260	1 ball to 1 tracer					
7 M14s	(3)	140	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-aimed	N A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod	
7 M14s	6	100	Duplex	Semi-auto			N A	M14 has no bipod
2 M14E2s	(3)	260	1 ball to 1 tracer	2 rd			Bipod	
5 M14s	(3)	140	Ball	Semi-auto	Battlesight 250m zero	Hasty foxhole shoulder-aimed	N A	M14 has no bipod
2 M60 MGs		294 [B]	1 ball to 1 tracer	2 rd	Zeroed at 600m rear sight on 300m		Bipod	
4 M14s	4	120	Duplex	Semi-auto	Battlesight 250m zero		N A	M14 has no bipod
2 M60 MGs	(3)	294 [B]	1 ball to 1 tracer	2 rd	Zeroed at 600m rear sight on 300m		Bipod	

[A] Three of these squads fired duplex, and the other three squads fired ball and/or tracer.

[B] To keep the weight carried by the M60 gunner to AR systems weight, while keeping squad size (nine men) constant, two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[C] M14 and M14E2 used 20-round magazines, M60 machinegun used 100-round bandoleers.

[B] Carried between gunner and assistant gunner.

NOTES:

1. Operational Policy. There were nine positions. Squad leader was in position five, automatic rifles machineguns and rifles representing automatic rifles, were in positions four and seven, (from right to left). Other squad members were in the remaining positions (right to left), in decreasing order of their marksmanship scores. Firers fired at targets as they saw them. The M60 machinegunner assistant was permitted to assist the gunner in target acquisition.

2. M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-19

OPERATIONAL POLICIES RIFLE SQUAD IN NIGHT DEFENSE AGAINST ATTACK (DUPLEX)
(Situation 8, Range C)

Squad Weapon Mix	Squads Used per Mix[A]	Basic Load[B] (per weapon)	Ammunition Mix[C]	Burst Length	Sight Setting	Position	Support	Remarks
7 M14s	(3)	100	All tracer	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	M14 has no bipod
2 M14s		295						
7 M14s			1 duplex to 1 tracer					
2 M14s	(3)	295	All tracer					
7 M14s	(3)	100	All tracer	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	M14 has no bipod
2 M14E2s		260	1 ball to 1 tracer	2 rd			Bipod and hinged butt plate	
7 M14s		100	1 duplex to 1 tracer	Semi-auto			N/A	M14 has no bipod
2 M14E2s	(3)	260	1 ball to 1 tracer	2 rd			Bipod and hinged butt plate	
7 M14E2s	(3)	80	All tracer	2 rd	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	Bipod and hinged butt plate	
2 M14E2s		260	1 ball to 1 tracer					
7 M14E2s		80	1 duplex to 1 tracer					
2 M14E2s	(3)	260	1 ball to 1 tracer					
5 M14s	(3)	100	All tracer	Semi-auto	Battlesight 250m zero	Hasty foxhole, shoulder-pointed	N/A	M14 has no bipod
2 M60 MGs		294[D]	1 ball to 1 tracer	2 rd	Rear sight on 300m		Bipod and hinged butt plate	
5 M14s	(3)	100	1 duplex to 1 tracer	Semi-auto	Battlesight 250m zero		N/A	M14 has no bipod
2 M60 MGs		294[D]	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m		Bipod and hinged butt plate	

[A] Three of these squads fired duplex and the other three squads fired ball and/or tracer.

[B] To keep the weight carried by the M60 gunner to AR systems weight, while keeping squad size (nine men) constant, two of the seven riflemen were used as assistant machinegunners to carry ammunition.

[C] M14 and M14E2 used 20-round magazines. M60 machinegun used 100-round bandoleers.

[D] Carried between gunner and assistant gunner.

NOTES

1. Operational Policy. There were three positions. Squad leader was in position five, automatic rifles, machineguns and rifles representing automatic rifles, were in positions four and seven (from right to left). Other squad members were in the remaining positions (right to left), in decreasing order of their marksmanship scores. Firers fired at targets when they observed simulator flashes. Firers did not use sights for night firing because they could not be seen, however, these are the settings that were placed on the weapons. The M60 machinegunner assistant was permitted to assist the gunner in target acquisition.

2. M60 machinegunner assistant carried a .45 caliber pistol with hip holster and three magazines.

Table A-20

OPERATIONAL POLICIES MACHINEGUN SQUAD IN DEFENSE AGAINST ATTACK (DUPLEX) (Situation 9, Range C)

Squad Weapon Mix	Squads Used per Mix	Basic Load* (per weapon)	Ammunition Mix	Burst Length	Sight Setting	Position	Support	Remarks
2 M60 bipod MGs	(3)	1123	1 ball to 1 tracer	2 rd	Zeroed at 400m rear sight on 300m	Hasty foxhole, shoulder-aimed	Bipod	
2 M60 bipod MGs	6 (3)		1 duplex to 1 tracer					
2 M60 tripod MGs	(3)	900	1 ball to 1 tracer				Tripod with hinged butt plate	Free gun
2 M60 tripod MGs	6 (3)		1 duplex to 1 tracer					

* Machineguns used 200-round ammunition boxes.

NOTES

1 Operational Policy. Machineguns were in foxholes four and seven, and targets were fired on as they were seen.

2 Each machinegunner assistant and ammunition bearer carried a .45 caliber pistol with hip holster and three magazines.

Annex B

RANGES, INSTRUMENTATION, AND DATA COLLECTION

Annex B

RANGES, INSTRUMENTATION, AND DATA COLLECTION

1. RANGES

Detailed information regarding the experimentation ranges, including sketch maps and reference tables that record firing distances, survey data, and visibility data, are presented in Appendixes 1 through 3 to this annex.

2. INSTRUMENTATION

The instrumentation described below included both the data sensing and recording system and the target elements. The block diagram (Figure B-1) shows the general layout and data flow.

a. Control and Recording Van

(1) Digital Events Actuator and Evaluator System

This system issued commands to the range equipment, and accepted, processed, and recorded data from it. It was made up of a Scientific Data System Model 910 computer, an events actuator subsystem (output), and an events evaluator subsystem (input). Peripheral equipment included an input-output teletypewriter, a paper tape unit, and a magnetic tape unit. The actuator subsystem was capable of commanding up to 102 contact closures to control target-raising and -lowering mechanisms, weapon simulator firings, and a digital clock. The evaluator subsystem scanned 384 input lines every 4 milliseconds and was designed to detect, store, and process signal changes under program control. A change in status was detected by comparing the current input signals with the stored result of the previous scan. Changes in status were processed and recorded on magnetic tape. Each could be summarized on a typed printout. The scanned input signals represented hits, near misses, target positions (up or down), weapon simulator firings, and rounds fired.

(2) Control Console

The control console, located in the center room of the trailer, is shown in Figure B-2. The floor sections of the control console contained all power and signal cables for the console, an auxiliary power supply for clock and camera controls, and the intercom power supply. The console consisted of five operator positions, each capable of controlling up to ten target elements. The operator control panels, which occupied the

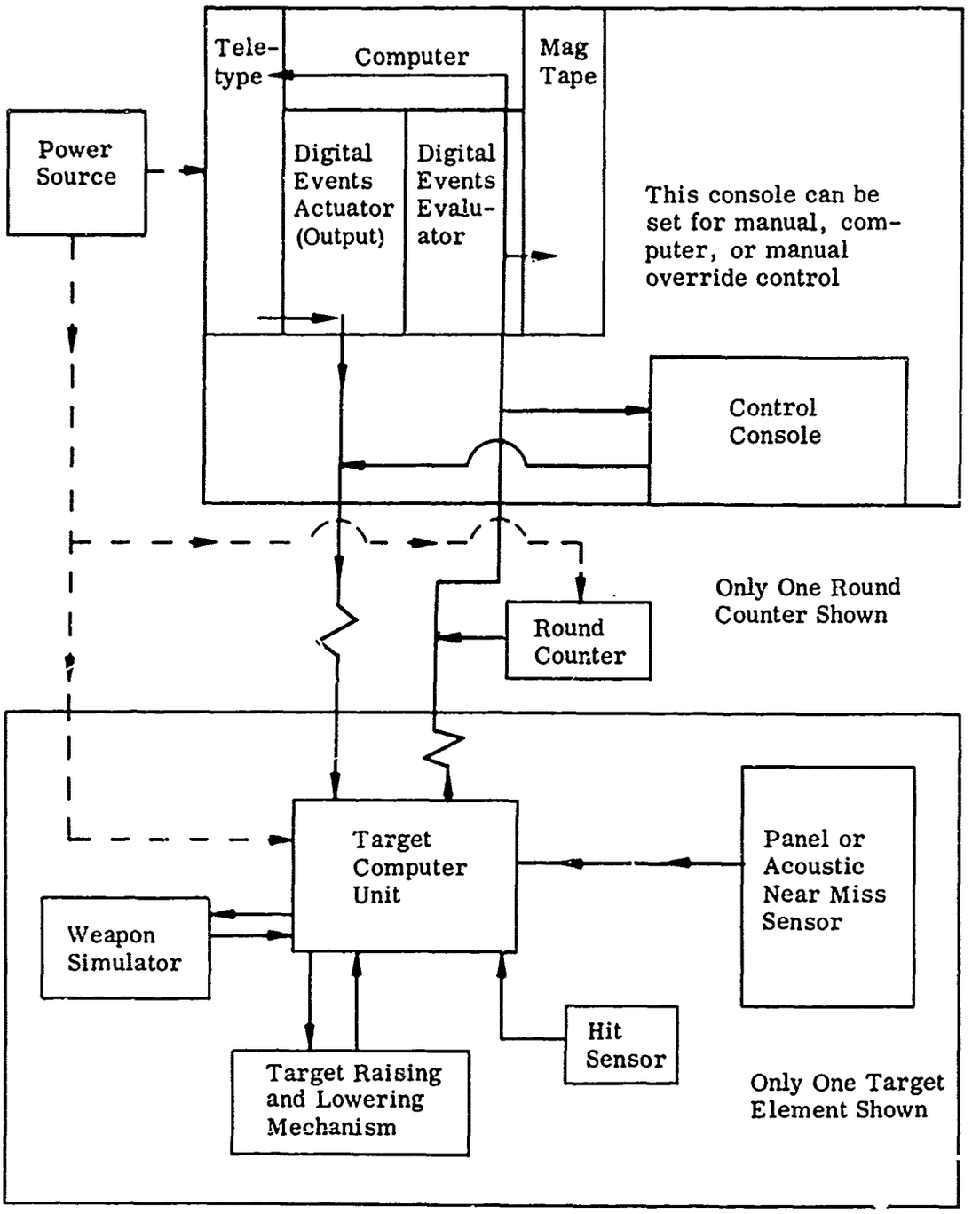
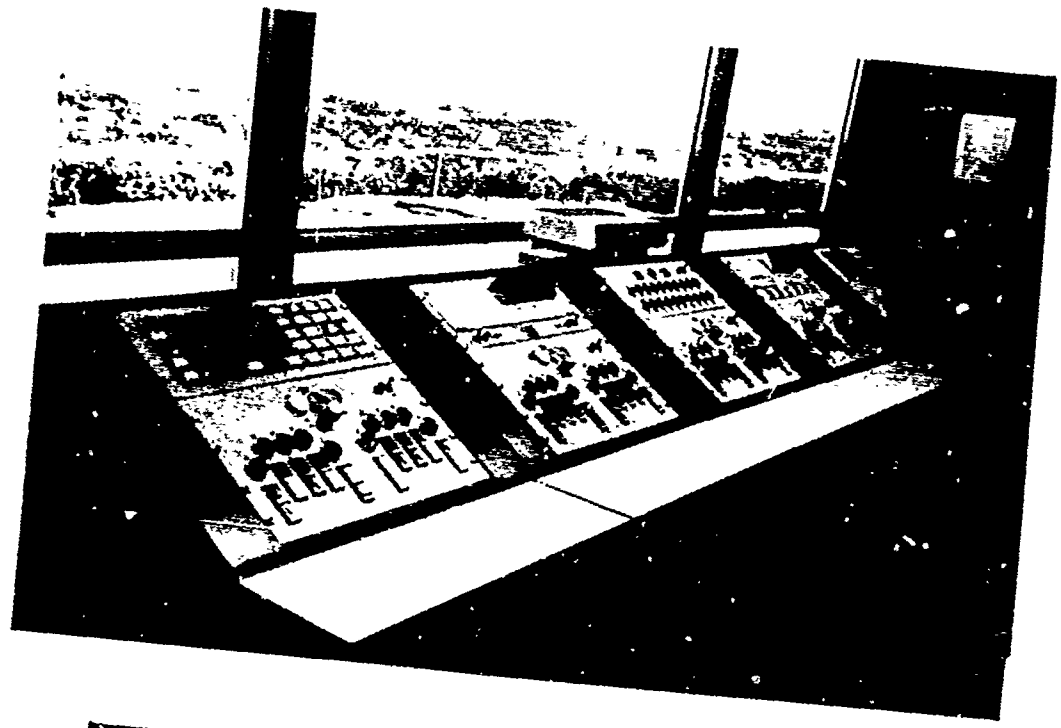


Figure B-1 DIAGRAM OF SAWS RANGE INSTRUMENTATION



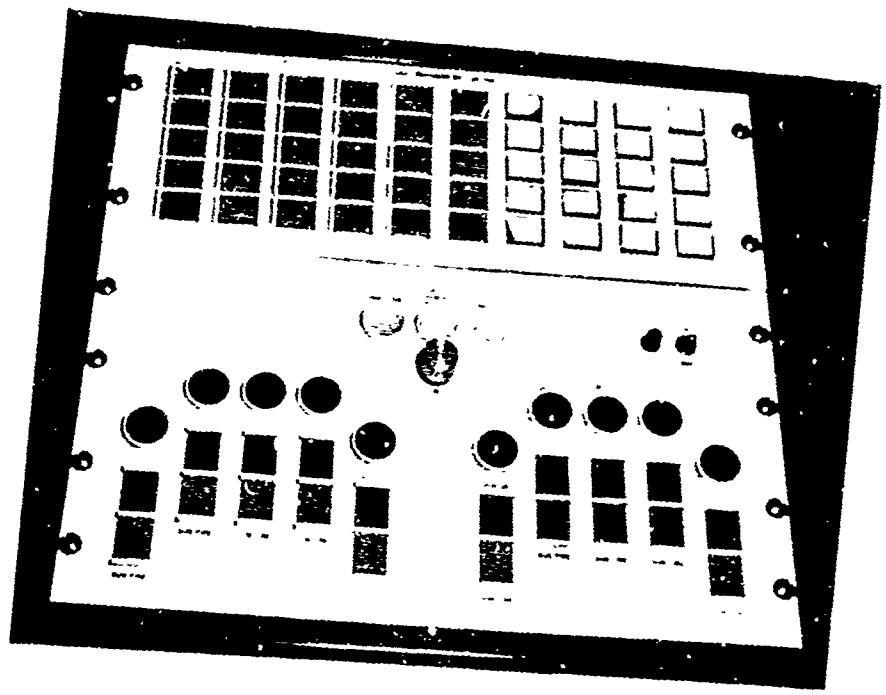


Figure B-2
TWO VIEWS OF SAWS INSTRUMENTATION CONTROL CONSOLE

lower portion of each operator position, were designed to control ten targets and their associated weapon simulators. Manual control was used during calibration, testing, and warm-up periods. Each control panel included:

1) An on-off switch and power indicator light (A)

2) A three-position mode control switch with associated indicator lights (B) to designate COMPUTER MODE, in which manual control could not be exercised; COMPUTER-MANUAL OVERRIDE, in which manual control could be used to raise or lower targets or fire simulators independently of the computer; MANUAL, in which the computer did not exercise control but still collected data

3) Ten sets of three pushbuttons each, with each set including a GUN-FIRE control (C) that would fire the associated simulator as long as the button was depressed; an alternate action POP-UP control (D) that could command the targets up or down (the button was illuminated when the target was up); a KILL-RESET button (E) that lit when the associated target was hit. By depressing this button a target element could be brought back into action

In addition the following functions were included:

1) The upper portion of Position No. 1 contained a weapon signature simulator malfunction panel that was illuminated if the simulator failed to receive a command to fire or fired without a command

2) Positions No. 2 and 4 contained synchronized digital clocks that provided experimentation run time

3) Position No. 3 contained the master control and event panel that controlled starting, stopping, and sequencing of experimental runs; an intercom master unit was mounted above Operator Position No. 3

4) The upper portion of Position No. 5 was the target mechanism malfunction panel, which consisted of an indicator light for each target element. Under normal circumstances, if a target fails to respond to command, or acts without command, the proper indicator (1 through 50) illuminated. Appropriate delays were built into the circuitry to allow for target mechanism reaction time

b. Target Elements

Each target element consisted of a target body with a hit sensor, a raising-and-lowering mechanism, and an electronic target computer unit. Some targets were equipped with weapon signature simulators (weapon simulator) and an acoustic or panel near miss sensor and associated electronic equipment. The target element was contained in a redwood box either 24 by 34 by 74 inches or 24 by 34 by 96 inches, depending on the size of the target body. The box was dug in to conceal the target, except when it was raised.

(1) Target Body

Targets were stamped aluminum, rubber backed, and in three sizes (Figure B-3). Each target was equipped with a crystal hit sensor designed to detect the shock caused by a bullet striking the metal target and transform this shock into an electrical impulse that was fed to the target computer unit (TCU). After being processed in the TCU, this hit signal was then sent to the Control and Recording Van, where it caused the red kill indicator on the control console to light, and to the digital events evaluator where it was evaluated every 4 milliseconds for a change of status. When a hit was indicated, the events actuator received a signal and commanded the target raising-and-lowering mechanism to lower the target.

(2) Raising-and-Lowering Mechanism

A modified M-31A1 trainfire target mechanism was used to raise the targets and lower them on command or when they were hit. A mechanical assist was added to the mechanism, enabling it to operate with the targets under winds up to 15 knots. Electrical filtering was added so the mechanism would not interfere with other system components.

(3) Weapons Simulators

Weapons simulators were installed as required on each range and simulated the flash, blast, and sound of rifle, automatic rifle, and machinegun fire. The system included the simulator, a control unit, and fuel storage tanks (propane and oxygen) positioned under the target box. The control unit included a timing device that released fuel through electrically controlled solenoid valves into a firing chamber. The gases in the firing chamber were ignited by an automotive-type ignition system and produced the flash, blast, and sound of gunfire at the muzzle of the simulator. Control for this subsystem was provided by the Digital Events Actuator or the console operator through the target computer unit at each target element. The simulators were designed with the capability to operate at a maximum rate of 500 simulated rounds per minute to represent automatic fire. To simulate semiautomatic fire, the computer

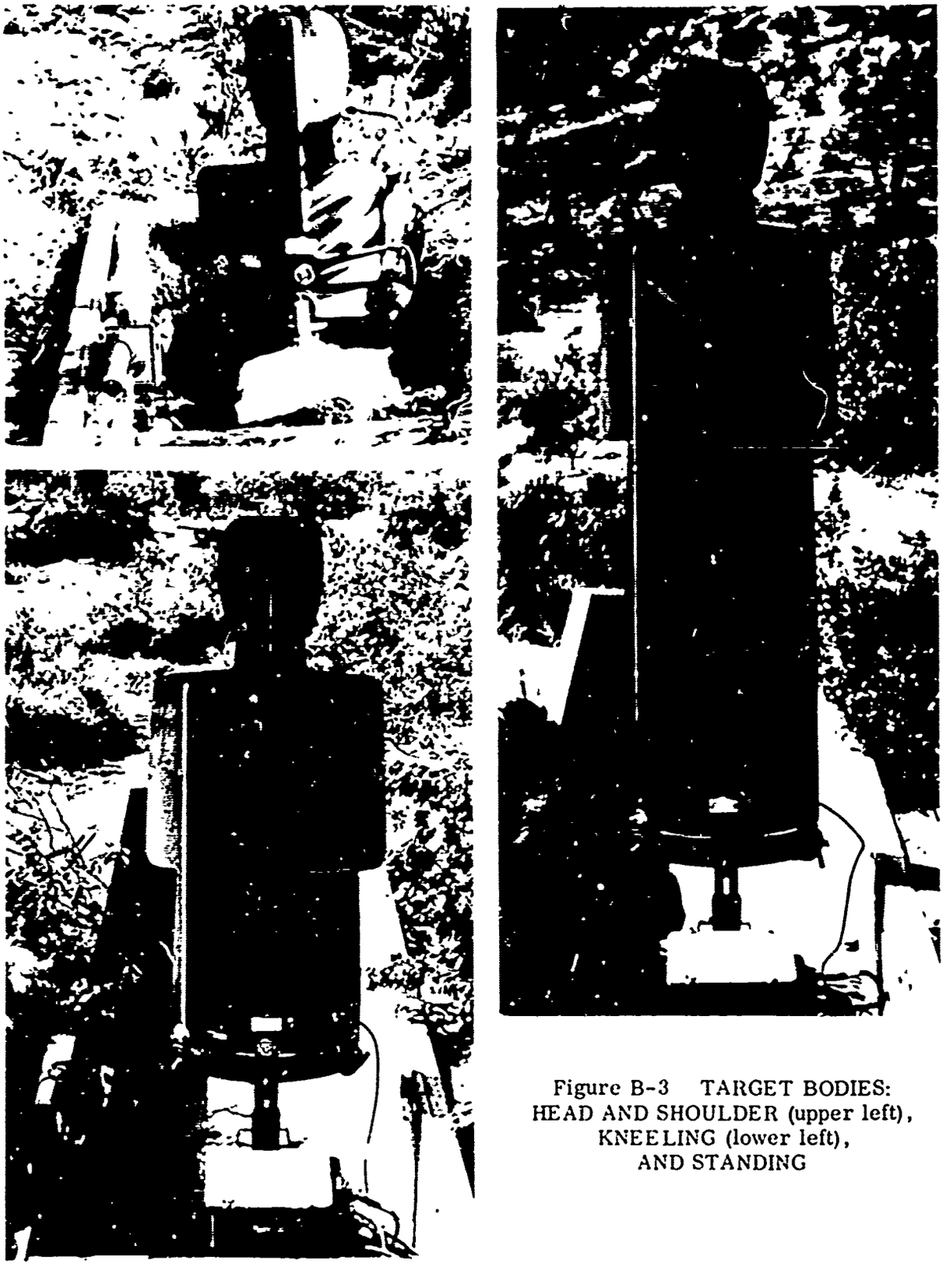


Figure B-3 TARGET BODIES:
HEAD AND SHOULDER (upper left),
KNEELING (lower left),
AND STANDING

commanded the simulator to fire and commanded it to stop before the second simulated round could be fired. Different rates and amounts of fire could thus be simulated by varying the time interval in 120 millisecond steps between the stop and start commands.

During the firing cycle, a signal from the electronic timing circuit in the gun simulator was sent to the target computer unit where it was used for two purposes: 1) to cause a signal to be generated for use in blanking out the acoustic near miss sensing channel so that the noise from the simulator firing would not be scored as a near miss; 2) to cause a second signal to be produced that indicated the simulator was commanded to fire. This second signal was sent from the target computer unit to the trailer where it was sent to the digital events evaluator, and subsequently stored on tape.

(4) Acoustic Near Miss Sensor

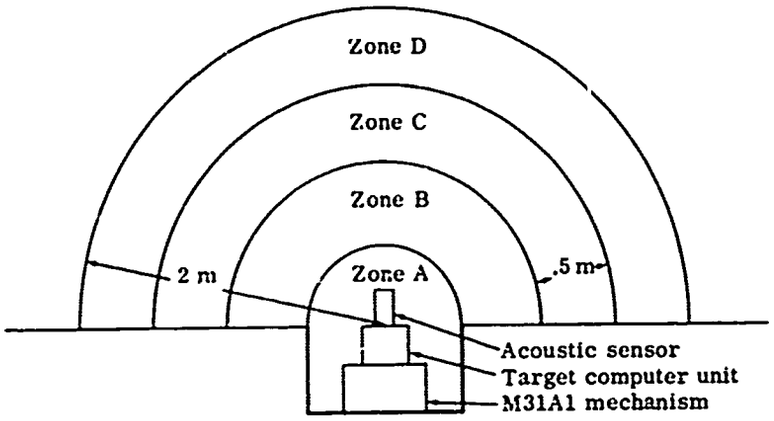
Also included as part of some target elements was a specialized microphone (Acoustic Near Miss Sensor) designed to detect the shock wave produced by a projectile (Figure B-4). The associated circuitry was designed to produce data for projectiles passing within 2 meters of the microphone. The miss zone signals were routed from the target computer unit to the digital events evaluator.

(5) Panel Near Miss Sensor

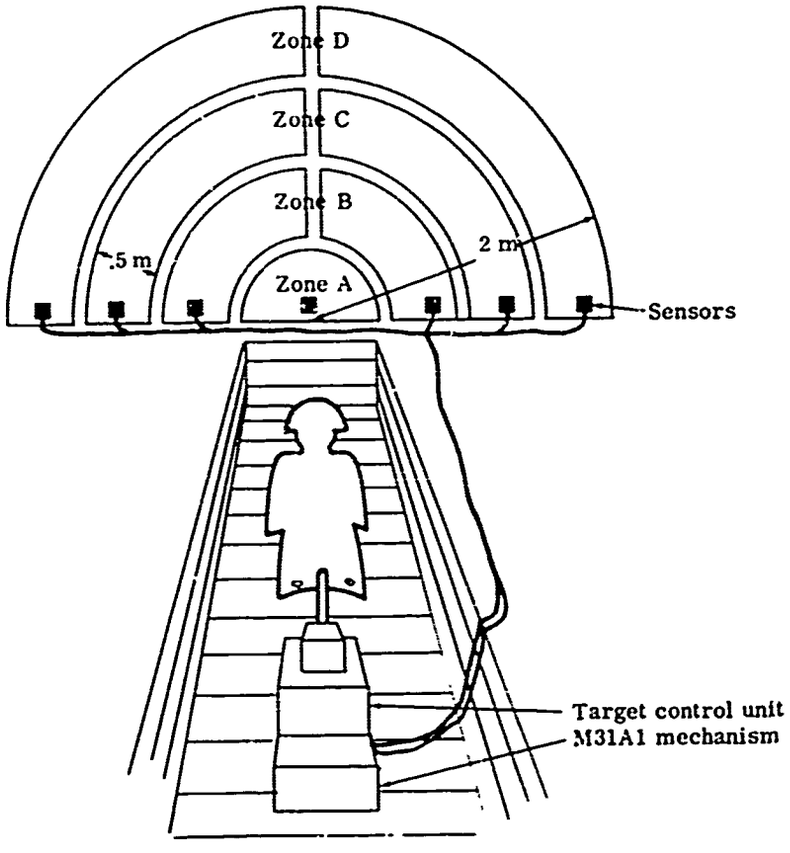
A solid panel miss sensing system was used for longer ranges. This panel was constructed of seven rubber backed metal sections glued to a plywood panel of 2 meter radius. The seven sections had hit sensors that were connected electrically to provide four two-dimensional, half-meter, concentric, sensing zones from the base of the panel (Figure B-4). Hit sensors were identical to those used on the target bodies. Output from a sensor was routed to a target computer unit modified for use with these panel near miss sensors, and then to the digital events evaluator.

(6) Target Computer Unit

The target computer unit, an electronic control and signal conditioning device, was used at each target element to control the target raising-and-lowering mechanism and weapons simulator and conditioned hit and miss signals before transmission to the Control and Recording Van. The unit contained up to three printed circuit cards, an ammunition selector switch, and associated electronic components. It was housed in a cast aluminum box mounted on top of the target raising-and-lowering mechanism. Card A contained the circuitry necessary for producing DC-power, control, and status of the weapon simulator and the target raising-and-lowering mechanism and conditioning the signal from the target hit sensor. When miss information was required at the target



Miss Sensing Zones



Front of Target Encasement

Figure B-4 DIAGRAMMATIC VIEWS OF TARGET CONTROL AND MISS SENSING SYSTEM

location, Cards B and C (when using the acoustic near miss sensor, or B prime and C prime when using the panel near miss sensor) were inserted. The function of these two cards was to gate the signal from the sensor into one of four half-meter zones and to condition the signal for transmission to the Control and Recording Van. The ammunition selector switch allowed the selection of four preset types of ammunition and also had one variable selection position.

c. Round Count System

An electronic round counting device was installed at each stationary firing position to provide the capabilities of counting each round fired from that position as a function of time. The system consisted of a transducer (directional microphone) connected to a signal conditioning box. The transducer was mounted to one side of the muzzle of the weapon and on line with it. It was pointed at the general area of the muzzle and sensed the report when the weapon was fired. A signal then was routed to the signal conditioning box, then to the events evaluator subsystem, and then to the computer memory for permanent record. The system was adjusted to reduce the counting of rounds from adjacent firers.

d. Range Power and Data Distribution System

Multiconductor armored cable systems for power and data control information were installed (buried in the target area) to control the target elements and transmit collected data to the Control and Recording Van. Junction boxes were positioned on the range for ease of maintenance and system flexibility. Power was provided by two of three 45kw diesel generators that were normally required to operate the system, one for the Control and Recording Van and one for range power. A power switching central was provided so that the third (spare) generator could replace either of the others. Over and under voltage automatic cutoff relays and accurate reading voltmeters were installed on the switching central to prevent system damage. Step-up transformers were connected to all three range power lines to increase the normal three-phase generator output from 208 volts to 230 volts since the range required three approximately balanced, single phase loads.

e. Meteorological Instrumentation

Meteorological data were recorded during each experimentation run at each range using the following devices:

1) Wind measuring set that recorded wind speed in miles per hour and wind direction in tenths of degrees from magnetic north

2) Recording microbarograph that recorded barometric pressure in inches of mercury (on Range C only)

3) Hygrothermograph that recorded temperature (Fahrenheit) and humidity

4) Standard rain gauge that measured rainfall in inches (Range C only)

5) Photometer that measured ambient light data in foot lamberts (night runs, Range C only)

f. Life of Target Bodies and Panels

The life expectancy of hit sensitive target bodies and panels depended on several factors: the number of holes in the targets or panel, the location of the holes, and the type of projectile fired. Observations noted during the experiment were:

1) An accidental hit on the sensor or wire harness rendered the target or panel useless

2) A concentration of hits around the sensor tended to isolate it, causing the target or panel to become insensitive

3) A concentration of hits in the neck of the target rendered the head insensitive

4) One hit in the center line stiffening rib in the neck area tended to render the head insensitive

g. Target System Command Program

Target system command programs were written to activate instrumentation in the Control and Recording Van and the targets and simulators in the target arrays. These programs were transposed into computer language in the form of computer command tapes. The use of these tapes provided for the reproducibility of identical firing cues and target exposures for each squad in each tactical situation. A summary of each target system command program is provided in Appendix 4.

3. DATA COLLECTION

a. Manual Data Collection

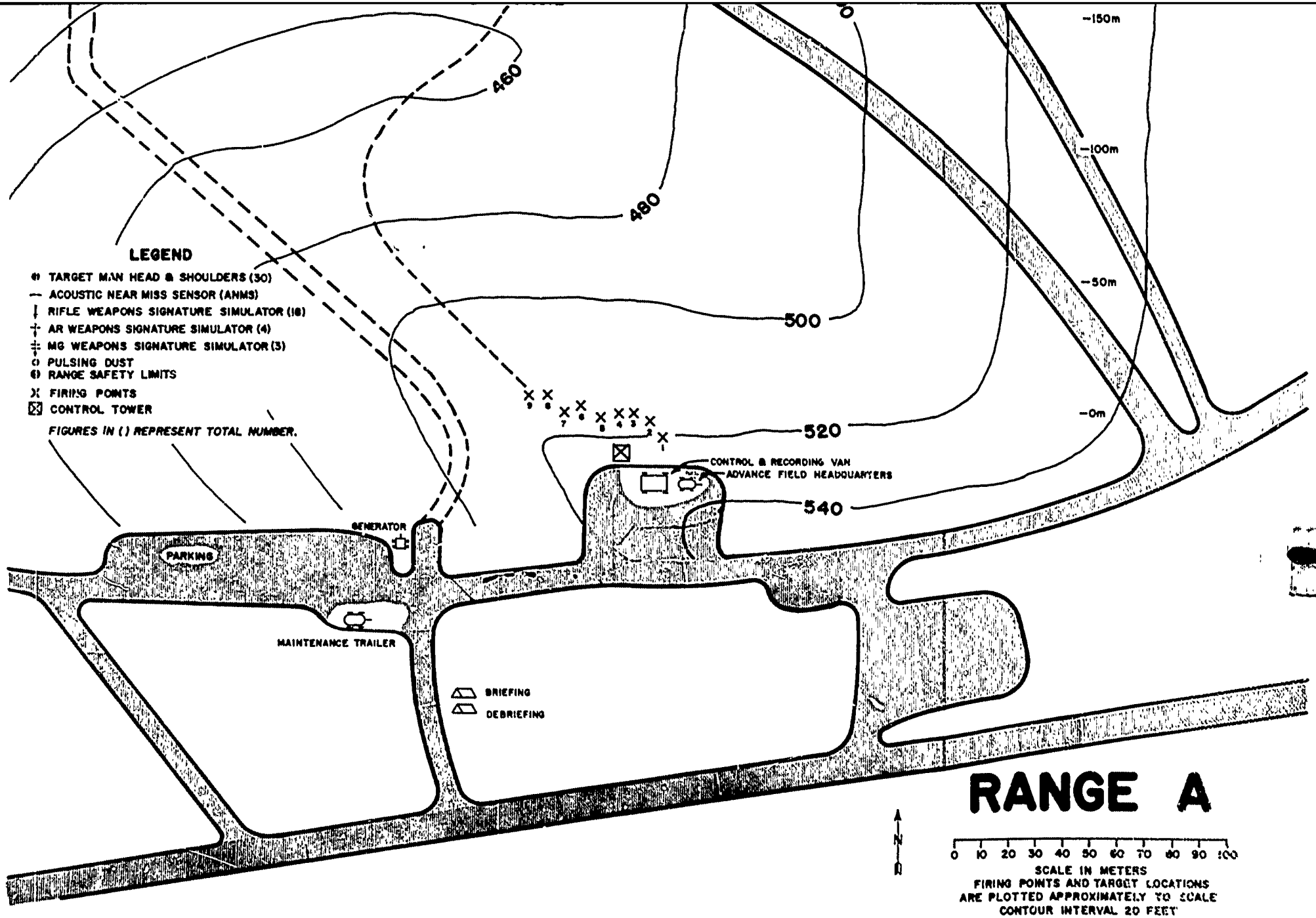
In addition to data collected using the instrumentation described above, the following data were collected manually: weapons reliability data, count of ammunition remaining, and count of target hits.

b. Film Data Collection

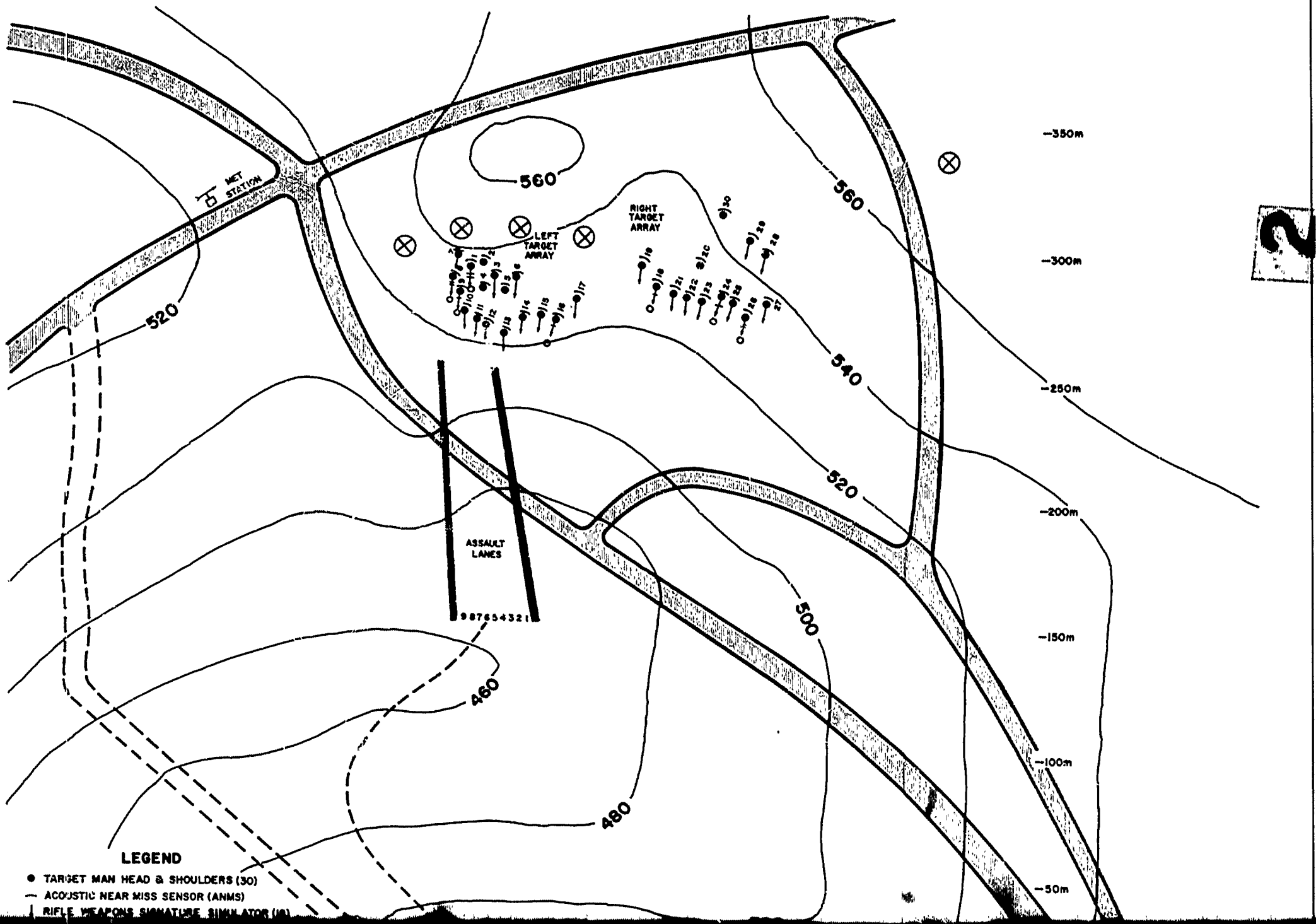
Hand held and tripod mounted individually operated 16mm FILMO cameras and remotely operated magazine loaded 16mm gun cameras provided motion picture coverage for study and correction of safety procedures and weapons malfunctions. Each range was provided with one cameraman equipped with a FILMO camera to record the actions and reactions of experimentation subjects during record runs, both in stationary and moving situations. Remote camera coverage was also provided. One camera was located within the target area on each range and provided a record of an individual target element during a record run. It was remotely controlled from the Control and Recording Van and actuated just before the target was raised. Several remote cameras were used in the moving situations on Range A (Situation 1) and Range B (Situation 4). These cameras were located to one side of the path of movement and pointed toward the firers as they approached the targets, providing continuous coverage of the actions of men and weapons during a record run. The cameras were mounted on poles and armored to prevent damage. Dummy camera positions were spaced along the course to prevent cuing firers to the location of event start positions. Cameras were activated by an operator that followed the firers. The cameras operated at 64 frames per second to permit slow motion review. Photographic coverage was primarily with black and white film, although color was used occasionally to emphasize specific points and for documentary purposes.

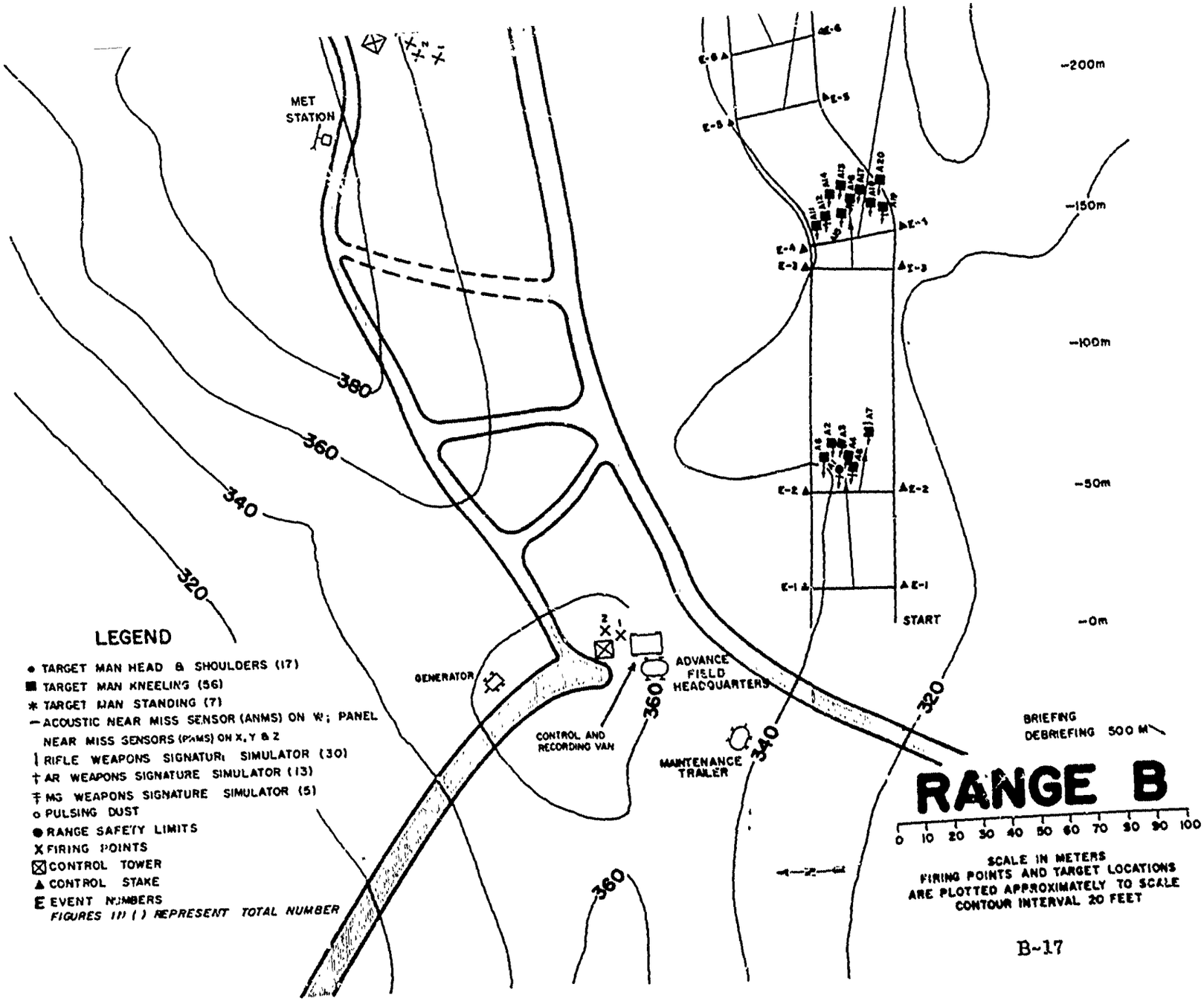
c. Data Collection Accuracy

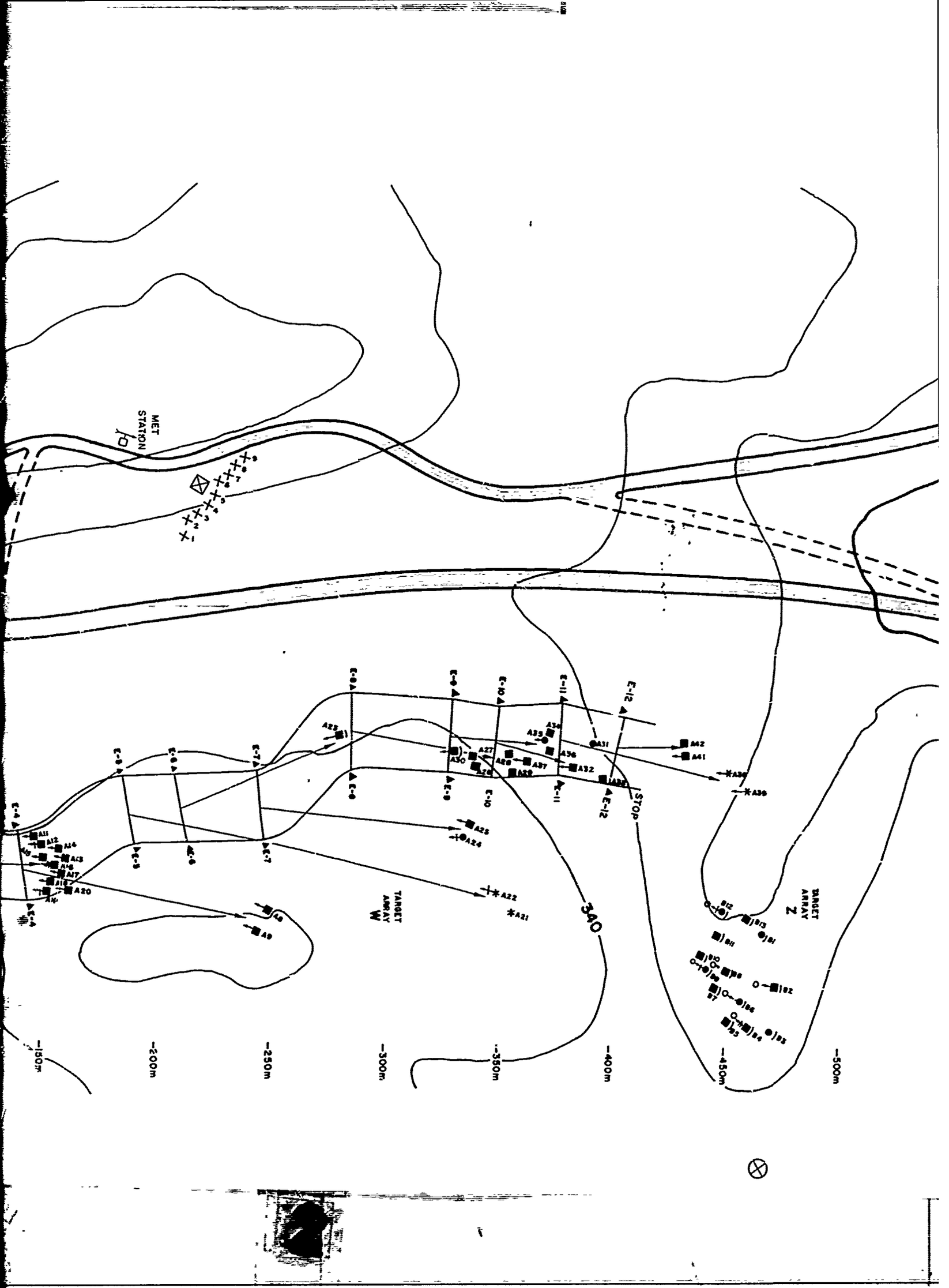
The accuracy of the computer gathered data was continuously checked by manual counts throughout the experimentation.

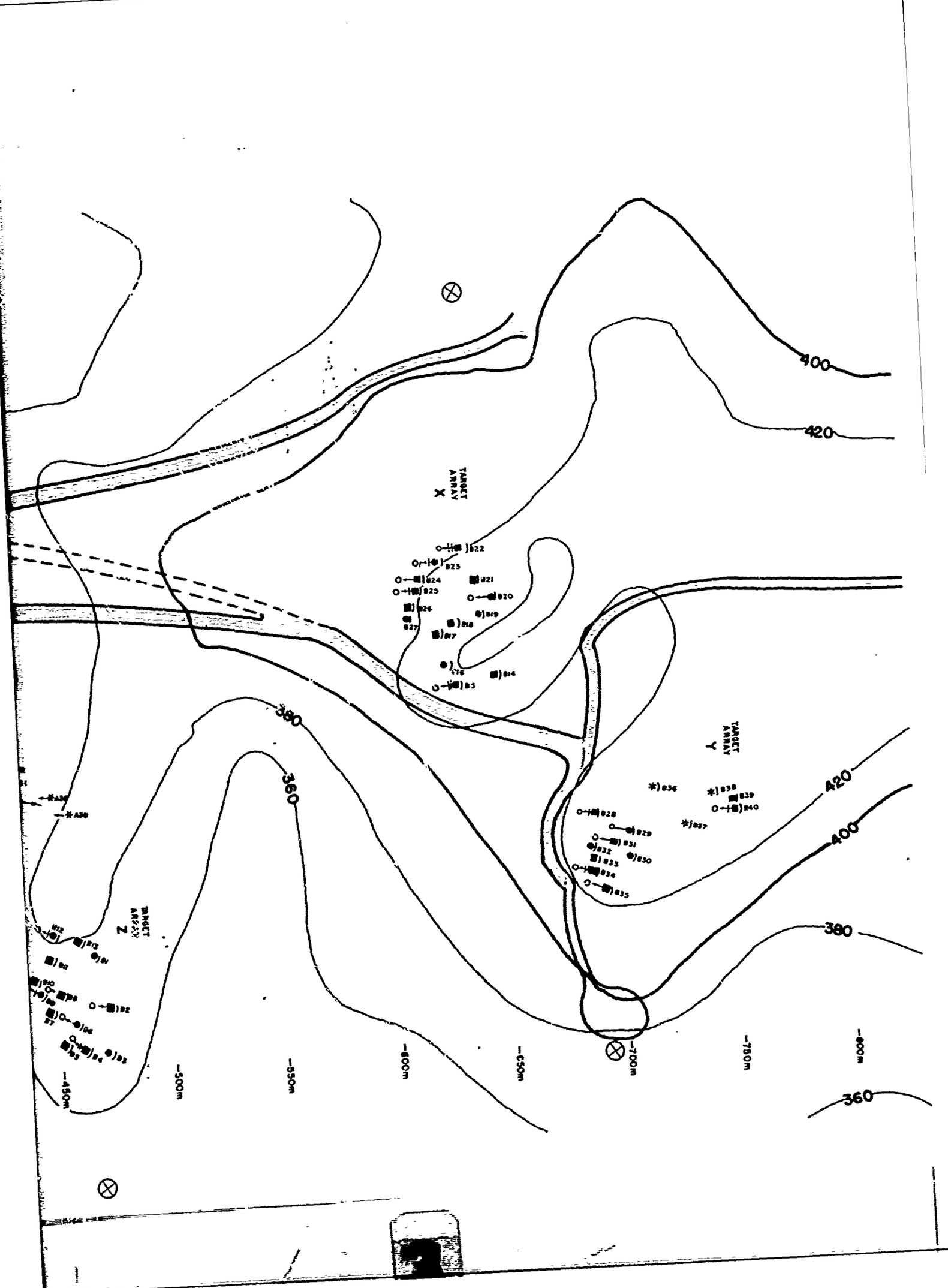

LEGEND
TARGET MAN HEAD & SHOULDERS (30)
ACOUSTIC NEAR MISS SENSOR (ANMS)
RIFLE WEAPONS SIGNATURE SIMULATOR (16)
AR WEAPONS SIGNATURE SIMULATOR (4)
MG WEAPONS SIGNATURE SIMULATOR (3)
PULSING DUST
RANGE SAFETY LIMITS
FIRING POINTS
CONTROL TOWER
FIGURES IN ( ) REPRESENT TOTAL NUMBER.
460
480
500
520
540
-150m
-100m
-50m
-0m
CONTROL & RECORDING VAN
ADVANCE FIELD HEADQUARTERS
GENERATOR
PARKING
MAINTENANCE TRAILER
BRIEFING
DEBRIEFING
N
0 10 20 30 40 50 60 70 80 90 100
SCALE IN METERS
FIRING POINTS AND TARGET LOCATIONS
ARE PLOTTED APPROXIMATELY TO SCALE
CONTOUR INTERVAL 20 FEET

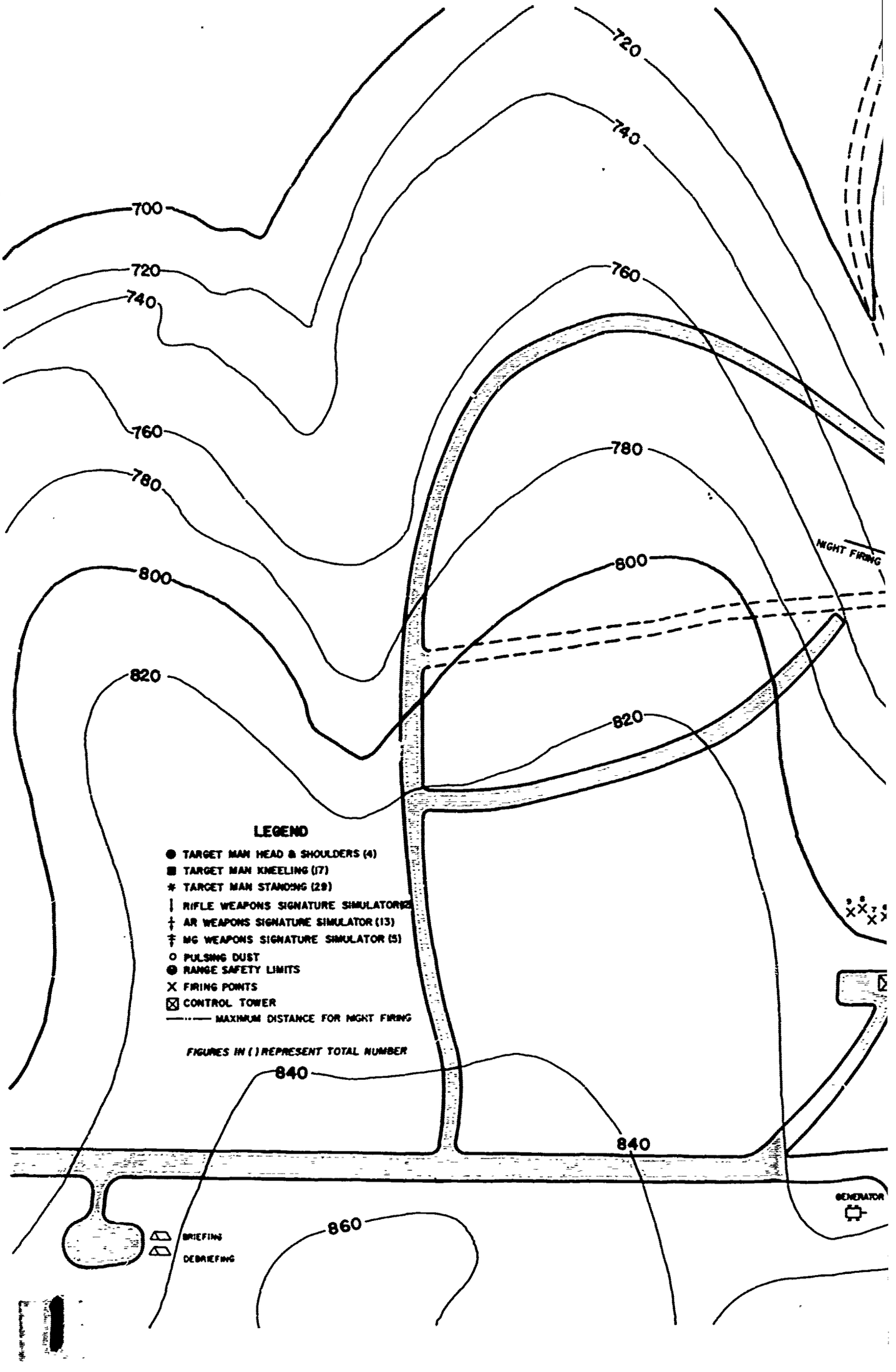
RANGE A

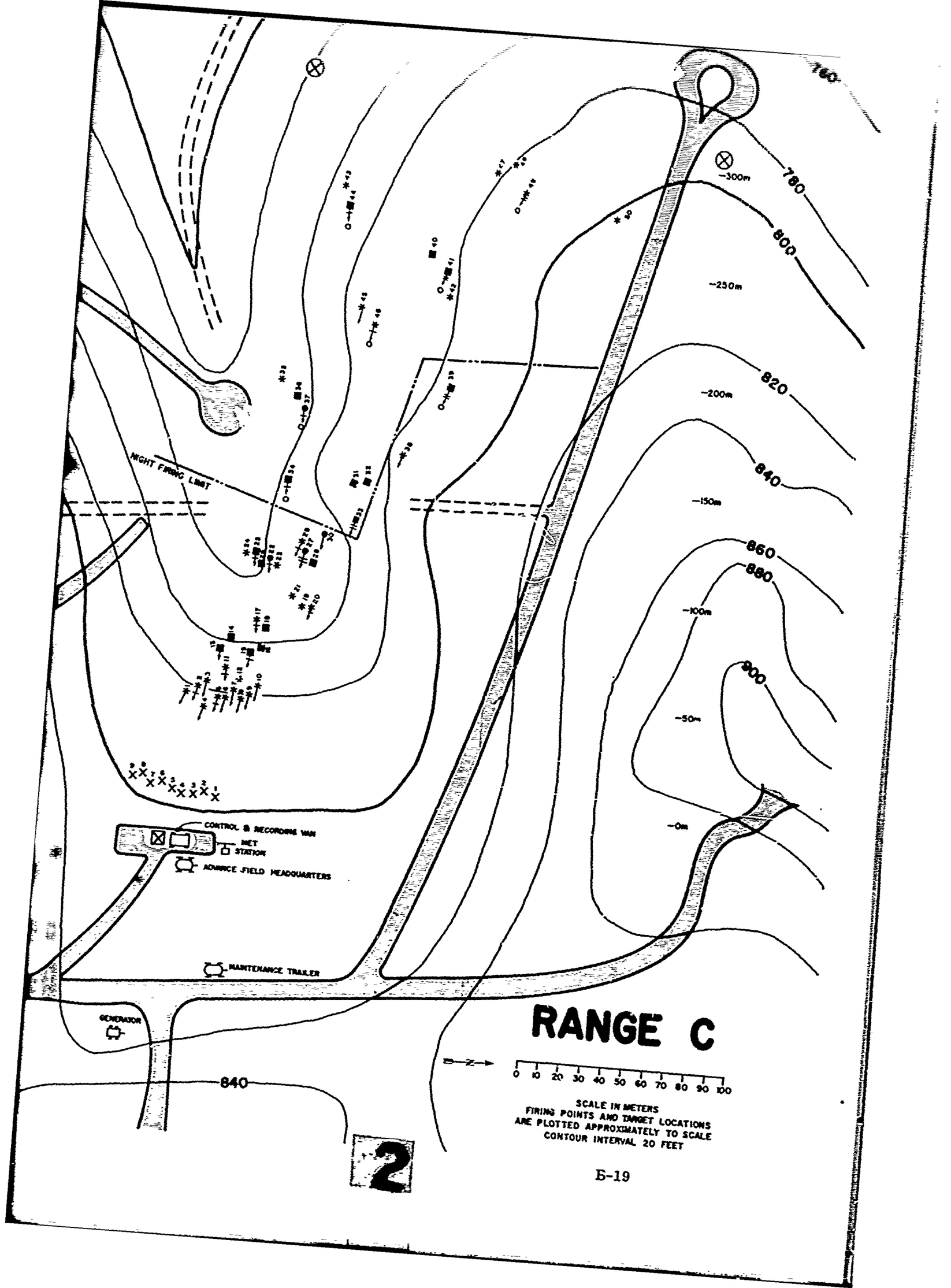

MET STATION
LEFT TARGET ARRAY
RIGHT TARGET ARRAY
ASSAULT LANES
9 8 7 6 5 4 3 2 1
560
520
540
500
460
480
-350m
-300m
-250m
-200m
-150m
-100m
-50m
LEGEND
TARGET MAN HEAD & SHOULDERS (30)
ACOUSTIC NEAR MISS SENSOR (ANMS)
RIFLE WEAPONS SIGNATURE SIMULATOR (6)


MET STATION
X2
X1
E-6
E-5
E-4
E-3
E-2
E-1
A20
A12
A2
A3
A4
A7
-200m
-150m
-100m
-50m
-0m
START
380
360
340
320
GENERATOR
Z
X
1
CONTROL AND RECORDING VAN
ADVANCE FIELD HEADQUARTERS
MAINTENANCE TRAILER
BRIEFING
DEBRIEFING 500 M
LEGEND
• TARGET MAN HEAD & SHOULDERS (17)
■ TARGET MAN KNEELING (56)
* TARGET MAN STANDING (7)
— ACOUSTIC NEAR MISS SENSOR (ANMS) ON W; PANEL NEAR MISS SENSORS (PNMS) ON X, Y & Z
| RIFLE WEAPONS SIGNATURE SIMULATOR (30)
† AR WEAPONS SIGNATURE SIMULATOR (13)
‡ MG WEAPONS SIGNATURE SIMULATOR (5)
o PULSING DUST
● RANGE SAFETY LIMITS
X FIRING POINTS
⊠ CONTROL TOWER
▲ CONTROL STAKE
E EVENT NUMBERS
FIGURES IN ( ) REPRESENT TOTAL NUMBER
RANGE B
0 10 20 30 40 50 60 70 80 90 100
SCALE IN METERS
FIRING POINTS AND TARGET LOCATIONS ARE PLOTTED APPROXIMATELY TO SCALE
CONTOUR INTERVAL 20 FEET


MET STATION
TARGET ARRAY W
TARGET ARRAY Z
STOP
340
-150m
-200m
-250m
-300m
-350m
-400m
-450m
-500m


TARGET ARRAY X
TARGET ARRAY Y
TARGET ARRAY Z
400
420
360
380
-450m
-500m
-550m
-600m
-650m
-700m
-750m
-800m


720
740
700
720
740
760
760
780
780
800
800
820
820
NIGHT FIRING
LEGEND
TARGET MAN HEAD & SHOULDERS (4)
TARGET MAN KNEELING (17)
TARGET MAN STANDING (29)
RIFLE WEAPONS SIGNATURE SIMULATORS(2
AR WEAPONS SIGNATURE SIMULATOR (13)
MG WEAPONS SIGNATURE SIMULATOR (5)
PULSING DUST
RANGE SAFETY LIMITS
FIRING POINTS
CONTROL TOWER
MAXIMUM DISTANCE FOR NIGHT FIRING
FIGURES IN ( ) REPRESENT TOTAL NUMBER
840
840
GENERATOR
860
BRIEFING
DEBRIEFING


760
780
800
820
840
860
880
900
-300m
-250m
-200m
-150m
-100m
-50m
-0m
NIGHT FIRING LIMIT
CONTROL & RECORDING VAN
MET STATION
ADVANCE FIELD HEADQUARTERS
MAINTENANCE TRAILER
GENERATOR
840
RANGE C
0 10 20 30 40 50 60 70 80 90 100
SCALE IN METERS
FIRING POINTS AND TARGET LOCATIONS ARE PLOTTED APPROXIMATELY TO SCALE
CONTOUR INTERVAL 20 FEET
2

Appendix 1 to Annex B

HORIZONTAL DISTANCES FROM FIRING POINTS TO TARGETS

Table B-1

HORIZONTAL DISTANCE IN METERS FROM FIRING POINTS TO TARGETS FOR RANGE A, RIFLE SQUAD BASE OF FIRE AND MACHINEGUN SQUAD IN FIRE SUPPORT OF ASSAULT**

Target No.	Left Target Array								
	Firing Point								
	1	2	3*	4	5	6	7*	8	9
1	309	307	298	308	298	292	294	287	293
2	310	304	300	302	300	294	296	289	295
3	306	298	295	297	295	289	292	285	291
4	300	294	290	292	290	283	287	279	285
5	301	294	291	293	297	289	288	281	290
6	304	299	293	295	294	289	291	284	290
7	317	211	307	308	307	301	303	295	301
8	310	303	299	301	299	293	295	287	293
9	302	296	292	295	291	286	287	284	286
10	295	288	285	286	284	279	280	273	279
11	289	283	279	280	279	273	275	267	274
12	286	280	276	278	276	271	273	265	271
13	284	278	274	276	274	269	271	263	270
14	285	274	275	277	276	271	273	265	272
15	287	281	278	280	279	274	276	269	276
16	284	278	275	277	276	272	274	266	273
17	292	286	283	286	285	280	283	276	283

Target No.	Right Target Array								
	Firing Point								
	1	2	3*	4	5	6	7*	8	9
18	297	292	289	292	292	288	292	285	293
19	305	300	297	300	300	296	299	292	300
20	305	299	297	301	301	297	301	295	303
21	295	290	287	291	291	287	291	284	292
22	292	287	285	288	288	285	289	283	290
23	291	286	284	287	285	284	288	282	290
24	294	289	287	290	291	288	297	286	294
25	292	287	285	288	289	286	290	284	292
26	288	283	281	285	285	282	287	281	289
27	298	293	291	295	296	293	298	292	300
28	310	307	304	307	308	305	310	304	312
29	316	312	309	313	313	311	314	309	317
30	326	322	320	323	323	320	324	318	326

* Firing point for automatic rifle, bipod and tripod mounted machineguns, and for the rifleman serving in the automatic rifleman's role in the rifle squad with nine rifles

** Based on plotted rather than computed data

Table B-2

HORIZONTAL DISTANCE IN METERS FROM FIRING POINTS TO TARGETS BY EVENT FOR RANGE B, RIFLE SQUAD IN APPROACH TO CONTACT**

Event No.	Target No.	Firing Point								
		1	2	3*	4	5	6	7*	8	9
1	A1	47	45	44	43	43	42	43	44	44
	A2	55	53	52	51	51	51	50	51	51
	A3	54	54	52	51	51	51	51	52	52
	A4	50	49	48	47	47	47	46	48	49
	A5	47	46	45	45	44	45	46	46	45
	A6	52	51	50	49	48	48	47	47	48
2	A7	24	22	22	21	22	23	24	26	28
3	A11	30	27	25	23	21	20	19	19	19
	A12	30	28	25	24	22	21	21	21	22
	A13	35	33	31	31	30	30	31	30	32
	A14	33	31	30	29	27	27	27	27	28
	A15	28	26	25	24	23	23	24	25	26
	A16	30	28	28	27	27	27	28	29	30
	A17	29	28	27	27	27	28	29	30	32
	A18	26	26	25	26	25	26	29	31	32
	A19	24	24	25	25	26	28	30	32	34
	A20	33	33	33	33	34	35	37	38	40
4	A8	102	103	104	105	106	106	107	110	111
	A9	100	101	102	104	105	106	108	109	110
5	A21	167	169	170	172	173	174	176	178	180
5	A22	159	159	160	162	163	164	165	168	170
6	A23	81	80	78	77	76	75	75	75	75
7	A24	88	89	89	90	91	91	93	94	95
	A25	90	90	91	91	92	93	93	94	95
8	A26	55	55	55	56	57	58	59	60	62
	A27	53	53	53	53	54	55	56	59	59
	A28	79	69	69	69	70	71	71	72	73
	A29	70	70	71	71	72	73	74	75	76
	A30	45	45	45	46	47	47	49	50	51
	A37	78	78	78	79	79	80	81	82	83
9	A34	44	44	43	43	42	43	43	44	44
	A35	42	41	40	40	39	40	41	41	42
	A36	45	45	44	44	42	44	45	46	47
10	A31	47	46	45	45	44	45	45	45	46
	A32	36	36	36	36	37	37	38	39	41
	A33	49	49	49	50	50	51	52	54	55
11	A38	74	74	74	74	74	75	76	76	78
	A39	83	83	83	83	84	85	86	87	89
12	A41	36	34	32	31	31	30	31	31	32
	A42	36	34	31	30	29	29	29	29	29

* Weapons in these positions fired tracer ammunition, and depending on the mix, were rifles, automatic rifles or machineguns

** Based on plotted rather than computed data

NOTE

Target A40 not used

Table B-3

HORIZONTAL DISTANCE IN METERS FROM FIRING POINTS TO TARGET FOR RANGE B, RIFLE SQUAD BASE OF FIRE SUPPORTING THE ADVANCE**

Target No.	Target Array X — Firing Point									Target No.	Target Array Y — Firing Point								
	1	2	3*	4	5	6	7*	8	9		1	2	3*	4	5	6	7*	8	9
B14	445	440	440	436	435	434	430	428	420	B28	498	495	495	485	495	485	486	479	477
B15	422	428	418	420	413	417	407	412	404	B29	515	510	510	508	502	506	503	498	492
B16	418	420	413	408	408	407	403	400	399	B30	518	513	514	510	510	510	505	505	502
B17	412	413	408	403	402	401	396	395	393	B31	509	506	505	503	495	495	498	496	488
B18	420	422	415	411	410	408	404	402	400	B32	494	498	497	487	487	487	489	486	480
B19	436	431	431	427	425	424	420	417	414	B33	501	500	500	495	490	494	486	490	488
B20	441	438	437	433	425	424	425	424	419	B34	503	500	500	497	490	495	492	491	489
B21	430	431	430	425	418	417	412	410	407	B35	510	507	508	497	503	504	500	499	491
B22	425	426	419	414	413	411	406	404	401	B36	516	516	513	515	508	508	509	507	500
B23	413	413	407	401	401	399	395	392	390	B37	537	537	535	530	524	524	526	525	516
B24	416	407	400	395	394	392	388	385	383	B38	541	541	538	539	534	532	528	526	525
B25	403	405	397	393	391	390	385	385	381	B39	556	557	553	550	542	541	537	535	534
B26	401	402	395	391	396	388	383	382	380	B40	560	560	550	551	550	544	540	539	536
B27	400	402	395	390	389	388	382	381	379										

* Firing point for automatic rifle, bipod and tripod mount machineguns, and for the rifleman serving in the automatic rifleman's role in the rifle squad with nine rifles.

** Based on plotted rather than computed data.

Table B-4

HORIZONTAL DISTANCE IN METERS FROM FIRING POINTS TO TARGETS FOR RANGE B, MACHINEGUN SQUAD IN FIRE SUPPORT OF ADVANCE TARGET ARRAYS X, Y, AND Z*

Target No.	MG 1	MG 2	Target No.	MG 1	MG 2
B1	468	472	B21	640	640
B2	480	488	B22	635	630
B3	482	486	B23	624	623
B4	473	477	B24	616	615
B5	469	467	B25	613	612
B6	466	470	B26	609	608
B7	457	458	B27	603	607
B8	458	460	B28	690	691
B9	450	453	B29	705	707
B10	446	449	B30	707	708
B11	450	453	B31	699	700
B12	449	452	B32	690	690
B13	465	468	B33	691	693
B14	645	645	B34	690	693
B15	627	628	B35	697	699
B16	622	626	B36	715	716
B17	620	620	B37	730	730
B18	629	630	B38	740	736
B19	640	639	B39	750	750
B20	646	645	B40	752	753

* Based on plotted rather than computed data

Table B-5:

HORIZONTAL DISTANCE IN METERS FROM FIRING POINTS TO TARGETS FOR RANGE C, DEFENSE AGAINST ATTACK**

Target No.	Firing Points									Target No.	Firing Points								
	1	2	3	4*	5	6	7*	8	9		1	2	3	4*	5	6	7*	8	9
1	50	46	44	48	46	43	47	44	47	26	110	109	109	114	113	111	115	112	115
2	52	49	48	50	49	47	51	48	51	27	121	120	121	126	126	126	131	128	131
3	53	51	49	53	52	50	54	52	55	28	118	117	118	123	123	121	128	125	128
4	46	46	44	48	48	46	51	48	52	29	129	124	125	130	130	129	134	131	134
5	46	45	44	47	48	46	51	49	55	30	131	131	132	138	138	137	142	140	142
6	45	43	43	48	48	47	53	50	54	31	159	159	160	165	165	165	170	167	170
7	50	49	49	54	54	54	60	58	61	32	169	164	165	170	170	170	178	175	178
8	45	45	46	51	52	52	58	57	60	33	146	146	147	152	153	151	158	156	159
9	49	49	50	56	57	57	62	62	65	34	150	149	149	153	152	150	154	151	154
10	55	55	56	62	63	64	70	68	72	35	195	195	194	198	196	194	197	198	196
11	60	59	58	62	61	60	65	63	65	36	189	188	188	192	191	188	192	188	191
12	56	55	57	60	60	60	65	64	66	37	184	183	183	187	186	184	188	184	187
13	69	68	67	70	70	67	72	69	72	38	181	182	183	189	189	188	197	192	195
14	73	72	71	76	75	73	77	75	77	39	219	219	221	226	227	226	234	229	232
15	69	69	69	74	74	73	79	77	80	40	270	270	271	276	276	271	279	276	278
16	71	71	72	77	77	77	82	80	84	41	265	265	256	270	271	270	274	271	274
17	84	83	84	88	88	87	92	90	92	42	257	257	258	264	263	262	267	264	267
18	81	80	81	86	86	86	90	88	91	43	288	287	287	291	290	287	291	287	289
19	98	98	100	105	106	106	111	109	112	44	279	278	277	282	281	278	282	278	280
20	99	99	101	106	107	106	113	111	114	45	236	235	236	240	240	239	242	238	241
21	100	101	102	107	107	107	112	110	113	46	230	229	230	234	234	231	236	233	236
22	112	112	112	116	116	113	119	115	118	47	318	318	318	323	323	322	327	328	327
23	111	110	111	116	115	114	118	115	118	48	325	326	327	327	322	330	336	332	335
24	114	113	112	116	116	113	117	114	116	49	315	315	316	321	322	320	325	323	326
25	114	113	113	117	116	114	118	115	117	50	328	330	331	337	338	338	344	341	344

* Firing point for automatic rifle, bipod and tripod mounted machineguns, and for the rifleman serving in the automatic rifleman's role in the rifle squad with nine rifles.

** Based on plotted rather than computed data.

Appendix 2 to Annex B

TARGET SURVEY DATA

Table B-6

SURVEY DATA FOR LEFT TARGET ARRAY
RANGE A, ASSAULT AGAINST DEFENSE

Target Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
1	07574.08	48916.19	537.95
2	07577.96	48918.75	538.92
3	07584.48	48915.97	536.28
4	07580.51	48909.64	533.65
5	07587.04	48911.45	534.64
6	07591.01	48914.40	535.95
7	07570.60	48922.30	538.90
8	07568.43	48916.16	533.98
9	07571.30	48909.13	531.36
10	07573.14	48902.98	528.08
11	07577.27	48897.10	526.11
12	07581.54	48895.26	525.70
13	07588.37	48894.45	525.12
14	07595.52	48896.52	526.76
15	07601.25	48899.78	528.40
16	07607.89	48897.52	527.09
17	07614.82	48906.96	531.68

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Table B-7

SURVEY DATA FOR RIGHT TARGET ARRAY
RANGE A, ASSAULT AGAINST DEFENSE

Target Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
18	07647.14	48912.51	529.06
19	07641.09	48920.48	533.00
20	07662.27	48918.72	536.60
21	07652.92	48910.67	530.70
22	07658.35	48907.08	530.04
23	07664.58	48905.52	529.06
24	07670.76	48907.87	532.67
25	07676.30	48904.97	533.00
26	07679.75	48900.08	531.36
27	07689.43	48908.99	539.56
28	07686.43	48922.20	545.13
29	07683.68	48928.06	546.10
30	07671.71	48940.55	551.08

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Table B-8

SURVEY DATA ON FIRING POSITIONS FOR RANGE A, RIFLE SQUAD BASE OF FIRE AND MACHINEGUN FIRE SUPPORT OF THE ASSAULT

Firing Position Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
1	07641.55	48613.40	517.91
2	07635.77	48618.48	515.28
3*	07630.57	48622.08	512.99
4	07624.93	48620.39	512.99
5	07618.53	48619.91	512.32
6	07611.19	48625.49	509.38
7*	07604.89	48622.20	509.61
8	07598.71	48628.30	506.43
9	07592.92	48623.09	510.04

* Firing point for automatic rifle, bipod and tripod mounted machineguns, and for the rifleman serving in the automatic rifleman's role in the rifle squad with nine rifles.

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Table B-9

SURVEY DATA FOR TARGET ARRAYS W, X, Y, Z
FOR RANGE B, ATTACK
AGAINST DELAYING ACTION

Target Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
	Target Array W		
A1	05482.58	51378.50	339.15
A2	05490.36	51379.97	338.16
A3	05489.87	51378.21	337.49
A4	05486.72	51375.24	336.16
A5	05484.17	51373.63	335.85
A6	05487.95	51381.39	338.82
A7	05494.01	51369.15	329.96
A8	05669.28	51355.52	326.03
A9	05665.67	51344.57	324.05
A11	05570.20	51381.13	339.98
A12	05573.23	51379.34	336.85
A13	05582.10	51375.33	333.92
A14	05579.29	51376.53	334.23
A15	05575.01	51372.85	333.23
A16	05577.15	51373.58	332.24
A17	05579.49	51368.25	331.93
A18	05577.68	51365.01	331.28
A19	05576.60	51361.61	329.96
A20	05585.63	51362.06	328.98
A21	05778.01	51355.48	333.24
A22	05771.84	51361.07	333.18
A23	05704.65	51427.05	343.42
A24	05758.29	51385.98	332.92
A25	05760.29	51391.44	333.90

Table B-9

SURVEY DATA FOR TARGET ARRAYS W, X, Y, Z
FOR RANGE B, ATTACK
AGAINST DELAYING ACTION
(Continued)

Target Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
A26	05763.01	51417.34	339.48
A27	05761.39	51419.98	339.80
A28	05777.73	51423.87	345.71
A29	05778.59	51414.32	343.07
A30	05754.28	51421.96	338.16
A31	05815.52	51424.68	360.14
A32	05806.27	51417.49	354.89
A33	05819.15	51411.60	358.17
A34	05794.12	51428.72	348.99
A35	05791.74	51426.10	347.68
A36	05795.73	51423.15	347.36
A37	05784.60	51418.07	345.05
A38	05873.50	51412.65	375.23
A39	05881.05	51406.19	376.21
A41	05855.96	51422.54	369.98
A42	05854.92	51425.73	370.14
	Target Array Z		
B1	05888.72	51345.00	378.18
B2	05896.92	51323.19	370.31
B3	05892.47	51304.26	365.72
B4	05883.31	51305.56	364.41
B5	05875.99	51310.47	367.03
B6	05879.40	51316.70	367.69
B7	05869.42	51322.66	371.62
B8	05873.14	51331.22	373.59

Table B-9.

SURVEY DATA FOR TARGET ARRAYS W, X, Y, Z
FOR RANGE B, ATTACK
AGAINST DELAYING ACTION
(Continued)

Target Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
B9	05869.67	51334.49	375.23
B10	05863.49	51336.24	375.23
B11	05869.00	51345.25	378.51
B12	05872.32	51355.08	383.10
B13	05876.99	51353.98	379.17
	Target Array X		
B14	06071.60	51457.55	434.93
B15	06053.52	51453.07	430.34
B16	06051.22	51463.87	439.52
B17	06046.93	51473.98	430.66
B18	06054.86	51480.67	432.96
B19	06063.91	51483.47	436.90
B20	06071.74	51491.49	433.62
B21	06065.01	51498.72	432.30
B22	06061.02	51513.34	420.50
B23	06048.11	51506.59	419.84
B24	06041.00	51500.87	418.53
B25	06037.93	51494.87	419.18
B26	06035.84	51488.24	416.72
	Target Array Y		
B27	06034.58	51483.55	414.10
B28	06113.98	51396.36	429.68
B29	06127.37	51388.20	433.94
B30	06127.10	51377.02	432.30

Table B-9

SURVEY DATA FOR TARGET ARRAYS W, X, Y, Z
FOR RANGE B, ATTACK
AGAINST DELAYING ACTION
(Concluded)

Target Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
B31	06121.39	51383.67	431.65
B32	06112.42	51381.83	428.04
B33	06113.26	51376.43	427.38
B34	06111.69	51371.19	425.09
B35	06116.08	51362.69	425.09
B36	06141.31	51406.18	429.02
B37	06153.52	51391.82	432.63
B38	06166.56	51403.75	433.29
B39	06174.16	51399.28	436.57
B40	06176.03	51396.01	436.57

Table B-10

SURVEY DATA FOR RIFLE SQUAD BASE OF FIRE AND MACHINEGUN FIRE SUPPORT FIRING POSITIONS FOR RANGE B, ATTACK AGAINST DELAYING ACTION

Target Position Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
Firing			
1	05634.59	51511.52	347.02
2	05633.68	51518.11	349.65
3	05641.01	51521.43	352.60
4	05646.07	51524.21	354.57
5	05647.71	51529.19	357.52
6	05650.46	51534.18	361.13
7	05654.40	51537.68	361.78
8	05657.01	51541.07	362.77
9	05659.32	51544.91	363.42
Machinegun			
1	05432.25	51454.85	376.54
2	05431.55	51464.75	377.86

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Table B-11

SURVEY DATA FOR RANGE B,
RIFLE SQUAD IN APPROACH TO CONTACT

Side of Event Line	Easting	Northing	Altitude (feet MSL)
Left			
1	05440.72	51390.13	347.35
2	05475.19	51388.93	344.73
3	05555.49	51385.95	342.43
4	05563.38	51386.76	314.12
5	05608.08	51410.65	341.12
6	05630.82	51411.55	340.79
7	05667.21	51412.98	339.81
8	05708.57	51444.41	346.04
9	05752.93	51442.33	344.40
10	05773.77	51441.37	347.68
11	05801.04	51443.06	348.32
12	05828.07	51437.81	358.14
Right			
1	05439.09	51360.27	323.58
2	05473.79	51359.08	330.95
3	05552.96	51356.53	332.26
4	05567.70	51356.07	331.28
5	05614.86	51381.17	331.61
6	05637.50	51381.99	331.28
7	05669.99	51383.14	332.26
8	05708.81	51414.42	340.79
9	05750.65	51412.93	342.76
10	05770.34	51412.23	340.79
11	05798.83	51411.22	344.40
12	05822.33	51410.38	358.83

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Table B-12

SURVEY DATA FOR TARGET ARRAY RANGE C,
DEFENSE AGAINST ATTACK

Target Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
1	11558.65	50550.99	782.6
2	11556.51	50553.95	771.0
3	11555.78	50558.35	769.5
4	11559.52	50560.42	771.7
5	11560.28	50562.55	782.6
6	11561.69	50565.74	782.6
7	11557.67	50571.22	771.7
8	11562.18	50575.74	774.3
9	11558.71	50579.67	782.6
10	11554.24	50583.07	771.7
11	11546.80	50567.10	765.3
12	11551.93	50572.93	766.4
13	11537.21	50563.45	761.2
14	11533.57	50567.81	758.9
15	11538.51	50578.88	762.1
16	11537.79	50583.37	762.1
17	11524.52	50580.72	751.3
18	11528.38	50584.72	752.6
19	11515.84	50602.23	752.3
20	11516.16	50605.12	752.9
21	11512.84	50597.84	750.0
22	11495.64	50583.92	741.1
23	11497.41	50586.96	741.5
24	11493.86	50573.50	737.9
25	11494.00	50577.19	738.2

Table B-12

SURVEY DATA FOR TARGET ARRAY RANGE C,
DEFENSE AGAINST ATTACK (Concluded)

Target Number	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
26	11497.32	50579.00	738.7
27	11491.79	50601.47	746.4
28	11496.37	50601.59	747.4
29	11487.42	50600.45	745.4
30	11483.12	50609.17	753.9
31	11458.21	50621.38	769.5
32	11455.85	50627.95	770.9
33	11474.20	50623.76	769.0
34	11459.86	50589.73	741.8
35	11412.90	50584.22	729.3
36	11418.70	50590.11	733.0
37	11426.49	50594.77	736.5
38	11443.61	50644.07	786.2
39	11411.66	50664.57	785.8
40	11349.89	50652.13	777.2
41	11358.71	50658.16	789.8
42	11368.57	50661.00	778.9
43	11322.07	50607.64	748.3
44	11331.30	50610.12	751.3
45	11377.83	50619.81	769.7
46	11385.74	50626.74	767.8
47	11310.51	50679.62	778.9
48	11305.66	50688.28	821.2
49	11319.34	50693.11	787.4
50	11326.87	50738.70	794.3

Table B-13

SURVEY DATA FOR RIFLE SQUAD AND MACHINEGUN SQUAD FIRING POSITIONS FOR RANGE C, DEFENSE AGAINST ATTACK

Firing Position	Grid Coordinates		Altitude (feet MSL)
	Easting	Northing	
1	11607.41	50566.18	793.3
2	11605.79	50561.48	792.9
3	11604.50	50555.88	792.9
4*	11607.54	50550.17	792.9
5	11605.13	50545.20	792.9
6	11601.85	50540.13	792.9
7*	11603.61	50533.85	792.9
8	11599.30	50531.25	792.9
9	11599.79	50527.27	792.9

* Firing point for automatic rifle, bipod and tripod mounted machineguns, and for the rifleman serving in the automatic rifleman's role in the rifle squad with nine rifles.

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Appendix 3 to Annex B

VISIBILITY DATA

Target effects (timely first hits and near misses) are a function of the ability of each squad first to detect the target and then to engage it with small arms fire. Thus, visual target detection is preliminary to effectively engaging the target. The ability of members of the squad to detect the individual targets of an array depends on:

1) Local lighting conditions -- relative position of the sun, cloud cover, and time of day

2) Terrain masking -- relative location of firer to individual targets in terms of mutual cover

3) Vegetation masking -- the concealment provided by vegetation between the firer and the individual targets

4) Visual acuity of the squad members

5) Target identification aids employed by the squad once one or more members have detected a target -- for example, the use of tracers

6) Simulated aiming cues produced by the target

Runs were scheduled to ensure that the same number of squads from each mix ran each situation at the same time of day, allowing the effects of visibility differences caused by differences in light to be balanced out. Also, to minimize effects of differences in firer-target intervisibility, firers with the same marksmanship capabilities were usually placed in the same positions for each run for each mix.

This appendix provides samples of the visibility data necessary to understand the realism of each of the tactical situations, as to the cover and concealment afforded each target. Visibility data are required input to any meaningful infantry fire fight computer simulation. These visibility data provide the basis for both the terrain and vegetation masking model for tactical situations for which target effects data are also available. These data provide a basis for validation of a computer simulation of the infantry fire fight in the platoon organizational and tactical context as portrayed on the CDCEC SAWS ranges. Such validation of computer simulation is not usually possible since the required masking models and

actual fire effectiveness data are not available as input and as a basis of comparison.

Samples of available visibility data indicating when targets are visible, concealed, or covered are presented in two formats:

1) In diagrams for the rifle squad in line assault (Situation 1) from the firer's position to the targets and the reverse

2) In tables for the rifle squad in approach to contact (Situation 4) and for the day and night defense against attack (Situations 7, 8, and 9)

The visibility data for the line assault situation were obtained by stationing at each target position a man whose height equaled the height of the target. A man was then moved up in each assault lane in 5-meter increments so that data could be recorded on each squad member's position and on the progressive firer-to-target visibility and target-to-firer visibility, as illustrated in the diagrams in Figures B-5 and B-6. The firer-to-target visibility charts portray the terrain and vegetation masking from the position of each firer as he moves up the assault lanes to one target. The same format is used for the target-to-firer visibility diagrams. Thus, there are two visibility diagrams available for each of 15 engageable targets in the array. Only one sample of each type (Target No. 4) is presented.*

Positions of terrain masking are identified by the shaded area labeled "Covered." In this area, both the target and firer are covered. The unshaded portion of the diagram labeled "Concealed" includes all firing positions from which the target is concealed. Ground locations from which the firer can see the target are shaded and labeled "Visible." The covered area for a firer with respect to a target is the same as the covered area when viewed from the target to the firer. However, the visibility areas as viewed from firer and target are not the same. A member of an assault squad often cannot detect a target behind a small bush, but a person at the target can look through the bush and see members of the assaulting squad. Thus the boundaries between the "Concealed" and "Visible" areas may not be the same when viewed from the firer's position as from the target's location.

Visibility data for the rifle squad in the approach to contact situation are shown in Table B-14. Although this was a moving situation, the firers stopped and fired from each event line when the targets were raised. Thus,

* A complete series of visibility charts for Situation 1 are available to users with a specialized requirement for the data. Requests for CDCEC SAWS Rifle Squad in Line Assault Visibility Data should be addressed to: CG, USACDCEC through USACDC for approval.

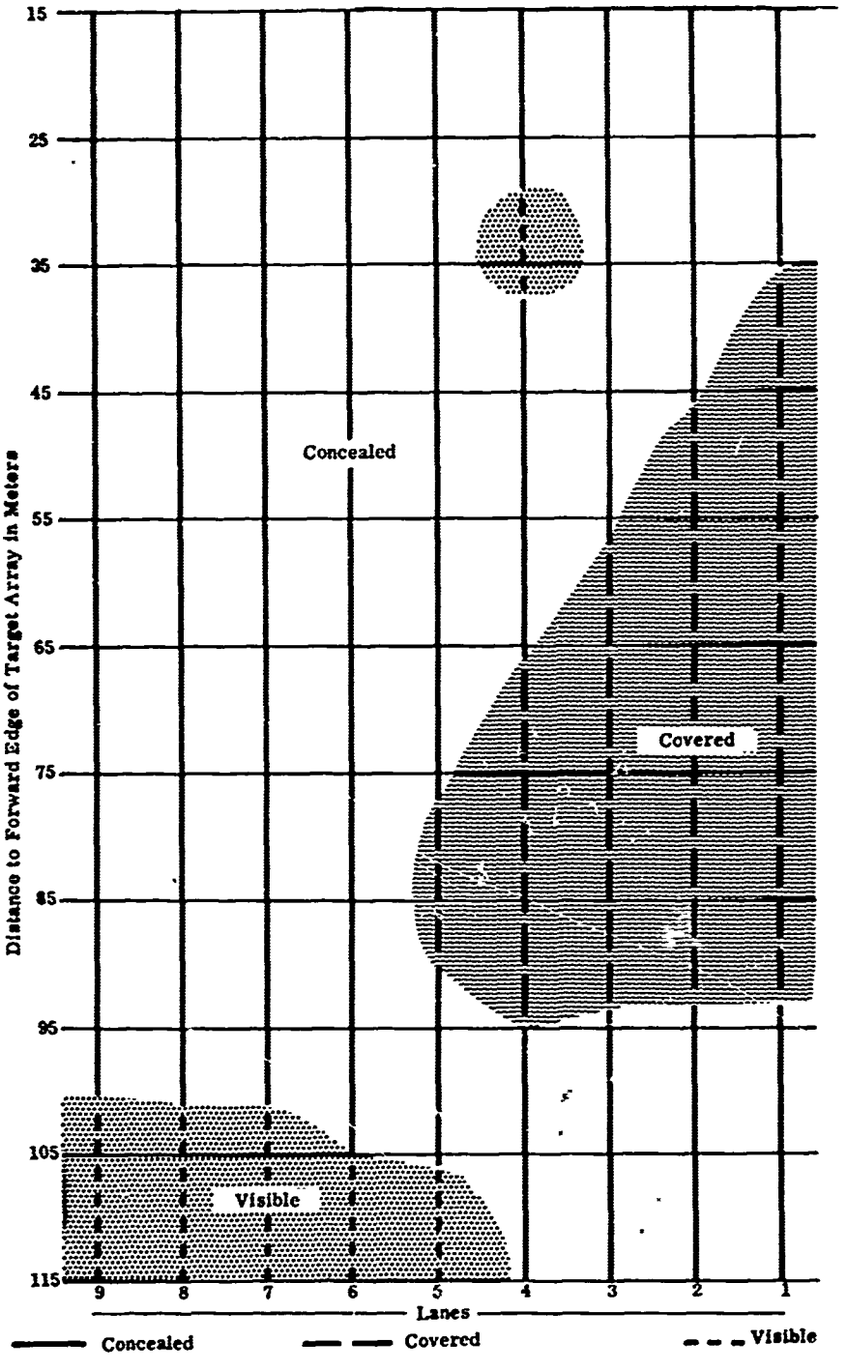

Figure B-5

SITUATION 1, FIRER TO TARGET NO. 4 VISIBILITY DIAGRAM

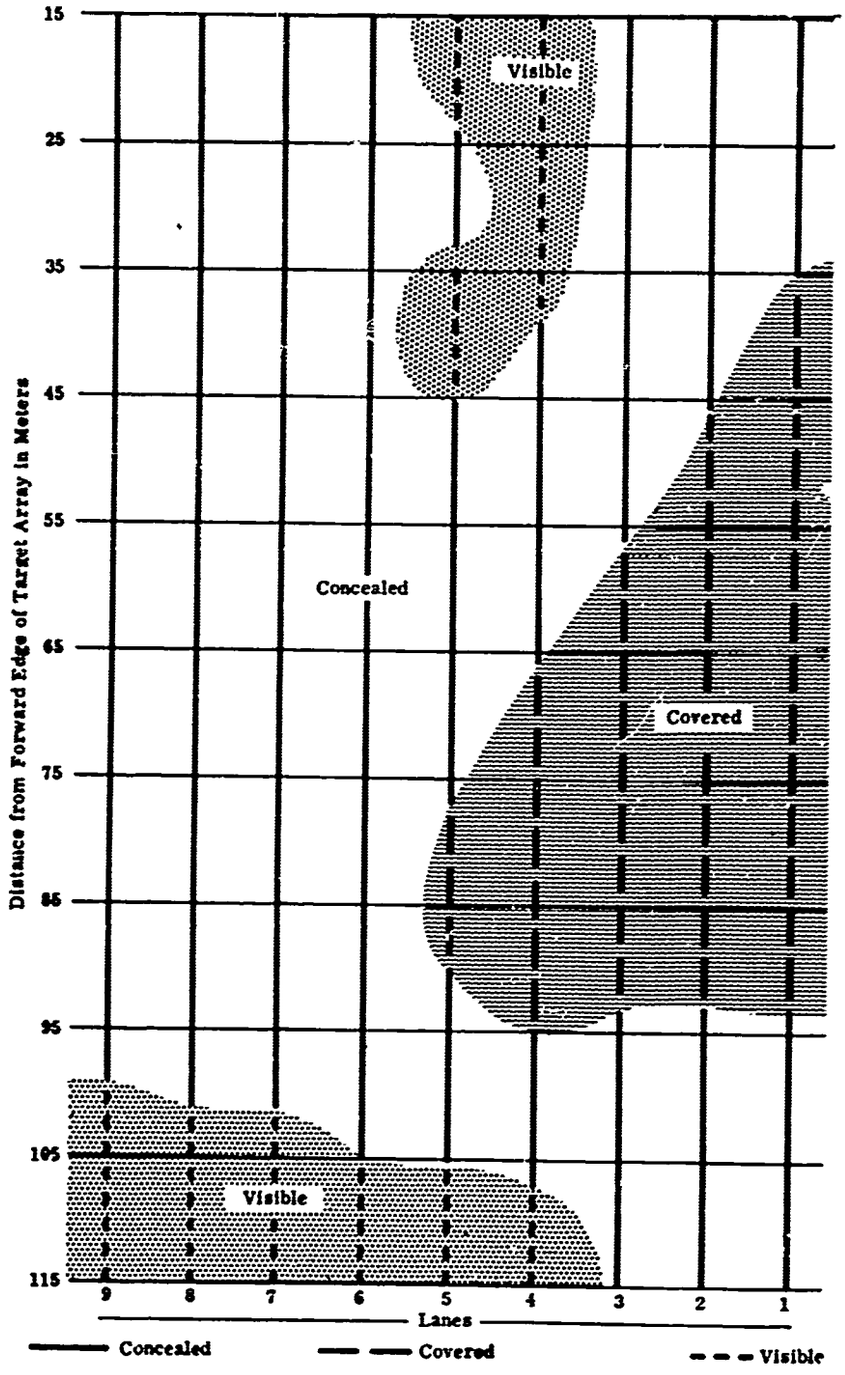

Figure B-6

SITUATION 1, TARGET NO. 4 TO FIRER VISIBILITY DIAGRAM

the detection problem is essentially reduced to a fixed firing point case. The visibility data presented in tabular format relate the stationary position of the firer, in his respective lane at each event line, to each target raised in that same event.

Visibility data for the live fire defense against attack, both day and night situations, are tabulated from each firing point to each target in Tables B-15 and B-16. These data were obtained by stationing a soldier at each firing position (in sequence), in the proper firing attitude, and recording his visual observations as targets were raised. When a target could not be seen, additional personnel were used to differentiate between vegetation and terrain masking. The focal point of observation at night was the simulator flash. The focal point of observation in daylight was the target body.

Table B-14

FIRING POINTS TO TARGETS VISIBILITY DATA FOR RANGE B, RIFLE SQUAD IN APPROACH TO CONTACT

Number		Firing Points								
Event	Target	9	8	7	6	5	4	3	2	1
1	A1	x	x	x	x	x	x	x	x	x
	A2	x	x	x	x	x	x	x	x	x
	A3	x	x	x	x	x	x	x	x	x
	A4	x	x	x	x	x	x	x	x	x
	A5	x	x	x	x	x	x	x	x	x
	A6	x	x	x	x	x	x	x	x	x
2	A7	*	*	*	*	x	x	x	x	x
3	A11	x	x	x	*	*	*	*	*	*
	A12	x	x	x	*	*	*	*	*	*
	A13	*	*	*	x	x	x	*	*	*
	A14	x	x	x	*	*	*	*	*	*
	A15	*	*	*	x	x	x	*	*	*
	A16	*	*	*	x	x	x	*	*	*
	A17	*	*	*	x	x	x	*	*	*
	A18	*	*	*	*	*	*	x	x	x
	A19	*	*	*	*	*	*	x	x	x
	A20	*	*	*	*	*	*	x	x	x
4	A8	x	x	x	x	x	x	x	x	x
	A9	x	x	x	x	x	x	x	x	x
5	A21	x	x	x	x	x	x	x	x	x
	A22	x	x	x	x	x	x	x	x	x

Number		Firing Points								
Event	Target	9	8	7	6	5	4	3	2	1
6	A23	x	x	x	x	x	x	x	x	x
7	A24	x	x	x	x	x	x	x	x	x
	A25	x	x	x	x	x	x	x	x	x
8	A26	x	x	x	x	x	x	x	x	x
	A27	x	x	x	x	x	x	x	x	x
	A28	x	x	x	x	x	x	x	x	x
	A29	x	x	x	x	x	x	x	x	x
	A30	x	x	x	x	x	x	x	x	x
	A37	x	x	x	x	x	x	x	x	x
9	A34	x	x	x	x	x	x	x	x	x
	A35	x	x	x	x	x	x	x	x	x
	A36	x	x	x	x	x	x	x	x	x
10	A31	*	*	x	x	x	x	*	*	*
	A32	*	*	x	x	x	x	*	*	*
	A33	*	*	x	x	x	x	*	*	*
11	A38	x	x	x	x	x	x	x	x	x
	A39	x	x	x	x	x	x	x	x	x
12	A41	*	*	*	x	x	x	x	*	*
	A42	*	*	*	x	x	x	x	*	*

x Target is visible, is inside the safety limits, and can be fired on and hit

* Target is visible, is outside the safety limits, and cannot be fired on

NOTE: Targets A10 and A40 were not used

Table B-15

FIRING POINTS TO TARGETS VISIBILITY DATA FOR RANGE C, DEFENSE AGAINST ATTACK

Target Number	Firing Points								
	9	8	7	6	5	4	3	2	1
1	x	x	x	x	*	*	*	*	*
2	x	x	x	x	x	*	*	*	*
3	x	x	x	x	x	*	*	*	*
4	*	x	x	x	x	x	*	*	*
5	*	*	x	x	x	x	*	*	*
6	*	*		x	x	x	x	*	*
7	*	*	*	x	x	x	x	x	*
8	*	*	*	*	*	x	x	x	x
9	*	*	*	*	x	x	x	x	x
10	*	*	*	*	*	x	x	x	
11	x	x	x	x	x	x	x	*	*
12	*	x	x	x	x	x	x		
13	x	x	x	x	x	x	*	*	*
14		x	x	x	x	x			*
15	*	x	x	x	x	0	0	0	
16	*	*	*	x					0
17	x	x	x	x	x	x			x
18	*	*	x	x					0
19	*	*	*	*	x	x	x	0	0
20	*	*	*	*	*	x	x	0	x
21	*	*	*	x	x	x	x	0	0
22	x	x	x	x	x	x	x	x	x
23		x	x	x	x	x	x	x	x
24			x	x	x	x			x
25	0	x	x	x	x	x			x

Target Number	Firing Points								
	9	8	7	6	5	4	3	2	1
26		x	x	x	x	x			
27	x	x	x	x	x	x	x	x	x
28	x	x	x	x	x	x	x	x	
29	x	x	x	x	x	x	x	x	x
30	x	x	x	x	x	x	x	x	x
31	x	x	x	x	x	x	x	x	x
32	x	x	x	x	x	x	x	x	x
33	x	x	x	x	x	x	x	x	x
34	x	x	x	x	x	x	x	x	x
35	x	x	x	x	x	x	x	x	x
36	x	x	x	x	x	x	x	x	x
37	x	x	x	x	x	x			x
38	x	x	x	x	x	x	x	x	x
39	x	x	x	x	x	x	x	x	x
40	x	x	x	x	x	x	x	x	x
41	x	x	x	x	x	x	x	x	x
42	x	x	x	x	x	x	x	x	x
43	x	x	x	x	x	x	x	x	x
44	x	x	x	x	x	x	x	x	x
45	x	x	x	x	x	x	x	x	x
46	x	x	x	x	x	x	x	x	x
47	x	x	x	x	x	x	x	x	x
48	x	x	x	x	x	x	x	x	x
49	x	x	x	x	x	x	x	x	x
50	x	x	x	x	x	x	x	x	x

x The target is visible

Blank indicates the target is concealed, but can be fired on and hit

0 The target is covered

* Target is outside range safety limits (and not fired on from this firing point)

Table B-16

FIRING POINTS TO TARGETS VISIBILITY DATA FOR RANGE C, NIGHT DEFENSE AGAINST ATTACK

Target Number	Firing Points								
	9	8	7	6	5	4	3	2	1
1	x	x	x	x	*	*	*	*	*
2	x	x	x		x	*	*	*	*
3		x	x		x	*	*	*	*
4	*	x	x	x	x	x	*	*	*
5	*	*	x	x	x	x	*	*	*
6	*	*			x	x		*	*
7	*	*	*	x	x				*
8	*	*	*	*	*	x	x	x	x
9	*	*	*	*					
10	*	*	*	*	*				
11	x				x	x		*	*
12	*	x	x	x	x	x	x		
13				.	x	*	*	*	*
14		x	x	x	x	x			*
15	*	x	x	x		0	0	0	
16	*	*	*	x					0

Target Number	Firing Points								
	9	8	7	6	5	4	3	2	1
17	x	x	x	x	x	x			x
18	*	*	x	x					0
19	*	*	*	*	x	x	x	0	0
20	*	*	*	*	x	x		0	
21	*	*	*	x	x	x	x	0	0
22	x	x	x	x	x	x	x	x	x
23		x	x	x	x	x	x	x	x
24			x	x	x	x			x
25	0		x						
26		x	x	x	x	x			
27	x	x	x	x	x	x	x	x	x
28	x	x	x	x	x	x	x	x	
29	x	x	x	x	x	x	x	x	x
30	x	x	x	x	x	x	x	x	x
38	x	x	x	x	x	x	x	x	x
39	x	x	x	x	x				

x Simulator flash is visible; target can be fired on

Blank indicates simulator flash is not visible, or simulator is not present, but target can be hit

0 Simulator flash is not visible; target is covered

* Target is outside range safety limits (and not fired on from this firing point).

Appendix 4 to Annex B

TARGET SYSTEM COMMAND PROGRAM

Tables B-17 through B-23 represent the target system command program and identify the sequence of programmed events by individual target. The individual target exposure times shown on these tables are programmed total exposure times. Targets fell when hit; therefore, the time that targets were exposed was shortened when they were hit. These times are not be be confused with the cumulative exposure time (CET) which varied according to the number of targets hit and the time required to hit them.

For clarity, the arrows on the tables indicate the simulator associated with a specific target. The simulators are identified as R (rifle), AR (automatic rifle), and MG (machinegun).

The following tables were used throughout the field experiment. For example, every rifle squad firing in Situation 1 used the target system command program shown in Table B-17.

Table B-17

TARGET SYSTEM COMMAND PROGRAM
RIFLE SQUAD IN LINE ASSAULT*
(Situation 1, Range A)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)
	Target	Simulator		
0.000	8 →	MG	119	2.000
0.100	13 →	R	67	1.900
0.150	3 →	R	80	1.850
0.200	7			1.800
0.200	14			1.800
0.220		7R	8	
0.232		14R	8	
0.250	5	None		1.750
0.250	17			1.750
0.300		17R	36	
0.370	1 →	MG	182	1.634
0.484	15			1.516
0.484	2	None		1.516
0.484	11			1.516
0.500		15R	8	
0.520		11R	28	
0.584	12			1.416
0.584	9			1.416
0.600		12R	8	
0.600		9AR	32	
0.650	4	None		1.350
0.650	10			1.350
0.686		10R	8	
0.716	6			1.284
0.716	16			1.284
0.736		6R	17	
0.768		16AR	101	
Total			702	27.132

* The command program had an initial sequence of events (0.000 to 0.768) and a cyclic sequence from 0.800 to 1.100 minutes that was repeated until the end of the assault. Pacers were used at each end of the squad to assist in controlling the rate of advance. The ranges fired were from 148 to 15 meters.

Table B-18

TARGET SYSTEM COMMAND PROGRAM
RIFLE SQUAD AS A BASE OF FIRE AND MACHINEGUN
SQUAD IN FIRE SUPPORT OF ASSAULT *
(Situations 2 and 3, Range A)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
0.000	8	MG	223	4.000	297
0.100	13	R	18	3.900	273
0.150	6	R	44	3.850	293
0.200	7	R	27	3.800	305
0.200	14			3.800	274
0.204		14R	9		
0.250	5	None		3.750	291
0.250	17			3.750	283
0.250	26	MG	279	3.750	284
0.258		17R	8		
0.366	1	MG	127	3.634	298
0.484	2	None		3.516	297
0.484	11			3.516	277
0.484	15	R	8	3.516	277
0.484	28			3.516	307
0.488		11R	8		
0.492		28R	8		
0.584	9	AR	8	3.416	291
0.584	12			3.416	275
0.602		12R	9		
0.650	4	None		3.350	283
0.650	10	R	9	3.350	283
0.650	20	None		3.350	299
0.650	29			3.350	310
0.652		29R	9		

* The command program had an initial sequence of events (0.000 to 0.912) and a cyclic program that began after barrels were changed and that was repeated as necessary to complete the base of fire and machinegun in fire support of the assault.

Table B-18

TARGET SYSTEM COMMAND PROGRAM
RIFLE SQUAD AS A BASE OF FIRE AND MACHINEGUN
SQUAD IN FIRE SUPPORT OF ASSAULT
(Situations 2 and 3, Range A)
(Concluded)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
0.716	16			3.284	275
0.716	18			3.284	291
0.716	19	R	29	3.284	298
0.716	23			3.284	286
0.716	27			3.284	295
0.734		23R	9		
0.750		27R	8		
0.766		16AR	75		
0.784		18AR	27		
0.816	3	R	37	3.184	294
0.816	21			3.184	289
0.816	25			3.184	288
0.834		21R	7		
0.850		25R	9		
0.900	22	R	36	3.100	287
0.900	24			3.100	290
0.900	30	None		3.100	322
0.912		24AR	46		
Total			1077	103.802	

Table B-19

TARGET SYSTEM COMMAND PROGRAM
RIFLE SQUAD IN APPROACH TO CONTACT
(Situation 4, Range B)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
Event 1					
0.000	6	R	12	0.082	48
0.004	1	AR	25	0.078	43
0.008	2	R	13	0.074	52
0.010	4	AR	21	0.072	47
0.012	5	AR	20	0.070	45
0.016	3	R	10	0.066	51
Event 2.					
0.000	7	R	11	0.050	23
Event 3					
0.000	11	R	9	0.066	22
0.000	12	AR	17	0.066	23
0.000	13	R	14	0.066	31
0.000	14	R	12	0.066	28
0.000	15	R	9	0.066	24
0.000	16	MG	20	0.066	28
0.000	17	R	9	0.066	28
0.000	18	R	14	0.066	27
0.000	19	AR	17	0.066	27
0.000	20	R	6	0.066	35
Event 4					
0.000	9			0.134	105
0.034		9R	14		
0.034	8			0.166	106
0.040		8R	31		
Event 5					
0.000	21	None		0.134	162
0.000	22			0.166	163
0.016		22AR	33		

Table B-19

TARGET SYSTEM COMMAND PROGRAM
RIFLE SQUAD IN APPROACH TO CONTACT
(Situation 4, Range B)
(Concluded)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
Event 6					
0.000	23	R	22	0.100	76
Event 7					
0.000	24	AR	11	0.066	91
0.034	25			0.066	92
0. 0.036		25R	9		
Event 8					
0.000	30	R	18	0.066	47
0.000	37			0.084	78
0.004	26	None		0.066	57
0.010	27	None		0.066	55
0.016	29	None		0.068	72
0.016		37R	13		
0.024	28	None		0.084	70
Event 9					
0.000	31	None		0.066	45
0.000	32	R	14	0.066	37
0.000	33	None		0.066	51
Event 10					
0.000	34	None		0.034	43
0.000	35	R	5	0.034	40
0.000	36	None		0.034	44
Event 11					
0.000	38	R	19	0.084	75
0.050	39	R	17	0.084	84
Event 12					
0.000	41	R	11	0.050	32
0.000	42	None		0.050	30
Total			456	2.968	

Table B-20

TARGET SYSTEM COMMAND PROGRAM RIFLE SQUAD AS A BASE OF FIRE SUPPORTING THE ADVANCE
(Situation 5, Range B)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
Array X					
0.000	20			2.000	395
0.000	24			2.000	392
0.000	25			2.000	429
0.016		24R	110		
0.034		25AR	82		
0.050		20R	140		
0.134	14	None		1.866	434
0.134	16	None		1.672*	408
0.216	22			1.784	413
0.324		22MG	208		
0.334	19	None		1.392*	425
0.334	23			1.666	401
0.382		23AR	151		
0.466	17	None		1.414*	402
0.466	21	None		1.278*	420
0.466	27	None		1.344*	389
0.566	15			1.434	415
0.566	18	None		1.218*	410
0.566	26	None		1.188*	390
0.586		15MG	157		
Total			848	22.256	

* Target was raised more than once

Table B-20

TARGET SYSTEM COMMAND PROGRAM RIFLE SQUAD AS A BASE OF FIRE SUPPORTING THE ADVANCE
(Situation 5, Range B)
(Concluded)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
Array Y					
0.000	33	None		1.840*	493
0.000	40			2.000	547
0.032		40AR	132		
0.116	28			1.884	488
0.116	32	None		1.614*	489
0.116	38	None		1.644*	533
0.116	39	None		1.726*	545
0.168		28AR	127		
0.200	29			1.800	504
0.200	36	None		1.650*	510
0.200	37	None		1.550*	528
0.234		29R	86		
0.300	30	None		1.490*	509
0.300	34			1.700	495
0.368		34MG	245		
0.434	31			1.566	499
0.434	35			1.566	502
0.500		31R	73		
0.544		35R	72		
Total			735	22.030	

* Target was raised more than once

Table B-21

TARGET SYSTEM COMMAND PROGRAM
MACHINEGUN SQUAD IN FIRE SUPPORT OF THE ADVANCE
(Situation 6, Range B)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
Array X					
0.000	20			2.000	646
0.000	24			2.000	616
0.000	25			2.000	613
0.016		24R	110		
0.024		25AR	82		
0.050		20R	140		
0.134	14	None		1.866	645
0.134	16	None		1.672*	624
0.216	22			1.784	633
0.324		22MG	208		
0.334	19	None		1.392*	640
0.334	23			1.666	624
0.382		23AR	151		
0.466	17	None		1.414*	620
0.466	21	None		1.278*	640
0.466	27	None		1.344*	605
0.566	15			1.434	628
0.566	18	None		1.218*	630
0.566	26	None		1.188*	609
0.586		15MG	157		
Total			848	22.256	
Array Y					
0.000	33	None		1.840*	692
0.000	40			2.000	752
0.032		40AR	132		
0.116	28			1.884	
0.116	32	None		1.614*	690
0.116	38	None		1.644*	738
0.116	39	None		1.726*	750
0.168		28AR	127		

* Target was raised more than once

Table B-21

TARGET SYSTEM COMMAND PROGRAM
MACHINEGUN SQUAD IN FIRE SUPPORT OF THE ADVANCE
(Situation 6, Range B)
(Concluded)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
0.200	29			1.800	706
0.200	36	None		1.650*	716
0.200	37	None		1.550*	730
0.234		29R	86		
0.300	30	None		1.490*	
0.300	34			1.700	708
0.368		34MG	245		
0.434	31			1.566	700
0.434	35			1.566	698
0.500		31R	73		
0.544		35R	72		
Total			735	22.030	
Array Z					
0.000	12	AR	95	2.000	451
0.000	13	None		1.760*	467
0.066	4			1.934	475
0.066	11	None		1.760*	452
0.100		4MG	196		
0.100	10	None		1.780*	448
0.166	8			1.834	459
0.166	2			1.834	484
0.208		8R	76		
0.234		2R	84		
0.270	7	None		1.606*	458
0.300	3	None		1.486*	484
0.300	9			1.700	452
0.324	5	None		1.426*	468
0.324		9AR	83		
0.366	1	None		1.340*	470
0.366	6			1.634	468
0.416		6R	47		
Total			581	22.094	

* Target was raised more than once

Table B-22

TARGET SYSTEM COMMAND PROGRAM FOR
RIFLE SQUAD AND MACHINEGUN SQUAD IN DEFENSE
AGAINST ATTACK
(Situations 7 and 9, Range C)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
0.000	49	MG	162	0.500	320
0.020	47	None		0.400	322
0.040	50	None		0.420	336
0.070	48	None		0.420	328
0.750	44	AR	96	0.340	279
0.800	43	None		0.340	288
1.220	41	MG	188	0.590	269
1.270	40	None		0.590	274
1.340	42	None		0.590	262
2.190	46	AR	91	0.320	232
2.290	45			0.320	235
2.310		45R	41		
3.040	38			0.890 *	188
3.080		38R	137		
3.100	39			0.872 *	215
3.150		39MG	246		
3.690	37	AR	143	0.450	185
3.720	35	None		0.450	195
3.740	36	None		0.450	189
4.770	34	AR	87	0.290	151
5.290	31	None		0.340	164
5.300	33	MG	269	0.340	152
5.340	32	None		0.340	170
5.800	25			0.250	115
5.840		25AR	60		
5.850	24	None		0.250	114
5.870	26	None		0.250	112
5.890	22			0.220	114
5.910		22AR	62		
5.920	23	None		0.220	114
6.340	27	MG	112	0.340	125
6.350	29	AR Not Used		0.340	129
6.390	28	None		0.340	122

* Target was raised more than once.

Table B-22

TARGET SYSTEM COMMAND PROGRAM FOR
RIFLE SQUAD AND MACHINEGUN SQUAD IN DEFENSE
AGAINST ATTACK
(Situations 7 and 9, Range C)
(Concluded)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
6.400	30 →	R	38	0.340	136
6.750	21	None		0.114	106
6.770	20 →	AR	37	0.110	106
6.800	19	None		0.074	105
7.064	18	None		0.166	85
7.070	17 →	17AR	49	0.170	87
7.090					
7.290	13 →	R	50	0.220	69
7.320	14	None		0.200	74
7.340	16	None		0.190	76
7.350	15	AR Not Used		0.160	73
7.540	11 →	AR	43	0.150	61
7.560	12	None		0.120	60
7.880	5 →	AR	81	0.250	47
7.880	7 →	R	77	0.250	54
7.890	3 →	R	59	0.250	52
7.890	8 →	R	56	0.250	51
7.900	1 →	R	54	0.250	46
7.900	10 →	R	67	0.250	62
7.910	9 →	R	54	0.250	57
7.920	2 →	AR	80	0.250	49
7.920	6 →	R	72	0.250	47
7.940	4 →	R	57	0.250	48
Total			2568	15.976	

Table B-23

TARGET SYSTEM COMMAND PROGRAM RIFLE SQUAD
IN NIGHT DEFENSE AGAINST ATTACK
(Situation 8, Range C)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
Cycle 1					
0.000	24	None		0.170	114
0.000	25	AR	42	0.170	115
0.000	26	None		0.170	112
0.090	22			0.100	114
0.090	23	None		0.100	114
0.090		22AR	26		
0.550	29	AR	72	0.250	129
0.550	30	R	37	0.250	136
0.590	27	MG	80	0.250	125
0.590	28	None		0.250	122
0.970	19	None		0.100	105
0.970	20	AR	27	0.100	106
0.970	21	None		0.100	106
1.100	38	R	25	0.170*	188
1.100	39	MG	58	0.170*	215
1.240	18	None		0.100	85
1.270	17	AR	24	0.090	87
1.520	13			0.140	69
1.520	14	None		0.140	74
1.522		13R	33		
1.540	15	AR	31	0.120	73
1.540	16	None		0.120	76
1.740	11	AR	20	0.070	61
1.740	12	None		0.070	60
2.090	1	R	25	0.170	46
2.090	2	AR	50	0.170	49
2.090	3	R	24	0.170	52
2.090	4	R	25	0.170	48
2.090	5	AR	49	0.170	47
2.090	6	R	27	0.170	47
2.090	7	R	24	0.170	54
2.090	8	R	34	0.170	51

* Target was raised more than once

Table B-23

TARGET SYSTEM COMMAND PROGRAM RIFLE SQUAD
IN NIGHT DEFENSE AGAINST ATTACK
(Situation 8, Range C)
(Concluded)

Sequence Programmed Events (Minutes)	Target and Weapon Simulated		Total Rounds Fired by Simulator	Target Exposure Time (Minutes)	Average Firing Distance (Meters)
	Target	Simulator			
Cycle 1					
2.090	9 →	R	19	0.170	57
2.090	10 →			0.170	62
2.096		10R	32		
Total			759	4.900	
Cycle 2					
0.000	17 →	AR	22	0.084	87
0.000	18	None		0.084	85
0.250	13 →	R	43	0.200	69
0.250	14	None		0.200	74
0.866	22 →			0.334	114
0.866	23	None		0.334	114
0.872		22AR	82		
1.484	15 →	AR	44	0.182	73
1.484	16	None	48	0.182	76
1.800	11 →	AR	34	0.134	61
1.800	12	None		0.134	60
2.200	1 →	R	65	0.250	46
2.208	2 →	AR	68	0.258	49
2.208	10 →	R	54	0.250	62
2.224	6 →	R	55	0.250	47
2.234	7 →	R	80	0.250	54
2.242	4 →	R	57	0.250	48
2.250	3 →	R	48	0.250	52
2.266	9 →	R	57	0.250	57
2.284	5 →	AR	47	0.250	47
2.284	8 →	R	55	0.250	51
Total			859	4.376	

Annex C

MATERIEL

Annex C

MATERIEL

This annex describes all candidate and Soviet weapons and ammunition used in the SAWS field experiment and the procedures for control and maintenance of weapons. Table C-1 presents a comparative description of the SAWS weapons. Tables C-2 through C-5 compare the weights, dimensions and firing characteristics of rifles, automatic rifles, and bipod and tripod machineguns. Table C-6 compares the ammunition used on the basis of component weights and certain ballistic characteristics. Table C-7 records the results of accuracy tests. Tables C-8 through C-21 present attrition data reflecting parts replaced and the interval and rate of part replacements. Table C-22 tabulates the results of fouling tests for M16E1 rifles.

1. EXPERIMENTATION WEAPONS

All weapons used in the experiment were air cooled, gas operated shoulder weapons. Individual characteristics of the different weapons are listed in Table C-1 and shown in Figures C-1 through C-7. Parenthetical nomenclature identifies the descriptive terms used for these weapons throughout the report.

a. US 7.62mm Weapons

The following standard US small arms were used in the experiment: the M14 and M14E2 rifles and the M60 bipod and tripod mounted machinesguns. They all fire the standard 7.62mm NATO cartridge.

The stock of the M14E2 rifle is modified to a straight line design and has a front end hand grip and rubber recoil pad. The M2 adjustable bipod is added as an easily detached component. A stabilizer assembly is installed over the flash suppressor on the rifles.

b. Colt 5.56mm Weapons

The Colt weapon family consists of three weapons, two of which were used: the M16E1 rifle and the Colt automatic rifle. The gas system that actuates these weapons eliminates the conventional gas piston and cylinder. The charging handle is centered in the rear of an aluminum receiver assembly. The rear sight has two apertures, one for ranges up to 300 meters and one for ranges from 300 to 500 meters. The rifle and automatic rifle are identical, except that the automatic rifle has a heavier barrel and a different buffer group.

c. Stoner 63 5.56mm Weapons

The following Stoner 5.56 weapons were used:

1) Rifle -- its rear sight has two apertures, like the Colt weapons -- one for ranges up to 300 meters and one for ranges from 300 to 500 meters

2) Automatic Rifle -- its ammunition is fed from the top of the receiver and ejected to the left, the sights offset to the left to accommodate the feeding system

3) Bipod Mounted Machinegun

4) Tripod Mounted Machinegun -- the same as the bipod mounted machinegun, except that a cradle adaptor allows it to be used with the standard M122 bipod

Sheet metal stamping and welding are used in the manufacture of the Stoner family. The weapons consist of 16 assemblies. There is a basic component group for all the weapons. The various configurations can be formed by adding assemblies to the basic unit. The family also includes a folding stock version of the rifle and a solenoid operated machinegun for use on vehicles; neither of these was evaluated. A 30-round aluminum magazine is being developed. A few of the magazines were provided for informal evaluation, but only the 30-round steel magazines were used in the experiment.

d. Soviet 7.62mm Weapons

The following Soviet-type 7.62mm weapons were used in the experiment:

1) AK47 Assault Rifle

2) RPD Bipod Mounted (squad level machinegun)

3) DPM Bipod Mounted (company level machinegun)

The AK47 rifle and the RPD machinegun fire the Soviet M1943 intermediate cartridge. The DPM machinegun fires the Soviet M1908 cartridge.

2. CONTROL AND MAINTENANCE OF FIELD EXPERIMENTATION WEAPONS

Weapons were stored in four van-type trailers for ease of transportation and security during the field experiment. Racks designed and

fabricated locally to support the weapons were adjustable to weapons of various lengths. Each rack accommodated 20 rifles or 10 machineguns (Figure C-8). The weapons were guarded at all times.

Maintenance of weapons was under the control and supervision of one officer, four NCOs, and 14 armorer artificers. These personnel were trained in a designated weapon system and then cross-trained in the other weapon systems to provide flexibility. Spare parts for the weapons were stored in three shop trucks used as weapon repair facilities. Since spare parts were not available for the Soviet weapons, extra weapons were used as a source for parts as necessary.

Weapon data books were established for each weapon to record by date* the mode of fire (semiautomatic or automatic) and the number of rounds fired: 1) the amount of ammunition expended in each weapon, 2) the malfunctions occurring, 3) the parts replaced in the weapons, 4) names of experimentation subjects assigned to the weapon, and 5) zeroing data.

Cleaning of weapons was closely supervised by the armorer artificers. Experimentation subjects cleaned their weapons after each firing. The procedures followed were those set forth in FM 23-8, May 1965; FM 23-9, January 1965; FM 23-67, October 1964; TM 9-1005-249-14, and Special Text 23-67, 1 July 1965. Uniform cleaning procedures were enforced.

3. AMMUNITION

Ammunition for the experiment was stored in the Fort Ord Ammunition Supply Point (ASP) and drawn as required. A building within the ASP was used for loading magazines and belts for delivery to the experimentation ranges.

Three NCOs and 18 enlisted men were used to operate the central magazine loading and ammunition issue facility. These personnel were used to hand load magazines because of a lack of mechanical loaders. Thirteen mechanical magazine loaders were available for Stoner 30-round magazines. These loaders were also used on the Colt 20-round magazines.** The use of a central magazine loading facility allowed the magazines and ammunition lots to be controlled. Magazines not used during a day's firing were marked for identification and used the next day, to avoid keeping magazine springs compressed any longer than necessary and to establish uniform treatment of magazines. Magazines identified as a cause of a malfunction were removed from service and secured for examination later.

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* Time was recorded in the weapon's reliability report record.

** A Colt magazine loader was furnished independently by the Colt representative but not used in the experiment.

The ammunition pouch used with the M14 rifle did not have a counterpart for the Colt, Stoner, and Soviet weapons. Suitable pouches for these weapons were designed at USACDCEC. Pouches for AK47 magazines were fabricated by the Natick Laboratory, Natick, Massachusetts. Those for the Colt and Stoner weapons were fabricated by Richmond General Depot, Richmond, Virginia. Both pouches are shown in Figure C-9.

Ammunition used in the experiment was identified by type, caliber, model, ammunition lot number, and manufacturer. Appropriate control of ammunition lots was maintained to avoid mixing lot numbers. Magazines delivered to the range were packed in ammunition crates and appropriately marked to designate squad usage, experimentation situation, date, caliber, type of ammunition, and lot number. Residue from firing was repacked and returned to ASP.

4. METAL LINK BELT

Machinegun ammunition was issued in metal link belts -- the M13 link for 7.62mm's, a scaled down version of the M13 link for 5.56mm's, and 7.62mm nondisintegrating links for the Soviet RPD.

The links initially received for the Stoner machinegun were significantly different from design specifications of the Cadillac-Gage Company. These manufactured links caused five to nine separations per 100-round belt. In one instance, there were 17 separations. USACDCEC discovered this error and initiated action to have Cadillac-Gage make new links. Experimental record runs for the rifle squads were conducted using the faulty links. During this time 100,000 correctly made links were manufactured by Cadillac-Gage and delivered to the Army Weapons Command. Of these, 30,000 were subsequently delivered to USACDCEC and used for the machinegun squad record runs. The limited number of links available required that the links be salvaged and reused.

Only 250 nondisintegrating links were available for use with the RPD until January 1966, when 1235 additional links were received.

Table C-1 SAWS FIELD EXPERIMENTATION WEAPONS COMPARED

Weapons	Feeding	Number rounds in magazine or belt	Mode of Fire		Bolt remains open after last round	Locking rotating bolt	Fires from closed bolt position	Fires from open bolt position	Gas system location		Capable of launching grenades	Quick-change barrel	Spare barrel kit	Flash suppressor	Sights			
			Automatic	Semi-auto					Under barrel	Over barrel					Rear sight adjustable for windage and elevation	Permanently-affixed front sight	Front sight adjustable for elevation for zeroing	Front sight adjustable for windage
US STANDARD																		
US rifle, 7.62mm M14 (M14 rifle)[ab]	Magazine	20	x	x	x	x	x		x		x			x	x	x		
US rifle, 7.62mm M14E2 (M14E2 rifle)[ab]	Magazine	20	x	x	x	x	x		x		x			x[c]	x	x		
US machinegun, 7.62mm M60 bipod-mounted (M60 bipod machinegun)[a]	Disintegrating belt	100 rd band-oleer 200 rd box	x			x		x	x			x	x	x	x	x		
US machinegun 7.62mm M60 tripod-mounted (M60 tripod machinegun)[a]	Disintegrating belt	100 rd band-oleer 200 rd box	x			x		x	x			x	x	x	x	x		
COLT																		
Rifle, 5.56mm, M16E1 (M16E1 rifle)[a]	Magazine	20 or 30	x	x	x	x	x			x	x			x	x		x	
Automatic rifle, 5.56mm CAR-15 (Colt automatic rifle)[a]	Magazine	20 or 30	x	x	x	x	x			x	x			x	x		x	
STONER																		
Rifle, 5.56mm Stoner 63 (Stoner rifle)[a]	Magazine	30	x	x	x	x	x			x	x	x		x	x		x	
Automatic rifle, 5.56mm Stoner 63 (Stoner automatic rifle)[a]	Magazine	30	x			x		x	x			x	x	x	x		x	
Machinegun, 5.56mm Stoner 63 bipod-mounted (Stoner bipod machine-gun)[a]	Disintegrating belt	150 rd band-oleer 900 rd box	x			x		x	x			x	x	x	x		x	
Machinegun, 5.56mm Stoner 63 tripod-mounted (Stoner tripod machinegun)[a]	Disintegrating belt	150 rd band-oleer 900 rd box	x			x		x	x			x	x	x	x		x	
SOVIET																		
Rifle, 7.62mm, AK47 (AK47 rifle)[ab]	Magazine	30	x	x		x	x			x							x	x
Machinegun, (squad level), 7.62mm, RPD, bipod-mounted (RPD machinegun)[ab]	Nondisintegrating belt	100	x					x	x								x	x
Machinegun, (company level) 7.62mm DPM bipod-mounted (DPM machinegun)[ab]	Drum magazine	47	x					x	x			x		x			x	x

[a] Abbreviated nomenclature used throughout report

[b] Wood stock

[c] Muzzle compensator

Table C-2 COMPARATIVE DATA--RIFLES

Item	M14	M16E1	Stoner	AK47
Weights (lb)				
Weapon[a]	9.69	6.87	8.25	8.75
With loaded magazine	11.27	7.55 (20 rd) 7.87 (30 rd)	9.52 (30 rd)	10.87 (30 rd)
Cartridge, ball duplex	0.0540 0.0570	0.0250	0.0250	0.0397
Steel magazine, unloaded	0.50 (20 rd)	--	0.52 (30 rd)	0.93 (30 rd)
Aluminum magazine, unloaded	--	0.18 (20 rd) 0.25 (30 rd)	--	--
Steel magazine, loaded	1.58 (20 rd)	--	1.27 (30 rd)	2.12 (30 rd)
Aluminum magazine, loaded	--	0.68 (20 rd) 1.00 (30 rd)	--	--
One cartridge plus share of magazine (steel)	0.0790 (20 rd)	--	0.0423 (30 rd)	0.0706 (30 rd)
One cartridge plus share of magazine (aluminum)	--	0.0341 (20 rd) 0.0333 (30 rd)	--	--
Weapon with 100 rounds in magazines	17.59	11.02[b] (20 rd) 11.12[b] (30 rd)	14.15[b]	16.44
Number of rounds at M14 system weight	100 (20 rd)	290 (20 rd) 300 (30 rd)	180 (30 rd)	120 (30 rd)

Table C-2 COMPARATIVE DATA--RIFLES (Continued)

Item	M14	M16E1	Stoner	AK47
Sling	0.31	0.31	0.31	0.38
Bipod	--	0.50	0.94	--
Bipod case	--	0.25	0.38	--
Dimensions				
Total length with flash suppressor	44.25	38.75	40.25	34.25[c]
Barrel length (inches)	22.00	21.00	21.67	16.39
Diameter of bore (millimeters)	7.62	5.56	5.56	7.62
Rifling (inches)	4R 1-12	6R 1-12	6R 1-12	4R 1-9.8
Height of sight above barrel (inches)	0.94	2.44	2.06	1.81
Sight radius (inches)	26.56	19.75	21.38	14.88
Firing Characteristics[d]				
Muzzle velocity (fps)	2800	3250	3250	2400
Muzzle energy (ft-lb)	2435	1300	1300	1630
Chamber pressure (psi)	50,000	52,000	52,000	Not Available
Cyclic rate (rpm)	700-750	800-850	740-800	600
Mode of fire	Semiauto (Selector can be installed to permit auto fire)	Semiauto and auto	Semiauto and auto	Semiauto and auto

[a] Includes sling only

[b] Includes bipod and bipod case

[c] No flash suppressor

[d] Rated, not measured

NOTE: Actual weighed weight, average of weapons:
US M14—SN 1522264, 1532819, Harrington and Richardson, SN 517524 Springfield

M14E2—SN 1279398, 1276089, 1282720, Winchester

Table C-2 COMPARATIVE DATA--RIFLES (Concluded)

M60—SN8776, 70109, 69861, SACO - Lowell Shops

Colt M16E1—SN 15225, 147616, 152115, Colt Firearms Division

Colt Automatic Rifle—SN 014786, 014750, 014761, Colt Firearms Division

Stoner Rifle—SN 000643, 000701, 000642, Cadillac Gage

Stoner Automatic Rifle—SN 000788, 000815, 000841, Cadillac Gage

Stoner Bipod MG—SN 000976, 000782, 000975, Cadillac Gage

Stoner Tripod MG—SN 000782, 000991, 000976, Cadillac Gage

Soviet Type AK47—SN 7899, Chicom, SN 2883, 4255, Soviet

Soviet Type RPD—SN 764341, 763410, 219374, Chicom

Soviet Type DPM—SN 203931, 209802, Chicom

Scales Used:

Scale Ammo—Ohaus, Precision Loading Scale Model 505 (No SN) located at 6th Army Marksmanship Unit (All ammo weighed)

Chatillon 20 pound—1 ounce capacity, type 027 (Team II - Tech Weapons) (Weighed three weapons of each type on this scale)

Postal Scale—70 pound capacity, manufactured by Trinar, located at Fort Ord Post Office. (One weapon each type weighed to check for accuracy).

Torision Balance Scale—Style 255, capacity 4 1/2 kilo, SN B75259 located at Fort Ord Pharmacy (five of every type accessory weighed, except three plastic Stoner bandoleers)

Table C-3

COMPARATIVE DATA—AUTOMATIC RIFLES

Item	M14E2	Colt	Stoner
Weights (lb)			
Weapon[a]	12.56[b]	8.00	10.62
With loaded magazine	14.14	8.68 (20 rd)	11.89
		9.00 (30 rd)	
Cartridge, ball	0.0540	0.0250	0.0250
duplex	0.0570	--	--
Steel magazine, unloaded	0.50 (20 rd)	--	0.52 (30 rd)
Aluminum magazine, unloaded	--	0.18 (20 rd)	--
		0.25 (30 rd)	
Steel magazine, loaded	1.58 (20 rd)	--	1.27 (30 rd)
Aluminum magazine, loaded	--	0.68 (20 rd)	--
		1.00 (30 rd)	
One cartridge plus share of magazine (steel)	0.0730	--	0.0423
One cartridge plus share of magazine (aluminum)	--	0.0341 (20 rd)	--
		0.0333 (30 rd)	
Weapon with 260[c] rounds in magazines	33.10	17.59[d] (20 rd)	23.12[d]
		17.50[a] (30 rd)	

Table C-3

COMPARATIVE DATA—AUTOMATIC RIFLES (Continued)

Item	M14E2	Colt	Stoner
Number of rounds at M14E2 system weight (33.10 lb)	260	714 (20 rd) 724 (30 rd)	492
Number of rounds rounded to nearest magazine not exceeding 33.10 lb	260	700 (20 rd) 720 (30 rd)	480
Number of rounds at M14 systems weight (17.59 lb) in rifle role	60	--	--
Sling	0.43	0.31	0.31
Bipod	considered organic	0.50	0.94
Bipod case	none	0.25	0.38
Dimensions (inches)			
Total length with flash suppressor	44.13	38.75	40.31
Barrel length	22.00	21.00	21.67
Height of sight above barrel	0.94	2.44	1.50
Sight radius	26.56	19.75	21.44
Rifling	4R 1-12	6R 1-12	6R 1-12
Firing Characteristics[e]			
Caliber	7.62mm	5.56mm	5.56mm
Muzzle velocity (fps)	2800	3250	3250
Muzzle energy (ft-lb)	2435	1285	1300
Cyclic rate (rpm)	700-750	800-850	To be determined

Table C-3

COMPARATIVE DATA—AUTOMATIC RIFLES (Concluded)

Item	M14E2	Colt	Stoner
Chamber pressure (psi)	50,000	52,000	52,000
Mode of fire	Semiauto, Automatic	Semiauto, Automatic	Automatic

[a] Includes sling only

[b] Bipod organic to weapon

[c] Current Army standard ammunition basic load for M14E2

[d] Includes bipod and bipod case

[e] Rated, not measured

NOTE: See note, Table C-2, for information on weapons weighed and scales used

Table C-4

COMPARATIVE DATA—BIPOD MOUNTED MACHINEGUNS

Item	M60	Stoner	RPD
Weights (lb)			
Weapon[a]	24.37	12.38	14.93
Weapon with ammunition in containers	31.77 (100 rd in bandoleer)	17.37 (150 rd in bandoleer)	20.66 (100 rd in drum
	41.06 (200 rd in metal box)	44.56 (900 rd in metal box)	--
Cartridge, ball	0.0540	0.0250	0.0397
duplex	0.0570	--	--
Ammunition container unloaded	0.87 (100 rd bandoleer)	0.56 (150 rd bandoleer)	1.13 (100 rd steel drum)
	3.63 (200 rd M19A1 in metal box)	5.63 (900 rd M2A1 in metal box)	
Ammunition container loaded	7.40 (100 rd in bandoleer)	4.99 (150 rd in bandoleer)	5.73 (100 rd in steel drum)
	16.69 (200 rd in metal box)	32.18 (900 rd in metal box)	
Link	0.0113	0.0045	0.0063
One cartridge (ball), link and share of container	0.0740	0.0332	0.0573
Number of rounds at M14E2 system weight (33.10 lb) as used in automatic rifle role[e]	120[b]	600	300 (in 3 drums)
Number of rounds available at machinegun system weight (129.65 lb)[c]	1000 129.28 lb (ammo in metal boxes)	2850 129.06 lb (ammo in metal boxes)	1833 129.62 lb (ammo in steel drums)
	1123 129.60 lb (ammo in bandoleers)	3059 129.63 lb (ammo in bandoleers)	

Table C-4

BIPOD MOUNTED MACHINEGUN (Concluded)

Item	M60	Stoner	RPD
Sling weight	0.31	0.31	0.37
Bipod weight	Not removable	0.94	Not removable
Bipod case	--	0.38	--
Dimensions (inches)			
Total length with flash suppressor	43.38	40.31	40.75[d]
Barrel length	25.75	21.67	20.50
Height of sight above barrel	2.75	1.44	1.93
Sight radius	21.38	21.88	23.50
Rifling	4R1-12	6R1-12	4R1-9.8[e]
Firing Characteristics[f]			
Caliber	7.62mm	5.56mm	7.62mm
Muzzle velocity (fps)	2800	3250	2434
Muzzle energy (ft-lb)	2435	1300	Not available
Cyclic rate (rpm)	550	650-850	700-780
Chamber pressure (psi)	52,000	52,000	Not available
Mode of fire	Automatic	Automatic	Automatic

[a] Includes bipod and sling

[b] An ammunition bearer armed with .45 caliber pistol replaced a rifleman allowing combined system weight of rifleman (17.59 lb) and gunner (33.10 lb) to carry 294 rounds for total weight of 50.63 lb

[c] Based on weight of M60 tripod MG, spare barrel kit, 800 rounds ammunition in metal boxes and two .45 caliber pistols for assistant gunner and ammunition bearer

[d] No flash suppressor

[e] Approximate

[f] Rated, not measured

NOTE: See note, Table C-2, for information on weapons weighed and scales used

Table C-5

COMPARATIVE DATA — TRIPOD MOUNTED MACHINEGUNS AND DPM

Item	M60	Stoner	DPM
Weights (lb)			
Weapon[a]	41.43	30.10 (with buttstock)	22.00
Weapon with ammunition in container	48.83 (100 rd in bandoleer)	35.17 Wpn with butt-stock (150 rd bandoleer)	27.70 (47 rd in steel drum)
	58.12 (200 rd in metal box)	62.35 Wpn with butt-stock (900 rd metal box)	
Cartridge, ball	0.0540	0.0250	0.0495
duplex	0.0570	--	--
Ammunition container unloaded	0.87 (100 rd bandoleer)	0.56 (150 rd bandoleer)	3.38 (47 rd in steel drum)
	3.63 (200 rd M19A1 metal box)	5.63 (900 rd M2A1 metal box)	3.38
Ammunition container loaded	7.40 (100 rd in bandoleer)	4.99 (150 rd in bandoleer)	5.70 (47 rd in steel drum)
	16.69 (200 rd in metal box)	32.18 (900 rd in metal box)	
Link	0.0113	0.0045	None
One cartridge, link plus share of container	0.0740	0.0332	0.121
Number of rounds at M60 system weight (129.65 lb)[b]	800 (ammo in metal boxes)	2298 (in metal boxes)	752 (in drums)
	900 (ammo in bandoleer)	2545 (in bandoleer)	

Table C-5

TRIPOD MOUNTED MACHINEGUNS AND DPM (Concluded)

Item	M60	Stoner	DPM
Tripod complete	17.37	19.37	--
Spare barrel	8.63	4.12	4.88
Spare barrel kit	12.56	5.87	Unknown
Dimensions			
Total length with flash suppressor (inches)	43.38	38.31	50.00
Barrel length (inches)	25.75	21.69	27.75
Height of sight above barrel (inches)	2.75	1.44	1.75
Sight radius (inches)	21.38	21.69	24.25
Rifling	4R 1-12	6R 1-12	Unknown
Weapon Characteristics[c]			
Caliber	7.62mm	5.56mm	7.62mm
Muzzle velocity (fps)	2800	3250	2756
Cyclic rate (rpm)	550	650-850	550
Chamber pressure (psi)	52,000	52,000	Not available
Mode of fire	Automatic	Automatic	Automatic

[a] M60 and Stoner Tripod Mounted, belt fed; DPM bipod mounted, drum fed

[b] Based on weight of M60 tripod MG, spare barrel kit, 800 rounds ammunition in metal boxes and two .45 caliber pistols for assistant gunner and ammunition bearer

[c] Rated, not measured

NOTE: See note, Table C-2, for information on weapons weighed and scales used

Table C-6 COMPARATIVE DATA--AMMUNITION

Cartridge and Model	Country of Origin	Projectile		Propellent Wt (gr)[a]	Case Wt (gr)[ab]	Cartridge Wt (gr)[a]	Ignition* Range (yd)	Burnout* Range (yd)	Velocity* (fps)	Chamber Pressure (psi)[c]
		Type	Wt (gr)[a]							
7.62mm, NATO M80	US	Ball	148	46	186	380	--	--	2,750	50,000
7.62mm, NATO M62	US	Tracer	141	46	185	372	100	850	2,690	44,500
7.62mm, M198	US	Duplex	82[c] 83[d]	46	189	401	--	--	2,700[c] 2,500[d]	--
5.56mm, M193	US	Ball	55	28	93	176	--	--	3,250	50,900
5.56mm, M196	US	Tracer	52	24	95	171	Muzzle	180	3,200	48,400
Soviet-type 7.62mm, M1943	Unknown[f]	Ball	123	31	108	262	--	--	2,400	Unknown
Finnish, 7.62mm, M60	Finland[g]	Ball	123	26	130	279	--	--	2,400	Unknown
Soviet-type, 7.62mm, M1943	Unknown[f]	Tracer	115	30	106	253	Unknown	Unknown	Unknown	Unknown
Soviet-type, 7.62mm, M1908	Unknown[f]	Ball	140	53	145	347	--	--	2,750	Unknown

* Rated not measured at HQ USACDCEC

[a] Values averaged from weighed samples of each ammunition type

[b] Primer weight included

[c] Front projectile

[d] Rear projectile

[e] 70° F

[f] Chicom packed

[g] Finnish ammunition cited in TB 381-5-1 Catalog of Foreign Material (U) page FOM 43-1385-7-7.62-1 as M60 received at USACDCEC as M1943 Type

[h] Miscellaneously packed

Table C-7

COMPARATIVE DATA--SAWS WEAPONS ACCURACY TEST
(Firing from 100 meters, ten rounds per target)

Type Weapon*	Ammunition	Firer	Number of Weapons	Number of Targets	Mean Radius		Extreme Horizontal		Extreme Vertical		Extreme Spread		Rounds Fired Prior to Test	
					AV	SD	AV	SD	AV	SD	AV	SD	AV	SD
M14	7.62mm Lot Number RA 5374	Number 1	24	24	2.52	.70	7.0	3.04	6.5	3.05	9.1	3.79	2187	802
		Number 2	24	24	2.37	.60	7.3	2.63	5.8	2.32	8.6	2.55		
		Both	24	48	2.44	.65	7.2	2.82	6.1	2.64	8.3*	2.87		
M14E2	7.62mm Lot Number RA 5374	Number 1	21	21	2.15	.55	6.5	1.52	5.1	1.83	7.3	1.87	869	532
		Number 2	21	21	2.31	.68	6.2	3.14	5.5	1.47	7.8	2.82		
		Both	21	42	2.23	.61	6.4	2.45	5.3	1.93	7.5	2.38		
M16E1	5.56mm Lot Number WCC 6098	Number 1	25	25	2.40	.61	6.4	2.02	6.3	1.87	7.9	2.05	1880.8	1066
		Number 2	25	25	1.81	.40	4.2	.88	4.8	1.47	5.5	1.33		
		Both	25	50	2.11	.59	5.3	1.90	5.6	1.82	6.7	2.10		
Colt AR	5.56mm Lot Number WCC 6098	Number 1	3	3	1.95	.64	6.7	3.34	4.9	2.59	7.9	4.35	1798.7	267
		Number 2	3	3	1.42	.37	2.8	1.21	4.7	1.42	5.3	1.00		
		Both	3	6	1.70	.87	4.8	3.09	4.8	1.87	6.6	3.16		
Stoner Rifle	5.56mm Lot Number WCC 6098	Number 1	24	24	2.24	.68	6.1	1.93	5.6	2.34	7.4	2.19	3318.6	1875
		Number 2	24	24	1.72	.39	5.0	2.11	4.7	1.49	6.2	2.25		
		Both	24	48	1.98	.61	5.5	2.10	5.1	1.99	6.8	2.29		
Stoner AR	5.56mm Lot Number WCC 6098	Number 1	3	3	4.64	.63	14.2	5.34	8.6	2.23	14.5	2.06	3986.6	2658
		Number 2	3	3	4.01	.33	9.6	2.15	9.9	3.25	12.1	.17		
		Both	3	6	4.32	.58	11.9	3.29	9.2	2.59	13.3	.38		

* This accuracy is characteristic of the M14 weapon - M80 ammunition. See Infantry and Aircraft Weapons Division report on tests for Ad Hoc Committee on accuracy and targeting of 7.62mm ammunition and M14 Rifles, Report No. DPS-471, March 1962, paragraph 3.2, page 17; paragraph 3.3, page 25; table XIV, page 27; paragraph 3.8.4., page 83-84.

NOTE: Measurements in inches

AV - Average
SD - Standard deviation

Table C-7

COMPARATIVE DATA--SAWS WEAPONS ACCURACY TEST (Concluded)
(Firing from 100 meters, ten rounds per target)

Type Weapon	Ammunition[a b]	Firer	Number of Weapons	Number of Targets	Mean Radius		Extreme Horizontal		Extreme Vertical		Extreme Spread		Known Rounds Fired Prior to Test[c]	
					AV	SD	AV	SD	AV	SD	AV	SD	AV	SD
AK47	Finnish Ball ChiCom Ball	Number 1	26 10	26 10	2.36 2.36	.49 .49	6.10 6.05	1.32 1.48	6.10 6.51	2.20 1.53	7.70 8.03	1.97 1.73	3300 9885	4339 2107
	ChiCom Tracer ChiCom API		26 10	26 10	2.63 2.50	.82 1.54	6.20 6.41	1.66 4.31	7.00 7.18	4.22 7.51	8.60 8.77	3.73 7.13	3345 10107	4416 2163
	Finnish Ball ChiCom Ball	Number 2	26 10	26 10	2.52 2.79	.58 .68	5.70 6.26	1.49 1.32	7.50 7.79	2.35 3.04	8.50 9.08	1.94 2.16	3300 9885	4339 2107
	ChiCom Tracer ChiCom API		26 10	26 10	2.57 2.27	.75 .44	5.90 4.93	1.98 1.38	7.20 6.72	2.47 1.30	8.60 7.30	2.65 1.18	3345 10107	4416 2163
	Finnish Ball ChiCom Ball	Both	26 10	52 20	2.44 2.57	.54 .62	5.90 6.16	1.41 1.37	6.80 7.15	2.36 2.43	8.10 8.56	1.97 1.98	3300 9885	4339 2107
	ChiCom Tracer ChiCom API		26 10	52 20	2.60 2.39	.78 1.11	6.10 5.67	1.81 3.21	7.10 6.95	3.42 5.25	8.60 8.04	3.21 5.03	3345 10107	4416 2163

[a] Finnish and ChiCom Ball tests conducted jointly for first ten weapons tested.

[b] ChiCom tracer and API tests conducted jointly for first ten weapons tested.

[c] These weapons were not new when received, and weapon history prior to their receipt is unknown. Numbers listed represent the quantity of rounds fired in each weapon since receipt of the weapon.

Table C-8

PARTS ATTRITION
(US Weapons Family)

Number Part Replacements per Weapon	M14			M14E2			M60		
	Number Weapons	Total Parts	Total Rounds Fired	Number Weapons	Total Parts	Total Rounds Fired	Number Weapons	Total Parts	Total Rounds Fired
0	51	0	109,785	52	0	101,757	7	0	33,041
1	63	63	196,240	17	17	35,913	13	13	82,784
2	6	12	21,878				12	24	118,745
3				1	3	2,676	6	18	68,244
4									
5							1	5	16,659
6							3	18	33,835
7							1	7	16,264
8									
9									
10							1	10	13,336
11									
12									
Total	120	75	327,903	70	20	140,346	44	95	382,908

	M14	M14E2	M60
Replacement rate per 1000 rounds			
All weapons	.228	.142	.248
Contributing weapons	.344	.518	.271
Mean rounds fired between replacements			
All weapons	4,372.0	7,017.3	4,030.6
Contributing weapons	2,908.2	1,929.5	3,682.8
Percent weapons w/o replacements	42.5	74.3	15.9
Percent weapons w/replacements	57.5	25.7	84.1

Table C-9

PARTS ATTRITION
(Colt Weapons Family)

Number Part Replacements per Weapon	M16E1			Auto Rifle		
	Number Weapons	Total Parts	Total Rounds Fired	Number Weapons	Total Parts	Total Rounds Fired
0	52	0	139,610	2	0	7,108
1	26	26	73,006	8	8	44,093
2	19	38	61,918	6	12	35,166
3	7	21	26,605	2	6	13,630
4	5	20	23,669	1	4	9,180
5	5	25	28,221	2	10	15,307
6	1	6	3,417			
7	2	14	7,839	1	7	6,936
8	2	16	16,131			
9						
10						
11						
12	1	12	5,803			
Total	120	178	386,219	22	47	131,420

	M16E1	Auto Rifle
Replacement Rate per 1000 Rounds		
All weapons	.461	.357
Contributing weapons	.722	.378
Mean Rounds Fired between Replacements		
All weapons	2,169.8	2,796.2
Contributing weapons	1,385.4	2,644.9
Percent weapons w/o replacements	43.3	9.1
Percent weapons w/replacements	56.7	90.9

Table C-10

PARTS ATTRITION
(Stoner Weapons Family)

Number Part Replacements per Weapon	Rifle			Auto Rifle			MG		
	Number Weapons	Total Parts	Total Rounds Fired	Number Weapons	Total Parts	Total Rounds Fired	Number Weapons	Total Parts	Total Rounds Fired
0	66		161,881	16		33,571	3	0	17,866
1	36	36	123,274	2	2	9,669	13	13	77,455
2	14	28	43,085	1	2	3,064	9	18	58,882
3	2	6	6,692	1	3	4,555	4	12	36,641
4	2	8	7,758				6	24	40,501
5				1	5	2,588	5	25	28,938
6							1	6	14,485
7							3	21	37,982
8									
9									
10									
11									
12									
Total	120	78	342,690	21	12	53,447	44	119	312,750

	Rifle	Auto Rifle	MG
Replacement rate per 1000 rounds			
All weapons	.228	.224	.380
Contributing weapons	.431	.603	.403
Mean rounds fired between replacements			
All weapons	4,393.5	4,453.9	2,628.1
Contributing weapons	2,318.1	1,656.3	2,478.0
Percent weapons w/o replacements	55.0	76.2	6.8
Percent weapons w/replacements	45.0	23.8	93.2

Table C-11

PARTS ATTRITION
(Soviet-type Family)

	AK47			RPD			DPM		
Number Part Replacements per Weapon	Number Weapons	Total Parts	Total Rounds Fired	Number Weapons	Total Parts	Total Rounds Fired	Number Weapons	Total Parts	Total Rounds Fired
0	23	0	131,267	2	0	20,684	3	0	40,839
1	6	6	55,996	3	3	28,666			
2				2	4	19,531			
3				1	3	19,972			
4									
5									
6									
7									
8									
9									
10									
11									
12									
Total	29	6	187,263	8	10	88,853	3	0	40,839

	AK47	RPD	DPM
Replacement Rate per 1000 Rounds			
All weapons	.032	.113	0
Contributing weapons	.107	.147	0
Mean Rounds Fired between Replacements			
All weapons	31,210.5	8,885.3	Unknown
Contributing weapons	9,345.8	6,816.9	Unknown
Percent weapons w/o replacements	79.3	25.0	100.00
Percent weapons w/replacements	20.7	75.0	

Table C-12

PARTS ATTRITION
(Replacement)
M14 RIFLE

Parts Replaced	Round Interval Between Parts Replacement						Total Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	
Extractor		3	4				7
Firing pin			10	11	4		25
Butt plate		3	1				4
Bolt			1	1			2
Stock assembly		1	1				2
Pinion assembly			1	1			2
Ejector		1	5				6
Roller, bolt		2					2
Windage knob			1				1
Bolt pin		4					4
Trigger pin			1				1
Pin, straight		1	1				2
Set screw, front sight			1				1
Selector		1	1				2
Piston, gas		1					1
Plug gauge			1				1
Retainer pin			1				1
Plunger spring		1					1
Aperture			1				
Bolt catch			1				1
Front sight		1					1
Base, rear sight			1				1
Operating spring guide		1					1
Misc. unidentified parts		1	3	1			5
Totals	0	21	36	14	4	0	75
Number weapons firing within round interval	120	120	96	34	11	2	
Ratio parts replaced to weapons	0	.175	.375	.412	.364	0	

NOTE: Total rounds fired, 327,903

Table C-13

PARTS ATTRITION
(Replacement)
M14E2 RIFLES

Parts Replaced	Round Interval Between Parts Replacement					Total Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	
Stabilizer	3					3
Trigger pin	2					2
Windage knob		1				1
Gas cylinder	1					1
Extractor	1			1		2
Gas piston	1					1
Bolt	2					2
Rear sight set screw	1					1
Stock, assembly		1				1
Butt plate			1			1
Firing pin	2					2
Lock catch	1					1
Retainer pin	1					1
Misc. unidentified parts replaced	1					1
Totals	16	2	1	1		20
Number weapons firing within round interval	70	61	35	9	3	
Ratio parts replaced to weapons	.229	.033	.029	.111	0	

NOTE: Total rounds fired, 140,346

Table C-14

PARTS ATTRITION
(Replacement)
M60 MACHINEGUN

Parts Replaced	Round Interval Between Parts Replacement																	Total Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	6001 to 7000	7001 to 8000	8001 to 9000	9001 to 10,000	10,001 to 11,000	11,001 to 12,000	12,001 to 13,000	13,001 to 14,000	14,001 to 15,000	15,001 to 16,000	16,001 to 17,000	
Bolt plug									1	1								2
Operating rod assembly	1	1	1	1				1	1	1	3		1				1	12
Guide assembly	4	2	3	2		1	2	2	1	1								16
Drive spring	2	2	2	1		1	1	2		1								12
Screw assembly washer										2								2
Washer key			1	5	3	2		1	1	2			1				1	17
Firing pin spring								1	1									2
Fore arm					1													1
Bolt				2			1											3
Sear retainer pin								1									1	2
Firing pin		1	2	2	2	1	1	1	1			1					1	13
Bolt, plug pin				1			1											2
Feed tray											1							1
Stock, butt							1											1
Ejector			1		1													2
Extractor					1	1												2
Slide level spring		1																1
Sling swivel					1													1
Misc. unidentified parts replaced				1														1
Totals	7	7	10	15	9	6	7	9	6	8	4	1	2	0	0	0	4	95
Number weapons firing within round interval	44	44	44	42	37	34	30	28	25	24	15	14	9	5	3	2	2	
Ratio parts replaced to weapons	.159	.159	.277	.357	.243	.176	.233	.321	.240	.333	.267	.071	.222	0	0	0	2.000	

NOTE: Total rounds fired, 140,346

Table C-15

PARTS ATTRITION
(Replacement)
M16E1 RIFLE

Parts Replaced	Round Interval Between Parts Replacement									Total Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	6001 to 7000	7001 to 8000	8001 to 9000	
Retainer pin	21	18	2	4	3					48
Disconnector	5	7	7	7	8	3				37
Firing pin		1								1
Cam pin		2								2
Bolt		2	1	2						5
Bolt ass ly	2		1	1		1				5
Ejector ing*	14	5		1						20
Ejector pin	1									1
Ejector	1									1
Buffer		3	4	5	4			1		17
Sear (auto)	1		2		1					4
Spring detent takedown pin		1				1				2
Selector level				1						1
Rear sight aperture	1									1
Buffer roll pin		6	1							7
Charging handle			1		1					2
Front swivel	1	1								2
Hammer pin	1									1
Hammer	1									1
Plunger bolt catch		1								1
Swivel pin	2	1								3
Stock	1									1
Bolt catch		1								1
Bolt catch spring		1								1
Carrier key					1					1
Extractor	1	1		1						3
Extractor spring	2		3	1						6
Extractor pin					2			1		3
Totals	55	51	22	23	20	5	0	2	0	176
Number weapons firing within round interval	120	120	86	62	31	13	6	4	2	
Ratio parts replaced to weapons	.458	.425	.256	.371	.645	.385	0	.500	0	

* One hundred and twenty ejector springs were replaced with manufacturers' new springs at one time in all weapons. These are not included in figures above.

NOTE: Total rounds fired, 386,219

Table C-16

PARTS ATTRITION
(Replacement)
COLT AR

Parts Replaced	Round Interval Between Parts Replacement									Total Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	6001 to 7000	7001 to 8000	8001 to 9000	
Retainer pin		3		1	1	2				7
Buffer	7	6	3	2	2	1				21
Extractor spring			3		1	3				7
Extractor						1				1
Extractor pin			2	1	1			1		5
Trigger pin	1									1
Bolt			1							1
Buffer detent spring						1				1
Left hand guard						1				1
Firing pin			1							1
Sear		1								1
Totals	8	10	10	4	5	9	0	1	0	47
Number weapons firing within round interval	22	22	20	19	16	13	5	2	2	
Ratio parts replaced to weapons	.364	.455	.500	.211	.313	.692	0	.500	0	

NOTE: Total rounds fired, 131,420

Table C-17

PARTS ATTRITION
(Replacement)
STONER RIFLES

Parts Replaced	Round Interval Between Parts Replacement							Total Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	6001 to 7000	
Bolt			1					1
Take down pin						1		1
Extractor	1	3	7	2		2		15
Extractor pin			1					1
Common pin	2	1						3
Rings, sight boss				1				1
Rear sight screw				1				1
Gas piston assembly	2							2
Bolt carrier	2	1						3
Hammer	1	1			1			3
Timer	1	1	3	1	1			7
Cocking handle			1					1
Bolt stop pin	6	3	3	2	1		1	16
Bolt stop spring	3	1		1				5
Butt stock			1					1
Operating spring guide pin	2							2
Plunger, extractor		1						1
Fore stock	1							1
Barrel	1							1
Front sight spring	1							1
Firing pin	1	2	1					4
Bolt stop	3	1		3				7
Totals	27	15	18	11	3	3	1	78
Number weapons firing within round interval	120	120	88	39	22	10	5	
Ratio parts replaced to weapons	.225	.125	.205	.282	.136	.300	.200	

NOTE: Total rounds fired, 342,680

Table C-18

PARTS ATTRITION
(Replacement)
STONER AR

Parts Replaced	Round Interval Between Parts Replacement							Total
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	6001 to 7000	Each Type Part
Fore stock assembly	1							1
Extractor	1		1		1			3
Firing pin	1			2				3
Ejector			1					1
Operating spring guide				1				1
Operating spring				1				1
Driving spring collar	1							1
Rear sight housing hold pin	1							1
Total	5	0	2	4	1	0	0	12
Number weapons firing within round interval	21	19	12	7	3	2	1	
Ratio parts replaced to weapons	.238	0	.167	.571	.333	0	0	.

* Figures included on this chart are for 21 weapons of 22 used (one gun bookl ost)

NOTE: Total rounds fired, 53,447

Table C-19

PARTS ATTRITION
(Replacement)
STONER MACHINEGUN

Parts Replaced	Round Interval Between Parts Replacement														Total Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	6001 to 7000	7001 to 8000	8001 to 9000	9001 to 10,000	10,001 to 11,000	11,001 to 12,000	12,001 to 13,000	13,001 to 14,000	14,001 to 15,000	
Bolt	1	1		4	2	3			2	2		1				16
Firing pin	1	1		3	2	2	1	1	2	2	1	1				17
Bolt carrier		1		4	1			1			2					9
Ring, sight boss		1	1	2	1	2		2	1	1	1					12
Extractor	1	3	1		1	6	6	4		1						23
Butt stock										1						1
Cover latch lock	1															1
Cover latch spring		1														1
Cover latch knob		1														1
Operating spring guide	1															1
Cocking handle assembly														1		1
Extractor spring		1				1	1	1								4
Plunger extractor	1															1
Gas piston assembly		1		1	1											3
Driving rod spring			1													1
Link guide				1												1
Gas piston rings				1												1
Ejector		1														1
Feed tray		6	10	4	1	2	1									24
Totals	6	18	13	20	9	16	9	9	5	7	4	2	0	1	0	119
Number weapons firing within round interval	44	44	44	43	39	29	25	20	14	12	8	5	4	3	2	
Ratio parts replaced to weapons	.136	.409	.295	.465	.231	.552	.360	.450	.357	.583	.500	.400	0	.333	0	

NOTE: Total rounds fired, 312,750

Table C-20

PARTS ATTRITION
(Replacement)
AK47 RIFLE

Parts Replaced	Round Interval Between Parts Replacement																Totals Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	6001 to 7000	7001 to 8000	8001 to 9000	9001 to 10,000	10,001 to 11,000	11,001 to 12,000	12,001 to 13,000	13,001 to 14,000	14,001 to 15,000	15,001 to 16,000	
Extractor								1			1		1				2
Trigger spring																	1
Front sight	1																1
Disconnector spring												1					1
Firing pin		1						1			1	1	1				6
Totals	1	1						1			1	1	1				
Number weapons firing within round interval	29	27	26	19	15	14	14	13	13	10	9	7	3	1	1	1	
Ratio parts replaced to weapons	.034	.037	0	0	0	0	0	.077	0	0	.111	.143	.333	0		0	

NOTE: Total rounds fired, 187,263

Table C-21

PARTS ATTRITION
(Replacement)
RPD MACHINEGUN

Parts Replaced	Round Interval Between Parts Replacement																				Total Each Type Part
	1 to 1000	1001 to 2000	2001 to 3000	3001 to 4000	4001 to 5000	5001 to 6000	6001 to 7000	7001 to 8000	8001 to 9000	9001 to 10,000	10,001 to 11,000	11,001 to 12,000	12,001 to 13,000	13,001 to 14,000	14,001 to 15,000	15,001 to 16,000	16,001 to 17,000	17,001 to 18,000	18,001 to 19,000	19,001 to 20,000	
Guide spring		1	1			1															3
Safety selector lever							1						1								2
Sear									1							1		1			1
Extractor																					2
Feed tray		1																			1
Firing pin	1																				1
Totals	1	2	1			1	1		1				1			1		1			10
Number weapons firing within round interval	8	8	8	7	6	5	5	5	4	4	4	4	4	4	4	4	1	1	1	1	
Ratio parts replaced to weapons	.125	.250	.125	0	0	.200	.200	0	.250	0	0	0	.250	0	0	.250	0	1.000	0	0	

NOTE: Total rounds fired, 86,853

DPM Machinegun

Three DPM machineguns firing 15,351, 11,919, and 13,569 rounds, respectively, for a total of 40,839 rounds, had no parts replaced.

Table C-22

FOULING TESTS, M16E1 RIFLES*

Ammunition Lot Number	Date Tested	Weapon Serial Number	Rounds Fired	Previous Rounds Fired	Malfunctions Directly Attributed to Fouling	Secondary Malfunctions	Malfunctions per Weapon	Malfunctions per 1000 Rounds
WCC 6098 (Ball)	22 Oct 65	155298	1000	1007	3 Failure to extract	1 DF	4	
	10 Nov 65	151543	1000	698	0	1 FFR 3 FF 3 FBR 1 BOR	8	
	10 Nov 65	147499	1000	736	1 Failure to extract	6 FJ 1 DF 1 FFR	9	5.6
	10 Nov 65	151467	1000	771	0	2 FFR	2	
	10 Nov 65	150471	1000	1271	0	2 BOR 3 FBR	5	
Total	N/A	N/A	5000	4485	4	24	28	N/A
RA 5074 (IMR)	9 Nov 65	155298	1000	2067	0	0	0	
	10 Nov 65	138133	1000	3003	0	1 FF 2 BOR	3	
	10 Nov 65	150460	1000	777	0	2 FF	2	
	10 Nov 65	152796	1000	683	0	0	0	
	10 Nov 65	152802	1000	885	0	0	0	0.91
	10 Nov 65	152031	1000	796	0	1 FF	1	
	23 Nov 65	147499	1620	824	0	1 FFR	1	
Total	N/A	N/A	7620	9035	0	7	7	N/A

* Fouling tests were conducted with sampling of M16E1 rifles using ball propellant and Improved Military Rifle (IMR) propellant. The tests were conducted in accordance with MIL-C-9963D, Appendix L. Weapons were prepared for testing in accordance with TM-1005-249-14, Change 3.

DF - Double feed
FF - Failure to feed
BOR - Bolt override
FBR - Failure of bolt to remain to rear after firing last round
FFR - Failure to fire
FJ - Failure to eject

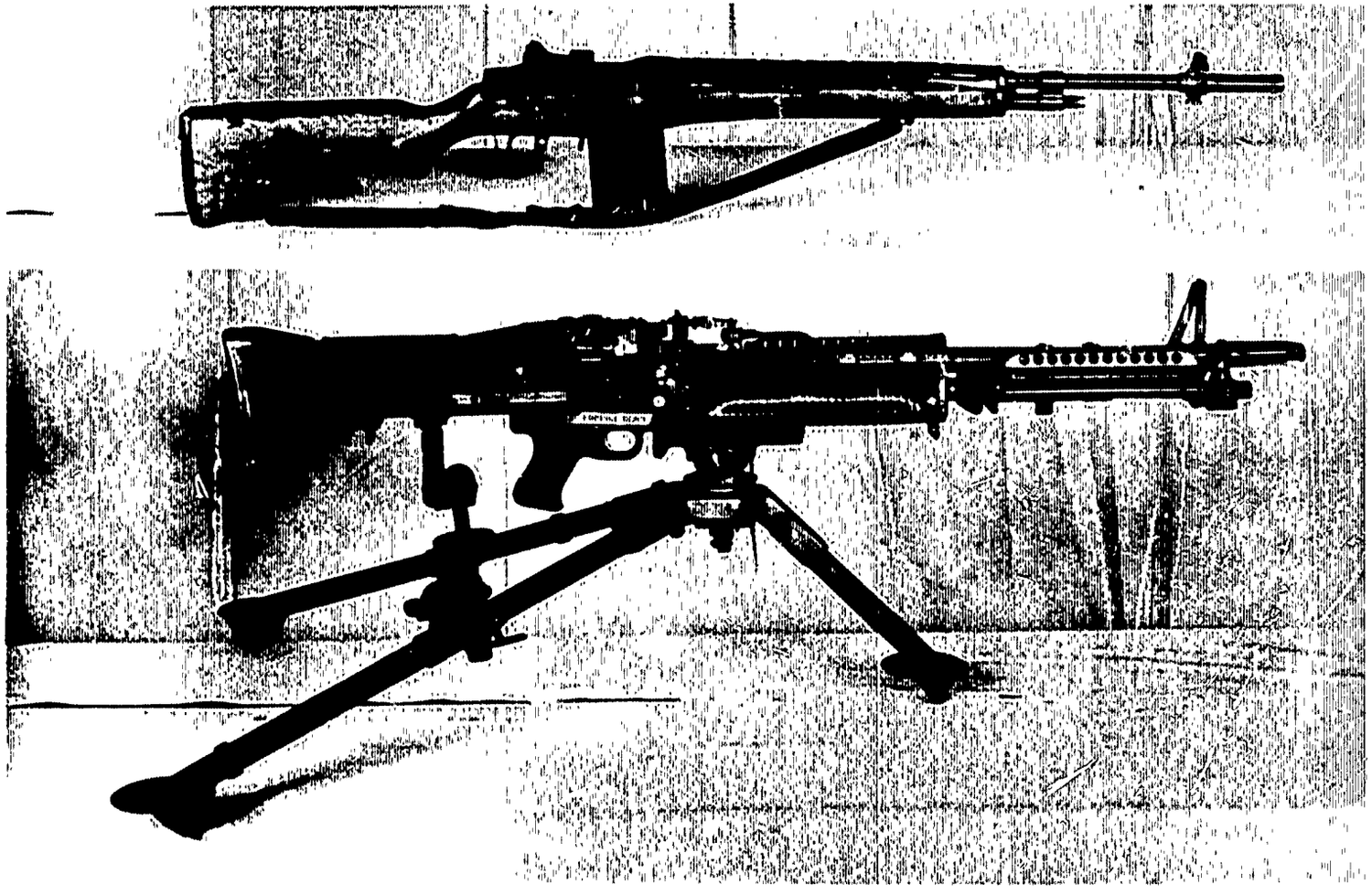

Figure C-1 US 7.62mm M14 RIFLE (top) AND M60 MACHINEGUN, TRIPOD MOUNTED (bottom)

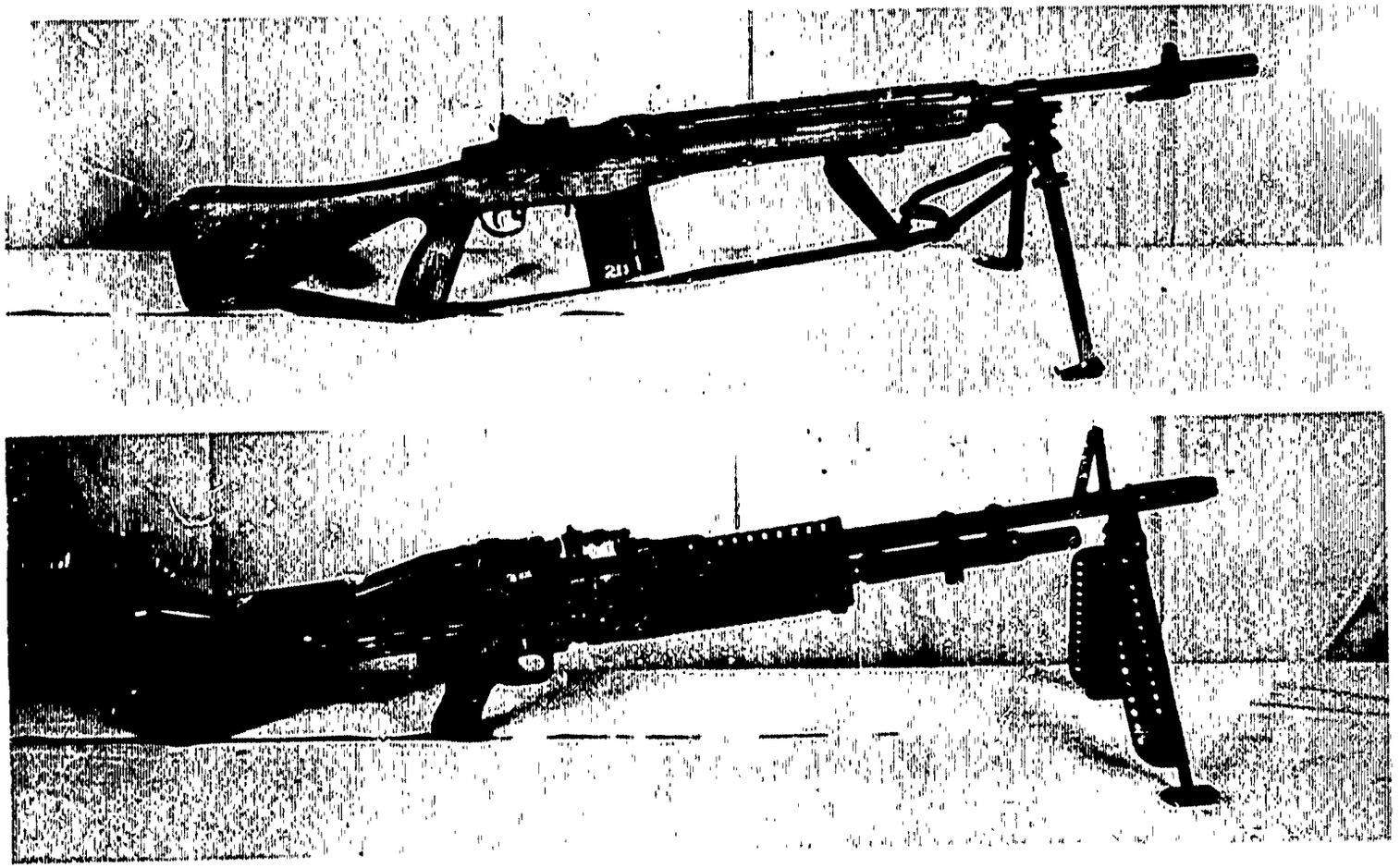

Figure C-2

US 7.62mm M14E2 AUTOMATIC RIFLE (top) AND M60 MACHINEGUN, BIPOD MOUNTED (bottom)

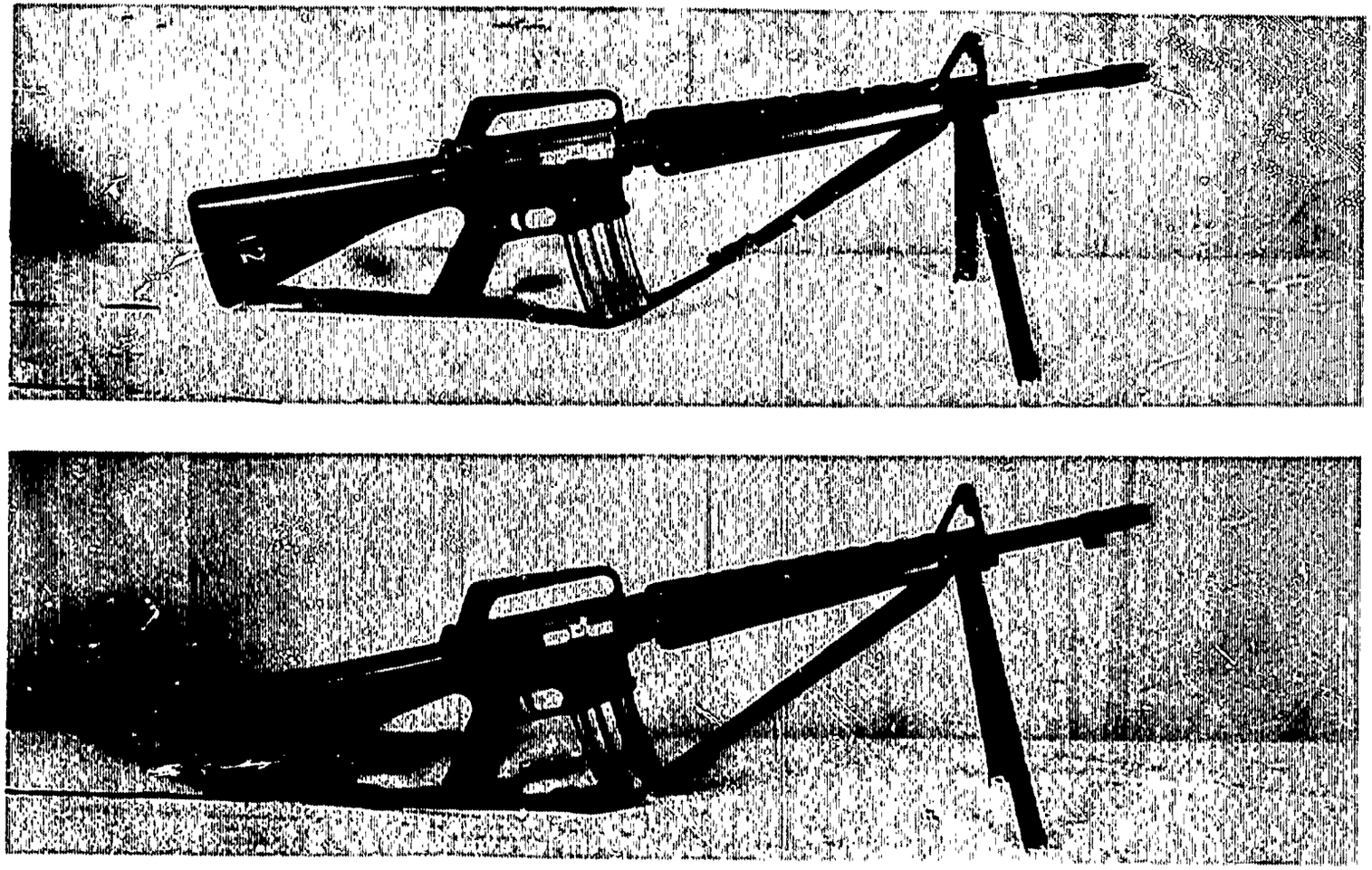

Figure C-3 COLT 5.56mm M16E1 RIFLE (top) AND AUTOMATIC RIFLE (bottom)

Figure C-4 STONER 63 5.56mm RIFLE (top) AND MACHINEGUN, TRIPOD MOUNTED (bottom)

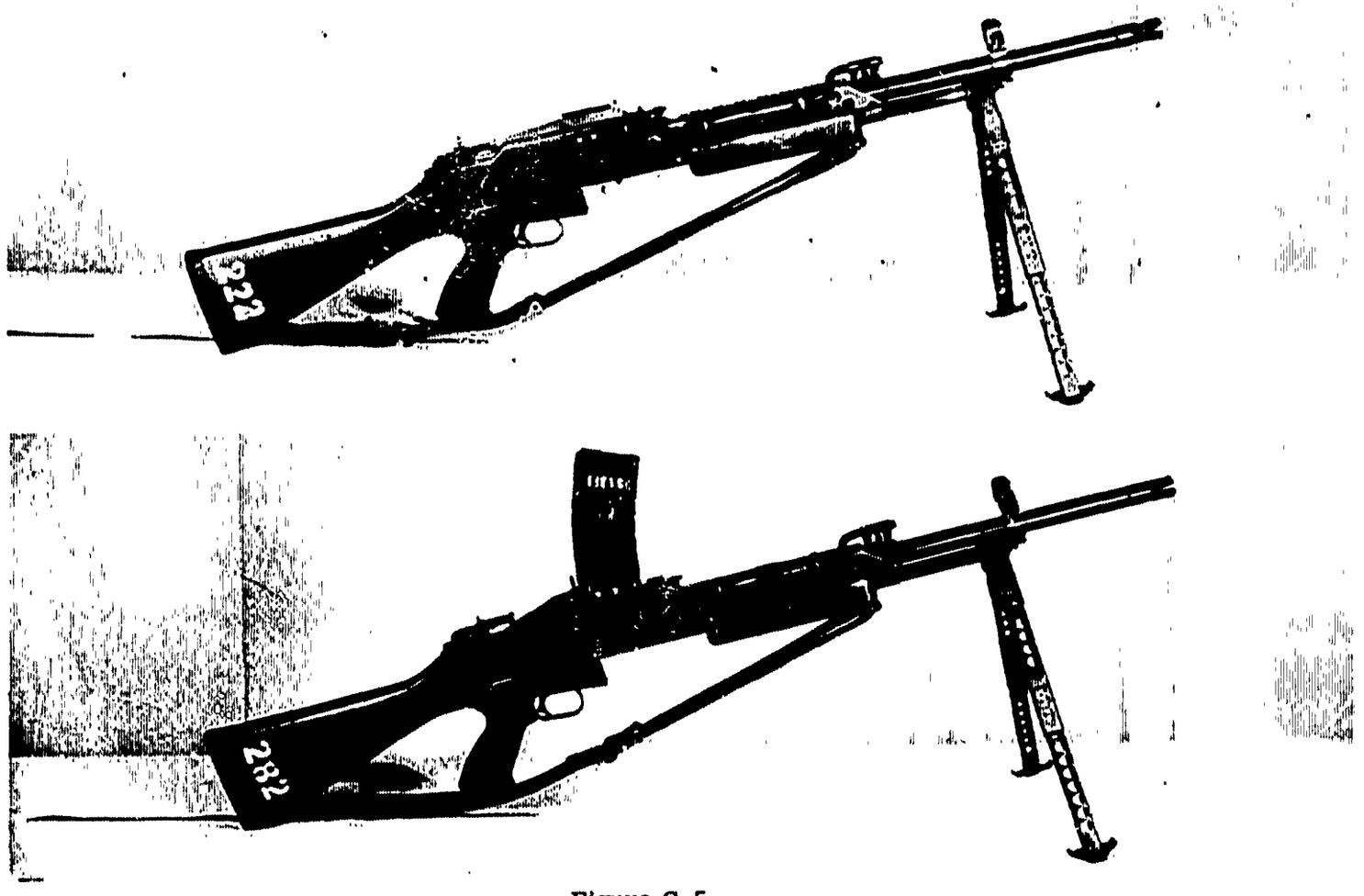

Figure C-5
STONER 63 5.56mm MACHINEGUN, BIPOD MOUNTED (top) AND AUTOMATIC RIFLE (bottom)

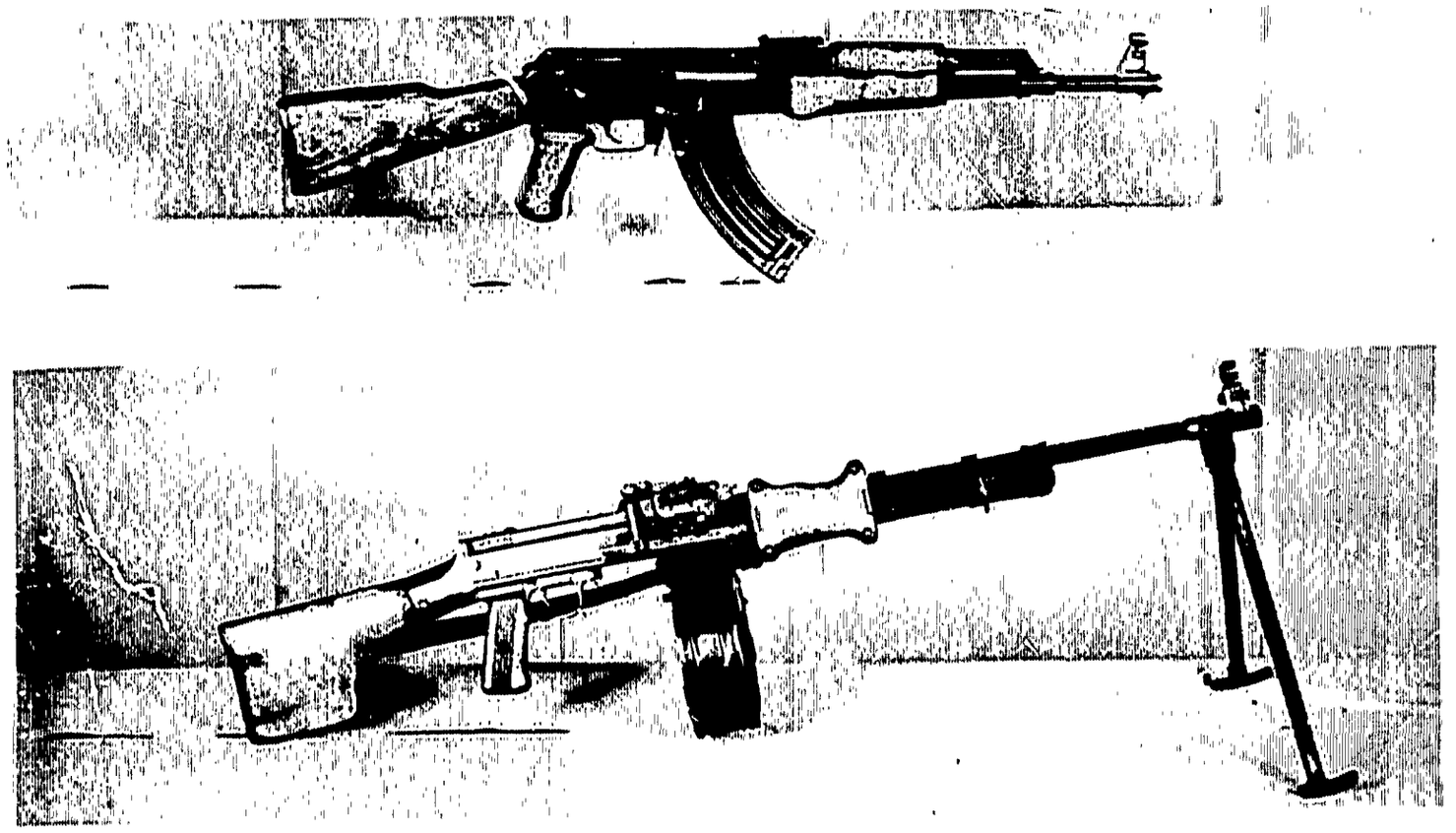

Figure C-6

SOVIET-TYPE 7.62mm AK47 RIFLE (top) AND RPD MACHINEGUN, BIPOD MOUNTED (bottom)

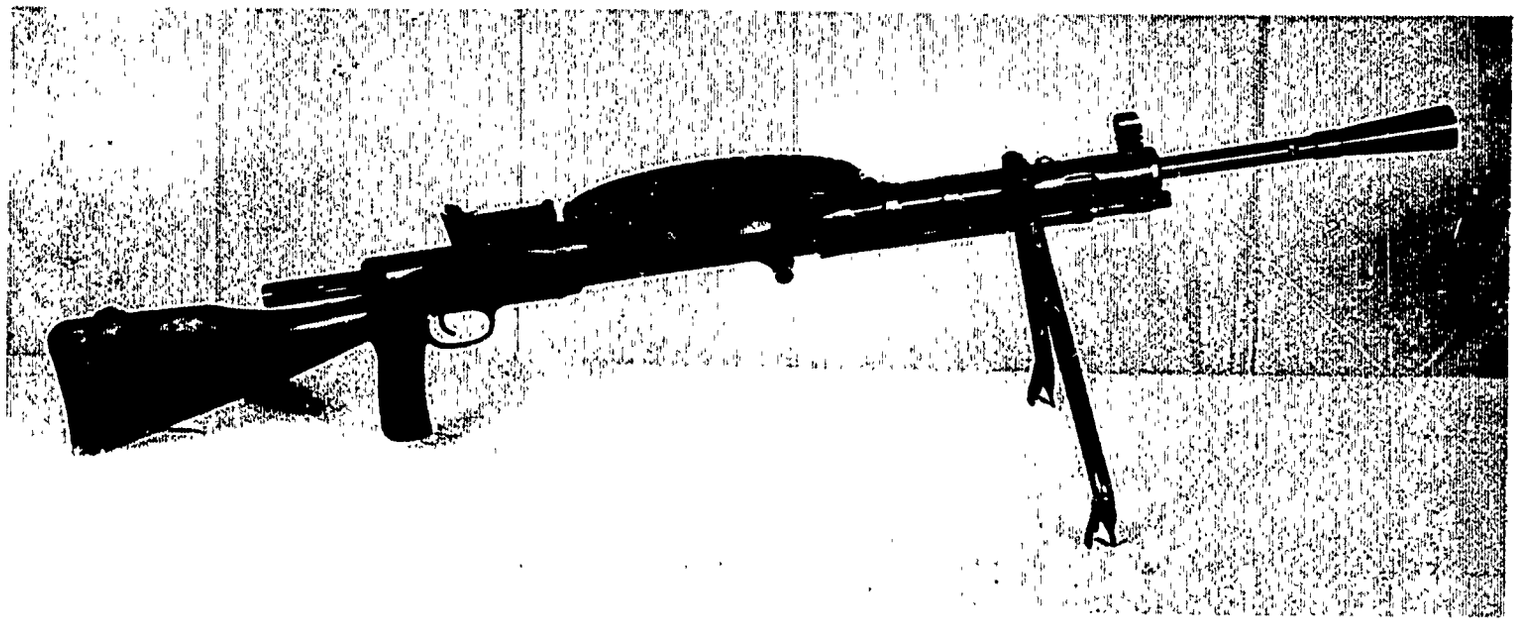

Figure C-7 SOVIET-TYPE 7.62mm DPM MACHINEGUN, BIPOD MOUNTED

Figure C-8 TRAILER GUN RACKS

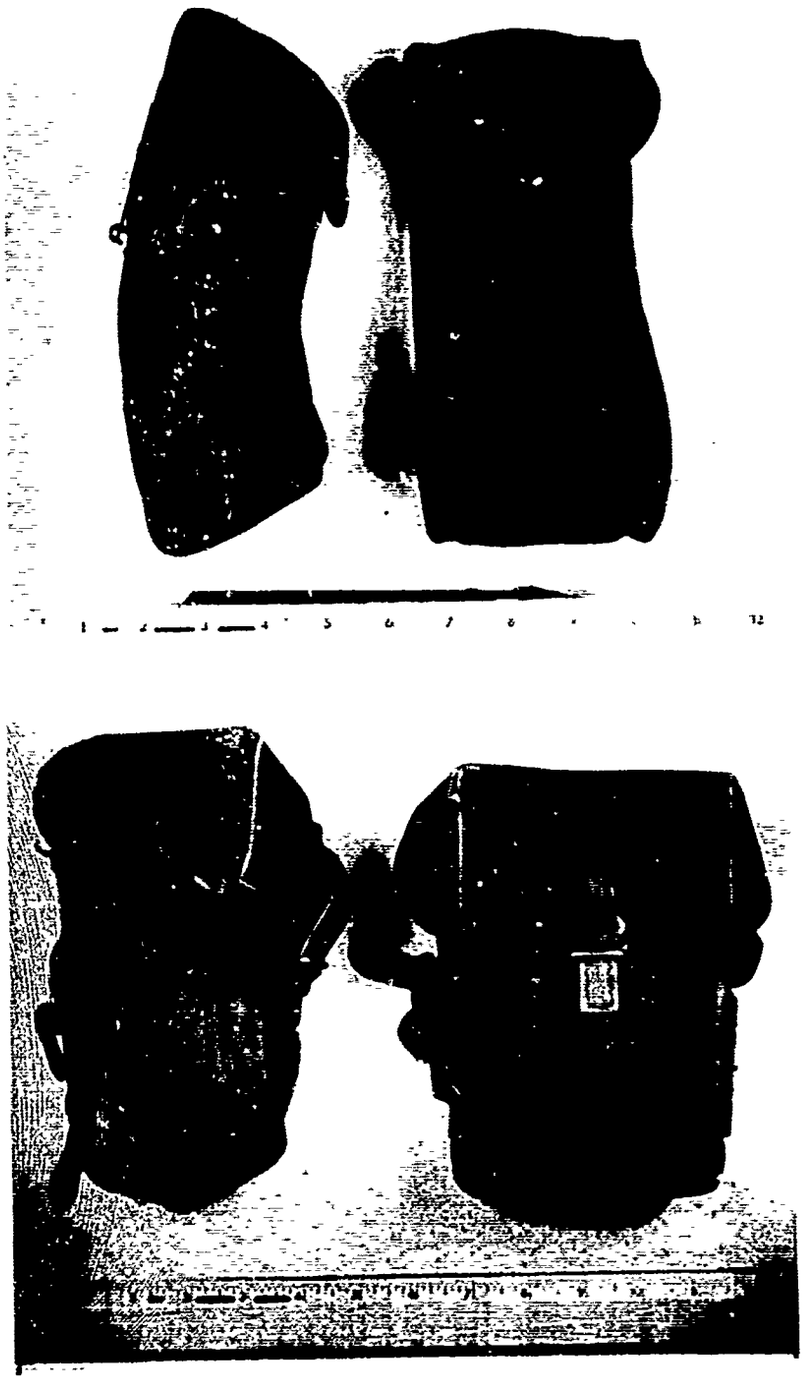

Figure C-9 RIFLE AMMUNITION POUCHES:
AK47 (top) AND COLT AND STONER (bottom)

Annex D

CORRELATION ANALYSIS

Annex D

CORRELATION ANALYSIS

A correlation analysis was run on measures of effectiveness, both primary and collateral, to determine the extent of the relationship between the measures and to gain further understanding of the nature of these relationships. The correlations for each situation are presented in Tables D-1 through D-9. Other measures, also presented in the tables, were generated to see if measures other than those used to evaluate the squad mixes could be used. The correlation formula employed was

$$\text{Correlation coefficient } r = \frac{\Sigma x\, y_i - \frac{1}{n}\, \Sigma x_i\, \Sigma y_i}{\left[\left\{\Sigma x_i^2 - \frac{1}{n}\left(\Sigma x_i\right)^2\right\}\left\{\Sigma y_i^{\,2} - \frac{1}{n}\left(\Sigma y_i\right)^2\right\}\right]^{1/2}}$$

In the tables the following keys to effectiveness measures are used:

1	Tot H	Total hits on target
2	TH	Number of targets hit
3	CET	Cumulative exposure time
4	CET/PCET	Cumulative exposure time and programmed exposure time ratio
5	RF	Rounds fired
6	PAU	Percent ammunition used
7	TH/PAU	Number of targets hit and percent ammunition used ratio
8	NM	Number of near misses
9	NM/PAU	Number of near misses and percent ammunition used ratio

Table D-1

CORRELATED EFFECTIVENESS MEASURES
Situation 1, Rifle Squad in Line Assault

Effectiveness Measures	Tot H 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6	TH / PAU 7	NM 8
1 Tot H								
2 TH	0.9667							
3 CET	-0.4392	-0.5087						
4 CET/PCET	-0.6614	-0.6985	0.6485					
5 RF	0.1499	0.0912	0.1290	-0.0384				
6 PAU	-0.0934	-0.0970	0.2228	0.0593	0.0832			
7 TH/PAU	0.7530	0.7722	-0.5084	-0.5596	0.0348	-0.5903		
8 NM	0.3497	0.3232	-0.0572	-0.2247	0.8113	-0.0221	0.2606	
9 NM/PAU	0.1683	0.1602	-0.1682	-0.0901	0.3686	-0.7591	0.5907	0.5687

Table D-2

CORRELATED EFFECTIVENESS MEASURES
Situation 2, Rifle Squad as Base of Fire Supporting the Assault

Effectiveness Measures	Tot H 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6	TH/ PAU 7	NM 8
1 Tot H								
2 TH	0.9626							
3 CET	-0.7957	-0.8431						
4 CET/PCET	-0.7924	-0.8399	1.0000					
5 RF	0.0117	0.0820	-0.0963	-0.0936				
6 PAU	0.1306	0.1086	-0.0758	-0.0759	-0.2401			
7 TH/PAU	0.6580	0.7097	-0.5852	-0.5826	0.2268	-0.5597		
8 NM	0.3786	0.4298	-0.3964	-0.3933	0.3718	0.2279	0.2566	
9 NM/PAU	0.1866	0.2388	-0.2263	-0.2240	0.4507	-0.5726	0.6542	0.6365

Table D-3

CORRELATED EFFECTIVENESS MEASURES
Situation 4, Rifle Squad in Approach to Contact

Effectiveness Measures	Tot H 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6	TH/ PAU 7	NM 8
1 Tot H								
2 TH	0.6398							
3 CET	-0.4465	-0.6566						
4 CET/PCET	-0.4466	-0.6569	1.0000					
5 RF	0.1583	-0.0176	-0.1804	-0.1806				
6 PAU	-0.2400	-0.2557	0.1538	0.1548	0.4574			
7 TH/PAU	0.2285	0.3454	-0.1684	-0.1690	-0.4099	-0.8981		

Table D-4
CORRELATED EFFECTIVENESS MEASURES
Situation 3, Machinegun Squad in Fire Support of the Assault
(Stoner MGs not included)

Effectiveness Measures	Tot H 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6	TH/ PAU 7	NM 8
1 Tot H								
2 TH	0.9282							
3 CET	-0.7727	-0.8311						
4 CET/PCET	-0.7722	-0.8303	1.0000					
5 RF	0.3512	0.4306	-0.3454	-0.3454				
6 PAU	0.3536	0.3302	-0.4143	-0.4140	0.1788			
7 TH/PAU	0.7104	0.7936	-0.5835	-0.5827	0.4185	-0.2767		
8 NM	0.5423	0.5239	-0.6086	-0.6105	0.6438	0.4405	0.2749	
9 NM/PAU	0.1819	0.2012	-0.2157	-0.2181	0.5316	-0.4663	0.5173	0.5564

Table D-5

CORRELATED EFFECTIVENESS MEASURES
Situation 5, Rifle Squad as Base of Fire Supporting the Advance

Effectiveness Measures	Tot H' 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6	TH/ PAU 7	NM 8
1 Tot H								
2 TH	0.9755							
3 CET	-0.8322	-0.8425						
4 CET/PCET	-0.8325	-0.8426	1.0000					
5 RF	0.3017	0.3038	-0.2492	-0.2501				
6 PAU	-0.1295	-0.0970	0.0267	0.0268	0.2437			
7 TH/PAU	0.7235	0.7229	-0.5514	-0.5513	0.0099	-0.6316		
8 NM	0.6424	0.6171	-0.5782	-0.5787	0.3420	-0.1045	0.4062	
9 NM/PAU	0.3736	0.3341	-0.2873	-0.2874	-0.0834	-0.7786	0.6946	0.5880

Table D-6

CORRELATED EFFECTIVENESS MEASURES
Situation 6, Machinegun Squad in Support of the Advance
(Stoner machineguns not included)

Effectiveness Measures	Tot H 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6	TH/ PAU 7	NM 8
1 Tot H								
2 TH	0.9662							
3 CET	-0.9043	-0.9404						
4 CET/PCET	-0.9048	-0.9406	1.0000					
5 RF	0.4278	0.4927	-0.5578	-0.5578				
6 PAU	0.4469	0.5049	-0.5750	-0.5762	0.9009			
7 TH/PAU	0.3525	0.3739	-0.2445	-0.2435	-0.3594	-0.5003		
8 NM	0.8673	0.8482	-0.8302	-0.8300	0.6359	0.5737	0.0891	
9 NM/PAU	0.3746	0.3582	-0.2627	-0.2609	-0.3030	-0.5253	0.9127	0.2547

Table D-7

CORRELATED EFFECTIVENESS MEASURES
Situation 7, Rifle Squad in Defense Against Attack

Effectiveness Measures	Tot H 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6
1 Tot H						
2 TH	0.7570					
3 CET	-0.6387	-0.8119				
4 CET/PCET	-0.6381	-0.8071	1.0000			
5 RF	-0.0316	-0.0039	0.1833	0.1831		
6 PAU	0.0286	-0.0899	0.2880	0.2917	0.3962	
7 TH/PAU	0.1020	0.2819	-0.4491	-0.4524	-0.3743	-0.8950

Table D-8

CORRELATED EFFECTIVENESS MEASURES
Situation 8, Rifle Squad in Night Defense Against Attack

Effectiveness Measures	Tot H 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6
1 Tot H						
2 TH	0.8557					
3 CET	-0.7932	-0.8537				
4 CET/PCET	-0.7935	-0.8539	1.0000			
5 RF	0.4258	0.2788	-0.2862	-0.2864		
6 PAU	-0.4211	-0.3855	0.4014	0.4024	-0.0091	
7 TH/PAU	0.7146	0.7253	-0.6592	-0.6598	0.2426	-0.8450

Table D-9

CORRELATED EFFECTIVENESS MEASURES
Situation 9, Machinegun Squad in Fire Support of the Assault
(Minus Stoner machineguns)

Effectiveness Measures	Tot H 1	TH 2	CET 3	CET/ PCET 4	RF 5	PAU 6
1 T t H						
2 TH	0.8002					
3 CET	-0.6957	-0.8562				
4 CET/PCET	-0.6953	-0.8563	1.0000			
5 RF	0.3065	0.4069	-0.1824	-0.1823		
6 PAU	0.1590	0.3539	-0.1557	-0.1559	0.9290	
7 TH/PAU	0.0568	-0.1345	-0.0566	-0.0564	-0.7073	-0.8300

Annex E

SMALL ARMS LETHALITY

Annex E

SMALL ARMS LETHALITY

Annex E is classified CONFIDENTIAL. It will be provided separately on request if there is a need-to-know. This annex should be requested under its full title: "Small Arms Lethality: A Review of Selected Casualty Studies and Reports on Experimental Wounds Analysis (U)."

Annex F

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Annex F

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