

[Home](#) :: [Military](#) :: [Library](#) :: [Policy](#) :: [Army](#) :: [Field Manuals](#) :: [21-75](#) ::

MILITARY

APPENDIX I

Range Cards

GENERAL

A range card is a rough sketch of the terrain around a weapon position. In the defense, you prepare a range card for the squad automatic weapon, the M60 and caliber .50 machine guns, and the Dragon, TOW, 106-mm RCLR, 90-mm RCLR, and LAW antiarmor weapons systems.

RANGE CARD DATA

A range card depicts **the following**:

- **Sectors of fire.**
- **A final protective line (FPL) or principal direction of fire (PDF).**
- **Targets and ranges to them.**
- **Prominent terrain features.**
- **Weapons symbols.**
- **Marginal data.**

Range cards for antiarmor weapons use target reference points (TRP) instead of FPL and PDF.

CONTENTS

[GENERAL](#)[RANGE CARD DATA](#)[PREPARATION OF AN M60 MACHINE GUN RANGE CARD](#)[RANGE CARD FOR THE CALIBER .50](#)[ANTIARMOR RANGE CARD](#)

SECTORS OF FIRE

Each gun is given a primary and a secondary sector of fire. Fire into your secondary sector of fire only if there are no targets in your primary sector, or if ordered to fire there. Your gun's primary sector includes an FPL, a PDF, or a TRP.

Where terrain allows, your leader assigns an FPL to your weapon. The FPL is a line on which you shoot grazing fire across your unit's front.

The FPL will be assigned to you only if your leader determines there is a good distance of grazing fire. If there is, the FPL will then dictate the location of the primary sector. The FPL will become the primary sector **limit** (right or left) closest to friendly troops. When not firing at other targets, you will lay your gun on the FPL or PDF.

DEAD SPACE

Dead space is an area that direct fire weapons cannot hit. The area behind houses and hills or within orchards, for example, is dead space.

PRINCIPAL DIRECTION OF FIRE

When the terrain does not lend itself to an FPL, your leader will assign a PDF instead. The direction should be toward a gully or down a ditch that leads into your position. The gun is positioned to fire directly down this approach rather than across the platoon's front.

TARGETS

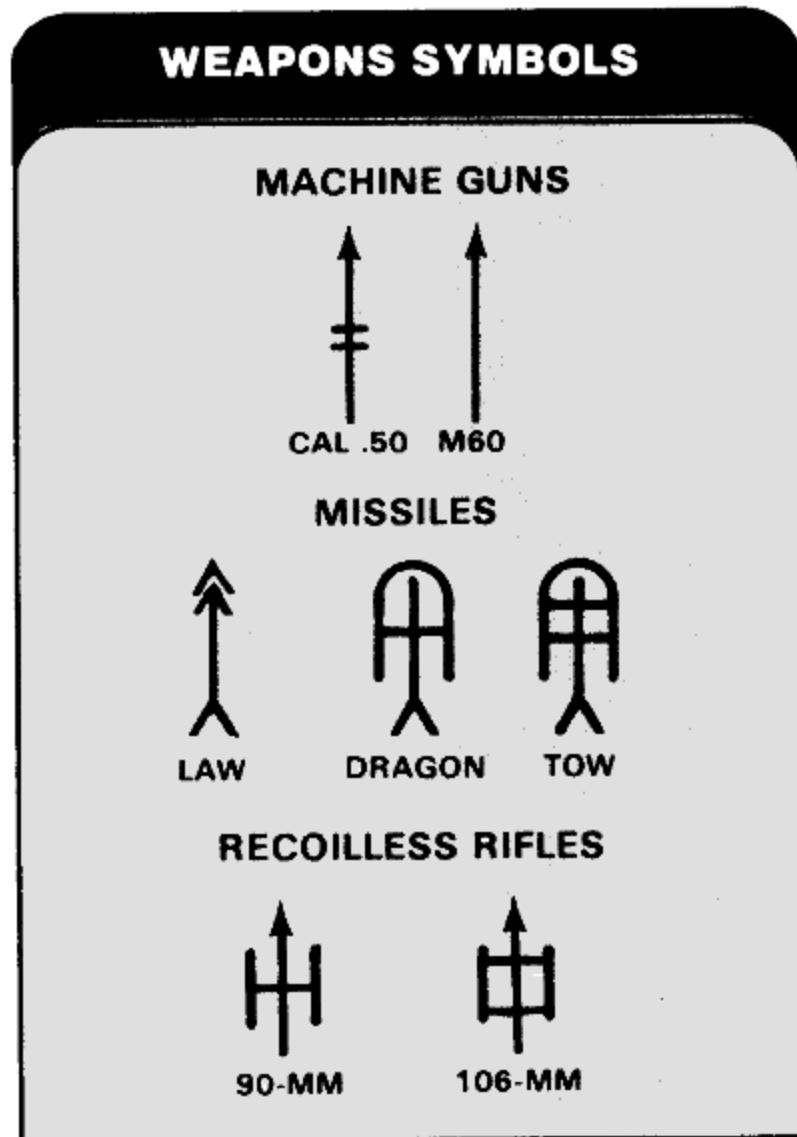
Your leader may also designate locations within your sector of fire where targets are most likely to appear. These locations should be noted on your range card.

TARGET REFERENCE POINTS

Target reference points are natural or manmade features within your sector that can be used for quick location of targets. Target reference points are used primarily for controlling DIRECT FIRE weapons only; however, TRP should appear on the company target list.

MAXIMUM ENGAGEMENT LINE

The maximum engagement line is a line beyond which you cannot engage a target. This line may be closer than the maximum engagement **range** of your weapon. Both the terrain and the maximum engagement range of your weapon will determine the path of the maximum engagement line. *This line is used for antiarmor range cards.*



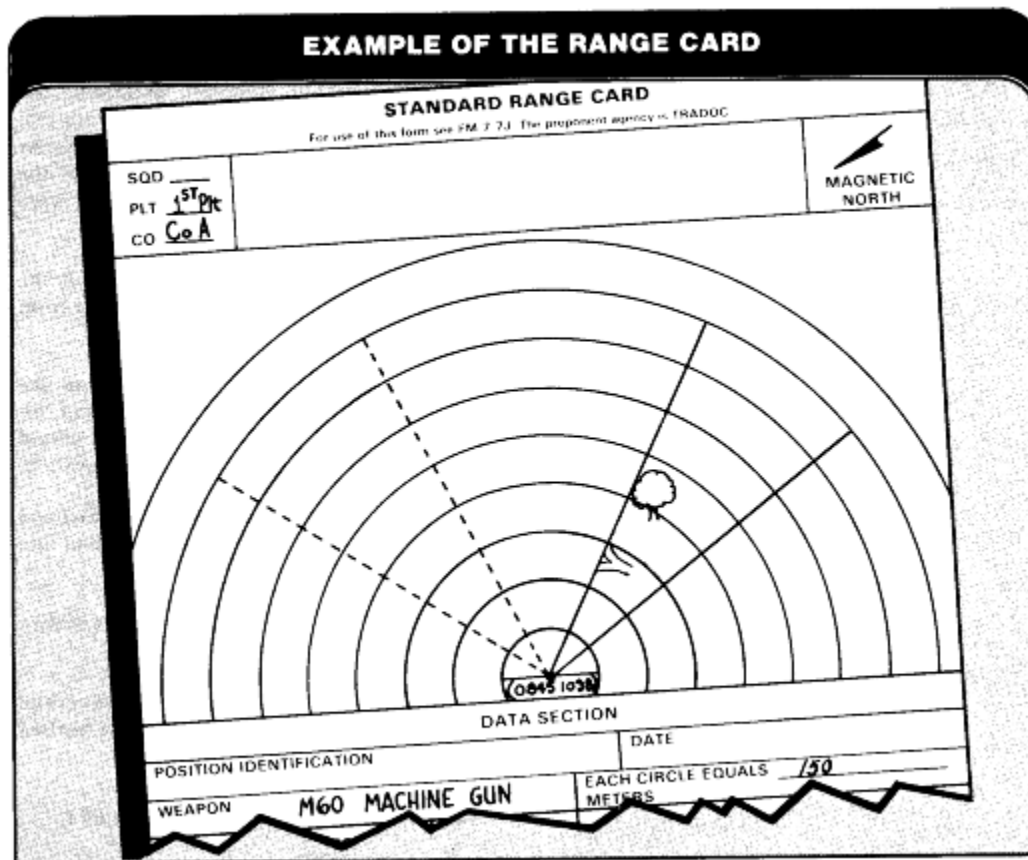
PREPARATION OF AN M60 MACHINE GUN RANGE CARD

Range cards are prepared immediately upon arrival in your position. **To prepare an M60 machine gun range card:**

- Orient the card so that both the primary and secondary sectors of fire (if assigned) can fit on it.
- Draw a rough sketch of the terrain to the front of your position. Include any prominent natural and manmade features which could be likely targets.
- Draw your position at the bottom of the sketch. Do not put in the weapon symbol at this time.
- Fill in the marginal data to include:
 - Gun number (or squad).
 - Unit (only platoon and company). Date.
 - Magnetic north arrow.

card with its base starting at the top of the marginal data section.

- Determine the location of your gun position in relation to a prominent terrain feature, such as a hilltop, road junction or building. If no feature exists, place the eight-digit map coordinates of your position near the point where you determined your gun position to be. If there is a prominent terrain feature within 1,000 meters of the gun, use that feature. Do not sketch in the gun symbol at this time.
- Using your compass, determine the azimuth in mils from the terrain feature to the gun position. (Compute the back azimuth from the gun to the feature by adding or subtracting 3,200 mils.)
- Determine the distance between the gun and the feature by pacing or from a map.
- Sketch in the terrain feature on the card in the lower left or right hand corner (whichever is closest to its actual direction on the ground) and identify it.
- Connect the sketch of the position and the terrain feature with a barbed line from the feature to the gun.
- Write in the distance in meters (above the barbed line).
- Write in the azimuth in mils from the feature to the gun (below the barbed line).

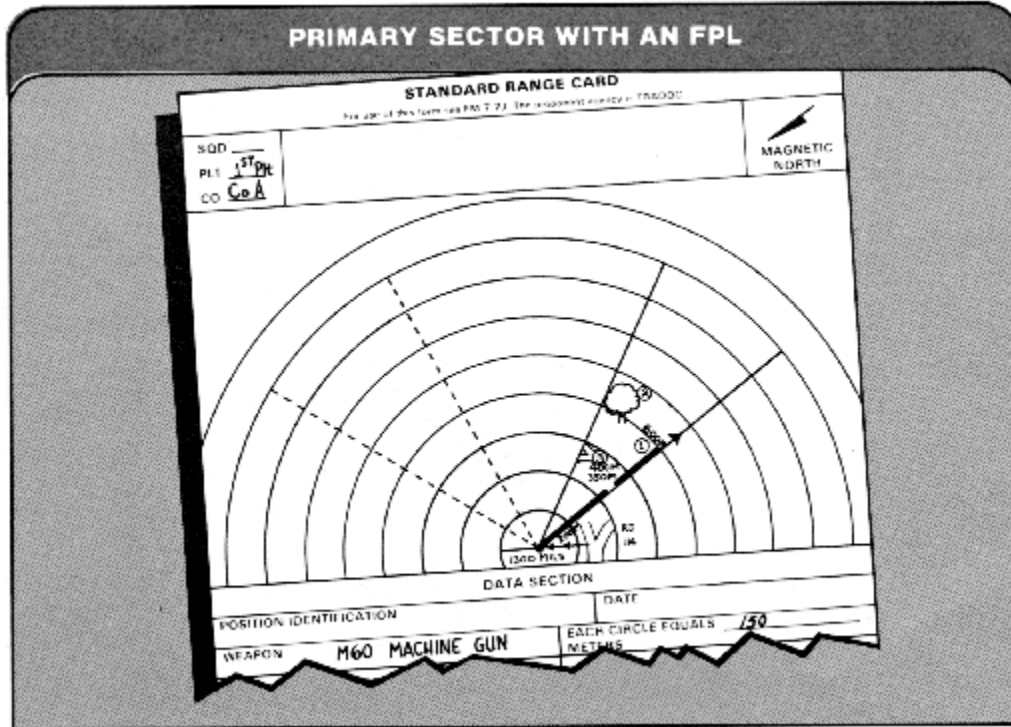


PRIMARY SECTOR WITH AN FPL

To add an FPL to your range card:

- Sketch in the limits of the primary sector of fire as assigned by your leader.
- Sketch in the FPL on your sector limit as assigned.
- Determine dead space on the FPL by having your buddy walk the FPL. Watch him walk down the line and mark spaces which cannot be grazed.

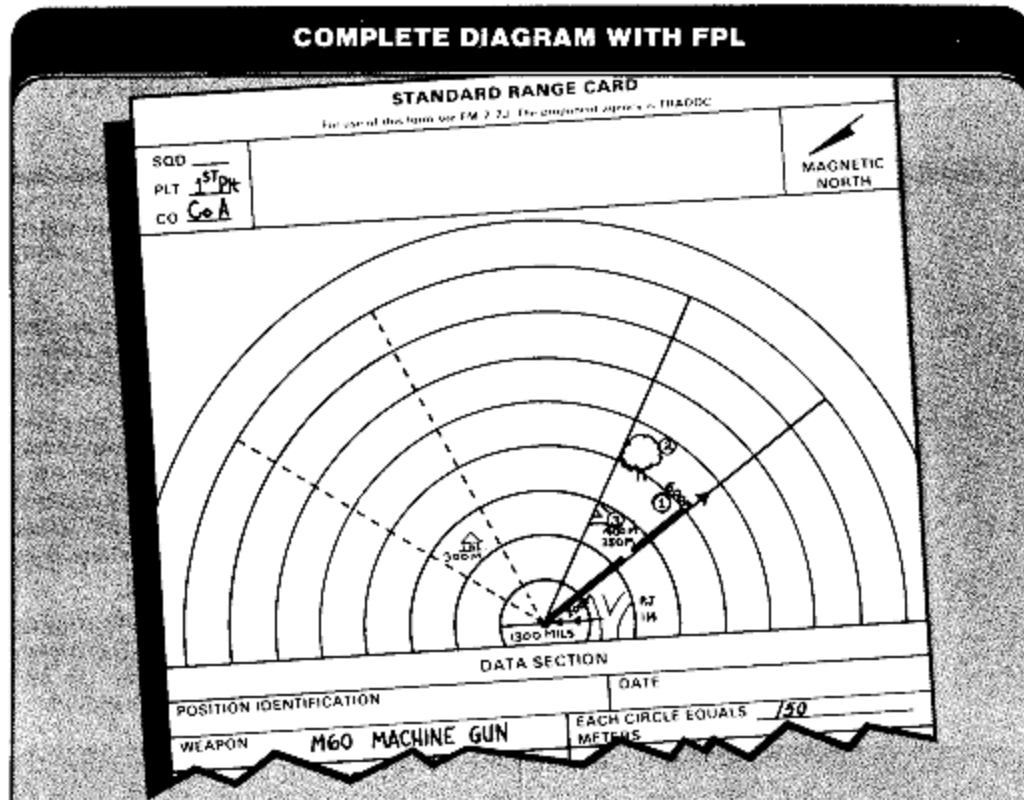
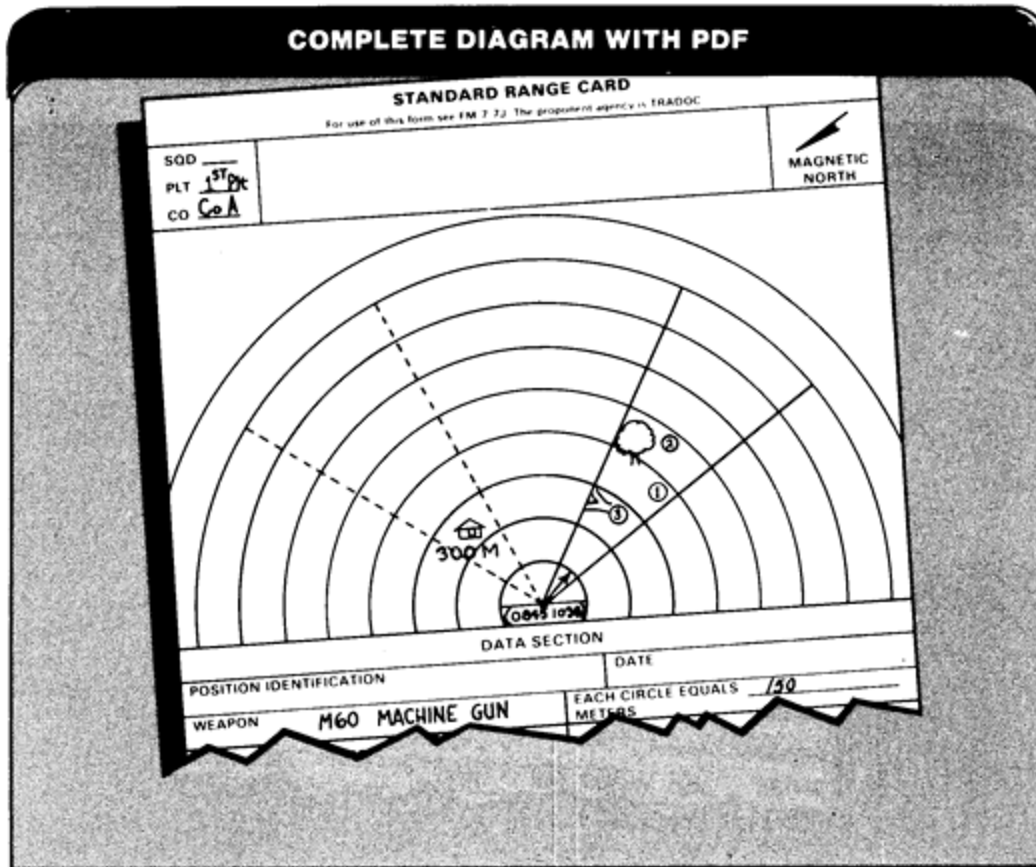
- Label all targets in your primary sector in order of priority. The FPL is number one.



PRIMARY SECTOR WITH A PDF

To prepare your range card when assigned a **PDF** instead of an FPL:

- Sketch in the limits of the primary sector of fire as assigned by your leader (sector should not exceed 875 mils, the maximum traverse of the tripodmounted M60).
- Sketch in the symbol for an automatic weapon oriented on the most dangerous target within your sector (as designated by your leader). The PDF will be target number one in your sector. All other targets will be numbered in priority.
- Sketch in your secondary sector of fire (as assigned) and label targets within the secondary sector with the range in meters from your gun to each target. Use the bipod when it is necessary to fire into your secondary sector. The secondary sector is drawn using a broken line. Sketch in aiming stakes, if used.

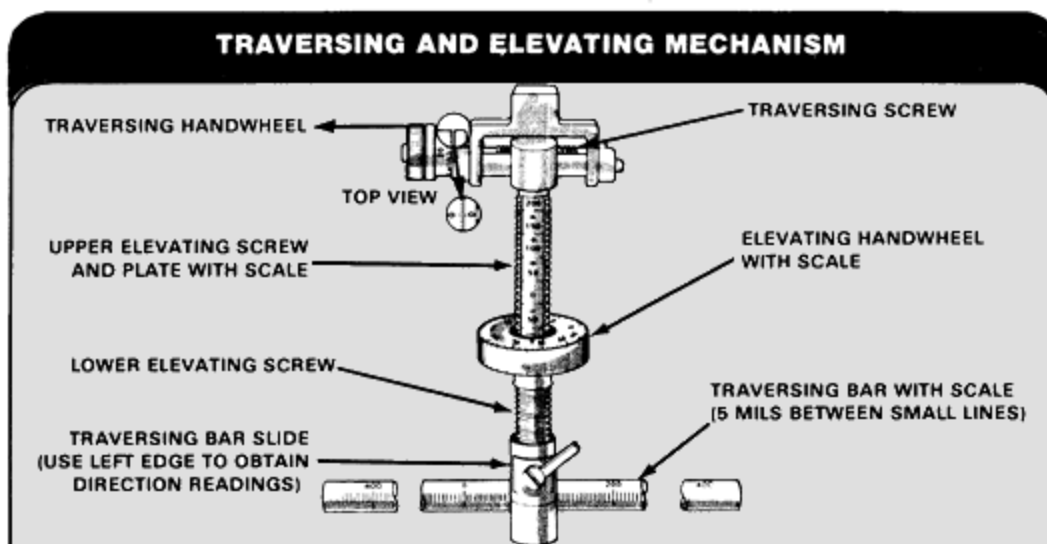


The data section of the range card lists the data necessary to engage targets identified in the sketch. The sketch does not have to be to scale, but the data **must** be accurate. The data section of the card can be placed on the reverse side or below the sketch if there is room. Draw a data section block (if you do not have a printed card), with the **following items**:

DATA SECTION					
NO	DIRECTION	ELEVATION	RANGE	DESCRIPTION	REMARKS
1		+50/3	600	FPL	-4
2	R 105	+50/40	500	LONE PINE	
3	L 235	0/28	350	TRAIL JUNCTION	W15/L7

To prepare the data section of the **M60 range card**:

- Center the traversing handwheel.
- Lay the gun for direction.
- When assigned an FPL, lock the traversing slide on the extreme left or right of the bar, depending on which side of your primary sector the FPL is on.
- Align the barrel on the FPL by moving the tripod legs. (Do not enter a direction in the data section for the FPL.)
- When assigned a PDF, align your gun on the primary sector by traversing the slide to one side and then move the tripod to align the barrel on your sector limit. Align on the PDF by traversing the slide until your gun is aimed at the center of the target.
- Fix the tripod legs in place by digging in or sandbagging them. The tripod, once emplaced for fire into the primary sector, should not be moved.



To read the direction to **each target**:

- Lay your gun on the center of the target.

- Enter the reading under the direction column of your range card data section.

A reading of left or right is determined by the direction of your barrel (just the opposite of the slide).

To read elevation for **your targets**:

- Lay your gun on the base of the target by rotating the elevating handwheel.
- Read the number (to include a plus or minus sign, except for "0") *above* the first visible line on the elevating scale.
- The sketch reads -50.
- Read the number on the elevating handwheel that is in line with the indicator.
- The sketch reads 3.
- Enter this reading under the ELEVATION column of your range card data section, separating the two numbers with a slash (/). Always enter the reading from the upper elevating bar first. (The sketch reads -50/3.)

Enter range to each target under the appropriate column in the data section.

Enter the description of each target under the appropriate column in the data section.

REMARKS COLUMN

Fill in the remarks column for each target **as needed**:

- Enter the width and depth (in mils) of linear targets. The -4 in the [illustration](#) indicates that by depressing your barrel 4 mils the strike of your rounds will go down to ground level along the FPL.
- When entering the width of the target, be sure to give the width in mils and express it as two values. For instance, the [illustration](#) shows that target number 3 has a width of 15 mils. The second value, L7, means that once the gun is laid on your target, traversing 7 mile to the LEFT will lay the gun on the left edge of the target.
- Enter *aiming stake* if one is used for the target.
- No data for the secondary sector will be determined since your gun will be fired in the bipod role.

COMPLETED DATA SECTION					
DATA SECTION			WEAPON: UNIT: <u>1ST BATTALION</u> DATE: _____	MAGNETIC NORTH	EACH CIRCLE: <u>150</u> METERS
NO.	DIRECTION	ELEVATION	RANGE	DESCRIPTION	REMARKS
1		-50/3	600	FPL	-4
2	R 105	+50/40	300	LONE PINE	
3	L 235	0/28	350	TRAIL JUNCTION	W15 / L7

RANGE CARD FOR THE CALIBER .50

- **The machine gun symbol is different.**
- **There are 800 mils of traverse with the caliber .50 compared to 875 mils with the M60.**
- **Maximum grazing fire with the caliber .50 is 1,000 meters compared to 600 meters with the M60.**
- **The caliber .50 machine gun has a secondary sector of fire; but it must be marked by aiming stakes since the caliber .50 machine gun has no bipod.**

ANTIARMOR RANGE CARD

The purpose of an antiarmor range card is to show a sketch of the terrain that a weapon has been assigned to cover by fire. Range cards for 90-mm RCLR, 106-mm RCLR, Dragon, and TOW are all prepared the same. By using a range card, you can quickly and accurately determine the information needed to engage targets in your assigned sector. Before you prepare a range card, your leader will show you where to position your weapon so you can best cover your assigned sector of fire. He will then, again, point out the terrain you are to cover. He will do this by assigning you a sector of fire or by assigning left or right limits indicated by either terrain features or azimuths. If necessary, he may also assign you more than one sector of fire and will designate the sectors as primary and secondary.

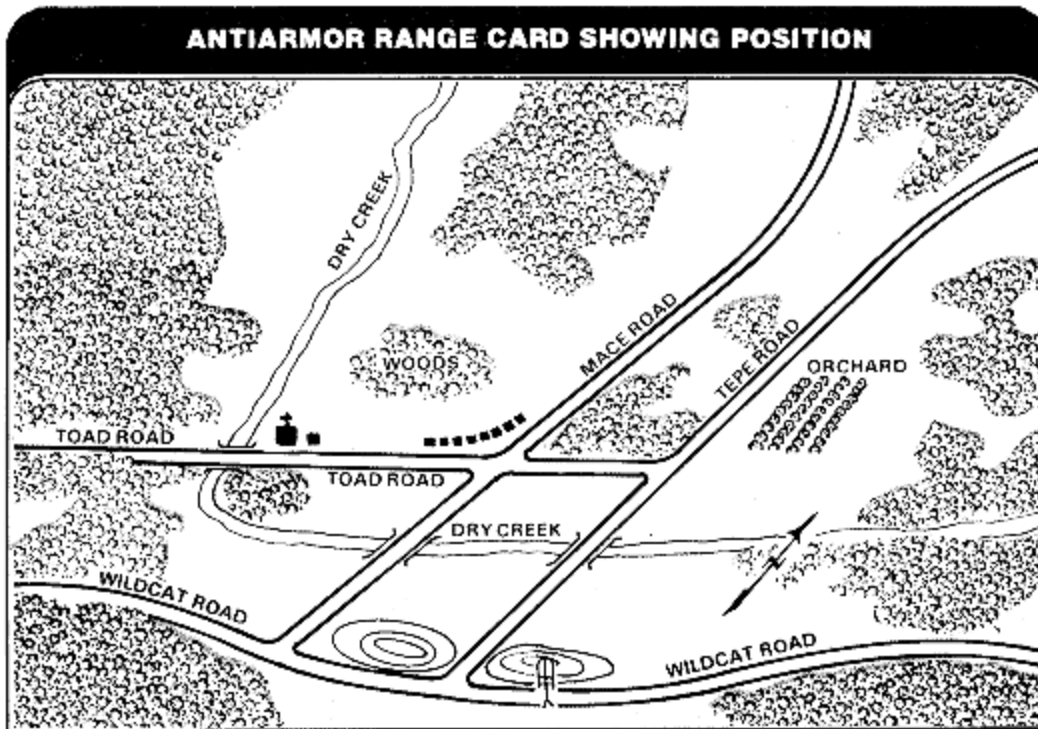
PREPARATION OF THE RANGE CARD

Once you have all the necessary information, you can begin preparing your range card, depending upon the priority of other jobs you must perform (such as preparing and camouflaging your firing position). If you are assigned alternate or supplementary firing positions, a range card is required for them also.

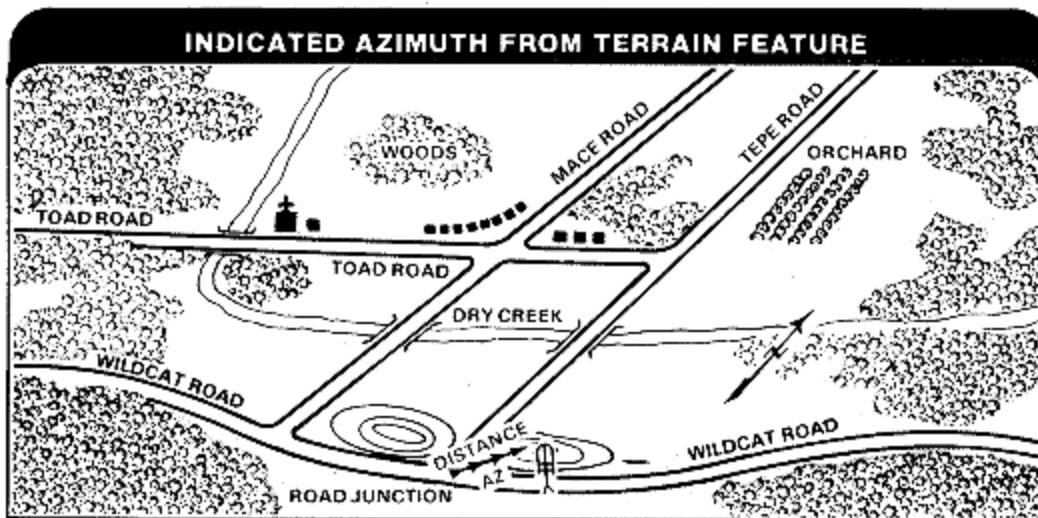
PROCEDURES

In the lower center of your range card, indicate your firing position by drawing the symbol for your assigned weapon. Also indicate the direction of magnetic north (not a requirement for a LAW).

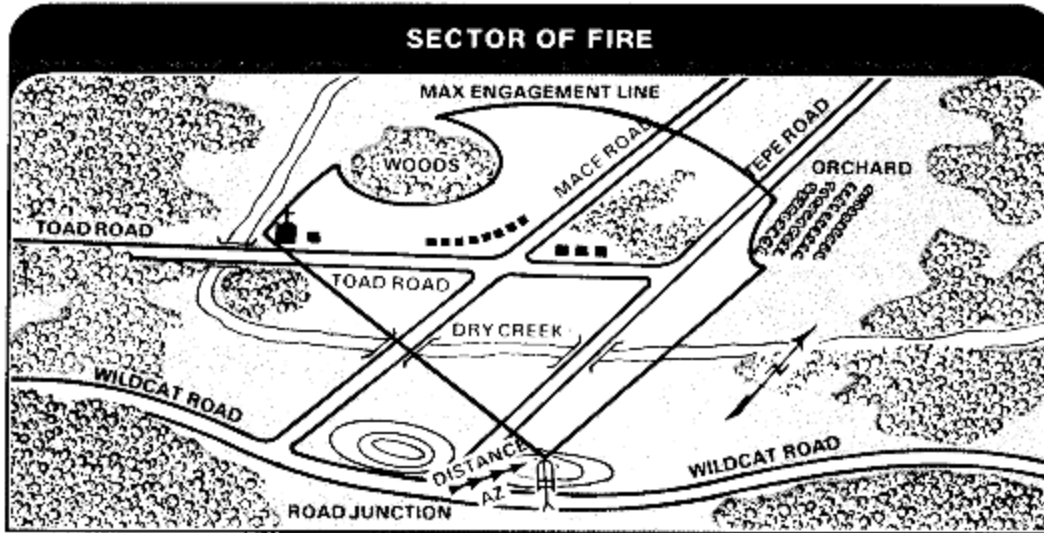
Draw and label your sector sketch. Draw roads, bridges, buildings, streams, hills, and woods. Be as accurate as you can.



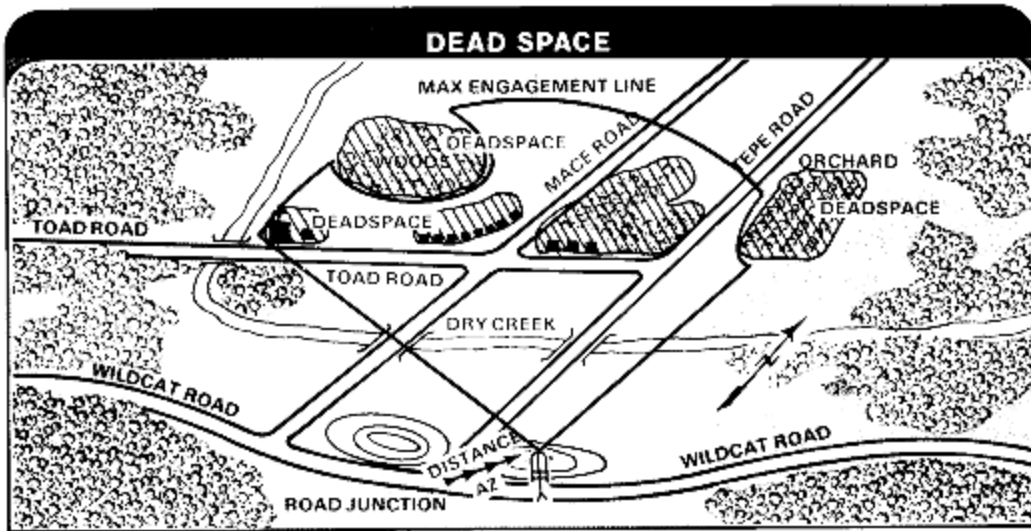
Show the location to your firing positions by drawing an arrow from a nearby recognizable terrain feature and assign it number one. Add the azimuth and distance from the terrain feature to your firing position. (This is not a requirement for a LAW.)



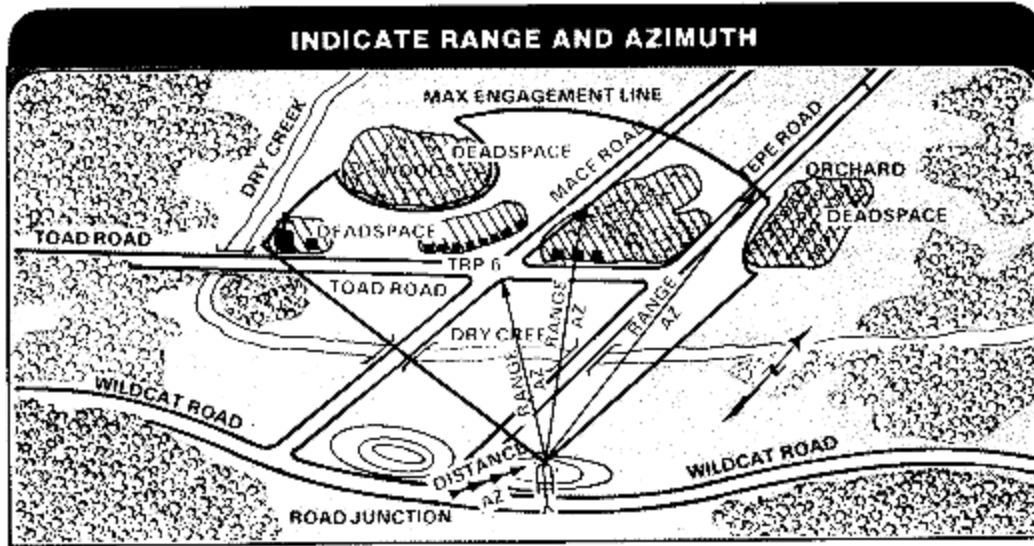
Now draw your sector. This is an enclosed line that outlines your sector of fire. The *maximum engagement line* is a segment of the sector line and indicates the maximum range that targets may be engaged.



Draw in the dead space in your sector. Be sure to indicate by an enclosed line those areas you cannot hit. Remember, your sector of fire can be any shape and size.

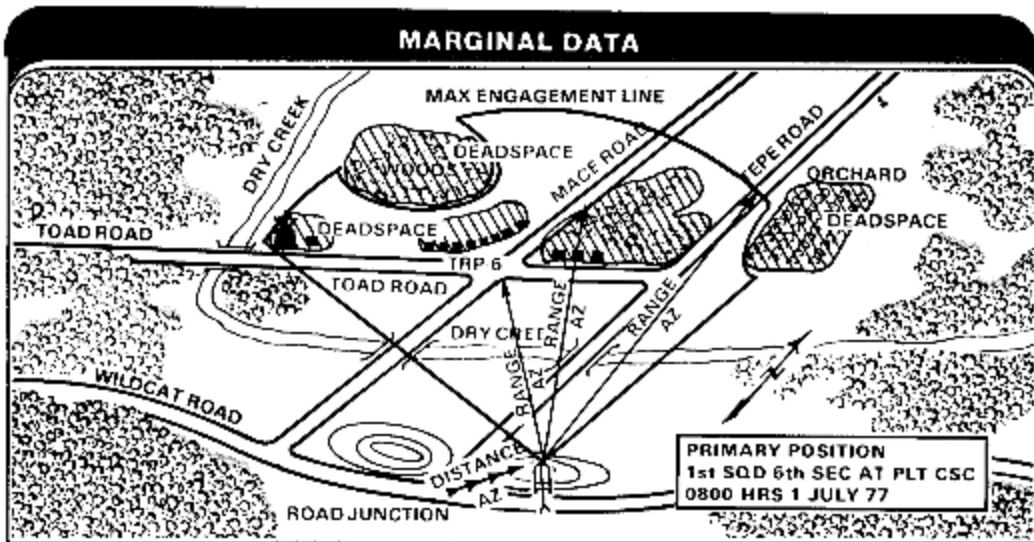


Next, draw in the range and azimuths to expected target engagement locations and TRPs in your sector. (Azimuth is not a requirement for a LAW.)



Write in marginal data. Marginal data **must** include the following:

- Type position (primary, supplementary, or alternate).
- Unit designation (to company only).
- Date/Time group.



Your range card is finished. The range card you construct for your sector of fire may not look exactly like those shown in this manual. Remember, however, the basic information and method of construction for all antiarmor range cards are the same.

Prepare your range card in two copies. Keep one copy at the weapon and send the other to your leader.

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