

SMALL ARMS DEFENSE AGAINST AIR ATTACK

SUBCOURSE NUMBER IS4401

EDITION C

United States Army Air Defense Artillery School
Fort Bliss, Texas 79916-3802

2 Credit Hours

Revision Date: May 2006

SUBCOURSE OVERVIEW

This subcourse was designed to teach you the basic procedures and techniques for small arms defense against air attack to keep your unit functioning and continue to perform the assigned mission. Contained within this subcourse are recognizing the threat; air attack warnings; application of passive air defense measures that include attack avoidance, and damage limiting procedures; and how to perform active air defense measures that includes firing positions.

There are no prerequisites for this subcourse.

This subcourse reflects the doctrine which was current at the time it was prepared. In your own work situation, always refer to the latest official publications.

Unless otherwise stated, the masculine gender of singular pronouns is used to refer to both men and women.

TERMINAL LEARNING OBJECTIVE

ACTION: You will identify threat situations, state passive air defense measures, identify procedures for applying active air defense measures to include aiming points and firing positions.

CONDITIONS: Use only this lesson material to complete the examination.

STANDARDS: To demonstrate competency of this task, you must attain a grade of 70 percent or more on the subcourse examination to receive credit for this subcourse.

TABLE OF CONTENTS

Section	Page
Subcourse Overview.....	i
Administrative Instructions.....	iii
Grading and Certification Instructions.....	iii
Lesson : Small Arms Defense Against Air Attack.....	1
Overview.....	1
Introduction.....	1
Part A: Recognize The Threat.....	3
Part B: Establish Air Attack Warning System.....	12
Part C: Apply Aerial Search and Scan Techniques.....	15
Part D: Employ Passive Air Defense Measures.....	19
Part E: Employ Passive Air Defense in a Convoy.....	22
Part F: Perform Active Air Defense Measures.....	28
Practice Examination.....	35
Examination.....	39
Student Inquiry Sheets.....	

ADMINISTRATIVE INSTRUCTIONS

1. Number of lessons in the subcourse: One.
2. Materials you need in addition to this booklet are a number 2 pencil and the ACCP examination response sheet and preaddressed envelope you received with this subcourse.
3. Supervisory Requirements: None.

GRADING AND CERTIFICATION INSTRUCTIONS

Examination: This subcourse contains a multiple-choice examination covering the material in the lesson. After studying the lesson and working through the practice exercise, complete the examination. Mark your answers in the subcourse booklet, then transfer them to the ACCP examination response sheet. Completely black out the lettered oval which corresponds to your selection (A, B, C, or D). Use a number 2 lead pencil to mark your responses. When you complete the ACCP examination response sheet, mail it in the preaddressed envelope you received with this subcourse. You will receive an examination score in the mail. You will receive two credit hours for successful completion of this examination.

LESSON

SMALL ARMS DEFENSE AGAINST AIR ATTACK

Critical Tasks: 01-0401.20-0001; 441-091-1101; 441-091-1102

OVERVIEW

In this lesson you will learn the basic procedures and techniques for small arms defense against air attack.

TERMINAL LEARNING OBJECTIVE

- ACTION:** You will identify threat situations, state passive air defense measures, identify procedures for applying active air defense measures to include aiming points and firing positions.
- CONDITIONS:** Use only this lesson material to complete the examination.
- STANDARDS:** To demonstrate competency of this task, you must attain a grade of 75 percent or more on the subcourse examination to receive credit for this subcourse.
- REFERENCES:** The material contained in this lesson was derived from the following publications: FM 5-20, FM 5-103, FM 44-8 and FM 3 – 01.80.

INTRODUCTION

In past wars, United States forces have fought on the battlefield with little concern about being attacked from the air. Troops and convoys were only occasionally bombed and strafed by hostile aircraft. Our forces enjoyed the luxury of practically unchallenged air superiority.

However, days of total air superiority by friendly forces are over. Our potential enemies now may have as many or more aircraft than we do. The sophistication of these aircraft has greatly increased during the last ten years. Aircraft such as the Mi-24 Hind D/E, and the Su-25 Frogfoot are being produced in large numbers.

Our potential enemies will gain air superiority over sectors of the battlefield for certain periods. When this happens, any unit in the division could be subjected to an air attack. Our enemies consider their air forces an extension of their field artillery. Their ground attack aircraft and attack helicopters operate as a part of the combat force and have the mission of supporting the attack by destroying the opposing force's maneuver units, lines of communications, command and control facilities, and logistical support means.

In the past, ground commanders have concentrated their attention toward winning the land battle and left the job of controlling the air to the Air Force and Air Defense Artillery. This is no longer possible and ground commanders must now fight within the confines of the air and land battle and be prepared to counter the air threat.

Knowledge of small arms defense against air attack is indispensable in the event that your unit is attacked during normal performance of mission requirements, while your unit is moving, while one or more weapon systems is nonoperational, or when pop-up targets suddenly appear.

Successful small arms defense against air attack is an essential element of survival on the battlefield. Knowledge and application of the principles and proper techniques of small arms used in air defense, together with the correct use of passive air defense will help your unit accomplish its mission. Small arms can be used effectively against air attack (Figure 1).



Figure 1. Defense Against Air Attack

You integrate air defense into any tactical training, and since we cannot assume air superiority in future conflicts, the significance of achieving maximum use of all weapons suitable for air defense is obvious.

Learning to use our full firepower for air defense means preparation and training. This lesson is a beginning.

PART A - RECOGNIZE THE THREAT

1. Identify Threat Airframes.

The primary aerial threats that must be countered include unmanned aerial vehicles (UAV's) such as the **SHMEL-1**, **DR-3 REYS**, and **D-4 NPU** in addition to cruise missiles (CM) like the **AS-4 KITCHEN**, **AS-15 KENT**, and **C-101**. Also, rotary wing (RW) attack helicopters including the **Mi-8 HIP**, **Mi-24 HIND D/E**, and **Mi-28 HAVOC**; close air support (CAS), ground-attack, fixed-wing (FW) aircraft such as the **Su-25 FROGFOOT**, **MiG-27 FLOGGER D/J**, and **MiG-29 FULCRUM**. These aircraft will conduct reconnaissance, surveillance, interdiction, antiarmor, and troop support missions. Only occasional attack by high-performance aircraft can be expected along the line of contact.

Elements in the division corps rear, especially nuclear delivery means, command and control facilities, and reserve forces, can expect repeated attacks by high-performance aircraft. These attacks will occur early in the war, with a lessening of attack frequency after about three days.

Expect attacks in the early morning. Pilots are rested and their aircraft are readied for the first sortie of the day. The danger of attack increases again near noon and in the early evening. However, surveillance for threat aircraft is a 24-hour a day mission. The enemy's order of battle, combat capability, readiness, and will to fight are some of the factors that will determine the times and rates of sorties. Convoys of troops, as well as supply trains, will always be vulnerable targets, especially as they concentrate at choke points along the convoy route.

The threat generally will consist of UAV's, attack helicopters and close air support (CAS) aircraft in the forward area near lines of contact, and ground attack fighter-bombers in the rear areas and against convoys. Because these types of aircraft differ in their capabilities and in the manner in which they conduct tactical operations, they present distinctly different threat profiles.

2. Identify Threat Unmanned Aerial Vehicles (UAVs)

UAVs are your most common air threat. They are inexpensive, easily procured or manufactured, and versatile. There are over 100 UAV programs being pursued by at least 35 countries. Their small radar cross sections (RCS) make them very difficult to detect and track. Payloads may consist of radar seekers, high explosive warheads, forward looking infrared (FLIR) cameras, laser designators, television (TV), thermal imaging devices, chaff, decoy and electronic attack capabilities. Ranges vary from 25 to 800 kms, and the upper limit of flight endurance reaches 72 hours. They perform a wide variety of missions including reconnaissance, intelligence, surveillance and target acquisition (RISTA), suppression of enemy air defense, ground attack, decoy, communications relay and chemical detection. (The RISTA mission, which utilizes enemy UAVs to locate friendly maneuver forces and key assets with the ability to pass real-time information back to enemy long-range attack systems, is the greatest near term concern for short range air defense and the force commander.) Three potential threat unmanned aerial vehicles, the **SHMEL-1**, **DR-3 REYS**, and **D4 NPU** are shown in figure 2.

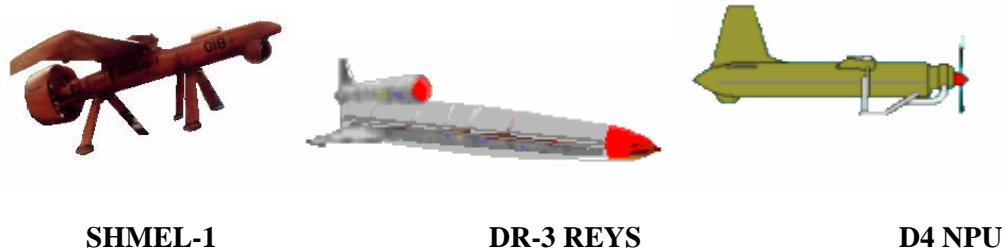


Figure 2. Threat Unmanned Aerial Vehicles

3. Identify Threat Rotary-Wing Aircraft.

Many countries around the world possess attack helicopters. Rotary-wing versatility and survivability make it ideal for logistics resupply, air assault, command and control and heavily armed weapons platforms for attack roles. Armed with stand-off anti-tank guided missiles, helicopters can inflict heavy casualties on the force and destroy critical assets. The proliferation of helicopters is also of concern. Utility helicopters, combined with stand-off munitions and state-of-the-art target acquisition technology, can produce less expensive, robust helicopter capabilities for any country. Potential threat helicopter air platforms, the **Mi-8 Hip**, **Mi-24 Hind**, and the **Mi-28 Havoc** are shown in figure 3.



Figure 3. Threat Rotary-Wing Aircraft

4. Recognize Threat Helicopter Ground Support Role.

Threat helicopter forces supporting ground operations operate nearly the same as US helicopter forces. For example, Commonwealth of Independent States (CIS), formerly Soviet Union helicopters are agile and make good use of cover, and concealment offered by folds in the earth and trees (Figure 4). Their armament includes antitank guided missiles (ATGM), free-flight air-to-air missiles (FFAR), and radar-directed 12.7 mm nose-, or chin-mounted machine or Gatling type guns. CIS ATGM's are electronically controlled or laser guided and can engage and destroy any armored vehicles at standoff ranges of more than 3 kilometers (Figure 5). Using sneak-and-peek techniques, attack helicopters can deliver a devastating blow against exposed maneuver units. Their lethality is somewhat softened by practical considerations. They must detect a target to engage it and remain in the open long enough to aim and fire their weapons. For some ATGM's, attack helicopters must maintain track on both the missile and target throughout the missile's flight which can be as long as 23.2 seconds. The 57 mm FFAR is an area weapon and is effective against exposed troops and lightly armored vehicles at ranges greater than 1,000 meters.

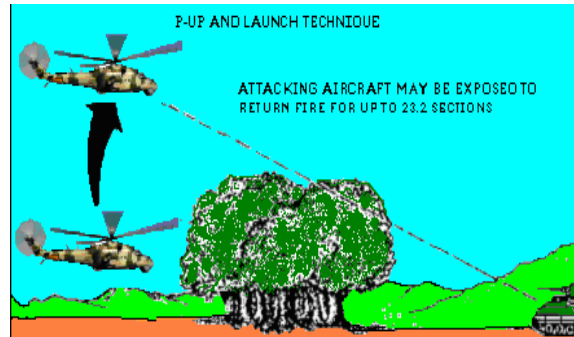


Figure 4. Threat Helicopter in Ground Support Role

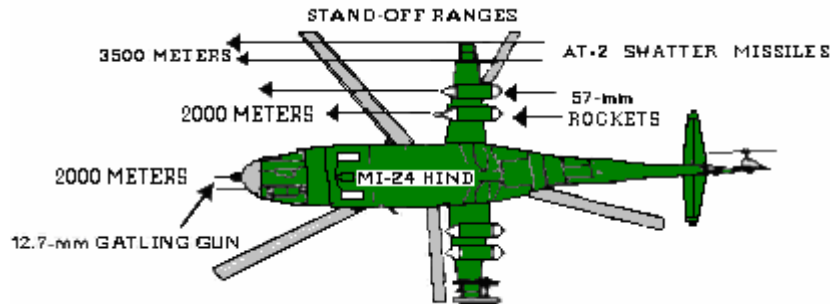


Figure 5. Threat Helicopter Weapon Ranges

5. Identify Ground Attack Aircraft.

Although theater missile threats have taken the place of FW aircraft as the principal air threat to ground forces, the following types of FW aircraft may be employed by the enemy against friendly forces: bombers, fighter-bombers, fighters and close air support aircraft. Any of the FW family may carry (TASM), while only the larger ones will carry cruise missiles. Improvements to FW aircraft will include increased survivability and improved fire control accuracy. Examples of three potentially threat aircraft, the **Su-25 Frogfoot**, **MiG-27 Flogger D** and **MiG-29 Fulcrum** are shown in figure 6.



Figure 6. Threat Ground-Attack Aircraft

Ground attack aircraft are effective against preplanned targets. The pilot generally knows the target location and will carry the correct ordnance for the target. Effectiveness decreases against targets of opportunity. Pilots must locate their targets, plan their attack, and deliver their ordnance in a short time. As a result, accuracy and effectiveness are degraded. The use of area type weapons such as cluster bomb units (CBUs) or FFARs can be expected on the initial attack run, while cannon and machine gun fire will likely be used in the follow-on attack.

High-performance aircraft, operating in a ground attack role, attack at relatively high speeds. They normally operate under centralized control and are directed against preplanned targets. These aircraft target the division and corps rear area where they deliver ordnance selected to optimize destruction effects on the target. If they have ordnance remaining after completing their primary mission, the aircraft may be released to attack targets of opportunity on their return flight. The attack will usually include a high-speed, low-level penetration run to a point near the target area to avoid low- and medium-altitude air defenses.

6. Recognize Ground-Attack and High-Performance Aircraft Attack Profiles.

a. Pop-up Attack. Upon nearing the target, the aircraft pops up to acquire the target, then dives to the ordnance release point (Figure 7). Following ordnance release, the pilot pulls up and executes an escape maneuver, or may execute a reversing maneuver and fire rockets and cannon while flying back over the target.

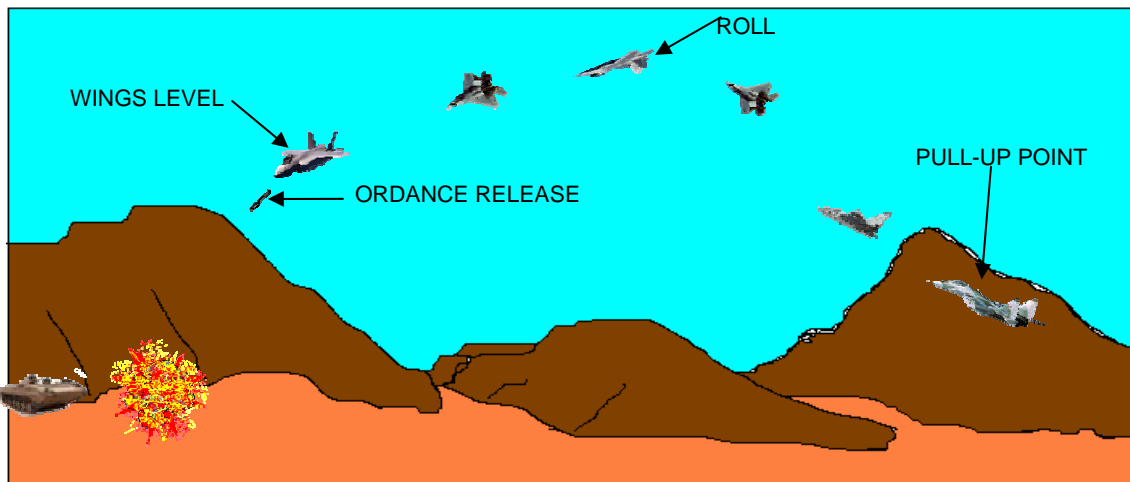


Figure 7. Pop-up Technique

b. Diverting Attention. The first element executes a pop-up maneuver. This pop-up is intended to divert attention until the second element attacks with a level, high-speed, low- altitude laydown of CBU's along the length of the convoy. (Figure 8).

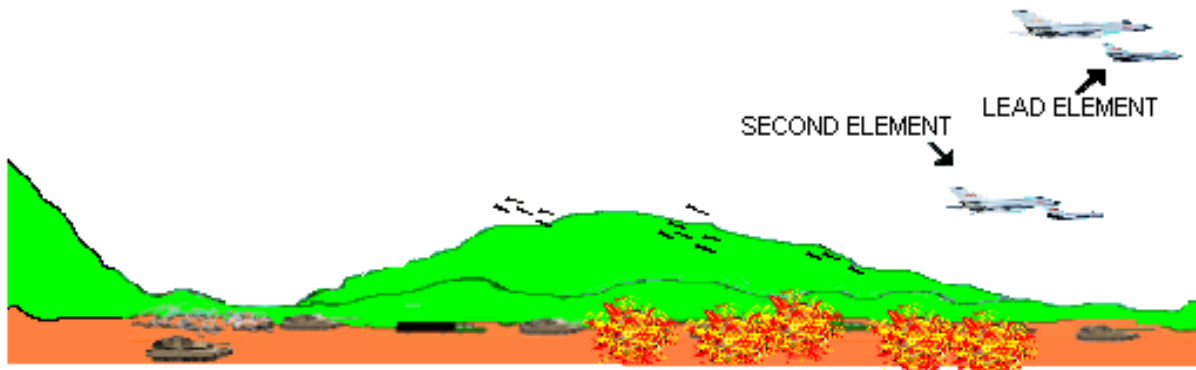


Figure 8. Diverting Attention Technique

c. Reversing Maneuver. From the pop-up, the first element will have completed a reversing maneuver to fly back over the column. As it flies back over the column, this first will concentrate on undamaged vehicles by dive bombing or by attacking with rockets or machine gun fire. (Figure 9).

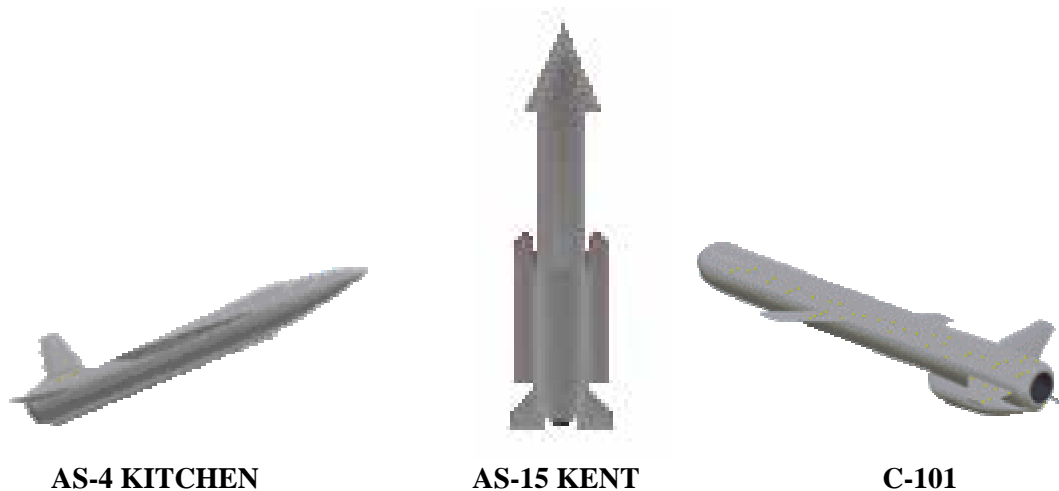


Figure 9. Reverse Maneuver Technique

Attacks are usually made by flights of two or four aircraft operating as a single pair or as two pairs. The first element may pop up over the target to divert attention, while the second element executes a level, high-speed, low-altitude laydown of CBU's. Meanwhile, the lead element can reverse and attack the target to add to the destruction.

d. Identify Threat Cruise Missiles

CMs are considered the most stressing threat because of the difficulty in detecting them at launch and in flight; and in destroying them at extended ranges. Their ranges vary from 10 to 400 kms. They can be packaged with a variety of payload options. They may be ground, air or sea launched. Cruise missiles with their increasing accuracy and warhead diversity are a potent threat. Three potential threat cruise missiles the **AS-4 KITCHEN**, **AS-15 KENT**, and **C-101** are shown in figure 10.



AS-4 KITCHEN

AS-15 KENT

C-101

Figure 10. Threat Cruise Missiles

7. Recognize the Threat Application

Air threat employment against US ground forces may vary from country to country. This employment will be driven by threat equipment, capabilities, organizational structures and military political goals. By understanding air threat proliferation and equipment, the commander can make assumptions on how a threat may employ air assets to interdict US operations. The following information describes the type of threat to be countered with each stage of force protection operations.

a. Entry Phase. Early entry forces may deploy into air inferiority or air parity environment. We can expect the threat to use all his aerial assets (use or lose) against lucrative targets in the areas of debarkation. Low-altitude aerial threats (RW, CM and FW) will probably be employed in attack operations against aerial port of debarkation/sea port of debarkation (APODs/SPODs), assembly areas and supply points.

b. Expansion And Buildup. During this phase, most potential threats will focus on conducting RISTA operations to locate friendly unit movements, assess unit sizes and strengths, and determine their ultimate position. UAVs will be the most challenging aerial RISTA and, therefore, a logical choice for threat use. Information obtained by aerial RISTA will be relayed back to the enemy who can be expected to use any attack means necessary to inflict maximum casualties, slow momentum and destroy forces. These aerial attack systems could be RW or FW aircraft, CMs and lethal UAVs.

c. Operations. We can expect the threat to attempt to counter U.S. defensive and offensive operations with a myriad of aerial platforms. RISTA UAVs will provide the threat commander the necessary information to determine friendly unit locations, movements and objectives. Aerial and artillery strikes can be generated from the intelligence gathered against the following targets:

- maneuver Force
- forward arming and refueling points (FARPs).
- aviation forward operating bases (FOBs).
- command and control nodes.
- reserve troop concentrations.
- logistical support areas.
- terrain features.
- obstacles constricting unit movements as US forces advance to close with the enemy forces.

Lethal UAVs can be effective in disabling C³I or destroying armored vehicles. CMs will probably be used against logistical concentration, command and control nodes or with sub-munitions for area denial. RW aircraft will be used to attack forward elements and the flanks of the advancing enemy maneuver forces to slow their tempo, cause confusion and, thereby, inflict maximum casualties. They can also be expected to conduct operations across FLOT, close air support (CAS), and air insertion operations. These armed attack helicopters constitute the most widespread and capable air threats to friendly ground forces in the close battle.

- (1) Defensive operations.

During defensive operations, friendly forces are vulnerable to the full spectrum of threat aerial platforms. The enemy will attempt to use aerial platforms to monitor friendly forces for targeting. We can expect the enemy to use UAVs, RW, and possibly FW aircraft, to determine locations of friendly artillery, command and control, ADA assets, logistical sites and troop concentration areas. Once these sites are located, threat forces will likely disrupt or destroy these sites with the use of artillery and rocket fire, air attacks, and air insertion.

Artillery and rocket attacks will be the enemy's preferred weapons against US forces and air defense assets. These systems are usually numerous, inexpensive, survivable and highly effective. UAVs will be employed to provide targeting data during this phase of operations. UAVs are extremely effective in this role due to their small size, small radar cross section and standoff capability. RW and FW attacks are less likely during this phase due to the poor survivability of these systems. In most cases, they are limited to daylight operations. These attacks will be supported with pre-attack and post-attack reconnaissance.

Threat air insertion operations will be conducted with either FW or RW assets and probably during the hours of limited visibility. The threat will likely conduct daytime reconnaissance of landing sites and target areas within 24 hours prior to attack. These operations will fly at low levels attempting to infiltrate into friendly rear areas.

(2) Offensive operations

During friendly offensive operations, enemy forces will attempt to use maneuver and fire support assets to regain the initiative. Threat air activity will most likely be categorized by RISTA operations in support of artillery and maneuver. UAVs are best suited for these types of operations, especially if threat forces have developed effective C³I. Secondary weapon systems the enemy will use are helicopters, either as dedicated attack assets or as armed utility helicopters. Helicopter assets can be used in attack, air insertion, or reconnaissance. Helicopters in the reconnaissance role will operate in the same manner as UAVs to support artillery targeting and maneuver. In the attack, the unit can expect spoiling attacks that usually consist of at least two helicopters or more (taking full advantage of cover and concealment) with the mission of disrupting friendly operations.

In some cases, helicopters will be used in conjunction with threat armored forces to deter friendly penetrations. However, it is unlikely the friendly commander will see large numbers of helicopters in this role. The enemy will use ground forces first to neutralize friendly air defense assets. Helicopters will be used as the primary CAS aerial platform against maneuver forces.

Threat FW assets will be limited and their use will be hampered by friendly FW aircraft. Use of enemy FW aerial platforms cannot be entirely ruled out. If used by the enemy, the ground commander can expect to see no more than one or two aircraft in a spoiling attack, normally not coordinated with enemy ground operations.

8. Determine The Threat Courses Of Action

Determine both the threat air and ground course of action and integrate the results of the previous information into a meaningful conclusion. Given what threat air and missile forces prefer to do and the effects of the operational environment, what are the enemy's likely objectives and what COAs are available to him? The G2/S2 develops enemy threat models that depict the threat's air and missile COAs. They also prepare event templates and matrices that focus intelligence collection on identifying which COA the threat will execute. The process of developing these templates and matrices is covered in depth in FM 34-130.

This overview is a reasonable assessment of the air threat to US Army ground units. Air attack of ground units can certainly be expected, but they will not always be overwhelming. Pilots of these aircraft will have problems in target acquisition, short reaction times, inaccurate deliveries, limited lethal effect, and survival. Small arms are effective (Figure 11). Dedicated application of the procedures outlined in this lesson can reduce the effectiveness of enemy air attack.



Figure 11. Effective Small Arms

PART B - ESTABLISH AIR ATTACK WARNING SYSTEM

In the past, the US Army has fought on the battlefield with little concern about surveillance or attack from the air. However, we could face a significant air threat in our next war or military operation. Potential enemies could have significant air capabilities. We can expect that friendly units will be targeted and attacked from the air as well as from the ground.

Because air defense artillery has limited resources, many Army units and facilities will not receive dedicated air defense protection. These units and facilities must be prepared to protect themselves. All units must reduce their vulnerability to air action by implementing passive and active air defense measures.

1. **Recognize Air Defense Warnings.** The air defense command and control structure uses air defense warnings (ADW), local air defense warnings (LADW), and directed early warning to alert all members of the force of hostile air activities. Non ADA units may monitor ADA early warning nets. These nets contain additional information for ADA units to include more detailed track information. However, the format will follow the SALUTE report format. Track locations will be reported using the same systems as directed early warning. You may consult unit signal operating instructions (SOI) to find the appropriate frequencies to monitor.

2. **Identify Air Attack Warnings (ADW).** Air defense warnings represent the air defense commander's evaluation of the probability of air surveillance or attack. They are routinely issued by the area air defense commander for dissemination throughout the entire theater of operations. Any commander may issue a higher level of warning for his command, but not a lower level. The three ADWs are red, yellow, and white. They are defined as follows:

a. **ADW Red.** Attack by hostile air platforms is imminent or in progress. This means that hostile air platforms are within a respective area of operations or in the immediate vicinity of a respective area of operations with a high probability of entry.

b. **ADW Yellow.** Attack by hostile air platforms is probable. Means that hostile or unknown air platforms are enroute toward a respective area of operations.

c. **ADW White.** Attack by hostile air platforms is improbable. ADW white can be declared either before ADW yellow or ADW red.

3. **Identify Local Air Defense Warnings (LADW).** While ADWs describe the probability of hostile air action over the entire theater, LADWs tell you what the air threat is for a specific part of the battlefield. They also require specific air defense reactions from receiving units. Commanders must establish in their TSOPs what they want their units to do when a LADW is received. Provide the local air defense warning status:

- a. **Dynamite.** Air platforms are inbound or are attacking; response is immediate.
- b. **Lookout.** Air platforms are in the area of interest, but are not threatening, or they are inbound, but there is time to react.
- c. **Snowman.** No air platforms pose a threat at this time.

LADWs do more than describe the current level of air threat in the immediate area. They also require specific air defense reactions from receiving units. Unit commanders must establish in their tactical standing operating procedures (TSOPs) what they want their units to do when a LADW is received.

4. Identify Directed Early Warning (DEW). It is essential that all Army units receive early warning, especially those units that have minimal air defense coverage. DEW is provided by the supporting ADA unit. It is early warning that is focused to alert a particular unit, units, or area of the battlefield. Early warning is quick, simple and redundant in nature and is reported to the supported unit by the ADA liaison officer. It is also passed over the supported unit command net. The DEW format is nothing more than a simplified SALUTE report. The report is passed as flash traffic. A sample report might be as follows: “Dynamite! Dynamite! Four Hinds heading east at phase line blue.” The location of the target may be reported using grid coordinates or reference to operational graphics.

5. Use Small Unit Warning. Your defense will be much more effective if you know in advance that an air attack is imminent. Initial attack warnings will normally come from higher headquarters and you can increase timely alerting if you establish an air attack warning system within your unit. Assign air watch personnel and set up a system of alarms to warn your unit of an impending attack.

- a. Assign Air Guards in Unit Area of Operation. A map reconnaissance of your unit’s area of operation will reveal the most likely areas from which aircraft can attack (avenues of approach). Assign air guards to watch the back sides of woodlines, ridgelines, and significant folds in the terrain for helicopters and other attack aircraft. Your local observation post (OP) personnel will have air watch as part of their duties. If an OP does not have a good view of the airspace in its area, position a special air guard to search that sector. Rotate air guards frequently, because scanning for long periods of time dulls the ability to detect aircraft.

- b. Assign Air Guards in a Convoy. Assign an air guard to each vehicle. Anyone on the vehicle, other than the driver, may perform this duty. Check your map. Mark narrow valleys, and any other terrain features that may force your unit to pinch together. Assign specific search sectors to each air guard, keeping those trouble spots in mind. If the convoy lasts more than an hour, have the soldiers take turns so that they will remain alert.

- c. Use Air Attack Alarms. To provide a standard method of disseminating emergency warnings within North Atlantic Treaty Organization (NATO) forces, the US armed forces have concurred in the provisions of Standardization Agreement (STANAG) 2047, Emergency Alarms of Hazard or Attack (NBC and Air Attack Only). Pertinent extracts at table 1.

VISUAL WARNING

AUDIBLE WARNING

Imminent Air Attack. Red. Preferable square in shape	1. Unbroken warbling siren for one minute duration. 2. Succession of long blasts on vehicle horns, whistles, bugles or other wind instruments in a ratio of 3 to 1; about three seconds on and one second off. 3. Vocal “Air Attack” or corresponding national term when one nation is involved.
All Clear, Removal of appropriate warning sign.	1. Vocal “All Clear Air Attack” or corresponding national term when only one nation is involved. 2. Steady siren note for one minute or sustained blast on a vehicle horn, whistle, bugle, or other instrument to indicate absence of all NBC and air attack hazards.

Table 1. Emergency Air Attack Alarms (NATO)

The actual form of a visual signal and method of display are left to the discretion of the local commander. Only the “red” visual warning in Table 1 is mandatory. Include your air attack warning system in your unit tactical standing operating procedures (TSOP). The hand and arm signal for air threat is shown in figure 12.



Figure 12. Hand and Arm Signal for Air Threat

PART C - APPLY AERIAL SEARCH AND SCAN TECHNIQUES

An air attack will be sudden and swift. Air guards must learn the techniques of search and scan to quickly recognize aircraft performing hostile acts. Air guards can then give the air attack warning immediately to allow maximum reaction time or seek cover and concealment and to prepare their weapons for firing.

Assign air guards to be on the lookout at all times for enemy threats. A map reconnaissance of each unit's area of operations will help locate likely areas from which air targets can attack. Air guards should watch for air threats attempting to take advantage of masking caused by woodlines, ridgelines, and significant folds in the terrain out to about 5,000 meters. Local observation post (OP) personnel should incorporate air guards responsibilities into their duties. If an OP does not have a good view of the airspace in its area, position a special sentry to search that sector. Establish a systematic procedure for searching all sectors. Frequently rotate air guards because scanning for long periods of time dulls the ability to spot air platforms.

In a convoy, every vehicle should have an individual assigned as an air guard. Anyone on the vehicle other than the driver may perform this duty. Check the map and mark narrow valleys or other terrain features that may force a unit to bunch together. Then, assign specific search sectors to each air guard keeping those trouble spots in mind. Ensure an air guard watches the rear of the convoy to prevent a surprise attack from this blind side. If the road march lasts more than an hour, have the troops take turns being air guards so that they remain alert.

1. Identify Search and Scan Techniques.

When searching, especially above the horizon, your eyes will tend to relax and distant objects may become blurred. Blurring can be prevented by focusing your eyes frequently on a distant object such as a terrain feature.

Squinting of your eyes will aid in focusing at long ranges. Squinting changes your eyes' focal length and aids in bringing distant targets in focus.

You should keep your eyes on an air target that you have detected. If you look away you may lose the target and have to look for it again. If you must look away, you should try to remember exactly where the air target was and its heading from a specific point such as a terrain feature.

a. Define the Search Sector Size. The size of a search sector directly affects aircraft detection. You can detect air platforms easier if the search sector is narrow. If you are assigned a search sector size of 360 degrees, your chances of detecting aircraft are greatly reduced. When you are supported by an alert warning system, then you can observe a fairly large sector of about 90 degrees. After receiving a warning, narrow the search sector to about 30 degrees and center your search on the air platforms approach azimuth (Figure 13).

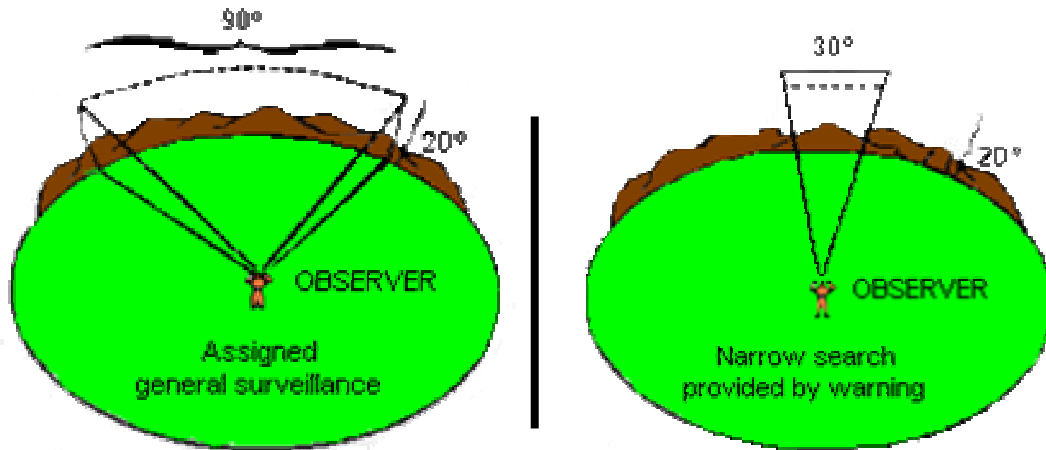


Figure 13. Search Sector Size

b. Establish Upper and Lower Limits. Vertical search limits are helpful in detecting aircraft. When searching and scanning for aircraft, do not limit your search too near the horizon and miss higher flying aircraft, nor search too high above the horizon and miss lower flying aircraft. Establish the search area 20 degrees above and 20 degrees below the horizon. This will ensure that aircraft are detected within the search parameters.

One method of *estimating* 20 degrees is extend one hand straight in front of you with your fingers fully spread. With your thumb in the air and your little finger pointed at the ground and touching the apparent horizon, your thumb tip will be about 20 degrees above the horizon (Figure 14).



Figure 14. One Method of Estimating 20 degrees

2. Search and Scan in Flat Terrain (Horizontal Scanning). Search from the horizon to 20 degrees above the horizon by moving your eyes in short movements across the sky, working up and across. Continue the pattern below the horizon to detect aircraft contour flying. This method of scanning is shown in figure 15.

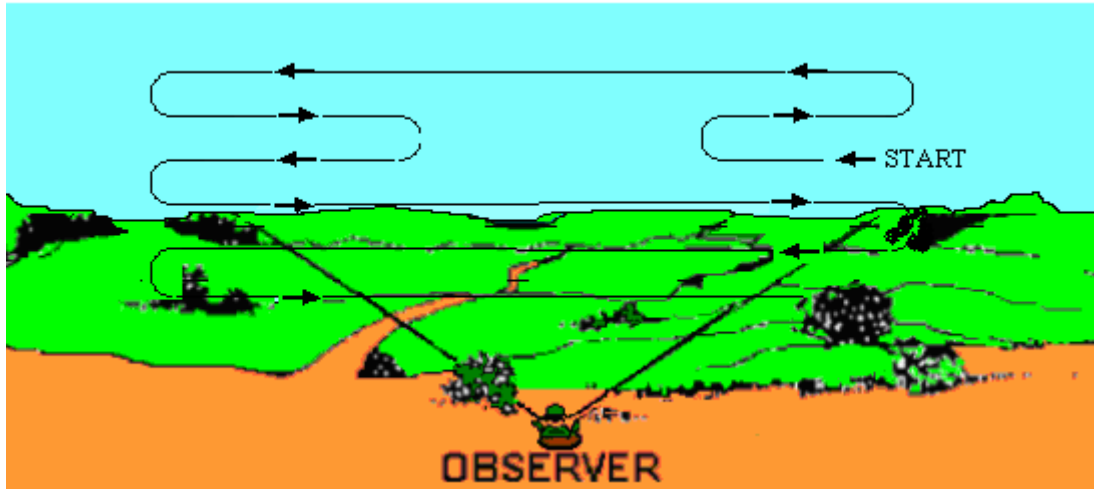


Figure 15. Horizontal Scanning

3. Search and Scan in Hilly Terrain (Vertical Scanning). Search the sky using the horizon as a starting point and prominent terrain features as reference points by moving your eyes in short movements up the sky, then back down, continuing the movement across the terrain. You should scan in the same pattern to 20 degrees below the horizon to detect aircraft contour flying. This method of scanning is shown in figure 16.

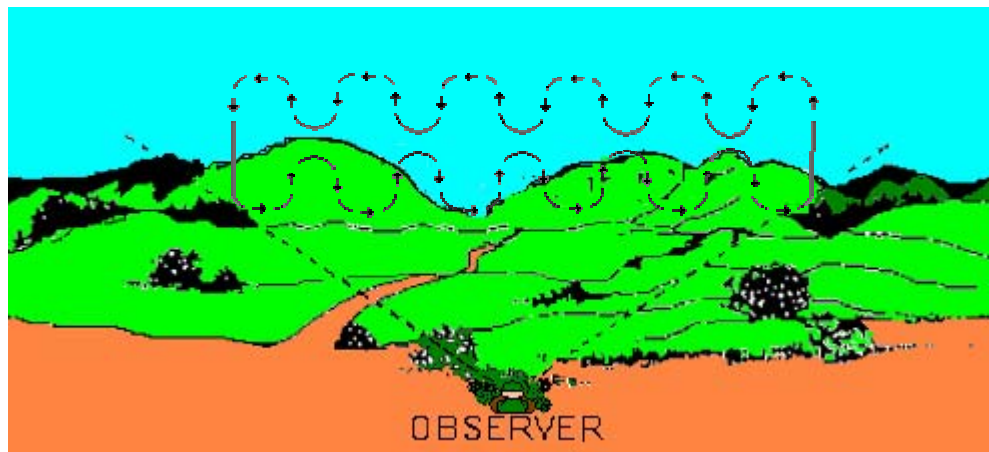


Figure 16. Vertical Scanning

4. Variations.

With experience, soldiers who possess above average vision may use nonsystematic methods of search. From the following select one that works best:

- Combination of the two systematic methods.
- Search of the horizon in the shape of an oval to 20 degrees above the horizon.
- General or random search of the horizon.

Air guards should look for sun reflections from canopies or cockpit windows, blade flash from rotating propeller blades, smoke trails and dust; and excessive movement of tree tops and bushes in a particular area. They should listen for noise from propeller blades or aircraft engines. It is likely that these indications will be detectable before the air platform is plainly visible. The sooner the air platform is detected, the more time the unit will have to react to an air threat warning.

PART D - EMPLOY PASSIVE AIR DEFENSE MEASURES

1. Identify Self-Defense Measures. Passive air defense measures are all measures other than active defense taken to minimize the effects of the hostile air action. Passive defense measures are of two types; *attack avoidance*; and *damage limiting* measures of which includes the use of cover, concealment and camouflage, protective cover, and deception.

a. You must accept as a foregone conclusion that the enemy has the capability to attack from the air and that they will exercise that capability. *Air attack is not a probability-it is a certainty*. Small units do not stand helpless before this threat. Simple, commonsense measures can be taken by a small unit to avoid attack and to limit damage if attacked. Should these measures fail, the unit has the option of fighting back. Passive air defense measures, if routinely followed, will reduce the probability of attack, and will limit damage if you cannot avoid an attack. Active air defense measures provides techniques for shooting back.

b. Defend yourself or hostile aircraft will destroy you. Your first line of defense against air attack is to constantly apply *passive air defense measures*. If the aircraft is not attacking you or your unit, the unit commander has a decision to make. First you may not want to fire and disclose your position. Secondly, to engage a non-attacking aircraft you must positively identify it as hostile. This may be difficult unless you have had aircraft recognition training. Remember if you are not being attacked, you must be given the order by your unit commander to fire.

2. Employ Attack Avoidance Measures. Passive defense measures are of two types; attack avoidance; and damage limiting measures of which includes the use of cover, concealment and camouflage, protective cover, and deception. Attack avoidance means take the actions necessary to *avoid* being seen by the enemy--concealment and, lacking concealment, camouflage. What can be seen can be hit, and if you can't be seen, the probability of being hit diminishes to near zero (Figure 17). The techniques, procedures, and materials used for concealment from aerial observation are the same as used for concealment from ground observation.



Figure 17. Attack Avoidance

a. There are three concealment principles employed (siting, discipline and construction) to eliminate the factors of recognition.

(1) Siting. Siting means selecting the most advantageous position in which to hide a man, an object, or an activity.

(2) Discipline. Success in any concealment effort is the strict maintenance of concealment *discipline* by both the unit and by you, the individual soldier. Avoid any activity that changes the appearance of an area or reveals the presence of military equipment. Laxness and carelessness will undoubtedly reveal your position. Tracks, spoil, and debris are the most common signs of military activity which indicate concealed objects. Ensure new tracks follow existing paths, roads, fences, or natural lines in the terrain pattern. Do not end exposed routes at a position, but extend it to another logical termination. If practicable, brush out, camouflage, or cover exposed tracks. Cover or place to blend all spoil and debris. When the terrain and natural vegetation are such that natural concealment is not possible, add artificial camouflage.

(3) Construction. Augment the construction of this type concealment by adding natural materials to blend with the surrounding terrain.

b. You have three fundamental methods of concealing installations and activities: hiding; blending; and disguising.

(1) Hiding. Hiding is the complete concealment of an object by some form of physical screen: Sod over mines in a minefield, hides the mines; the overhead canopy of trees hides the objects beneath from aerial observation; a net hides objects beneath it; a defilade hides objects from ground observation. In some cases the screen itself may be invisible. In other instances the screen may be visible, but it hides the activity behind it.

(2) Blending. Blending is the arrangement or application of camouflage materials on, over, and around the object so that it appears to be part of the background. For example, you can apply face paint to the exposed areas of skin; add burlap, paint, and live vegetation to your helmet and clothing so that you will closely resemble or *blend* into the background. You can apply the same technique for equipment or structures.

(3) Disguising. Is the *simulation* of an object, piece of equipment or activity of military significance. Clever disguises will mislead the enemy as to the identity, strength, and intention, and will draw his fire from the real asset. You have probably seen the rubber tanks and tents and even buildings that when filled with air, look like the real thing, and especially from the air.



Figure 18. Detection Avoidance

c. Camouflage. The difference between *concealment* and *camouflage* is that concealment is using natural terrain to hide your presence and camouflage is constructing concealment. In addition to hiding your equipment, you can also use mud for glassy surfaces and unfilled sandbags over windshields to avoid detection (Figure 18). Camouflage is one of your basic weapons of war. You must completely understand the importance, the principles, and the techniques of camouflage. In addition, you will ensure the effectiveness of all camouflage measures. You are responsible for the strict enforcement of camouflage discipline.

3. Employ Damage Limiting Measures. Another type of passive air defense, damage limiting, will also help you survive. These measures are an attempt to limit any damage you may receive if the enemy detects your position. If the enemy is to destroy your equipment, make him do it one piece at a time. Do not allow your unit to be put out of action with just a single attack. Apply the same measures you take to limit damage from artillery attack--*dispersion*, *protective construction*, and the *use of cover*. Large bombs will seldom, if ever, be used against troops on the ground. Most munitions delivered by aircraft must make a direct hit to be effective.

Dispersed troops, vehicles and equipment will force the attacker to concentrate on a single small target that will likely be missed. The wider the dispersion, the greater the potential is for limiting damage.

Your use of cover, natural or manmade, acts to reduce damage and casualties. Folds in the earth, natural depressions, trees, buildings, and walls offer damage limiting cover which you should seek out and use habitually. If deployment is in flat terrain lacking cover, digging in or sandbagging can offer you some protection. If you are moving and cannot use natural cover or cannot build fortifications, try using smoke. Smoke makes target acquisition much more difficult for the attacker.

The intent here is to emphasize to you the importance of passive defense against an air attack. Do everything you can to avoid an attack in the first place. Not succeeding in that aim, then at least use cover and dispersion to limit the amount of damage to your unit.

PART E - EMPLOY PASSIVE AIR DEFENSE MEASURES IN A CONVOY

1. Identify Passive Air Defense Measures. A convoy is vulnerable to air attack since it is easily seen from the air. Movements along a road are hampered by shoulders, ditches, and embankments which restrict freedom of maneuver. Additionally, since vehicles are stretched out in a long line, convoys represent high-value, hard-to-defend, but easy to hit targets to enemy ground attack aircraft. This linear array also makes command and control very difficult. A high probability of air attack must be assumed in planning a convoy, and you as well as all other soldiers in the convoy must know exactly what to do if attacked (Figure 19).



Figure 19. Convoy Under Attack

Not all convoys will be provided dedicated air defense assets. Some convoys must rely on organic passive and active air defense measures for protection. As in defended areas, passive air defense includes *attack avoidance* and *damage limiting* measures. Active air defense involves shooting back and killing or driving off the attacker.

2. Employ Attack Avoidance. Reduce the visible signature to the point where the enemy cannot find the convoy. While it is not possible to become invisible, every step taken in that direction decreases the likelihood that the convoy will be spotted. Not much can be done to change the shape of a vehicle moving down the road, but the type of cargo being transported can be disguised or concealed by covering it with a tarp. By rigging traps and bows over the cargo compartment, the nature of the cargo can be concealed from the enemy pilot. Other effective passive measures are--

- a. Train operators, as they disperse to look for a bush, tree, or some other means of concealment to break their vehicles' shapes as seen from the air.
- b. If vehicles are not already painted in a pattern to blend with the terrain and to break the outline, use mud, camouflage nets, or cut vegetation to achieve this effect.
- c. Use the cover of darkness. If possible, convoy only at night and under blackout conditions. This is by far your best defense against air attack.

d. Travel during periods of inclement weather. Low clouds, rain, snow, and fog offer you good concealment and limit a pilots visibility.

e. Try to eliminate the dust plume that invariably accompanies a convoy. When possible, plan your route along hard surface roads and try to avoid unpaved secondary roads. If you must travel on unpaved roads, reduce speed to reduce dust.

f. Use routes that offer natural concealment. Trees and the shadows they cast are concealing; so are the shadows cast by mountain ridge lines in the morning and in the late afternoon. If you must cross open country, travel when the sun is high to avoid casting long, highly visible shadows.

g. Eliminate glare. Be sure that every vehicle in the convoy is camouflage painted. A camouflage-painted vehicle is not easily detected from the air, but a vehicle reflecting light from glossy surfaces and window glass provides an easy target. Try to eliminate glare by using mud, tape, cardboard, traps, camouflage nets, or ponchos to cover headlights, window glass, and other glossy surfaces. (Figure 20).



Figure 20. Eliminate Glare

h. Use smoke/obscurants to conceal positions and movements. Also, to deceive the enemy as to mission and intent (draw attention to deception operations).

i. Operate at night or during cloudy or foggy weather as much as possible.

j. Position vehicles and facilities inside woodlines and erase vehicle tracks left outside woodlines.

3. Employ Damage Limiting Measures. A convoy is highly visible, and you should plan the convoy to limit damage in case your signature reduction efforts are not successful. Cover is the best damage limiting factor.

a. Select Natural Cover. Ditches and embankments to the sides of the road offer cover and should be used if you are attacked (Figure 21).



Figure 21. Select Natural Cover

b. Use Dispersion. One of your better damage limiting measures is the use of dispersion to lessen target density and reduce the lethal effects of the ordnance used against you. Large bombs will seldom be used against troops on the ground. Most of the munitions that air platforms deliver against vehicles must make a direct hit to be effective. Dispersing troops, vehicles, and equipment will force the attacker to concentrate on a single small target that he will likely miss. The wider the dispersion the greater the potential for limiting damage. Even area weapons become less effective if the unit is dispersed. The commander must weigh the need for dispersion against the need to stay concentrated to accomplish the mission. To achieve dispersion--

(1) Travel in an open column with 80 to 100 meters between vehicles.

(2) Divide a convoy into small units or about platoon size and send the units out separately with at least 1,000 meters between units. This procedure provides a smaller target and increases the level of control over each convoy element.

(3) Do not park vehicles in a straight line; instead, stagger the vehicles to present a poor target. Park the vehicles under cover if available. Make arrangements with the drivers so that if an attack occurs, they can (disperse) drive the vehicles to the opposite sides of the road to seek cover; for example the lead vehicle (odd numbered) is driven to the left, the second vehicle driver (even numbered) pulls off to the right, and so on (Figure 22).

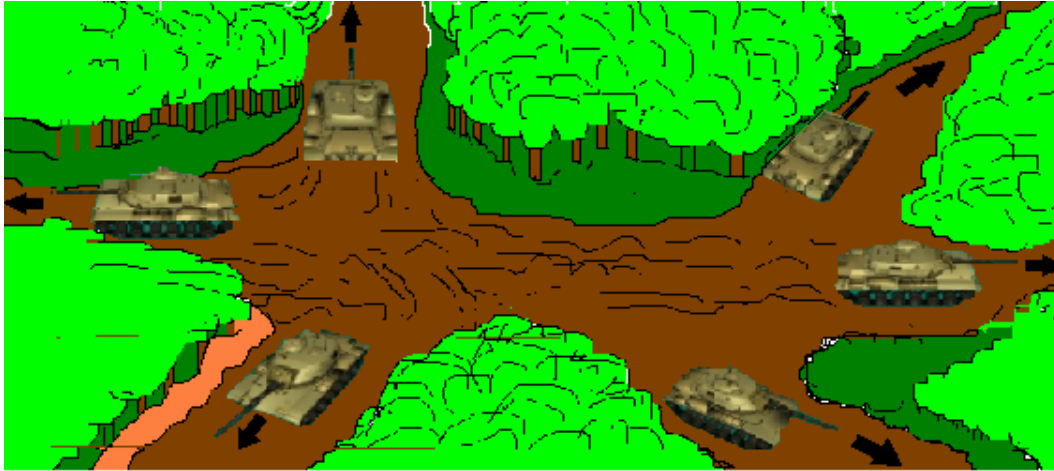


Figure 22. Vehicle Dispersion

c. Post Air Guards. Air guards will be posted throughout the column, constantly watching the skies in their assigned areas, ready to give early warning of a detected hostile aircraft. The sooner a threat aircraft is detected, the more time you will have to react. Air guards will search and scan for approaching aircraft, observing their assigned sectors. Alert the vehicle commander after sighting an aircraft by calling out, “**plane,**” and pointing to the aircraft.

d. React to Overflights. If a hostile aircraft or a flight of hostile aircraft passes over your convoy and does not attack the convoy, you will still disperse the vehicles to the sides of the road. Stagger the convoy and prepare to return fire in case the aircraft returns. If the aircraft attacks, everyone will choose the correct aiming point and fire upon command until the aircraft is hit or flies out of effective range. Small arms alone can give coverage figure 23.

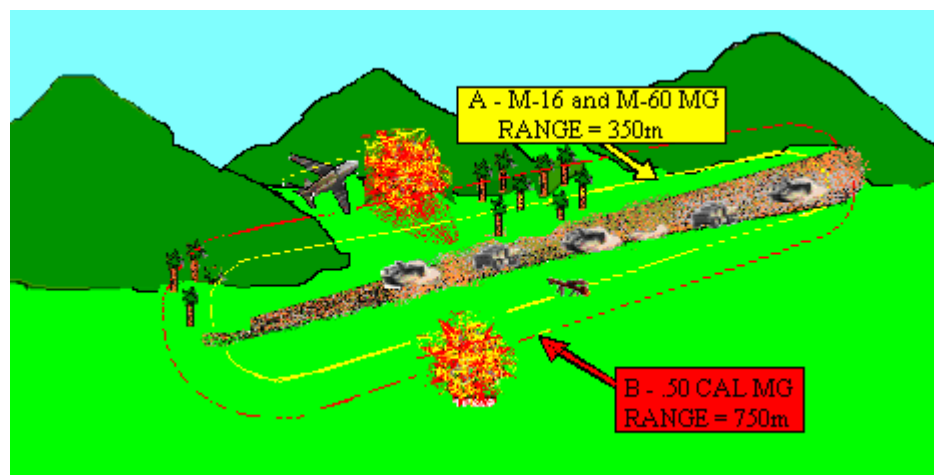


Figure 23. Small Arms Convoy Coverage

4. Employ Convoy Self-Defense Measures. In terms of vulnerability to air threats, a convoy of vehicles usually presents a lucrative target. Convoys are easily visible from the sky, and shoulder ditches or embankments restrict their freedom of maneuver. The linear array of a convoy makes command and control difficult. Convoys are high-value, hard-to-defend, easy-to-see/hit targets for enemy air. The unit must assume there is a high probability of air attack when planning any convoy.

a. Routes. Use routes that offer natural concealment. Trees and the shadows they cast offer concealment. The shadows cast by mountain ridge lines in the early morning and late afternoon also provide concealment. When crossing open country, travel should occur when the sun is high to avoid casting long, highly visible shadows. When possible, use multiple routes to reduce convoy lengths.

b. Dispersion Interval. Travel in an open column with 80 to 100 meters between vehicles. Vehicles stretched out in a long thin line in a convoy, make excellent targets.

c. Small Convoy Units. The convoy can also be broken into small platoon size units and dispatched separately with at least 1000 meters between units (use separate march units). This procedure provides a very diluted target and increases the level of local control over each convoy element.

5. Breakout Plan. Make arrangements for an attack by moving the vehicles to opposite sides of the road to seek cover: The lead vehicle goes to the right, the second vehicle pulls to the left, and so on. This technique is called "Herringbone" (see Figure 24). If possible, have vehicles drive 45 degrees off the road and move to a covered and concealed position. Establish rally points for the convoy to reassemble after the attack. In cases where not all vehicles in the convoy have radios, the unit must develop a means to signal drivers that enemy aircraft are coming. The use of protective vehicle-launched or hand grenade smoke could cause the threat air to lose weapons lock or disrupt target acquisition long enough for convoy vehicles to find suitable concealed or dispersed positions.

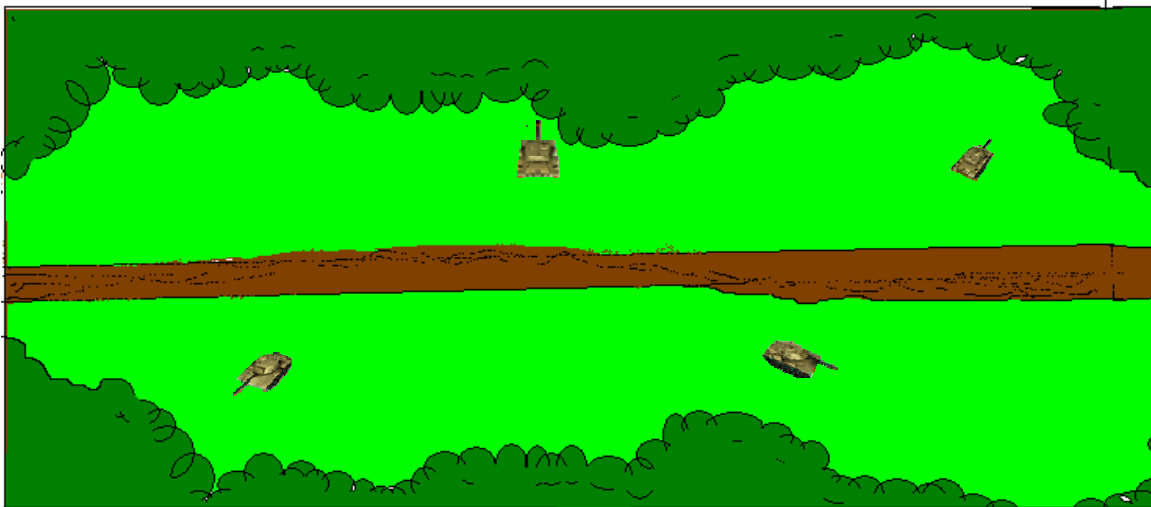


Figure 24. Herringbone

6. Integrate Air Defense Capabilities. Vehicles that have weapons effective against air threats should be integrated into the convoy every fourth or fifth vehicle if possible. Many simple, commonsense measures can be taken by a small unit to avoid attack and to limit damage if attacked.

7. Resolve Question of Firing Back or Not Firing Back. The question of whether or not to use active air defense measures when a convoy comes under attack is one for local resolution. The decision must be made before the convoy begins so that the response can be automatic-- either return fire or do not fire. *Reasons favoring a decision to fire:*

- a. Attacking aircraft may be damaged or killed by small arms fire.
- b. A pilot's awareness of being under heavy fire may cause the attack to be abandoned or, through lack of concentration, cause the ordnance to be delivered inaccurately.
- c. Personnel take a great deal of satisfaction shooting back at an attacker.

reasons to not fire are:

- a. Attack speeds will be around 300 to 400 knots, so the time that the aircraft will be within small arms range is probably not more than one or two seconds.
- b. In an open column, the distance between vehicles is so great that a large volume of fire cannot be achieved and effectiveness is decreased.
- c. Generally, attacking aircraft will not pass over your convoy within small arms range. The maximum effective range of the types of weapons normally available to you for convoy defense will probably not exceed 500 meters.

If your decision is to return fire if the convoy is attacked, then you must ensure that the troops are informed. Tell them whether to fire on their own initiative or upon command by you or their squad leader. Because the distance between vehicles will be considerable, you may elect that each vehicle crew fire on its own initiative at attacking aircraft. In this case, the vehicle pulls off the road and stops, and the crew assumes firing positions. As the attacking aircraft comes within range, the crew opens fire using the techniques explained in the *active air defense* section of this lesson. If their fire is to be controlled, the procedures are the same except that they will fire on command. Clock positions used to direct fire are referenced to the convoy's direction of travel. Specific instructions regarding air attack are a part of your briefing prior to convoy departure.

Because of equipment and personnel differences in smaller units, commanders should prepare standing operating procedures (SOP) for convoy control based on their own particular needs and available resources.

PART F - PERFORM ACTIVE AIR DEFENSE MEASURES

1. Identify Active Air Defense Doctrine. Active air defense is direct action taken to destroy enemy air platforms or reduce their effectiveness. While the first line of defense against enemy air is the constant application of passive air defense measures, commanders must prepare their units to actively engage air threats. If attacked the unit has the option of fighting back. The decision to engage hostile air platforms will include consideration of the unit's mission and tactical situation. If the enemy air platforms are outside the engagement range of the unit's weapons, a unit's most attractive option could be to seek cover.

Fighting back is active air defense, but it's not undertaken as a one-on-one activity, that is, one soldier acting independently against one air threat. Rather, it is a coordinated group response either undertaken spontaneously or under command using prescribed engagement techniques. If a unit cannot coordinate its fire, it will be ineffective and waste ammunition.

2. When passive air defense measures fail and enemy air threats are within range of organic weapons, units can conduct active air defense by shooting back. All Army units can engage enemy air threats to --

- a. Destroy the threat.
- b. Force the threat away from friendly positions.
- c. Force the threat to fly higher, so they can be destroyed by friendly aircraft or ADA.
- d. Spoil the hostile pilot's aim as they engage friendly forces.

3. Right of Self-Defense.

Your right to fire at an attacking aircraft is derived from the doctrine of self-defense. You may defend your unit from direct attack but you do not engage aircraft not attacking you except on the command of the next higher authority. Even if you are under direct attack, practical considerations bear on your decision to fire. It makes no sense at all to shoot at a helicopter attacking you from a standoff range of 3 kilometers, except perhaps with the main gun of a tank. Your decision to fire should be tempered by consideration of the capabilities of weapons you have available to you. However, there is another side to the fire decision. While your intent in firing is to kill the attacking aircraft using small arms, it will result in a low probability. However, the use of coordinated group firing, using all organic weapons to make the pilots aware that they are under fire, can disturb their concentration and cause them to miss their target or abandon their attack. The pilots should be made aware that they are under fire from the ground. Nothing is more disturbing to a pilot's concentration than flying into a hail of tracers, and if practical, tracers should be used.

4. Small arms fire against aircraft is obviously effective. A quick review of the record shows this to be true.

In the Korean War, our Air Force lost 259 jet aircraft and 285 other aircraft to combined small arms and air defense fire, which is nearly five times as many aircraft that were lost in air-to-air combat.

In South Vietnam only, we lost 410 fixed-wing aircraft, and 2,100 helicopters. In the Mideast War 36 Arab aircraft were shot down by ground fire.

Once again, fighting back is active air defense, but it **is not** undertaken as a one-on-one activity; that is, one soldier acting independently against one aircraft. It is a coordinated group response undertaken on command and executed according to previously learned techniques. If you do not coordinate your small arms fire, you may as well save your ammunition.

5. Engage Aircraft With Volume Fire. Small arms fire against aircraft is obviously effective. To engage aircraft effectively, you must follow some basic rules. The first rule to follow is to use a technique known as “**volume fire**”. The key idea is to fill the air in front of the enemy aircraft with as many bullets as possible; accuracy is not important. If everyone fires at once, you increase the chances of hitting the aircraft. Even if you do not hit the aircraft, you may cause the pilot to miss the target or climb to a higher altitude where he is less effective and subject to air defense weapon systems (Figure 25).

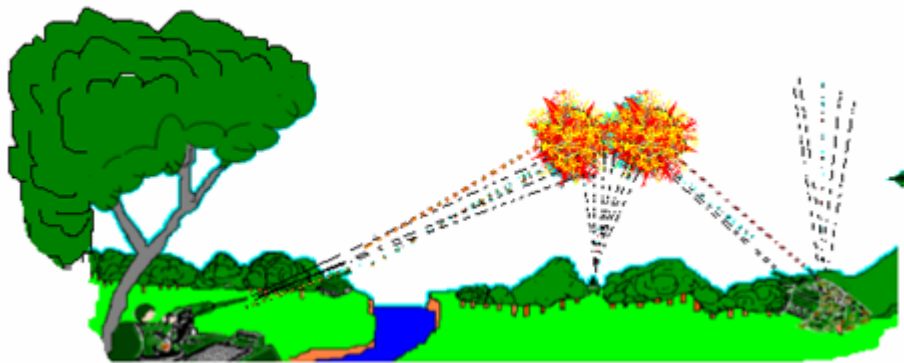


Figure 25. Volume Fire

Let's make one of the most important points about volume fire clear right now. Once you estimate the lead distance, **aim at the estimated aiming point** and **fire at that single point** until the aircraft has flown past that point. **Maintain the aiming point, not the lead distance**. Once you start firing, **do not adjust your weapon**. The rules for selecting aiming points are simple, logical, and easily learned and retained.

6. Engagement Principles. The decision to fire is the unit commander's and is based on his judgment of the situation. The techniques for delivering fire are standard. Volume fire is the key to effective small arms fire against air threats. *Every weapon (M16, M60, M246, M2), must be used to engage the target with the goal of placing as many bullets as possible in the enemy's flight path.* That does not mean that everyone fires in some random direction. Instead, each individual selects an aiming point in front of the target and fires at that point. This aiming point is determined using the football field technique.

a. Football field technique.

The football technique is a simple method of estimating lead distance. The theory is that most people have played or watched football and have a concept of how long a football field is. When told to lead the target by one football field, everyone aims at approximately the same point in space. One person's error in making the football field estimate will be offset by another person's error. The variation in aiming points will ensure that massed fire is delivered into a volume of space in front of the target rather than on a small point. Also, the differing perspectives from which the soldiers view the target will act to further distribute the fire over a volume of space. Figures 26 and 27.

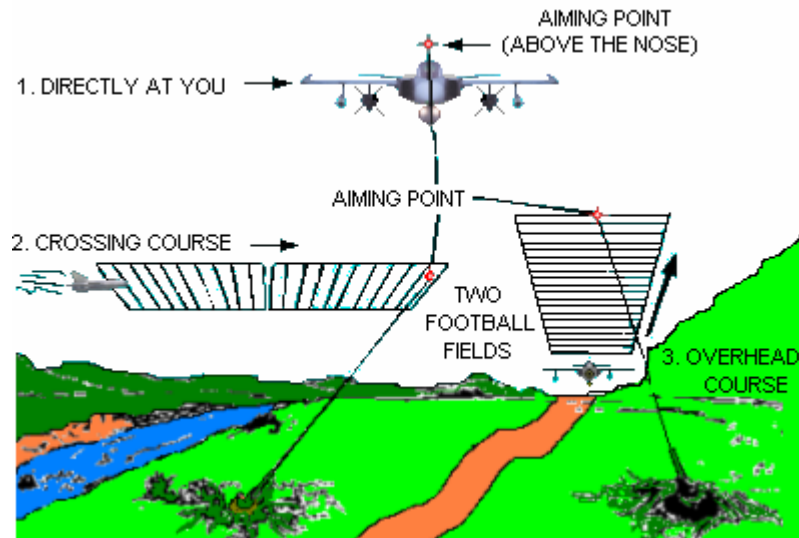


Figure 26. Jet Aiming Points

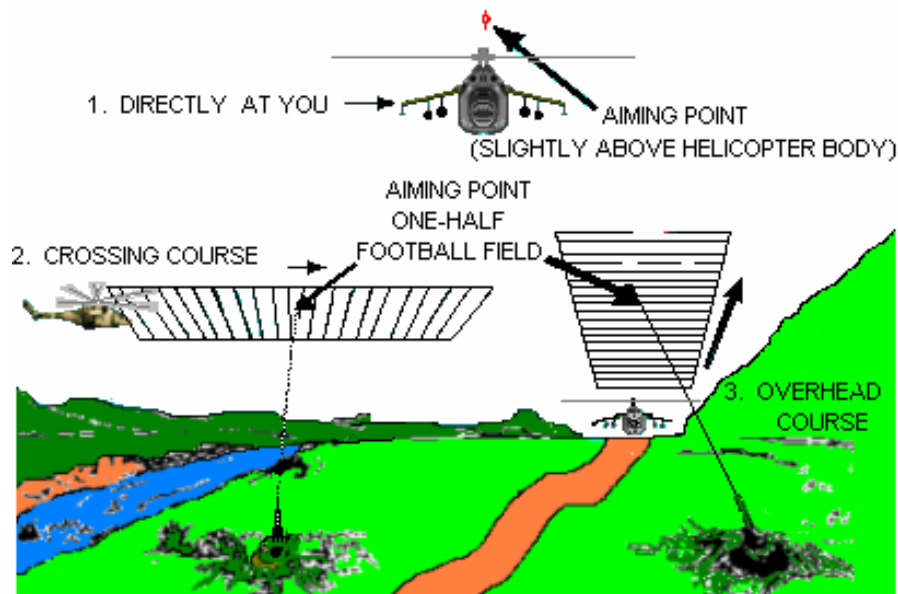


Figure 27. Helicopter Aiming Points

b. Aiming points.

Aiming points for jets and helicopters are depicted in Figures 6-2 and 6-3. Cruise missiles, if detected, should be engaged using the jet aim points. UAVs should be engaged using the helicopter aim points. The rules for selecting aiming points are simple, and easily learned and retained. The various aim points are summarized in table 2.

TYPE AIRCRAFT	COURSE	AIMING POINT
JET/CRUISE MISSILE	CROSSING	2 FOOTBALL FIELDS IN FRONT OF AIRCRAFT NOSE
JET/CRUISE MISSILE	OVERHEAD	2 FOOTBALL FIELDS IN FRONT OF AIRCRAFT NOSE
JET /CRUISE MISSILE	DIRECTLY AT YOU	SLIGHTLY ABOVE AIRCRAFT NOSE
HELICOPTER	HOVERING	SLIGHTLY ABOVE HELICOPTER BODY
HELICOPTER/UAV	DIRECTLY AT YOU	SLIGHTLY ABOVE HELICOPTER BODY
HELICOPTER /UAV	CROSSING	1/2 FOOTBALL FIELD IN FRONT OF NOSE

Table 2. Aiming Points

7. Select Reference Points. The selection of reference points, when used, must be made well in advance of an enemy air strike. From your position, select an object two at a football field distance which will be in the suspected avenue of approach of an enemy aircraft. "Eyeballing" that path, select another object at the half football field distance. When an enemy aircraft is sighted, you will fire at the appropriate reference mark when the aircraft is in the proper location. Remember to do this for each suspected avenue of approach and from each position around your perimeter.

8. Identify Firing Positions. Except for the prone position, the rifleman's basic firing positions stay the same (Figure 28). Firing at aircraft when lying down, means the firers are lying on their backs (supine), aiming their rifles into the air. It will not take you long to learn to fire from some kind of cover and concealment, no matter how small. If you are in a fighting position (foxhole), stay there and return fire from the supported standing position. If you are not in a firing position, you should look for a tree, a large rock, or something to help support the weapon and provide protection.

a. You can use all the basic firing positions for air defense except the prone position. Instead, use the reverse position; lie on your back (supine) and point your weapon upward.

b. Always take cover when available. If you are in a fighting position--stay there. Assume a supported standing position and return fire. A bipod on the M16 rifle assists you in firing your weapon more effectively at hostile aircraft.

c. If cover and or concealment is fairly good, use the high-kneeling position. If the cover and or concealment is less substantial, use the low-kneeling position.

d. The M60 machine gunner will also fire from a protected position if possible. The gunner needs to get the weapon up in the air. He can hold it up or use some support such as a tree limb. In an emergency, another soldier can act as a hasty firing support.

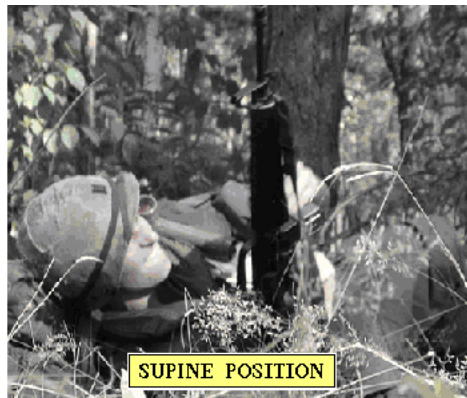


Figure 28. Basic Firing Positions

9. Select Reference Points. The selection of reference points, when used, must be made well in advance of an enemy air strike. From your position, select an object two at a football field distance which will be in the suspected avenue of approach of an enemy aircraft. “Eyeballing” that path, select another object at the half football field distance. When an enemy aircraft is sighted, you will fire at the appropriate reference mark when the aircraft is in the proper location. Remember to do this for each suspected avenue of approach and from each position around your perimeter.

10. Analyze a Practice Sequence of Engagement. A coordinated, high volume of fire will get results; precision is not important. Fire is delivered on command and not at the option of the individual soldier. The sequence of engagement might be as follows:

- a. An aircraft commences an attack on your unit.
- b. You, or the air sentries spot the attacker. In either event, you are alerted to the attack and decide to engage the target.
- c. You alert the unit. For example, “*Air attack, inbound 5 o’clock, prepare to fire*” (Table 1 on page 14 lists the methods of giving alarms).
- d. Each member of the unit prepares his weapon to fire by placing the weapon in full automatic mode. He locates the target, finds his aim reference point as determined by the rules (Table 2), and waits for your command to fire.
- e. You estimate the right moment and give the command “*Fire*”.
- f. Each individual fires at the aiming point until he expends his ammunition, or you order “*Cease Fire*”. Everyone immediately reloads and prepares to engage follow-on attackers.

PRACTICE EXERCISE

1. Which of the following listed conditions best describes your authority to return fire if an air platform is attacking your position?
 - a. When higher headquarters has directed you to return fire.
 - b. The aircraft has been identified as hostile.
 - c. The right of self-defense is never denied.
 - d. Your commander has authorized the use of force.

2. A soldier can use most basic firing positions when engaging an air platform. The prone position is modified to_____.
 - a. The standing position.
 - b. Lying on the back (supine) position.
 - c. A fighting position (foxhole).
 - d. The High-kneeling position.

3. When the order comes to engage an air platform, who should fire their small arms at the air platform?
 - a. Designated personnel.
 - b. Selected squads.
 - c. Machine-gun personnel only.
 - d. All soldiers in the unit.

4. From what source does a unit commander normally receive early warning of hostile air platforms before he visually sees the air platform?
 - a. Air guards posted throughout the convoy.
 - b. Higher headquarters.
 - c. Air defense warnings.
 - d. Area air defense commander.

5. The greatest danger of air attack your unit faces usually comes_____?

- a. When little or no cover is available.
 - b. In the early morning.
 - c. Late at night.
 - d. In a bivouac area.
6. High-performance aircraft operating in a ground attack role are normally directed against _____ targets.
- a. Stationary.
 - b. Moving.
 - c. Preplanned.
 - d. Opportunity.
7. What is the correct response when your convoy suddenly comes under an air attack?
- a. Continue the road march, but return fire.
 - b. Quickly dismount from your vehicle and seek cover.
 - c. Stagger the vehicles and disperse to the sides of the road.
 - d. Have the convoy stop and everyone return fire.
8. Primary aerial threats include fixed wing, rotary wing, UAV, etcetera. The most common of these air threats is the _____?
- a. Rotary wing.
 - b. Fixed wing.
 - c. UAV.
 - d. High performance.

9. What is the key to effectively engaging air platforms with small arms?
- a. Selecting the proper aiming point.
 - b. Choosing a firing position that offers unobstructed view.
 - c. Filling the air with as many bullets as possible.
 - d. Aiming and firing your weapon at the center of mass.
10. In a convoy every vehicle should have an assigned air guard. Any soldier in the convoy can be assigned as air guard except the_____.
- a. Convoy commander.
 - b. Vehicle driver.
 - c. Squad leader.
 - d. Dedicated gunner.

ANSWERS TO PRACTICE QUESTIONS

<u>Question</u>	<u>Answer</u>	<u>Reference Page</u>
1.	c.	28
2.	b.	32 & 33
3.	d.	29 & 34
4.	d.	12
5.	b.	3
6.	c.	6
7.	c.	24
8.	c.	3
9.	c.	29
10.	b.	15