

## Chapter 5

### ALL ARMS AIR DEFENCE (AAAD)

#### INTRODUCTION

**0501. Use.** AAAD is not part of standard training but can become part of the surge training prior to operational deployment and is taught on some courses in the UK.

**0502. Aim.** The aim of this chapter is to provide guidance on the operation of a range to be used for AAAD training.

**0503. Associated Publications.** The training pamphlets shown in the associated publications section as References AI-AL have sections that cover the mechanics of using each of the weapons in the AAAD role. All Services are to follow these pamphlets. In Reference AM there is a section dealing with the setting up of a range for AAAD firing.

**0504. Principles.** It should be noted that the above mentioned pamphlets do not cover the principles of AAAD, which are contained in Chapter 23 of Joint Warfare Publication 3-63.1. It is important to take into account the threat categories contained in this publication as these should dictate the type of live firing training that is planned and conducted.

**a. The Fighter Ground Attack (FGA) Threat.** It should be noted that the likelihood of hitting a FGA aircraft with small arms fire is remote. The speed of the target, the engagement distances and the stand-off ranges of modern ground attack weapons all mitigate against hitting the aircraft. However, AAAD fire may be able to prevent the attacker from achieving his aim by breaking up the attack profile.

**b. The UAS Threat.** Sensor carrying UAS are a real-time threat to ground forces and may need to be countered as soon as possible where small arms fire is known to be effective. It should also be noted that some larger UASs have the capability to carry and launch munitions. A UAS flying a fixed pattern between way-points is a reasonable target for small arms engagement.

**c. Helicopter Threat.** Troop and attack helicopters present differing threats to ground forces and highlight the need for a comprehensive Air Defence plan and the importance of fire control. Both types of helicopter are vulnerable to small arms fire.

#### GENERAL

**0505. Control.** The key safety requirements for an AAAD live firing practice are control of the target and control of the firer. For small arms to be effective against aircraft and UAS, it is necessary to engage the target with the maximum number of weapons. Control, therefore, is crucially dependent on positioning the target within a safe engagement arc and ensuring that the safe arc limits are clear to the firers. Arc markers must be placed in a prominent position so that they are visible at all times, bearing in mind that firers and supervisors will be looking upwards at targets.

**0506. Weapon Types.** A wide variety of weapons could be used for AAAD firings but realistically there are three broad groups that should be permitted on ranges:

- a. **Shoulder Fired Small Arms.** Examples are 5.56mm and 7.62mm rifles and machine guns (MG). These require the greatest level of supervision to ensure that each firer in a tactical group/unit remains within arcs and safe engagement limits.
- b. **Pintle Mounted Weapons.** Examples are 7.62mm and .05in MG bolted on to vehicle mounted bars or rings. Consideration may be given to the use of physical 'stops' to limit azimuth and elevation. Supervision of each weapon system will be required.
- c. **Turret Mounted Weapons.** Examples are 7.62mm chain gun and 30mm Rarden cannon. Where possible stops should be employed to limit traverse and elevation.

### THE RANGE

**0507. The Range.** All Arms Air Defence (AAAD) firings may take place on any range that can contain the weapon and target WDA templates. It should be noted that in the case of a UAS target there may be additional requirements in order to meet the MoD duty of care but these will be contained within the UAS flight operating instructions.

**0508. Establishing the Danger Area.** For a detailed explanation of how to apply the WDA template to the allowable danger area see Reference B.

**0509. Firing Over the Heads of Troops.** In theory, with sufficient protection, this is possible, however in practice it is difficult to organise and control. It would normally only be considered when realistic training in a combined arms setting is a priority. Advice should always be sought, through the Chain of Command, from the relevant Competent Authority. Troops in front of other weapon systems may have to contend with noise, blast, flash, debris and toxicity in addition to other more direct hazards.

**0510. Firing From Ships.** The Royal Marines and embarked Service personnel from Army and RAF Units may require to test weapons or procedures in the AAAD role from ships. Despite the absence of a defined range area and the ad hoc nature of such firings the SMS and practice should be as for a land to air range.

**0511. Night Firing.** This should not be undertaken without the right level and quality of night observation equipment. Control of the firers both in terms of position and orientation is essential as is the clear marking of firing arcs.

**0512. Target Types.** Aerial targets can be mobile or static. For most AAAD training a mobile target will be required but there are occasions when a static target can give a better representation of the attack profile, e.g. for helicopters. The following can be considered for use as targets for AAAD firing:

- a. UAS.
- b. Towed Targets.
- c. Helicopter pop-up targets.
- d. Illuminating rounds from Mortars/Artillery.

**0513. UAS Safety Constraints.** If hit when making an engagement run directly towards the firers a target UAS can become a ballistic projectile. If the command system is damaged in such circumstances then it becomes possible for the UAS to crash into the firing point. The WDA applied for the target must take this into account but as a consequence the UAS may only be able to operate at ranges beyond the effective engagement range for shorter range small arms. Therefore, a UAS engagement run for such weapons is likely to be parallel to the firers and a sufficient distance away that if damaged it cannot turn into the firing line. However, if it is necessary for the firer(s) to practice against head-on targets overhead protection measures may be necessary or an increased risk may have to be accepted.

**0514. Target Profiles.** There are essentially two types of UAS and towed target profiles:

**a. Crossers.** Most targets will be engaged as crossers. This requires careful placement of and strict adherence to fixed firing arcs. Where there is a mix of weapons available in a firing unit it may be possible to match the target profile to the respective optimum ranges for the engagement. Thus, initial engagement could be by 30/40mm cannon, gradually decreasing down to shorter range weapons such as MG and rifle.

**b. Head-on.** Control of fire within arcs is easier with a head-on profile but the engagement height cannot be kept as a constant and the risk of the target impacting with the firing point is increased. For the heavier calibre weapons this should not be a problem as turret mounted weapons are usually on armoured vehicles which can provide a measure of protection if a target comes down over the firing point.

**0515. Other Targets.** Further detail is contained in Chapter 7.

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