

Chapter 7

TARGETRY

INTRODUCTION

0701. The airspace above the range is not exclusive to the MoD user of the range and Reference Q which deals with air regulations should therefore be read in conjunction with this JSP. In broad outline, Reference S regulates for all activities on range except where the airworthiness of a UAS is involved.

0702. Aim. The aim of this chapter is to give guidance on the use of the different types of target that may be deployed on ranges for GBAD firings.

GENERAL

0703. Pyrotechnics Storage. UAS targets offer a number of flare and chaff options. Reference H gives the MOD regulations for explosive storage on the Range. The EMC environment must also be considered.

0704. Range Airspace Incidents. Any Airspace incidents, either by intruder aircraft or by the Target UAS leaving the Range ADA must be reported in accordance with Chapter 2, Annex B.

TARGETS

0705. Types. The main divisions for targets are shown below:

- a. UAS.
- b. Small UAS operating under CAA model aircraft rules.
- c. Towed Drogues and Sleeves.
- d. Ballistic Targets (shells and rockets).
- e. Flares and Parachute Illuminating rounds.
- f. Ground based pop-up Targets (normally for Helicopter profiles).
- g. Synthetic Targets.
- h. Static hard targets (for GBAD ground to ground firings)

UAS

0706. Definition¹⁴. A UAS is defined in Part 1 Chapter 6. In general terms it:

- a. Is capable of sustained flight by aerodynamic means.
- b. Is remotely piloted or automatically flies a pre-programmed flight profile.

¹⁴ See Reference A4

- c. Is reusable.
- d. Is not classified as a guided weapon or similar one shot device designed for the delivery of munitions.

0707. UAS Airworthiness. Reference T describes the principles and the policy for the regulation of the airworthiness of UK Military aircraft. It is MoD policy that the operation of a UAS should be no more likely to cause injury or fatality to personnel or the general public than the operation of a manned aircraft. The design criteria for a particular UAS is to take into account its intrinsic safety, its mode of operation and the environment in which it operates. The criteria applies to all UAS whether operated by the Services or appointed contractors. This policy is amplified in Annex B of Reference T which takes precedence over JSP 403 for all airworthiness issues.

0708. Military Aviation Policy. The regulations and directives are outlined in Reference Q, the preface outlines the flying regulation and aircraft operating authority.

0709. The SMS for the UAS. The SMS must conform to the requirements of Reference Q and operate as described in Part I, Chapter 6 of this JSP. There is no size limit to the target and therefore even small UAS must have a Military Aircraft Release (MAR) and the generic type must have a tail number. This allows for cannibalisation of parts but ensures that configuration control and hence airworthiness is maintained.

0710. Release To Service Authority (RTSA). In accordance with Reference T the RTSA is the delegated HQ that holds the Safety Case and is responsible for the UAS SMS. Operational control of the system may be held by another HQ, (the Aircraft Operating Authority (AOA)) but the RTSA is responsible for the airworthiness of the UAS in training

0711. The SMS for the ADA. There is the same four tiered approach to the SMS as outlined in Chapter 2, paragraph 0221.

0712. Operating Advice. DOSG will provide advice on:

- a. Range Safety and Safety and Suitability for Service for the UAS – which will take into account the MAR and Reference T.
- b. The interface between the contractor and Range Control.
- c. The inspection regime.
- d. The WDA for the operation of the UAS.

0713. Small UAS Operating under CAA Model Aircraft rules. There are currently no small targets operated by the Services, however, there are small sensor UASs that can be operated under CAA CAP 69 rules for model aircraft (Reference AH). It may be possible to use these regulations for a small target should one be procured at any stage.

0714. Chase aircraft. In the unlikely event of UAS being permitted to cross into general airspace they are required to observe the 'Sense and Avoid' rule of the air. One solution is to use a chase aircraft that reports to the UAS operator what the UAS

is doing. In addition the chase aircraft acts as a radar image in close proximity to the UAS.

TOWED DROGUES AND SLEEVES

0715. Towed Targets. The modern towed target has a height keeping mode so that the target can be programmed to maintain height from sea skimming to high level as required. The target may be towed by manned aircraft or by a larger UAS.

0716. The RN and RAF also use targets towed by manned aircraft under a Service contract with a civilian contractor (Flight Refuelling Aviation). This contract is administrated by HQSTC SO1EWTD. Day to day operations are controlled by OC JSATO at RNAS Yeovilton. Other than sleeve targets, there is no overland capability under this contract

BALLISTIC TARGETS

0717. Use. The RN is the only Service that uses ballistic targets for surface to air missile firings.

0718. Radar Controlled Engagements. A shell is a very small radar target and is moving at considerable speed. It is entirely predictable in its trajectory and therefore a simple target provided the weapon radar can pick out the moving shell. The trajectory of the shell must not cross directly overhead of the firing point. It should be noted that the shell is travelling above the speed of sound for most of its flight and therefore is likely to be well beyond the designed acquisition and engagement limits of most VSHORAD Systems. In addition the radar reflective cross section of a shell is very small for head-on/tail shoots.

FLARES AND ILLUMINATING ROUNDS

0719. Hand held flares. Historically, these flares have been used as targets but they are essentially static, apart from wind drift, and serve mainly as an aiming point.

0720. Mortar and Artillery Illuminating Shells. The flares on parachutes are also essentially static, apart from wind drift, but as targets they do have the advantage of being able to be placed at variable engagement ranges.

GROUND BASED POP-UP TARGETS

0721. Helicopter Targets. Some surface to air ranges, e.g. in Poland and Canada, operate simple pop-up targets based on a vertically swinging gantry. They are used to represent the fleeting helicopter threat. They are not suitable for larger GBAD missiles because of the damage that can be caused to the target armature. The potential for ricochet must also be considered.

0722. Ground Targets. Moving and static tank targets can be adapted to simulate a variety of GBAD ground to ground or low level scenarios. However, it should be noted that the electronics involved with such targets are both expensive and vulnerable to proximity warheads.

SYNTHETIC TARGETS

0723. Synthetic Targets. The Synthetic Target Injection Device (STID) is available for firings at the GBAD range in the Outer Hebrides where it is built in to the firing points. It is currently only available for RAPIER missile firings.

STATIC HARD TARGETS

0724. These targets are normally used for AFV firings but can be used in the GBAD ground to ground role and for proof firings on appropriate TERP ranges. There are two additional risk factors to be considered when using these targets for GBAD weapon systems:

- a. **Ricochet.** Hard targets usually consist of heavily armoured vehicles that were designed to deflect anti-tank rounds. There is a significant risk of ricochet.
- b. **Debris.** Hard targets are shot at until complete destruction and as they deteriorate there is a risk of significant debris being thrown up on impact.