

Chapter 3

FIXED WING AIR TO SURFACE ENGAGEMENTS

GENERAL

0301. **Aim.** The aim of this chapter is to detail the procedures for the planning and conduct of fixed-wing (FW) engagements on Defence Land Ranges.

0302. **Lead Service.** The lead Service for co-ordinating the joint service procedures for FW engagements is the RAF. The sponsor for Chapter 3 of JSP 403 Volume III is HQ 1Gp (SO2 Ranges).

0303. Air weapons training by FW aircraft is only to take place in approved danger areas, which are classified as follows:

- a. Permanent and scheduled danger areas that are allocated a danger area number and may be subject to UK byelaws.
- b. In exceptional circumstances, a temporary danger area may be authorised at Command level.
- c. Air-to-surface firing over the sea in other than designated ranges must be conducted in accordance with single Service regulations.

0304. Engagements must be conducted in accordance with the relevant Range Orders and Unit Flying Orders, whichever is the more stringent. Range firing must be carried out under the authorisation of the Range Safety Officer (RSO) or Range Safety Officer (Air Traffic Control) (RSO(ATC)).

SAFETY

0305. The safety of personnel, property and livestock is paramount. The ultimate responsibility for the safe delivery of weapons remains at all times with the aircraft commander. The following procedures are to be adhered to:

- a. **Range Preparation.** Before he allows range operations to begin, the RSO/RSO(ATC) is to ensure that the range is clear of people, livestock, shipping and aircraft. He is to ensure that all warning devices are displayed or illuminated. Where the range has a land or shore area, the RSO/RSO(ATC) is to ensure that a suitably equipped vehicle with driver is available for crash rescue duties, either at the main tower or within the range area.
- b. **Clear Range Procedure.** Steps are to be taken, in so far as is reasonably practicable, to ensure that the Range Impact Area/Zone and the airspace through which any weapon or store is liable to pass, is clear of unauthorised personnel, livestock air or sea traffic. The RSO/RSO(ATC) is to ensure that clear range procedure is observed at all times. He may use sentries, vedettes, radar, EO devices, closed circuit television surveillance, or a combination thereof to satisfy clear range procedures. He is not to authorise an attack if the target danger area for that attack is fouled and is to order the aircraft Commander to discontinue an authorised attack if the area is subsequently fouled. On air to sea ranges, the Commander of the attacking aircraft or leader of the aircraft formation normally carries out the duties of RSO/RSO(ATC). The civilian Master

of a towing vessel is not qualified to undertake clearance procedure; he can only advise the aircraft Commander of shipping fouling the range. Notwithstanding this, MOD Instructions to the contractor's Masters clearly place on them a responsibility to warn the pilot when an aircraft is apparently about to attack the wrong target. Aircraft Commanders have ultimate responsibility for ensuring that clear range procedures are adhered to during a range detail.

c. **Ballistic Safety Traces.** Hazard Impact Area Traces (HIATs) are recommended and approved by the Air Weapons Ballistic Committee and authorised for use by HQ 1Gp (SO2 Ranges). FW weapon events are only permitted if the weapon, any associated furniture, the ricochet boundary and the explosive risk area will impact within the Range Impact Area/Zone. In exceptional circumstances, subject to Command approval, the ricochet boundary may lie outside the published surface danger area over the sea with Clear Range Procedure enforced.

d. **Laser Safety.** Laser Safety clearances for specific target attack profiles are approved by the Laser Safety Review Panel (LSRP) of the MLSC and are implemented by HQ 1Gp (SO2 Ranges). Specific Range clearances are detailed within Reference Y. Targets are not to be attacked with laser, ground or airborne, unless a current clearance exists.

e. **T&E Ranges.** See Volume I, Chapter 10 of this JSP.

RANGE CONTROL

0306. All FW air-to-surface engagements are to be under the tactical control of a RSO/RSO(ATC)/FAC or current aircrew member.

a. **RSO/RSO(ATC).** The RSO/RSO(ATC) is the person who has overall responsibility for the safe execution of a particular range detail. On dedicated Air Weapons Ranges (AWR) this duty is performed by the RSO(ATC). The RSO(ATC) is to be an officer or SNCO of the Air Traffic Control Branch who holds a minimum endorsement of TC (AWR). The RSO(ATC) is responsible for the co-ordination of the practice should more than one aircraft be operating on the range. In addition to Command orders, the RSO(ATC) is responsible for:

- (1) The maintenance of flying discipline in so far as it affects the conduct of weapons exercises over the range.
- (2) The maintenance of a range log book.
- (3) Cancelling or postponing any exercise if for any reason he considers the activity would be dangerous or unproductive.
- (4) Taking appropriate action in the event of an anomalous occurrence.

b. **Requirement for RSO(ATC).** The RSO(ATC) is to be employed when:

- (1) Air to surface weapons training takes place at a dedicated AWR.
- (2) Participating aircraft will require integration, separation or holding.

c. **Forward Air Controllers (FAC).** On tactical ranges, weapons release clearance may be given by a suitably qualified FAC whose logbook is endorsed "AWRSO" by the

JFACTSU Supervisory AWRSO. If only one aircraft is scheduled upon the range, a current aircrew member from the user unit may issue release clearances.

- d. **DE&S/TEST Ranges.** The contractor exercises control in accordance with the relevant Range Standing Orders and where appropriate the Trial Specification.

GENERAL ORDERS FOR AIRCREW

0307. Each range operating authority is to promulgate any additional orders necessary for the safe operation of its aircraft and ranges.

0308. **Knowledge of Orders.** Squadron Commanders are to ensure that all aircrew taking part in air weapon sorties are fully conversant with the contents of JSP 403 Volume III and any additional operating authority orders (e.g. Reference Y). They are to ensure that aircrew sign as having read and understood the orders on the following occasions:

- a. On arrival at the unit.
- b. Immediately after the incorporation of an amendment.
- c. Annually

0309. **Selection of Switches to LIVE and Release of Ordnance.**

- a. Armament switches are to be kept in a SAFE condition until:
 - (1) The aircraft is within the air danger area.
 - (2) Any weapon released from the aircraft deliberately or accidentally will impact within the WDA/Z.
- b. Switches are not to be selected to LIVE before a clearance has been received from the RSO(ATC) or the FAC.
- c. Switches are to be selected SAFE immediately after each weapon event.

0310. **Lasers.** Non-eye safe lasers are to be treated as live weapons: as directed, diffuse, wet target and specular laser reflections can be dangerous. Laser orders are in Chapter 2. Laser incidents are to be reported using the format at Chapter 2 Annex B.

COMMUNICATIONS AND CONTROL

0311. Radio calls are to be in accordance with JSP 552. Radio calls are classified as mandatory or advisory.

- a. **Mandatory Radio Calls.** The following radio calls are mandatory:
 - (1) Joining the range pattern, requested by aircraft captain, giving call-sign, number and type of ac, booked or bootleg, TOT, event and target.
 - (2) Clearance to join, given by RSO/RSO(ATC) with call-sign, clearance to join, pressure setting, surface wind and range state.
 - (3) Clearance to deliver weapons is given by RSO/RSO(ATC)/FAC.

- (4) Informing aircraft of no impact observed which is given by RSO/RSO(ATC).
- (5) Informing aircraft they have been adjudged to incur a foul is given by RSO/RSO(ATC).
- (6) Confirmation that aircraft armament switches are SAFE on departure is given by aircraft Commander.
- (7) STOP-STOP-STOP call to stop a weapons delivery can be give by any party on the range frequency; however it is normally given by RSO/RSO(ATC)/FAC.
- (8) Passing of essential traffic information and precautionary warnings will be given by RSO/RSO(ATC).
- (9) Calling 'downwind last pass' is given by aircraft Commander.
- (10) The use of laser.

b. **Advisory RT.** It is only advisory that the following information is transmitted:

- (1) The aircraft passes the aircraft position in range pattern.
- (2) Weapon scores may be given by RSO(ATC) when aircraft is established downwind.

c. **DE&S/TEST Ranges.** On DE&S/TEST Ranges, additional RT may be required in accordance with the relevant Trial Specifications.

0312. Loss of Communications. An aircraft that loses communication with range control, regardless of who has suffered the communications failure, is to depart the range. Prior to departure, the Commander may fly slowly between the target and the control tower, rocking his wings to signify communications failure. Should the range lose all external landline communications, the RSO(ATC) may elect to continue a range detail if more than 2 aircraft are in the pattern. When all RT Communications have been lost the RSO(ATC), on dedicated AWR, may use an Aldis Lamp to pass the following instructions to aircraft in the range pattern:

- a. A RED light indicates that all aircraft are to select switches safe and depart the range.
- b. A WHITE/YELLOW light indicates that all ac are to select switches safe and remain in the pattern.

ANOMALOUS OCCURRENCES

0313. Normally, the first indication of an anomalous occurrence will be a report of an unobserved or wide weapon. The cause will usually be due to a hang-up, irregular release, inadvertent release or gross aiming error. A wide weapon is one where the impact point relative to the desired point of impact is outside the following parameters:

- a. Low & High Angle Dive and Laydown (visual and EO). - 750ft
- b. Radar laydown and Reversionary Attack - 1750ft

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- c. Loft/Toss . - 3000ft
- d. Medium and High Level Bombing .- 3000ft
- e. Outside range boundaries irrespective of miss distance.
- f. Laser failing to track/remain on target.

0314. Immediate Actions. The RSO/RSO(ATC) is to:

- a. Log full details and inform the Range Commandant/Officer Commanding or Site Head.
- b. Where the weapon has fallen outside the surface danger area on to land, he is to send personnel to locate the weapon and initiate any necessary safety precautions.
- c. Where death/injury to persons/livestock, or damage to property, has been caused, he is to close the range and render assistance as appropriate.
- d. If the weapon could endanger shipping, he is to inform the nearest RN authority.
- e. Inform HQ Parent Command immediately by telephone in the event of death, injury, damage to property, irregular release, inadvertent release or hang up (except practice bombs).

0315. Aircrew Immediate Actions. Following an anomalous occurrence, aircrew are to:

- a. Avoid over-flying populated areas (or pointing at populated areas if a forward firing weapon is involved) and remain within the Air Danger Area while executing b to d below.
- b. Note all armament switch positions.
- c. Make all armament and laser switches safe.
- d. Inform the RSO/RSO(ATC) confirming weapon type.

0316. Subsequent Actions – Hang-Up.

- a. **Practice Bomb.** A further attack may be made using normal procedures. If a second hang-up occurs, the particular station/pylon is to be de-selected and the range detail may be continued using other weapon stations.
- b. **Other Configurations.** For all other weapon hang-ups, an inspection fly past may be made over the range at the discretion of the RSO(ATC) followed by a pass to initiate jettison if required. Should the inspection reveal that the suspected weapon is not present, the occurrence is to be reported as a wide weapon. Where jettison at the range is not possible, the Commander is to attempt to jettison over sea within a designated range danger area using clear range procedures. The aircraft may then return to the range for a confirmation inspection fly past if required.
- c. **Unsuccessful Jettison.** In the event of an unsuccessful jettison, the sortie is to be

discontinued and the Commander is to take all necessary action to minimise the risk of further hazard. During the transit and recovery, the Commander is to avoid overflying populated areas. The track flown is to be noted and, if possible, a second aircraft is to provide escort. Armament engineering personnel should meet the aircraft after landing.

0317. Subsequent Actions – Irregular Release. An irregular release indicates a weapon system malfunction. The sortie is to be discontinued and, in addition, aircraft Commanders are to act in accordance with JSP 550.

0318. Subsequent Actions - Inadvertent Release. Following an inadvertent release, and at the discretion of the RSO(ATC), the range detail may be continued if the cause can be identified and its repetition avoided. If the occurrence is repeated, the range detail is to terminate (this does not necessarily mean the sortie is to be discontinued).

0319. Subsequent Actions – Gross Aiming Error. In the case of a wide weapon caused by gross aiming error, the range detail may be continued provided the Commander/crew carry out a dry familiarisation run first. If the occurrence is repeated, the range detail is to terminate.

0320. Subsequent Actions - Discontinued Sortie. When a sortie is discontinued, the Commander is to take all necessary action to minimize the risk of further hazard. He is to avoid overflying populated areas during his transit and recovery. In addition, he is to inform ATC of his problem and is to request armament engineering personnel to meet his ac upon arrival at his destination.

0321. Anomalous Occurrences – Reporting Procedure. In the event of an anomalous occurrence, the RSO (ATC) is to submit a signal report within 12 hours using the format at Chapter 2, Annex E. Commanders are to submit a signal using the format at Chapter 2, Annex D if the weapon impact is outside the Range Danger/Impact Area/Zone, if required by HQ Air or as required by the following:

- a. **Death/Injury to Persons/Livestock or Damage to Property.** Whatever the circumstances of release Commanders are to submit a signal report within 2 hours of landing.
- b. **Irregular/Inadvertent Release or Hang Up.** Commanders, in consultation with armament engineering staff, are to submit a preliminary signal within 12 hrs of landing. In the case of an irregular release, the RSO(ATC) is to submit a report within 12 hours of the occurrence. Armament engineering staffs are to report the results of an irregular release investigation.