

## Chapter 2

### AIR TO SURFACE RANGES

#### INTRODUCTION

0201. **Aim.** The aim of this chapter is to define the responsibilities of the range organisation when involved in the conduct of air to surface practices and to define the interface between the Range Staff and the Practising Unit.

#### THE RANGE

0202. When used for air to surface firing practices the range is to be established and operated in accordance with the range management system specified in Volume I of this JSP. Essentially, the range is to conform with the following provisions:

- a. **Authorisation.** The Range Authorising Officer (RAO) will approve a list of air to surface firing activities on the Range Authorising Certificate (MOD Form 904). The categories of weapon systems and any restrictions on munitions will be listed on the MOD Form 904 and re-stated in the Range Standing Orders.
- b. **MOD Form 905.** When the range is first established the initial MOD Form 905 (Land Range Safety Certificate) is issued to the Range Administrating Unit (RAU). Thereafter, the certificate is renewable by the RAO every three years.
- c. **MOD Form 906A.** A record of usage and management of the range is to be maintained by the Range Staff using the MOD Form 906A. This is to include a record of all 'Blinds'; which in this case refers to all incidents involving unexploded warheads or unobserved practice weapons known to have been launched or dropped on the range.
- d. **Range Standing Orders.** These are the site-specific instructions for the safe use of the range. It is important to be aware that the task of drafting and updating these instructions may lie at very different levels depending on the Service controlling the range. Therefore:
  - (1) **RN.** Ranges that are controlled by the RN are governed by Range Standing Orders that are produced and promulgated by the RAU with the approval of the RAO.
  - (2) **Army and DTE.** Ranges that are controlled by the Army or DTE are governed by Range Standing Orders written by the RAU and approved by the RAO.
  - (3) **RAF.** RAF ranges are governed by Air Command Air Weapon Range Orders (ACAWROs), produced by HQ 1 Gp and promulgated by HQ Air with the approval of the RAO.
  - (4) **DE&S.** Ranges operated for the DE&S by a contractor are subject to Range Standing Orders promulgated by the Head of Site with the approval of the RAO.

0203. The Range Staff are responsible for providing and maintaining a safe working

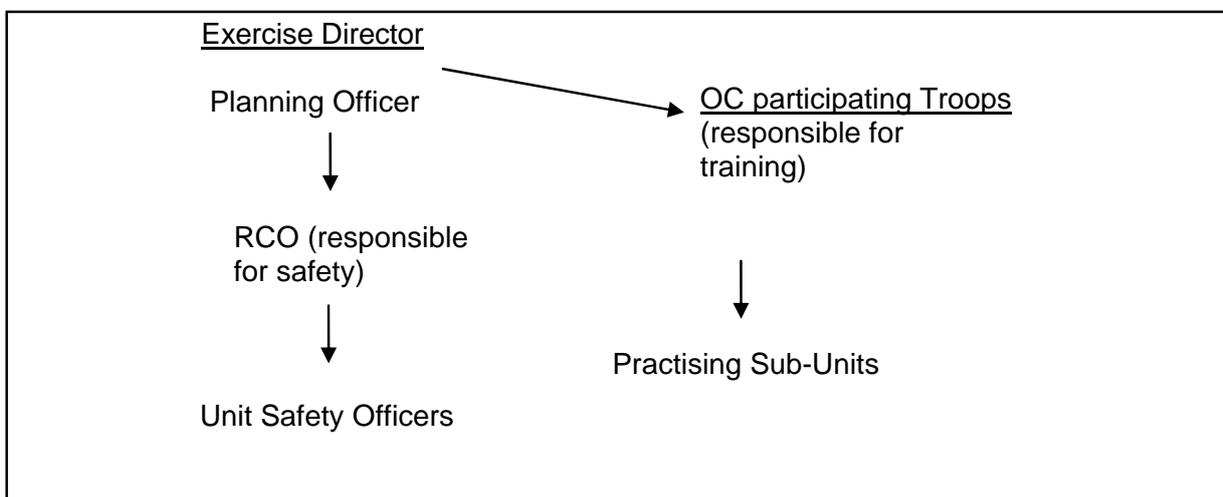
environment for the conduct of practices by Units. Because of past historical and Service associations the titles used by staff on the individual ranges vary and in some cases are not the same as those used by the Units. This has potential for confusion and therefore it is important that Practising Units on the range are clear about who is doing which job and who is responsible for what part of the overall safety system.

0204. Once the range has been authorised by the RAO, the following functions belong to the Range staff and the RAU:

- a. The Officer accountable to the RAO for providing a safe environment at the range. This is normally the CO/Head of the RAU.
- b. There will be an Officer who has the overall responsibility for the safe operation of the range and is responsible for the clear range procedure. He may be referred to as the Range Safety Officer (RSO) or, because there are several functions combined in one post, he may be under another title but still carry out the function of RSO. On an RAF range he would be a Range Safety Officer, who must be an Air Traffic Controller; hence the short title is RSO(ATC). He should not be confused with a Range Conducting Officer (RCO) provided by the Practising Unit.
- c. The Officer responsible for liaison with the practising Unit is often referred to as the Range Liaison Officer (RLO). He will issue a Daily Range Summary which will detail the Units and type of practice authorised to be carried out on the range. He may be responsible for the day to day functioning of the range and the compliance of civilian contractors, the Range Staff and the Practising Units with Range Standing Orders. On DTE ranges he could also be the Range Officer or RSO.
- d. There may well be a requirement for a specific Air Traffic Controller (ATC) and his direct responsibility will be for control of the movement to and from the range boundary as well as the air units using the range. He would be referred to as an ATC on an Army or DTE range but on an RAF range this function may be linked to the RSO(ATC).

### THE PRACTISING UNIT

0205. The Unit using the range will require some or all of the following functions to ensure the safe conduct of their particular training practice. It may well be possible to link the various functions under one person in accordance with individual service procedures but as a general rule safety and training functions are to be kept separate on the range, see Fig 1:



The Practising Unit  
Fig 1

- a. There is a need to distinguish between the CO of the Unit and the Senior Officer accompanying the firing Unit. An Exercise Director (the person who directs the training to take place) is unlikely to be with the firing Unit. However, he may appoint Officers to carry out specific functions, such as Planning Officer or Range Conducting Officer (RCO).
- b. The RCO is the person who is authorised to conduct a particular air to surface gunnery practice and is qualified as such. The Senior RCO is responsible for the co-ordination of the practice should there be more than one aircraft or type of weapon system operating on the range simultaneously. The RCO is a member of the Unit and not part of the Range Staff.
- c. There may be a need for a Training or Planning Officer who will be responsible for an agreed schedule of training with the range staff. On a busy range, detailed and timely planning is essential for safe practice.
- d. Depending on the type of training, there is likely to be a requirement for one or more Safety Officers/Supervisors to oversee the individuals operating the weapons to be used on the range. The requirement for Safety Officers/Supervisors and their responsibilities will be laid down in the appropriate training pamphlets issued by the Subject Matter Expert (SME) HQs. Typically, Safety Officers would be known by their function such as a Firing Point Officer (FPO) or a Visual Flight Safety Officer (VFSO).
- e. It is possible that the Unit may need to bring in other Officers to support training; for example, a Forward Air Controller (FAC).

**DOCUMENTATION**

0206. On occasions there may be no requirement for a Practising Unit to become involved in range documentation beyond reading the Range Standing Orders and making the user aware of his responsibilities; for example, an RAF fixed wing pilot wishing to use a dedicated AWR for a bombing practice. Provided the range is open and the pilot is in contact with the Range Control he will be cleared to enter the range and drop his ordnance. He will be given a hit/miss indication as he leaves. There is no requirement to book the range and all the arrangements can be made whilst he is in the air. In other circumstances the range space will need to be booked in advance, the training practice discussed, target facilities specified and booked, a reconnaissance made and a full planning cycle instigated.

0207. **The Range Standing Orders.** The RAU is responsible for preparing and maintaining Range Standing Orders. The Range Standing Orders will typically include amongst other matters:

- a. The titles and responsibilities of members of the Range Staff.
- b. The format for submitting the Practice Request, the timings involved, the need for a reconnaissance and the processing of that request.
- c. The facilities available on the range including targetry and miss-distance indications.

- d. Procedures for publishing warnings and notices as may be required by statute or Byelaws.
- e. Procedures for providing a safe environment for the conduct of the practice.
- f. The identification of firing lines/firing boxes/way points/IPs, PUPs as appropriate by day and night.
- g. Procedures for ensuring that the intended impact area and manoeuvre zone is clear of intruders.
- h. The orders for maintaining surveillance as necessary to ensure the range remains free from intruders during the range detail or that in the event of intrusion the practice may be aborted.
- i. The control of authorised personnel within the Weapon Danger Area.
- j. Allocation of safe areas/routes for support teams including FARPs, ground based laser designator teams etc.
- k. The maintenance of communications with the practising aircraft and persons with a safety critical function.
- l. The maintenance of a Range Log (MOD Form 906A), by date and time, of all activity on the range including the identity of the practising unit, the number and nature of participating aircraft, the number and nature of munitions fired/released on the range, non-eye safe Laser firing, the location and final disposal of blinds (where applicable) and of all incidents.
- m. The maintenance of a log of all communication with the practising aircraft and persons with a safety critical function.
- n. Authorising the commencement of the training and the finish of training.
- o. Instructions for the safeguarding of Activity Logs and Communication Logs for a minimum of 10 years after the activity to which they relate.
- p. Emergency actions.
- q. Range communication networks.
- r. Danger areas.
- s. Transit corridors.
- t. Byelaws and MOD responsibilities.
- u. Laser Firing Orders.

#### **CO-ORDINATION BETWEEN RANGE STAFF AND RANGE USER**

0208. Where the range is run by a single Service and is mainly used by Units from that Service, there is usually little difficulty in understanding the terminology in use on the range. The difficulty arises when Units of another Service come on to the range that are familiar with

operating under one set of Range Standing Orders and need to adapt to another. It is the responsibility of the Range Staff to fully brief the in-coming Unit on the Range Standing Orders - see Fig 2. It is the responsibility of the Unit to ensure that all members of the Unit understand the Range Standing Orders. UK Military aircrews are to be fully conversant with ACAWROs prior to conducting a range detail on a AWR.

At an early stage:	-	Planning Officer goes to range to discuss with the RSO/RLO the training plan and to be briefed on the range facilities.
Later:	-	Confirm plan and allocation of facilities and space with RSO/RLO.
<b><u>Planning Officer issues Exercise Instruction - vetted by Exercise Director</u></b>		
Resources:	-	RCO + Safety Staff allocated.
	-	OC Troops nominated.

The Planning Cycle

Fig 2

0209. **Dispensations/Variations.** For operational reasons, there may be a requirement for a Unit to carry out exceptionally hazardous training activities. Details on the procedure for a dispensation or variation, on the personal authority of the appropriate 2 Star officer, are given in Volume I.

**LASER ORDERS**

0210. Non-eye safe lasers are to be treated as live weapons and in particular, the specular reflections of the full laser energy, which can be dangerous. Specular reflections usually arise from mirror-like surfaces such as water, windscreens or any polished surface. They will also come from normally dull surfaces that have become wet such as metal hulks or glossy leaves on plants.

- a. **Targets.** Only those targets cleared by a Laser Safety Clearance Certificate for laser attacks are to be used and then only once clearance has been given by the RSO or RSO(ATC). Lasers are not to be fired overland outside range boundaries unless specifically cleared by the MLSC.
- b. **Clear Range Procedures.** The Laser Clear Range Procedure is to be used in accordance with Range Standing Orders.
- c. **Traverse.** Should the laser start to traverse away from the aiming point then the laser is to be switched off immediately.
- d. **Laser Precautions and Hazard Distances.** Aircrews are to be aware of the hazard distances applicable to naked eye viewing of laser illuminated targets. Depending on the Laser type and power being used, aircrews may need to use

protected magnifying sights or binoculars to view targets being 'illuminated' or 'marked'. It is important to be aware that a Laser Safety Clearance Certificate will show if unprotected magnifying sights or binoculars can be used in conjunction with the laser.

e. **Laser Incidents.** Aircraft crews are to report laser incidents in the format shown at Annex B.

0211. The CO/Head of the RAU is to ensure that all personnel are instructed on the possible hazards associated with lasers and on the precautions to be taken. JSP 390 covers laser safety. Volume I, Chapter 9 of JSP 403 deals with the safe use of lasers on ranges.

0212. **Exposure to Laser Radiation.** The CO/Head of the RAU is to maintain a record of any accidental laser discharges or incidents where personnel are suspected of being exposed to laser radiation and arrange for Annex B to be submitted. Personnel suspected of being exposed to laser radiation should report to a medical officer. Range records should contain:

- a. Location and DTG of the incident.
- b. Visibility.
- c. Position of personnel relative to the laser.
- d. Altitude and direction of fire of laser.
- e. Condition and Serial No of laser.
- f. Circumstances of the incident
- g. Who was affected.

### **RANGE AIRSPACE INFRINGEMENTS**

0213. Infringements of range airspace and instances of dangerous flying in the range area are to be reported by signal in the format given at Annex C. The RAU may wish to discuss individual instances with the RAO HQ before deciding whether or not a signal is justified.

0214. **DE&S Ranges.** DE&S Air Ranges operate under the same basic rules as other Defence ranges with MOD Form 904 defining the categories of weapons/systems that can be accepted. However, as these ranges provide a data gathering capability and historically have provided a test and evaluation service, any weapon activity will be in accordance with a local Trial Specification. This will be produced by the Range Staff and will define flight lines, WDA, target information and any instrumentation requirements. Controls related to the release/firing of defined weapons will be specified together with mandatory calls between aircrew and the range and air controllers. Local Range Standing Orders will define the general local rules and range management infrastructure.

### **ANOMALOUS OCCURRENCE REPORTING**

0215. The circumstances when anomalous occurrences must be reported are detailed in Chapters 3, 4 and 5. The formats for the various reports are given in Annexes C - E of this Chapter.

Annexes:

AIR TO SURFACE RANGES

JSP 403 Volume 3  
Edition 1 Change 3

- A. Reserved.
- B. Laser Incident Report.
- C. UK Danger Area Infringements – Signal Reporting Action.
- D. Aircrew Anomalous Occurrence Report.
- E. RSO/RSO(ATC) Signal Report.

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**CHAPTER 2 ANNEX A**

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**CHAPTER 2 ANNEX B**  
**LASER INCIDENT REPORT**

1. **Precedence.** ROUTINE.
2. **Classification.** RESTRICTED.
3. **SIC.** B2B.
4. **Addressees.**
  - a. Action. Parent Command.
  - b. **Information.**
    - (1) MODUKAIR/ARMY/NAVY<sup>1</sup>.
    - (2) HQ Air(unless notified at 4a).
    - (3) HQ of aircraft concerned.
    - (4) Weapons range where incident occurred
    - (5) Authorising HQ where appropriate.
    - (6) MODUK DE&S for DOSG.
5. **Text.**

**LASER INCIDENT REPORT**

- a. Rank and name of pilot/RCO (as appropriate).
- b. Type of aircraft and airframe number, call-sign and operating base.
- c. Date and time of incident, range and target attacked.
- d. Outline of events.
- e. Who is affected.
- f. Type and serial number of all equipment being used.
- g. Injuries, if any.
- h. Remarks, to include cause, if known.

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<sup>1</sup> According to aircraft type.

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## CHAPTER 2 ANNEX C

### UK AIR DANGER AREA INFRINGEMENTS – SIGNAL REPORTING ACTION

1. The appropriate elements of the signal format detailed below for reporting aircraft infringements of Danger Area (DA) airspace should be repeated in the appropriate Single Service publications. Range COs/Site Heads may wish to discuss individual incidents with their controlling authorities before deciding whether a signal report of an incident is justified:

- a. **Precedence.** Normally ROUTINE, but IMMEDIATE if justified by flight safety or political implications.
- b. **Classification.** UNCLASSIFIED.
- c. **SIC.** B2B/12D/IYL/KBL/KBC.
- d. **Addressees.**

(1) For DA infringements by UK military aircraft (including USAF):

#### **ACTION**

- \* MoDUKAIR (For DAS LA Ops, and DAS (Sec) – RAF and USAF aircraft.
- \* FLEET HQ for ATCOS SO1 - RN aircraft.
- \* MoD (DE&S) (For DGS&E AD Air Sys) - Aircraft which are under the regulation of DGS&E AD Air Sys (MOD(DE&S) Air Fleet.
- \* HQ DAAvn – Army aircraft.

HQ AIR (For SO2 ATC SM & I2 and AIS(M) for possible tape impounds and for military aircraft estimated to have been low flying or if aircraft is known to have been in receipt of a service from an ATCRU.

\* Reduce addressees to appropriate organisation(s) if reported aircraft is satisfactorily identified.

**INFORMATION**

DAP (ORA) LONDON

HQ RAF P & SS UK

DA controlling authority, as directed, e.g. FOSNNI, FOST, HQ 1 Gp (SO2 Ranges), but HQ DTE LWC for all infringements of DTE range danger areas.

Aircraft Operating Authority, if known, e.g. FLEET, HQ AIR, HQ 3 AF and down to base airfield if identified.

- (2) For DA infringements by foreign military aircraft and civil aircraft:

**ACTION**

MoD UKAIR (For DAS LA Ops & DAS (Sec).

DAP (ORA) LONDON

HQ AIR (For SO2 ATC SM & I2 and AIS(M) for possible tape impounds.

**INFORMATION**

DA controlling authority, as directed. (See (1) above)

Aircraft Operating Authority and base, if known, and on signals network.

- e. **Text.**

DA AIRSPACE INFRINGEMENT REPORT.

- (1) DA identification number and name. Date and time of incident.
- (2) Number and type of reported aircraft. Callsign, airframe number or registration if available. Any other identifying details (See Note 2).
- (3) Route(s), including estimated heading(s) and height(s).
- (4) Where applicable, nature of hazardous activity being conducted legitimately within the DA at the time of the infringement.
- (5) Amount and height of cloud base, surface wind and visibility, and any other pertinent weather details.
- (6) Any other useful data on reported aircraft e.g. aircraft operator, departure and destination points, captain's name (See Note 2).

## NOTES

1. Low flying military aircraft are:
  - a. Fixed wing aircraft, other than light propeller-driven (maximum weight 12,500lb/5670kg) or less, estimated to be flying below 2,000ft above ground level (agl)/surface.
  - b. Rotary wing or light propeller-driven aircraft estimated to be operating below 500ft agl/surface.
2. Accurate and detailed information when completing paras (2) and (6) of the 'Text' is of vital importance for a subsequent investigation to be feasible. Where appropriate, range staff should request assistance with aircraft identification from any adjacent Air traffic Service Unit.

## **FOLLOW-UP ACTIONS ON REPORTED INFRINGEMENTS OF UK AIR DANGER AREAS**

2. On the receipt of a report of an alleged Air Danger Area (ADA) infringement by an aircraft, the following actions are to be taken:
  - a. **Tape Impounds.** HQ AIR (SO2 ATC SM & I2) is to have an assessment made of the content of the initial report and, when appropriate, is to have relevant ATC radar and/or radio recording tape(s) impounded to assist in any subsequent investigation.
  - b. **ATCRU Involvement.** HQ AIR (SO2 ATC SM & I2) is to have an in-depth investigation carried out.
  - c. **Military Low Flying.** HQ AIR Detachment LATCC (Mil) SO2 LF is to have tracing action carried out through the Low flying Booking Cell at LATCC (Mil).
  - d. **Other Military Aircraft.** The appropriate Service Dept. is to 'Request Ident' from AIS(M) at LATCC (Mil) through HQ AIR (SO2 ATC SM & I2) who is also to instigate the initial tracing action for RN or foreign aircraft.
  - e. **Identified Military Aircraft.** For reported infringements by identified military aircraft an investigation is to be instigated by the following:
    - (1) **UK Military Aircraft (including USAF)** – FLEET HQ ATCOS SO1, MoD DAS LA Ops, HQ Air, HQ DAAvn, HQ 3AF, etc as appropriate.
    - (2) **Foreign Military Aircraft.** DAP ORA 1 (Sec UK DAUG).
  - f. **Unidentified Military Aircraft.** If the identity of the aircraft making the alleged DA infringement cannot be positively established, the investigating unit is to inform the appropriate MoD Dept. and the complainant. Further action will be decided by MoD possibly using HQ RAF P & SS (UK).
  - g. **Identified Civil Aircraft.** DAP ORA 1 is to pass the details of the alleged DA infringement to the CAA Safety Data Unit 3 (SDU 3) of the Safety Data Department

and request an investigation.

h. **Unidentified Civil Aircraft.** If from the infringement report signal and initial actions there is insufficient evidence of aircraft identification to enable the CAA to carry out an investigation, DAP ORA 1 is to advise the complainant.

3. **Further Action.**

a. **Military Aircraft.** The results of investigations involving military aircraft are to be passed to the complainant, DAP ORA 1 and, by the usual channels, to the appropriate MoD Dept. which additionally is to be informed without delay of any incidents which could have political implications.

b. **Civil Aircraft.** The results of an investigation of an alleged infringement of a danger area by an identified civil aircraft are to be passed to DAP ORA 1 who will then advise the complainant.

## CHAPTER 2 ANNEX D

### AIRCREW ANOMALOUS OCCURRENCE REPORT

1. **Procedures.** ROUTINE, unless death or injury to persons and livestock or damage to property is known or suspected when it should be IMMEDIATE.

2. **Classification.** UNCLASSIFIED.

3. **SIC.**

a. B2B/IYL - for conventional weapons (plus I3F if weapon landed outside range danger area).

b. B2B/IIL/13F/HWH - for air-to-air missiles.

c. B2B/IIL/13F/HWH - for air-to-surface missiles.

d. B2B/IYL/13F/HNH - for irregular release.

4. **Addressees.**

a. Action. Parent Command.

b. **Information.**

MODUKAI R/ARMY/NAVY<sup>1</sup>

HQ AIR/HQ LAND/FLEET HQ (unless notified at 4a).

HQ of aircraft concerned.

Weapons range where incident occurred.

Authorising HQ when appropriate.

MODUK DE&S for DOSG.

5. **Text.** All or some of the following, as appropriate.

#### **IRREGULAR RELEASE/INADVERTENT RELEASE/HANG UP - AIRCREW REPORT**

a. Aircraft type, airframe number, home base, callsign.

b. Date and time of incident, range and target being attacked.

c. Best estimate of impact position, in relation to target if appropriate.

d. Type of attack.

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<sup>1</sup> According to aircraft type.

- e. Quantity and type of weapons released, with serial numbers if possible.
- f. Weapon station concerned.
- g. Aircraft height and speed at release.
- h. Brief account of incident, including control system indications.
- i. Who was affected.
- j. Damage or injury, if known.
- k. Cause, if known.

NOTE: If investigation reveals a technical fault, then para h may read 'irregular release'. Further reporting action will then be through engineering channels.

## CHAPTER 2 ANNEX E

### RSO/RSO(ATC) SIGNAL REPORT

1. **Precedence.** ROUTINE, unless death or injury to persons and livestock or damage to property is known or suspected, when it should be IMMEDIATE.
2. **Classification.** UNCLASSIFIED unless death or injury to persons and livestock or damage to property is known or suspected, when it should be RESTRICTED -STAFF.
3. **SIC.**
  - a. B2B/IYL - for conventional weapons (plus I3F if weapon landed outside range danger area).
  - b. B2B/IIL/13F/HWH - for air-to-air missiles.
  - c. B2B/IFL/13F/HWH - for air-to-surface missiles.
  - d. B2B/IYL/13F/HNH - for irregular release.
4. **Addressees.**
  - a. **Action.** Parent Command.
  - b. **Information.**
    - (1) MODUKAIR/ARMY/NAVY<sup>1</sup>
    - (2) MODUK DE&S for DOSG
    - (3) HQ AIR/HQ LAND/FLEET HQ (unless notified at 4a).
    - (4) HQ of aircraft concerned.
    - (5) Operating base of aircraft concerned.
    - (6) Authorising HQ when appropriate.
    - (7) Range where incident occurred.
5. **Text.** All of the following:

#### WIDE WEAPON/IRREGULAR RELEASE/INADVERTENT RELEASE - RANGE REPORT

- a. Aircraft type, operating base and call-sign.
- b. Date and time of incident, range and target being attacked, type of attack and attack track.

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<sup>1</sup> According to aircraft type.

- c. Quantity and type of weapons.
- d. Best estimate and impact position, and whether in or out of range danger area.
- e. Damage or injury if known.