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**RULES FOR LIVE AIR WEAPONS
DEMONSTRATIONS**

Edition A Version 1

MARCH 2019



NORTH ATLANTIC TREATY ORGANIZATION

ALLIED FLIGHT SAFETY PUBLICATION

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NATO STANDARDIZATION OFFICE (NSO)
NATO LETTER OF PROMULGATION

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CHAPTER 1 INTRODUCTION

1.1 AIM

The aim of this agreement is to ensure that all factors, including the standardization of the daylight markings of control installations, affecting the safe conduct of any live air weapons demonstration with and without spectators are adequately studied and to specify responsibilities for the planning and conduct of such demonstrations.

1.2 AGREEMENT

Participants agree to:

- a. follow the rules and procedures specified herein for the planning and conduct of live air weapons demonstration; and
- b. Comply with the marking procedures specified herein for all air weapons ranges.

1.3 GENERAL

1. A NATO live air weapon demonstration is a demonstration in which at least two nations are involved in either the operation of a weapon system or systems, or in the responsibility for the range on which the demonstrations is being held, be it permanent or temporary.
2. For the purposes of NATO live air weapons demonstration, any weapon, weapon carrier or weapon system which is loaded with a missile, store or projectile, is said to be live. Any launching, releasing or firing of a missile, store or projectile, be it inert, or filled with explosive, gaseous or combustible material, fused or non-fused, is said to be a live firing.
3. In the interest of safety it is essential that range control installations and spectator sites should be positioned and marked in such a manner as to preclude misidentification of targets from the air. The markings and colours selected for control installations and spectator sites must on no account be used for the marking of targets.
4. All personnel involved in operation and maintaining the range facilities and all spectators are to be confined to these marked areas whenever aircraft are utilizing the range. On dual weapon ranges, range personnel may perform maintenance on the closed side of the range as long as radio contact is maintained between pilots and range controllers. Air Control Teams on controlled tactical ranges may be exempted from this requirement.

5. Before using a range, aircrew are to be briefed in detail on the layout of the range including the positioning of range control installations and spectator sites and their position relative to the targets. This information is also to be included in the appropriate range orders pertaining to each range.

1.4 TERMINOLOGY

The following terms and definitions are used for the purpose of this agreement only:

- a. AIR WEAPONS RANGES: all air-to-ground training and authorized ranges as well as controlled tactical ranges and areas use for weapon demonstrations.
- b. TACTICAL RANGE: a range in which realistic targets are in use and a certain freedom of manoeuvre is allowed.
- c. RANGE CONTROL INSTALLATIONS: installations, including all range accommodations and facilities operated by range personnel, i.e. control tower, spotting and flanking towers, etc. Living quarters and maintenance buildings not located within the target area are not included under this definition.
- d. SPECTATOR SITES: any areas, including the vehicle parking areas, designated as viewing sites for visitors to the range located outside the range control installations areas.
- e. CONTROLLED RANGE: a range in which the movement of aircraft is strictly controlled by a range control officer.

CHAPTER 2 RULES FOR AIR WEAPONS DEMONSTRATION

2.1 IDENTIFICATION MARKINGS

1. All range control installations are to be painted in a combination of the colours yellow and black so that they are clearly visible from the air at a distance appropriate to the types of attack used on the range. On controlled tactical ranges, yellow and black checkered panels fulfilling the above specifications may be used to mark control installations which, for operational training reasons, cannot be permanently painted. The minimum size of the panel squares should be 2 x 2 feet (0,6 x 0,6 metres).
2. Control installations at tactical ranges may be marked additionally by a flashing white light.
3. All spectator sites are to be indicated by yellow and black-checkered panels positioned in a square or rectangle around the sites and angled so as to be clearly visible from the air at a distance appropriate to the types of attack used on the range. These sites may also be marked by a flashing white light visible from the same distance.
4. When installing an additional white light, care must be exercised on the type of light to be used to preclude possible conflict with heliport or other similar beacons.
5. See also Annex A for more detailed description of ground attack and bombing demonstration markings and signs.

2.2 PLANNING LIVE WEAPONS DEMONSTRATION

The amount of planning required will depend upon the aim and scope of the demonstration. The more complicated demonstrations may require some 12 months to complete. The requirements for a major joint demonstration are described in the following paragraphs. There will be occasions when minor joint live firing demonstrations do not require the full procedure described in the following paragraphs. However, as a minimum:

- a. A Directing Country must be agreed upon and nominated by the senior officers of each Country involved; and
- b. A Directing Committee must be formed in accordance with paragraph 2.7 below.

2.3 SPONSOR COUNTRY

The country proposing a NATO live air weapons demonstration is to be the Sponsor Country, unless otherwise agreed. The Sponsor Country will be responsible for obtaining, where necessary, approval of any civil agencies.

2.4 CO-ORDINATION COMMITTEE

1. The Sponsor Country is responsible for forming a Co-ordination Committee of members from each of the Countries required to participate in the demonstration. Members of the committee should be of a rank commensurate with the aim and scope of the demonstration. The Sponsor Country is to supply the chairman of the committee.
2. The Co-ordination Committee is responsible for:
 - a. Defining the aim(s) of the demonstration;
 - b. Stating the time at which the demonstration should take place;
 - c. Estimating the required scope of the demonstration, including broad requirements for participation from each nation;
 - d. Proposing a preferred location for the demonstration, with alternatives in order of priority.

2.5 CO-ORDINATION COMMITTEE WORKING PARTY

1. The Co-ordination Committee is to appoint a Working Party composed of weapons, control and any other required specialists from each of the Countries participating. The Co-ordination Committee is to issue a written directive to the Working Party, stating its requirements for the demonstration in the terms outlined in paragraph 2.4 above.
2. The Working Party is to study implications of the directive in terms of all factors affecting the safe conduct of the demonstration at each of the locations listed. Such factors include air traffic control and its co-ordination with civil authorities, range safety and the application of clear range procedure, weapon control facilities, positioning of spectator sites, targets and directions of fire, danger areas, etc. It is to report to the Co-ordination Committee its recommendations for the best location and allocation of forces to achieve the aim of the joint demonstration exercise.

2.6 DIRECTING COUNTRY

1. The Co-ordination Committee, having decided upon the scope, timing and location of the demonstration, is to appoint one Country in control of it, taking into account such factors as the operational effort to be provided by each Country, the relative magnitude of air traffic control, weapon control and surveillance problems as applied to each Country, and responsibility for the range, be it permanent or temporary. The Country appointed is known as the Directing Country.
2. The Directing Country will be in overall control of all further planning of the demonstration itself, of any post-demonstration work required and it will have control of all forces which are participating in the demonstration.

2.7 DIRECTING COMMITTEE

1. The Directing Country is to provide the Chairman of a Directing Committee. The Directing Committee shall be composed of members drawn from each of the participating countries. They could be the same members of the Co-ordination Committee Working Party or other personnel nominated by the participating countries.
2. The Directing Committee is responsible to the Directing Country for the production of all orders and facilities necessary to conduct the demonstration safely and effectively in fulfilment of the requirements of the Co-ordination Committee.

2.8 NOTIFICATION OF PLANS FOR JOINT DEMONSTRATION TO NATIONAL MINISTRIES

All major NATO live air weapons firing demonstrations are to be notified to all interested countries during the planning stage. Notification should include broad proposals for the demonstration and must state which is the directing country and whether the demonstration is a major or a minor one. The decision as to whether it is a major or a minor demonstration rests with the Co-ordination Committee.

2.9 CONTROL OF AIR WEAPONS DEMONSTRATION

1. Control of a live air weapons demonstration is to be exercised by the Directing Country, which is to be given control of all participating forces and spectators during the demonstration.
2. Control of forces participating in the demonstration is to be by voice radio, which is the only medium by which orders and execution instructions are to be given and acknowledged. Failure of two-way voice radio communication must lead to automatic cancellation of the event or events. Any other form of communication such as ground panel, pyrotechnic or light can only be advisory, except in the one specific instance of an agreed mandatory signal to cancel an event in an emergency.

3. The Directing Country will publish one common “clear range” procedure which will conform to the procedures used by countries participating in the demonstration.

2.10 SINGLE COUNTRY RESPONSIBILITIES

1. All Forces participating in a NATO demonstration, although under the control of the Directing Country are nevertheless responsible under their own regulations for preparation, loading, safety precautions for, and the proper use of, their own weapons. The participating countries will comply with their own regulations only insofar as they contain equal or higher norms than the relevant regulations of the host country. Relevant directives of the host country must be complied with when they specify higher norms than those of the participating countries. They are similarly responsible for irregular discharge, misfire, hang-up and subsequent unloading of their own weapons and for all procedures relating there to.

2. To facilitate the disposal of unexploded ammunition and as a check of the fusing required, a comprehensive list of ammunition to be used is to be supplied together with the type, mark and setting of fuse to be used.

2.11 ORDERS

1. Taking into consideration the tactical and safety requirements and standing regulations of each country, the Directing Committee is to issue comprehensive orders for the demonstration to meet the requirements of the Co-ordination Committee and the Directing Country as well as with the safety authorities such as air traffic control centres, local civilian authorities and property owners. The orders are to contain relevant clear range procedures designed to protect unwitting intruders such as civilian aircraft and ships.

2. The Directing Committee is to issue all necessary warning notices such as, Notices to Airmen, Notices to Mariners and any relevant local warning, and is to be responsible for public relations and liaison with the press.

2.12 DANGER AREAS

1. The Directing Country is responsible for defining the danger area or areas to be used for the demonstration. To enable this to be done, each participating Country is responsible for stating its own safety rules for the weapons, weapon systems and tactics it intends to employ. These rules are to be framed for each weapon, weapon system and variation of tactics to eliminate all possibilities that a mishap may occur.

2. These rules must be in accordance with the procedures used by the participating country for its own live weapons demonstrations, taking into account known risks involved, based upon reliability factors of the weapon or weapons system used and the proficiency of the operators.

Note: No deviation from these single country rules which may tend to reduce the safety factor may be taken by the Directing Country or by the Coordinating Committee without written approval of the country concerned.

3. The Directing Country is then to produce combined danger area charts for the demonstration giving due consideration in the light of the various declared risks for each individual weapon or weapon system and to the cumulative chances of one or another missile falling outside the combined danger area.

2.13 NOTIFICATION

On completion of the joint program, and of planning and preparation of the range safety orders for a joint firepower demonstration, the Directing Country is to notify the respective Major NATO Commander of its intentions. It is to keep the Co-ordination Committee informed, pointing out in particular where specific approval has been obtained to relax normal peacetime rules, and/or when it has been considered prudent to increase a combined danger area due to considerations outlined in paragraph 2.12.3 above.

2.14 DISTINCTIVE MARKINGS

1. The positioning of the various essential features for a demonstration on the range chosen is the responsibility of the Directing Country, acting on the advice of the Directing Committee. Certain of these sites are to be distinctively marked in accordance with the instructions laid down in Annex A.

2. It is particularly important that the spectators' enclosure be unmistakably marked in such a way that it can be seen and recognized immediately by all participants.

2.15 BRIEFING

1. The Directing Country is to arrange the necessary briefings to ensure that all participants know and understand the full scope and safety aspects of the demonstration.

2. Each participating Country is then to arrange detailed briefings of its own personnel taking part to ensure that they are fully aware of all safety regulations and range orders and of the detailed orders for their own particular part of the display.

3. The Directing Country is to arrange for the briefing of the spectators both before and during the display. During the display this might be best done by the appointment of a commentator provided with a public address system. The verbal briefings are to draw attention to safety regulations in force and restrictions on movement outside the spectator area. They should be reinforced with a short written handout.

2.16 REHEARSALS

1. Arrangements must be made by the Directing Country for all personnel taking part in a NATO live air weapons demonstration, including reserves such as aircrew or gun crews, to reconnoiter the range area after it has been set up for the demonstrations. Aircrews require an air reconnaissance.
2. No NATO demonstration is to take place unless a satisfactory firing rehearsal of the demonstration has been carried out beforehand. Any departure from this will need to be referred to major NATO Commanders.

2.17 POSTPONEMENT

The postponement of a demonstration for over 48 hours will require all orders and instructions to be reviewed and updated ones issued if necessary. For a shorter postponement, the Directing Country is responsible for checking all arrangements to ensure that safety precautions, warnings, etc., are still valid, and for notifying Countries and authorities concerned (Military and civilian) of the change.

2.18 UNEXPLODED AMMUNITION AND EXPLOSIVE STORES

1. The Directing Country is to make arrangements for the clearing and/or avoidance of unexploded ammunition and explosive stores. Clearance and avoidance should cover at least the aspects listed below and any other relevant to a particular demonstration:
 - a. The possibility of troop movement across or close to a danger area previously used during a firing demonstration, or part of a demonstration, and which may contain unexploded ammunition and explosive stores;
 - b. Timing of rehearsals and demonstrations to ensure that the danger area has been cleared of unexploded ammunition and explosive stores before work is carried out on rebuilding targets, etc.
 - c. Final post-demonstration range clearance.
2. Participants and/or observers in a position to do so are to be briefed to identify unexploded missiles and report their position by voice radio when authorized to do so. Facilities must be available to plot such position reports.
3. Air weapons jettison areas must be clearly laid down in the demonstration orders.

2.19 SAFETY DEVICES

The Directing Country is to ensure that adequate fire-fighting, medical and rescue facilities are available for the demonstration and for all rehearsals.

2.20 RANGE MAPS AND SURVEY

The Directing Country is to arrange for the range area to be surveyed for the production of the necessary range maps and for the distribution of them to participants.

2.21 RANGE LOGBOOK

A range logbook is to be kept throughout all rehearsals and the demonstration. All ammunition (including type, mark and fuse-setting) use, and all unexploded ammunition and explosive stores reported, is to be recorded. All outstanding and noteworthy incidents are to be recorded with the precise time of their happening.

2.22 REPORTING PROCEDURES

On completion of the demonstration, the Directing Committee is to render a report to the major NATO Commander, reporting any incident or accident and making recommendations for improving future demonstrations.

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**ANNEX A GROUND ATTACK AND BOMBING DEMONSTRATION –
MARKINGS AND SIGNS.**

A.1 IDENTIFICATION OF TARGETS

The following markings and signs are to be provided by the directing country as required by the scope of the demonstration:

Colour, Shape and Size of Targets:

- a. Colour: for positive identification from the air, targets should be coloured to provide a distinct contrast with the surrounding terrain. The upper surfaces of vehicles, tanks and other target material are therefore to be painted “Dayglo” red or orange, except on terrain which provides a poor contrast, such as desert areas, when a more suitable contrasting is used. As a yellow and black checkered pattern may be used for marking Range Control Installations and Spectator Sites these colours must not be used for target identification.
- b. Shape: the plan form of all targets must be quite distinctive and not likely to be confused with the spectators’ enclosures. Targets must also be large enough to be clearly identified from the altitudes and slant ranges appropriate to the attacks being carried out.
- c. Size: targets for demonstrations must be of sufficient size to be easily acquired from the air. To achieve this size, targets should be grouped where necessary to provide the size of practice targets as indicated in paragraph A.2 below.

A.2 PRACTICE TARGETS AND MARKINGS

In some cases, sponsor countries may wish to use practice targets for demonstrations. The recommended shape and size of practice targets are:

a. Bombing Targets:

Type of bombing		Form	Size
Medium altitude	Visual	Triangle	Length of sides 75 to 100 ft (25-30m)
	Radar	Triangle with radar deflector	As above – with radar deflectors fitted. (allows for visual monitoring)
Dive and Low altitude		Circle	Diameter approx. 150 ft (50m)
Ground Controlled Radar Release		No physical target required, except when visual monitoring of run is required	

b. Air to ground Gunnery and Rocket Projectile Targets:

Targets should be placed in a line at right angles to the direction of attack and spaced approximately 100 yards (100 m) apart, preferably on a sandy surface or on soft soils.

c. Directional Arrow:

Where the operating authority for the aircraft making bombing attacks considers that additional ground indicators are required, a directional arrow is to be used. The dimensions are to be varied according to the bombing height as follows:

Bombing height feet (metres)	Length of Arrow feet (metres)	Length of Barbs feet (metres)	Width feet (metres)
14,000 (4,300) and below	40 (12)	20 (06)	4 (1.20)
14,000 (4,3000) to 20,000 (6,000)	60 (18)	30 (09)	6 (1.80)
20,000 (6,000) to 25,000 (7,500)	80 (24)	40 (12)	8 (2.40)

The interior angle of the apex of the barbs is to be 100° approximately. The upper face of the arrow should be painted white, except where this provides a poor contrast with the surrounding terrain, when black should be used.

A.3 LABS ATTACKS

1. Low-Angle Release: requires an IP (Identification Point) positioned on the attack heading to the target. The position of the IP is related to the approach speed of the aircraft. IPs should be 15 feet (5 m) to 25 feet (8 m) high and approximately 20 feet (6 m) wide. The side facing the aircraft on the approach to the target should have distinctive markings. Broad red and white diagonal strips will give a distinctive appearance under normal conditions.

2. High-Angle Release (over the shoulder): no IP is required, as aircraft pulls up when over the target. Attack heading is to be over a directional arrow situated on the edge of the range danger area. The target should be 15 feet (5m) to 25 feet (8m) high and painted "Dayglo" orange or red.

A.4 PROVIDING OF EASE OF IDENTIFICATION OF TARGETS

Since positive identification of targets and spectators' enclosures is essential, it is important to prove the overall colour, shape and size of the enclosure with targets and groups of targets from the range at which identification is necessary. This proving should be done as soon as possible before the first rehearsal.

A.5 MARKING OF OTHER AREAS

Other areas are to be marked as follows:

- a. Enclosures for spectators and vehicles: the spectator enclosures and vehicle parks are to be square or rectangular in shape and are to be outlined with black and yellow checkered panels of such a size as can easily be seen from all altitudes at which attacks are to be carried out. In addition, a black and yellow checkered panel is to be displayed alongside the enclosure in such a position that it can be seen from all directions of attack. The minimum size of the squares should be 2 x 2 feet (0.6 x 0.6 m).
- b. Routes for Spectators and Vehicles: these routes are to be indicated on metallic boards and clearly defined tracks by suitably worded black and white signs. Where no clearly defined track exists, the route is to be marked with white "mine field" tape, and entries and exits marked with sign boards.
- c. Danger area into which participating troops may not pass: where infantry and armour are required to take part in fire power demonstrations, the line beyond which they may not pass during any phase is to be marked with white "mine field" tape. In the interest of realism, these check lines should be positioned in dead ground out of view of the spectators.
- d. First Aid Positions: these positions are to be marked with signs bearing a red cross on a white background. Where a landing point for a helicopter is provided, this is to be marked with an H. If ground panels are used, these must be firmly secured or removed before the helicopter comes to hover. These areas are furthermore to be marked in the same way as enclosures for spectators or vehicles.
- e. Control Positions: whenever possible these positions are to be elevated above ground level and surrounded with (black and yellow checkered) panels of such a size as can easily be seen from all altitudes at which attacks are to be carried out. The minimum size of the squares should be 2 x 2 feet (0.6 x 0.6 m). Control installations at tactical ranges are to be marked individually by a flashing white light of such intensity that, when conditions dictate, it will be the primary mean of initial identification.

- f. Range boundaries: will be marked by:
- (1) Red flags to provide a warning to the public that the range is in use. Flags are to be hoisted at least half an hour before firing starts and lowered when the range is clear. The flags are to be hoisted on flag poles, sited so that at least one red flag is conspicuous from any point on the range boundary.
 - (2) Danger boards displaying notices warning the public not to pass when the red flags are flying and firing is in progress. These boards should also carry copies of the range bye-laws and be positioned by every normal point of entry to the range.

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