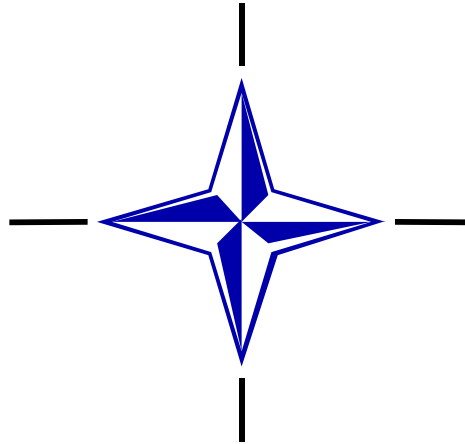


AArtyP-1(B)

ARTILLERY PROCEDURES

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AArtyP-1(B)
ARTILLERY PROCEDURES

APRIL 2009


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**NORTH ATLANTIC TREATY ORGANIZATION
NATO STANDARDIZATION AGENCY (NSA)
NATO LETTER OF PROMULGATION**

27 April 2009

AArtyP-1(B) – ARTILLERY PROCEDURES is a NATO/PfP UNCLASSIFIED publication. The agreement of nations to use this publication is recorded in STANAG 2934.

1. AArtyP-1(B) is effective on receipt. It supercedes AArtyP-1(A), which shall be destroyed in accordance with the local procedure for the destruction of documents.



Juan A. MORENO
Vice Admiral, ESP(N)
Director, NATO Standardization Agency

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RESERVED FOR NATIONAL LETTER OF PROMULGATION

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RECORD OF NATIONAL RESERVATIONS

CHAPTER	RECORD OF RESERVATIONS BY NATIONS
GENERAL	ITA, FRA
1	
2	BEL, DNK
3	
4	
5	
6	CAN
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RECORD OF SPECIFIC RESERVATIONS

NATION	RESERVATIONS
BEL	BEL will not use neither the procedure and message referenced in chapter 6, neither some excerpts of the chapter 2 Annex B dealing with ICM because it does not comply with applicable national and international laws and regulations.
CAN	a. SCATMIN (Chap 6). Canada will not be involved, in any capacity, in the kill-chain of SCATMIN delivery. b. Tgt Location (Para 210). Using target grid procedures with rockets and extended range munitions, Canada will include the grid zone designators in the target location.
DNK	Chapter 2, Call for fire procedures: Opportunity fire will not be implemented before a more finalized version of the chapter is available. Chapter 9, Weapon locating radar: DNK will not implement all listed radar zones in current radar systems.
FRA	As a signatory State to the Ottawa Convention on the Prohibition of the Use of Anti-Personnel Mines, France will not use this type of field artillery delivered scatterable mines.
ITA	In accordance with national law, Italy will not use any device which may be classified as antipersonnel mine according to the following definition "An antipersonnel mine is defined as a device which may be placed above, under, inside or next to any surface and adjusted or adapted with specific measures in order to explode, cause an explosion or release incapacitating substances as the result of the presence, the proximity or contact by a person". Moreover, considering military activities in multinational scenario, cooperation of the Italian Armed Forces also with non signatory Nations of the Ottawa Convention is permitted, with the proviso that activities by Italian servicemen be compatible to the Ottawa regulations.

RECORD OF CHANGES

Change Date	Date Entered	Effective Date	By Whom Entered

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NATION	NATIONAL IMPLEMENTING DOCUMENTS
	Note: AArty P-1(B) is an implementing document, however most nations go further and include the contents in their national publications.
Belgium/ (BEL) Luxembourg (LUX)	
Canada (CAN)	B - GL - 371 - 003, B - GL - 371 - 004
Czech Republic (CZE)	<i>Ratification in progress.</i> (Del - 1 -1, Del - 2 -1).(Pub - 74 -14 -01)
Denmark (DNK)	<u>HRN 410 - 001, A Arty P - 1</u>
France (FRA)	<i>Ratification in progress.</i>
Germany (DEU)	ZDv 3/101, HDv 260/100, AnwFE 266/100, AnwFE 267/220, AnwFE 267/500
Greece (GRC)	A Arty P - 1(B)
Hungary (HUN)	<i>Ratification in progress.</i>
Italy (ITA)	A Arty P - 1(B)
Netherlands (NLD)	Leidraad Vuursteun
Norway (NOR)	A Arty P-1. UD-13, UD-14,UD-16, UD-17, UD-18
Poland (POL)	Regulaminy dzia a taktycznych artylerii (kompania wsparcia, dywizjon wsparcia bezpo redniego, ogoólnego, pu k, brygada), podr czniki walki artylerii (pluton wysuni tych obsewatorow, pluton mo dzierzy, bateria artylerii, bteria artylerii raketowej).
Portugal (PRT)	<i>Ratification in progress.</i>
Romania (ROU)	<i>F.T./A-3.3; F.T./A-2.1; F.T./A-2.2</i>
Spain (ESP)	AArty P - 1 (Bi-lingual), R-3-5-1, OR5-301 Parts 1 & 2, OR5-305, RE5-307& M-3-6-4
Turkey (TUR)	KKT 6-30, KKT 6-40, KKT 6-40A, KKT 6-20, KKT 6-2, KKT 6 -15
United Kingdom (GBR)	AArty P-1, AT. Vol. I Pams. 1 & 12, AT. Vol. II Pam. 13, AT. Vol. III Pam. 11 Pts 1 & 4, Sigs Comms in the Army Vol. 4, Pam 6, ATP-27(B)
United States (USA)	FM 6 - 1, FM 6 - 20, FM 6 - 40, FM 6 - 15, FM 6 - 121, FM 6 - 30

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**CHAPTER 1
INTRODUCTION**

101. This publication should be read in conjunction with A Arty P-5 (Artillery Tactical Doctrine).

102. **Aim of Arty P-1(B).** The aim of this publication is to detail the procedures agreed upon by NATO forces for use by their artillery units in order to produce timely and effective artillery support to manoeuvre units. Especially for para 2 and para 3 the procedures as described are to be used when ADP systems are not used. Using ADP systems between nations the templates as depicted in Aarty-P3 are to be used. In time it is foreseen that the procedures as described in Aarty-P1(B) and Aarty P3, when both documents evolve, will come closer to each other.

103. **Scope of A Arty P-1(B)(B).** Owing to the wide variety of organizations and equipment within the NATO forces, this publication is concerned with fundamentals and those procedures likely to be used in multi-national operations. It does not, for the present, cover the complete range of technical artillery procedures.

104. **Terms and Definitions.** Artillery terms and definitions of general military significance are

contained in the NATO Glossary of Terms and Definitions (AAP-6). Artillery terms of a more specialized nature are in the NATO Artillery Glossary (AAP – 38) .

105. **Bearings and Co-ordinates.** All references to mils are to the NATO mil (6400 mils in a circle; 0000 is North). All co-ordinates will be given in the order of Eastings then Northings.

106. **Associated Publications.** Related Allied Publications (Aps) and Standardization Agreements (STANAGs) are contained in Annex A to this Chapter, it should be noted that:

- a. NATO nations have concluded a wide range of agreements on various matters, and more are under negotiation. AAP-4 contains a full list of Aps and STANAGS.
- b. Most STANAGs are not circulated direct to units. Their contents are included in national and command instructions (e.g., training pamphlets, standing operating procedures and field manuals).
- c. Aps are STANAGS that have been converted to a book that can be used by units. This simplifies distribution and makes implementation much quicker. The following should be read in conjunction with this AP documents used in A Arty P-1(B) are annotated*:

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TABLE OF RELATED ALLIED PUBLICATIONS AND STANAGS

Ser.	Allied Publication	STANAG	Title
1.	AAP-6*	3680	NATO Glossary of Terms and Definitions
2.	AAP-38 ¹	2247	NATO Artillery Glossary
2.	ACP-122*		Communications Instructions Security.
3.	ACP-125*		Communications Instructions Radio-Telephone Procedures.
4.	APP-6	2019	Military Symbols for Land Based Systems .
5.	ATP-4	1034	Allied Spotting Procedures for Naval Gunfire Support.
6.	ATP-27	3982	Offensive Air Support Operations.
7.	ATP-33	3700	NATO Tactical Air Doctrine .
8.	ATP-35	2868	Land Force Tactical Doctrine.
9.	ATP-40	3805	Doctrine and Procedures for Air Space Control in Times of Crisis and War
10.	ATP-41	2904	Airmobile Operations.
11.	ATP-50*	2990	Principles and Procedures for the Employment in Land Warfare of Scatterable Mines with a Limited Laid Life.
12.	Aarty P-5	2484	NATO Field Artillery Tactical Doctrine.
13.		1001	Standardized System of Designating Days and Hours in Relation to an Operation or Exercise.
14.		2014	Operation Orders, Warning orders and Administrative / Logistic orders.
15.		2020	Operational Situation Reports.
16.		2029	Method of Describing Ground Locations, Areas and Boundaries.
17.		2101	Principles and Procedures for Establishing Liaison.
18.		4044	Adoption of a Standard Atmosphere.
19.		4061	Adoption of a Standard Ballistic Meteorological Message.
20.		4082	Adoption of Standard Artillery Computer Meteorological Message
21.		4103	Format for Request for Meteorological Messages for Ballistic and Special Purposes.
22.		4131	Adoption of a Standard Character by Character Meteorological Message Format.
23.		4140	Adoption of a Standard Target Acquisition Meteorological Message.
24.		2245	Standard for the Inter-operability of ADP Fire Support Systems.
25.		5621	Standard for the Inter-operability of NATO Land Combat Operations Systems.
26.	APP-11		NATO Messages

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¹ A draft document, not yet ratified. AAP-38 replaces annex C(Glossary of Artillery and related terms and definitions.

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CHAPTER 2

CALL FOR FIRE PROCEDURES – OPPORTUNITY FIRE

SECTION I

GENERAL

201. The aim of this chapter is to describe the calls, terms, procedures and commands that have been agreed by NATO forces for use when one nation provides fire in response to a call for fire from another nation. This chapter deals with non-ADP systems (i.e. countries may have ADP systems but the use of them is not opportune for reasons of for example communications restraints, RoE or others). The interoperability between ADP using countries and between ADP and non-ADP systems (i.e. countries may have ADP systems but the use of them is not opportune for reasons of for example communications restraints, RoE or others). Is covered in A Arty P-3. All multi-national Fire Mission (if not being able to use the possibilities of A Arty P-3) are to use the procedures laid down in this chapter.

202. The differences in national procedures, language, capabilities and the limited scope of this agreement make the presence of Fire Support Liaison Officers essential (See Chapter 11).

203. When calling for Naval Surface Fire Support, the procedure in ATP-4 should be used.

204. Terms and definitions, used in this chapter, may be found in the NATO Artillery Glossary (AAP-38)

205. Throughout this chapter the word “gun” is used in its generic sense to include all indirect fire systems and the word “observer” is used to indicate the originator of a call for fire.

206. Calls for fire are requests unless prior authority has been granted to order fire:

- a. **Requests for Fire:** The FDC/CP will determine the units to fire, the type and quantity of ammunition (except if specified in the CFF due to ROE, for example) to be expended, and any other appropriate data and tell the observer.
- b. **Orders for Fire:** The observer may order fire from the fire unit(s) he has been authorized to control.

SECTION II

ELEMENTS OF A CALL FOR FIRE

207. The call for fire is divided in THREE PARTS:

- a. Warning Order consisting of
 - (1) Observer identification
 - (2) Warning Order
- b. Location of target (including direction when necessary).
- c. Target & Conduct of fire consisting of
 - (1) Target description.
 - (2) Complementary Data
 - (3) Method of fire and method of control

208. The sequence of the elements of a call for fire is mandatory for opportunity fire. It is not necessary to await completion of all the elements before beginning the transmission of a call for fire. The THREE parts are sent separately and subsequently to avoid any confusion and to stress the importance of each part.

209. Warning Order – Part ONE

The warning order for the opportunity fire consists of

- a. **Observer Identification (mandatory):** This is the establishment of communication between the observer and the FDC/CP.
- b. **Mission type (mandatory):** "Fire Mission".
The type of mission may be substituted for, or added to, the Warning Order. This could include:
 - * Adjust Fire (Not yet in A Arty P-3)
 - * Fire for Effect (Not yet in A Arty P-3)
 - * Polar (Not yet in A Arty P-3)
- c. **Target number (mandatory):** TWO letters followed by FOUR digits.
- d. **Numbers of gun (conditional) :** amount of guns or fire units that will fire in fire for effect.
It is not mentioned if an effect will be asked later on in the call for fire (normal way). It will be specified for mission as mark or mark illuminating where one gun is firing to indicate a target for example.
- e. Example: "S9C27 this is S9C37 Fire mission on KT2564 over"

210. Location of Target – Part TWO

The location of the target may be given, in order of priority in one of the following ways. :

a. **By Grid Coordinates (the normal method of circulation by national FDC to other nations and the only option if working with both ADP and non ADP artillery units.):**

- (1) The grid will be given in terms of Easting followed by Northing, preceded by the word "Grid", to the degree of accuracy required by the type of engagement.
Easting = THREE to FIVE digits
Northing = THREE to FIVE digits
- (2) Altitude (in meters) is normally given by the observer. If it is not given, it is determined in the FDC/CP. Altitude (eventually preceded by MINUS if below sea level) and introduced by the word "Altitude".
- (3) Target grid zone will be given in TWO digits introduced by the word "Zone". The digits will be preceded by "Minus" if located in the southern hemisphere. (optional)
- (4) Examples
"GRID 14910 52360 Altitude 256 Zone 32 over"

b. **By Reference/Shift from a Target Number (not in A Arty P-3):**

- (1) The designation and location of the target/Target Number, must be known to both the observer and the FDC/CP. The reference/shift from the known point will include the direction, horizontal correction (shift) and the vertical correction (shift), if any, to the target. All corrections are expressed in meters except if specified otherwise.
- (2) Examples:
"From KT 1764, Direction 1200, Right 400, Drop 200, Up 50 over".
or
"Shift KT 1764. Direction 0400, Right 400, Drop 200, Up 50 over".

c. **By Polar Co-ordinates/Polar Plot (not in A Arty P-3):**

- (1) To be used only when the position of the observer is known by the FDC/CP. Polar co-ordinates consist of the direction, distance and vertical correction/shift, if any, from the observer's position to the target. A vertical correction/shift is accepted as being defined in meters unless specified otherwise. When using Polar co-ordinates the phrase "Fire Mission Polar" should be used during the warning order.
- (2) Examples:
"Direction 1240, Distance 2000, Up 50".
"Direction 1242, Distance 1795, Up 23 mils".

d. **By Target Number(not in A Arty P-3):**

The recorded target and associated location must be known to both the observer and the FDC/CP.

Example: "KT 1764"

211. **Direction. (not yet in A Arty P-3):**When the observer anticipates that he will be required to adjust or correct the fire, he will send a direction. The direction is normally the

grid bearing (measured in mils) from the observer to the target. If the direction is given in degrees, the word “degrees” must be stated. If the observer wishes to use the gun-target line (GT line) he will order “Direction GT”. If a direction is not ordered by an air-observer, the GT line is used. If the observer wishes to use an arbitrary reference line other than the line observer-target or gun-target, he will order it in the normal way, e.g. “Direction 1440”.

212. **Target description, complementary data and conduct of fire – Part THREE**

a. **Description**

The observer includes any or all of the following target features using the standard terminology as given in Annex A to present chapter and also gives the target size :

- (1) **Target Type (mandatory)**: Provides information over the type and subtype of the target.
Example: “Heavy Mortar”.
- (2) **Degree of Protection (conditional)**: Provides information relative to the target protection. The degree of protection is only mentioned for target type “Personnel”.
Example: “Prone”.
- (3) **Target size (mandatory)**: Defines the size of the target. The target can be either circular, in this case, we send a radius in meter or rectangular, in this case, we transmit a Length, a Width (both in meter) and an attitude (azimuth of the longest axis) or converge (means that all guns firing in effect will use one single impact point).
Example : “Radius 150” or “300 by 150 Attitude 1585”
- (4) **Target activity. (not yet in Aarty-P3)** Provides information relative to the activity of the target, e.g. “Preparing to move”.
- (5) **Example of target description with all subparts:**
”Heavy Mortar , Radius 150 over” Or
”Heavy mortar , 300 by 150, Attitude 1585 over”

b. **Target strength**

Amount of target elements (personnel, guns,...) to be fired on or within the defined target area . Expressed in ONE to FOUR digits.

c. **Report value accuracy (optional)**

One to three digits used to define the accuracy of the target location.

If nothing is stated, it is assessed that the conditions at FO are fulfilled to fire in effect.

d. **Trajectory type (optional)**

This is the order to define the trajectory. The orders that can be sent are “High angle or Low angle” fire. Comment: If no order is given the convention is to fire at low angle for howitzer and high angle for mortar units.

e. **Danger Close Missions (not in A Arty P-3)**

- (1) The FO adds “Danger close” after the target description.
- (2) The grid reference ordered will be the location of the target. Prior to adjustment the observer may order a correction to ensure that the first rounds do not

endanger friendly forces. The size of this correction may be varied to take account of caliber, ammunition, range from the guns to the target, rules of engagement and possible variations in muzzle velocities.

- (3) Deliberate corrections towards the target are used and fire is brought to a distance from friendly forces which is acceptable to the maneuver unit commander.

f. **Ammunition (optional)**

This element indicates the volume and eventually the type of ammunition. The FO will specify the ammunition if he wants to have a special effect (illuminating, smoke, WP). If nothing is specified, it will be determined by the FDC :

(1) **Number of Rounds**

Used to specify the numbers of rounds (rocket) to be fired in effect for each effector.

(2) **Type**

The observer could specify the "type of ammunition" required in effect. This ensures that the response is in accordance with the observers call for fire, which may differ from national default options. The ammunition consists of a shell and a fuze. Ammunition is specified in accordance with Annex B of the present chapter.

g. **Effect required (conditional)**

- (1) For traditional ammunition (HE, ICM) **and in ADP processing**, it defines the effect of the fire on the target and it is given by a percentage ranging from 1 to 30. The default effect is neutralization (thus between 10 and 29 %). If the effect is specified, the numbers of volleys, the rate (interval) and amount of guns can NOT be specified.
- (2) Some special effects may be asked in voice process as mark, mark illuminating, smoke, quick smoke, blinding in order to clarify the use of projectiles or the effect required.

h. **Method of fire and method of Control (mandatory)**

(1) Method of fire

- i "Fire for effect" (**not in A Arty P-3**): The FO requests the effectors to deliver the effects without adjustment.
- ii "Adjust Fire" (**not in A Arty P-3**) Fire is to be adjusted by the observer.
- iii "Battery Left (or Right)" (**not in A Arty P-3**) Individual guns are to be fired in sequence with a standard interval of five seconds. The interval may be changed by the observer specifying the interval required, e.g., "Battery Right 10 Seconds".
- iv "Continuous Illumination". (**not yet in A Arty P-3**) Rounds are fired at such an interval as to maintain uninterrupted illumination of the target area, e.g. "Continuous Illumination".
- v "Co-ordinated Illumination". (**not yet in A Arty P-3**) Illumination rounds are fired, using an interval, so that the target area is illuminated at the time of

impact of other projectiles. It may be controlled by either the FO or the FDC/CP.

- vi “Continuous Fire”. **(not yet in A Arty P-3)** In field artillery and NSFS, loading and firing at a specified rate or as rapidly as possible consistent with accuracy within the prescribed rate of fire for the equipment. Fire will be continue until terminated by the command ‘End of Mission” or temporarily suspended by the command “Cease Loading” or “Check Fire”.

(2) Methods of controls

- i **“At my command”** (followed by) “Fire” is used when the observer wishes to control the moment of firing for any reason. The order “Fire” is given after the fire unit has reported “Ready” and/or when the observer wishes to fire.
- ii **“Restricted when ready”**: when the observer gives the clearance for firing from a specific time (FOUR digits defining the earliest time) and a amount of minutes (maximum THREE digits) to defines the validity. It allows the FDC/CP to command the fire in order to have a volley deliver at the considered level (section, platoon, battery or higher) Example: “ Restricted when ready, from 2359, for 65 minutes”.
- iii **“Time on target”** (TOT) is the control of firing on a target in which various artillery units, mortars and naval gunfire support ships so time their fire as to ensure the initial rounds strike the target simultaneously at the time required. The observer has to specify the time (expressed in FOUR digits). Example : “ TOT 1525”
- iv **“Time to fire”**: it defines the time (expressed in FOUR digits) when the first volley has to leave the effectors platform.
- v **“When ready”** is the clearance to fire given by the observer at effectors level that allow the effectors to deliver the volleys when they are ready without waiting the firing readiness of the section, platoon, battery. It's the chosen method if the urgency of fire is paramount.

(3) Firing interval (conditional)

It allows the observer to define the time interval between the volleys to be fired. It is expressed in seconds with a maximum of THREE digits. Example : “Interval 5 rounds 20 secs”

(4) Duration of fire (optional)

This is a term used to specify the duration for the delivery of the required effect. It is expressed in minutes with a maximum of THREE digits. It will be mainly used for smoke or illuminating. It is normally defined as a period of time but can be defined as a start and an end time.

SECTION III

MESSAGE TO OBSERVER

213. Message to Observer. When the observer's call for fire is received, the FDC/CP to which it has been directed will prepare and transmit a message to observer as soon as possible. The message to observer may include the elements shown in the table below. When any element has been specified by the observer in his call for fire, it may be omitted from the message to observer, if the FDC/CP can meet the observer's requirements, otherwise it must be included. If the request for fire cannot be met the FDC/CP will report "Can not comply" plus the reason (see section IV below).

Serial	Element	Remarks
(a)	(b)	I
1	Call sign originator (M)	
2	Target number (M)	As given by the FO in its call for fire
3	Amount of guns (M)	Maximum TWO digits to define the amount of guns firing in effect
4	Number of rounds from each gun for fire for effect (M)	The amount of ammunition is specified if different of these requested by the FO in its call for fire or if it was not bot specified in the call for fire.
5	Projectile and/or Fuze (O)	If a type of ammunition is not specified in the call for fire, the best possible projectile/fuze combination aking into account the target description and size will be fired, il will be sent to the FO. A report must also be made if the FDC/CP changes the type of ammunition requested by the FO or cannot comply with the order.
6	Method of fire (M)	The FDC/CP only reads back the method commanded by the FO or modify it if not applicable. ONLY in voice procedure
7	Method of control (M)	The FDC/CP only reads back the method commanded by the FO or modify it if not applicable.
8	Observer data (O)	"Time of flight" is always sent for High angle mission, for an air observer, a mix of different projectiles (e.g. illuminating with HE shells) It can be repeated if there is major change after the command "Shot". Error probable in range expressed in meter.

Note : M = mandatory – O = Optional

SECTION IV

FIRE MISSION COMMANDS

214. Fire mission commands

It allows the FO conducting fire to interrupt the fire or the FDC/CP to warn the FO of the completion of fire.

a. Warning Part

(1) Originators Identification (mandatory)

This is the establishment of communication between the observer and the FDC/CP.

(2) Mission type (mandatory)

"Fire Mission Command"

(3) Target number (mandatory)

To identify the target to which the message is related

b. FO fire commands

(1) "Cease Loading"

The command used during firing two or more rounds to mean that the guns are not to be reloaded. Fire shall be brought to an end with bores (barrels) clear.

(2) "Check Firing"

A command to cause a temporary halt in firing while all other drills continue.

(3) "Fire"

A command use to ask the delivery of a fire for which the method of control was "At my command" or to command an objective belonging to a fire plan.

(4) "Cancel"

(a) The series (1) and (2) are annulated by sending "Cancel cease loading" or "Cancel check firing".

(b) Can also be used to cancel other orders. (Not with target grids)

(5) "End of mission"

The observer send "End of mission" to specify the mission will be considered as ended after completion of the fire.

(6) "Battle damage assessment"

BDA can be transmitted in plain text or in code, see Annex C for possible option. The number of casualties or destroyed vehicles may added using a maximum of FOUR digits. It can be sent just before sending end of mission.

(7) "Stop" (not in A Arty P-3)

This order caused the halt of ALL activities in case of safety incidents and is lifted by "Cancel stop". It is always sent on voice net and transmitted at all levels.

Comment: BEL, DNK, HUN and POL use this term.

(8) "Repeat" (not in A Arty P-3)

During the adjustment, it is given to ask for another round(s) at the last data, coupled with any change in number of guns and/or ammunition, if necessary.

- During Fire for Effect, it is given to ask for the same number of rounds using the same method of fire for effect as last ordered.

Comments:

* Changes may be made to the number of guns, the interval and the ammunition.

* Target grid corrections at FFE may also be coupled with this order.

(9) **Example**

"SC27 this is SC37 Fire mission command Fire for KT1589 over

c. **Report to observer (given after a call for fire or message to observer)**

(1) **"Ready"**

The term to indicate that a weapon or weapons are aimed, loaded and/or prepared to fire.

(2) **"Rounds complete"**

"Rounds Complete" is always reported when fire for effect is completed except when firing the method of fire "Adjust Fire".

(3) **"Cannot comply"**

The FDC/CP warns the FO is not able to deliver the requested fire or effect; it also tells the reason.

(4) **"Shot"**

It is reported for the first round of adjustment or the first fire for effect volley.

(5) **"Splash" (not in A Arty P-3)**

"splash" is reported by convention, five seconds prior to predicted time of impact when:

firing high angle, an air observer is controlling the mission, requested by a ground observer.

Notes

-If an observer requires an alteration to the interval of five seconds, he couples the alteration with "Report Splash", e.g., "Report Splash 10".

-USA and ESP always report "Splash".

(6) **"Neglect" (not in A Arty P-3)**

It is reported when for any reason a shell is fired at incorrect data or with incorrect ammunition. Another shell or shells is fired at the correct data without any order from the observer. Unless "At My Command" is in force, or during a "danger close" mission.

(7) **"Target Recorded"(not in A Arty P-3)**

This may be reported by the FDC/CP when it has recorded the data of the fire mission.

(8) **Example**

"SC37 this is SC27 Fire mission command shot on KT1589 over"

SECTION V
ADJUSTMENT OF ARTILLERY FIRE
GENERAL

215. This section describes on one hand the agreed procedure when dealing with ADP artillery units and the agreed simplified procedures to be used for the adjustment of ground force artillery fire by ground or air observer.

The two adjustment procedures are:

- a. The Automated Data Process (ADP) procedure.
- b. The NON-ADP procedures

ADP PROCEDURE

216. The procedure is given to allow the FO not equipped with ADP system to conduct adjustment, to repeat the fire or to terminate the mission with a FDC/CP equipped with ADP system. All details can be found in Aarty-P3.

217. Warning Order – Part ONE

The warning order for the opportunity fire consists of

- a. Observer Identification (mandatory): This is the establishment of communication between the observer and the FDC/CP.
- b. Mission type (mandatory): “Fire Mission Sub”.
- c. Target number (mandatory): TWO letters followed by FOUR digits.
- d. Trajectory type (optional): Default the same as in the original CFF.

e. Ammunition (optional)

This element indicates the volume and eventually the type of ammunition. It will only be transmitted if different from original request

If nothing is specified, it will be determined by the FDC :

(1) Number of Rounds:

Used to specify the numbers of rounds (rocket) to be fired in effect.

(2) Type

The observer could specify the “type of ammunition” required in effect. This ensures that the response is in accordance with the observers call for fire, which may differ from national default options.

The ammunition consists of a shell and a fuze.

Ammunition is specified in accordance with Annex B of the present chapter.

218. Location of Target – Part TWO

The FO will send the coordinates of the corrected point by Grid Coordinates:

- a. The grid will be given in terms of Easting followed by Northing, preceded by the word "Grid", to the degree of accuracy required by the type of engagement.
Easting = Up to FIVE digits
Northing = Up to FIVE digits
 - b. Altitude (in meters) is normally given by the observer. If it is not given, it is determined in the FDC/CP.
Altitude consists of maximum FIVE digits (eventually preceded by MINUS if below sea level) and introduced by the word "Altitude".
 - c. The target grid zone will be transmitted if different from the reference call for fire. Target grid zone will be given in TWO digits introduced by the word "Zone". The digits will be preceded by "Minus" if located in the southern hemisphere.
219. Method of fire, method of control, complementary data – Part THREE
- a. Method of fire (optional)
It will only be mentioned if different from original call for fire. For details, see above.
 - b. Method of Control (optional)
It will only be mentioned if different from original call for fire. For details, see above.
 - c. Firing interval (optional)
It will only be mentioned if different from original call for fire. For details, see above.
 - d. Duration (optional)
It will only be mentioned if different from original call for fire. For details, see above.

NON ADP PROCEDURE

220. **Observer.** The observer observes and corrects fire relative to a spotting line (called the Direction), which may be:
- a. When the observer anticipates that he will be required to adjust or correct the fire, he will send a direction. The direction is normally the grid bearing (measured in mils) from the observer to the target and is sent in FOUR digits. If the direction is given in degrees, the word "degrees" must be stated.
 - b. If the ground observer wishes to use the gun-target line (GT line) he will order "Direction GT". If a direction is not ordered by an air observer, the GT line is used. If the observer wishes to use an arbitrary reference line other than the line observer-target or gun-target, he will order it in the normal way, example: "Direction 1440".
 - c. The FO will send the use direction just prior the first correction.

d.

221. TARGET GRID PROCEDURE

a. **Corrections**

The following corrections are used in relation to the target and the direction/spotting line:

b.

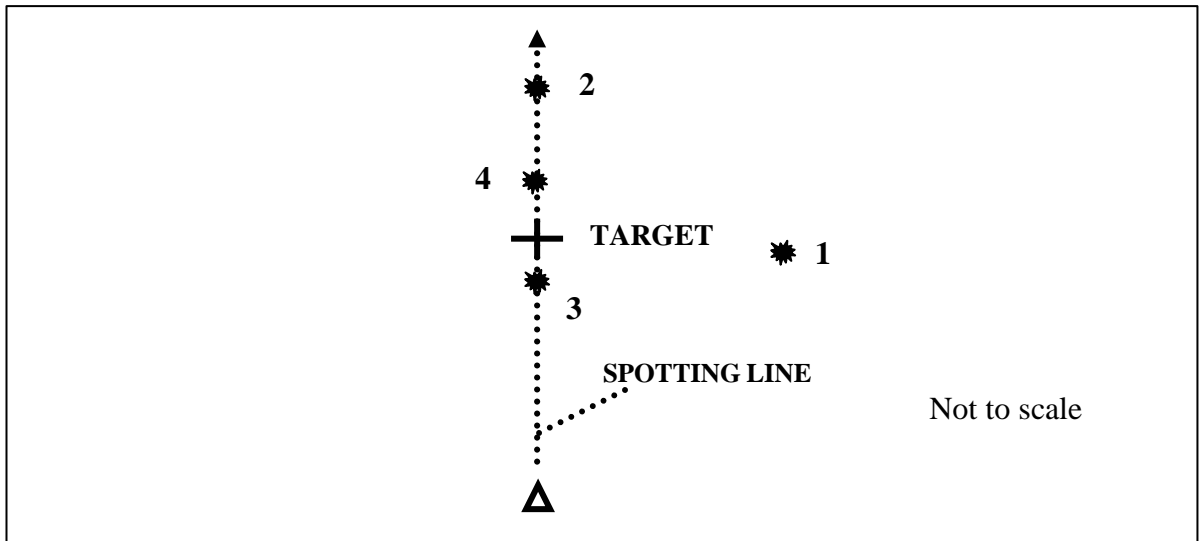
POSITION OF ROUND	CORRECTIONS	UNIT
Right of line	Left	Meter
Left of line	Right	Meter
Beyond target (over)	Drop	Meter
Short of target (short)	Add	Meter
Below desired height of burst	Up	Meter
Above desired height of burst	Down	Meter

Notes: The up/down corrections apply to either time air burst or to a change in target altitude.

c. **Adjustment: The adjustment procedure consists of two stages:**

- (1) Stage I – Correcting fire on to the spotting line.
- (2) Stage II – Bracketing along the spotting line until a suitable adjustment is obtained.

d. An example of adjustment is as follows:



POSITION OF ROUND	CORRECTIONS
1. Round one or first series of rounds fell to the right 2. Round two or second series of rounds fell on the line and over 3. Round three or third series of rounds fell short. 4. Round four or fourth series of round fell over	Left 200 over. Drop 200 over. Add 100 over. Drop 50, 5 Rounds Fire for Effect over

Note:

- * The third and fourth round or series of rounds constitute the 100 meter bracket on the spotting line.
- * When the observer is experienced he will combine the actions of serials 1 and 2 above.

222. LASER RANGE FINDER (LRF) PROCEDURE

Corrections: If the observer indicates a target using polar coordinates, fire can be adjusted by one of the following procedures.

- a. Target Grid Adjustment.
 The FO gives one unique correction consisting of one correction in direction (left or right) and one correction in distance (add and drop). Both parts are not mandatory (depending on the observation) but both are expressed with a precision of one meter.
- b. Laser Range Finder (LRF) Adjustment. LRF adjustment may be conducted in the following ways:

- (1) Lazing the point of burst/impact of a single round and then sending the Direction, Distance and Vertical Angle to the FDC.

- (2) Using multiple rounds the observer lazes the point of burst/impact of each round and sends the mean Direction, Distance and Vertical Angle to the FDC.
- (3) Using multiple rounds the observer lazes the mean point of impact and sends the Direction, Distance and Vertical Angle to the FDC.
- c. This initial correction is usually accompanied by an order for FFE

Note: DEU does not use the LRF Adjustment procedure.

SECTION VI

SPECIAL PROCEDURES

223. Call for fire – Fire Plan objective

The procedure sounds as follows

- a. Originator Identification (mandatory): This is the establishment of communication between the observer and the FDC/CP.
- b. Mission type (omitted): "Fire Mission Command"
- c. Command (mandatory): "Fire for effect on"
- d. Fire plan name (mandatory) : one to six alphanumeric characters
- e. Target number (mandatory): TWO letters followed by FOUR digits.
- f. The FO will send the direction to warn the FDC that he is ready to observe or can not observe in case of problem.
- g. Example
"SC27 this is SC37 Fire for effect on KT1589 from target list TL2568 over"

224. Call for fire – Target registration (not in Aarty-P3)

This special procedure is initiated by FDC/CP when there is a problem to process calculation on a target belonging to a fire plan (for example arbitrary grid). The procedure sounds as follows

- a. Originator Identification (mandatory): This is the establishment of communication between the observer and the FDC/CP.
- b. Mission type (omitted): "Fire Mission Command"
- c. Command (mandatory): "Target registration on"
- d. Fire plan name (mandatory) : one to six alphanumeric characters
- e. Target number (mandatory): TWO letters followed by FOUR digits.
- f. The FO will send the direction to warn the FDC that he is ready to observe or can not observe in case of problem.
- g. Example
"SC27 this is SC37 Target registration on KT1589 from target list TL2568 over"

225. Call for fire – Registration Fire (not in Aarty-P3)

Ordered whenever survey or meteorological data is not available, is suspect or is known to be inaccurate. Normally the FDC directs the observer to conduct a registration mission

on a designated point. However, the observer may be directed to select the registration point. The procedure sounds as follows

- a. Originator Identification (mandatory): This is the establishment of communication between the observer and the FDC/CP.
- b. Mission type (omitted): "Fire Mission Command"
- c. Command (mandatory): "Registration fire on"
- d. Reference point (mandatory): TWO letters followed by FOUR digits.
- e. Example
"SC27 this is SC37 Fire for effect on KT1589 from target list TL2568 over"

ANNEX A TO
CHAPTER 2

TARGET TYPE AND SUBTYPE

CODE	TYPE	SUBTYPE	CODE	TYPE	SUBTYPE
01	Air Defense Artillery	Unknown	54		Very Heavy
02		Light	55		Position
03		Medium	56	Personnel	Unknown
04		Heavy	57		Infantry
05		Missile	58		Observation Post
06		Position	59		Patrol
07	Armor	Unknown	60		Work Party
08		Light	61		Position
09		Medium	62	Rockets/Missiles	Unknown
10		Heavy	63		Anti-personnel
11		Armored Personnel Carrier	64		Light Missile
12		Position	65		Medium Missile
13	Artillery	Unknown	66		Heavy Missile
14		Light	67		Antitank
15		Medium	68		Position
16		Heavy	69	Supply Dump	Unknown
17		Position	70		Class 5
18	Assembly Areas	Unknown	71		Class 3
19		Troops	72		Class 4
20		Troops and Vehicles	73		Class 1
21		Mechanized Troops	74		Class 2
22		Troops and Armor	75	Terrain Features	Unknown
23	Building	Unknown	76		Road
24		Wood	77		Road Junction
25		Masonry	78		Hill
26		Concrete	79		Defile
27		Metal	80		Landing Strip
28		Special Purpose	81		Railroad
29	Bridge	Unknown	82	Vehicle	Unknown
30		Foot Pontoon	83		Light Wheeled
31		Vehicle Pontoon	84		Heavy Wheeled
32		Concrete	85		Reconnaissance
33		Wood	86		Boats
34		Steel	87		Aircraft
35		Site	88		Helicopter
36		Raft	89	Weapons	Unknown
37		Ferry	90		Light Machine Gun
38	Center	Unknown	91		Antitank Gun
39		Small	92		Heavy Machine Gun
40		Battalion	93		Recoilless Rifle
41		Regiment			
42		Division			
43		Forward			
44	Equipment	Unknown			
45		Radar			
46		Electronic Warfare			
47		Search-light			
48		Guidance			
49		Loud-speaker			
50	Mortars	Unknown			
51		Light			
52		Medium			
53		Heavy			

DEGREE OF PROTECTION

CODE	FIRST VOLLEY	SUBSEQUENT VOLLEYS	VOICE EQUIVALENT
1	Half Prone, Half Standing	All Prone	Standing
2	Prone	Prone	Prone
3	Prone	Dug In	Mix Dug in
4	Prone	Under Overhead Cover	Mix Overhead
5	Dug In	Dug In	Dug In
6	Under Overhead Cover	Under Overhead Cover	Overhead

ANNEX B TO
CHAPTER 2

PROJECTILE AND FUZE CODE

WPN TYPE	PROPELLANT CODE	PROJECTILE CODE	FUZE CODE
60MM		HEA = High Explosive HED = Anti-Personnel & Anti-Material Submunitions SMK = Smoke WP = Smoke White Phosphorous ILL = Illuminating IIR = Illuminating Infra Red ILL = Illuminating	PD = Point Detonation TI² = Time Action
81MM		HEA = High Explosive RP = Smoke Red Phosphorous WP = Smoke White Phosphorous ILL = Illuminating	PD = Point Detonation TI = Time Action PDD = Point Detonation Delay MRF = Multi-Role Fuze MRP = Multi-Role Fuze Point Detonation MRT = Multi-Role Fuze Time MRV = Multi-Role Fuze Variable Time MRF = Multi-Role Fuze MRP = Multi-Role Fuze Point Detonation MRT = Multi-Role Fuze Time MRV = Multi-Role Fuze Variable Time MRD = Multi-Role Fuze Delay
82MM 98MM		HEA = High Explosive HEA = High Explosive HEI = ATICM Anti-Tank Submunitions	PD = Point Detonation PD = Point Detonation PDD = Point Detonation Delay MRF = Multi-Role Fuze MRP = Multi-Role Fuze Point Detonation MRT = Multi-Role Fuze Time MRV = Multi-Role Fuze Variable Time MRD = Multi-Role Fuze Delay
105MM		HEA = High Explosive HEC = APICM Anti-Personnel Submunitions RP = Smoke Red Phosphorous WP = Smoke White Phosphorous ILL = Illuminating SMK = Smoke	CP = Concrete Piercing PD = Point Detonation PDD = Point Detonation Delay TI = Time Action VT = Variable Time VTD = Variable Time Desensitized MRF = Multi-Role Fuze MRP = Multi-Role Fuze Point Detonation MRT = Multi-Role Fuze Time MRV = Multi-Role Fuze Variable Time MRD = Multi-Role Fuze Delay
120MM		HEA³ = High Explosive HEI = ATICM Anti-Tank Submunitions SMK = Smoke WP = Smoke White Phosphorous ILL = Illuminating IIR = Illuminating Infra Red HER = Rocket Assisted LEA = Leaflet/Propaganda	PD = Point Detonation MRF = Multi-Role Fuze MRP = Multi-Role Fuze, Point Detonation MRT = Multi-Role Fuze Time MRV = Multi-Role Fuze Variable Time MRD = Multi-Role Fuze Delay TI = Time Action PDD = Point Detonation Delay ⁴ VT = Variable Time
122MM		HEA = High Explosive SMK = Smoke WP = Smoke White Phosphorous ILL = Illuminating	PD = Point Detonation MRF = Multi-Role Fuze MRP = Multi-Role Fuze Point Detonation MRT = Multi-Role Fuze Time MRV = Multi-Role Fuze Variable Time MRD = Multi-Role Fuze Delay

² TI includes both Mechanical and Electronic time fuzes.

³ For ITA this includes the practice round.

⁴ This includes Short Delay and Delay.

WPN TYPE	PROPELLANT CODE	PROJECTILE CODE	FUZE CODE
152MM		HEA = High Explosive ILL = Illuminating HED = DPICM Anti-Personnel & Anti-Material Submunitions SMK = Smoke HED = DPICM Anti-Personnel & Anti-Material Submunitions	PD = Point Detonation MRF = Multi-Role Fuze MRP = Multi-Role Fuze Point Detonation MRT = Multi-Role Fuze Time MRV = Multi-Role Fuze Variable Time
155MM	GREEN WHITE XRNGA = (Extended Range Type A) XRNGB = (Extended Range Type B) XRNGC = (Extended Range Type C)	HEA = High Explosive ⁶ HEB = Improved High Explosive HED = DPICM Anti-Personnel & Anti-Material Submunitions HEI = ATICM Anti-Tank Submunitions HER = Rocket Assisted AML = Anti-Materiel Mine, Long Delay AMS = Anti-Materiel Mine, Short Delay APL = Anti-Personnel Mine, Long Delay APS = Anti-Personnel Mine, Short Delay RP = Smoke Red Phosphorous WP = Smoke White Phosphorous ILL = Illuminating SMK = Smoke HEA = High Explosive JED = DPICM Anti-Personnel & Anti-Material Submunitions JEE = ATCMS Anti-Material & Anti-Personnel JEH = Reduced Range Practice Rocket JEM = DEU/GBR Reduced Range Practice Rocket JMT = Anti-Tank Mine JTA = MLRS Terminally Guided Warhead JTB = MLRS SADARM JTC = ATCMS Brilliant Anti-Tank JEL = Extended Range Rocket HEA = High Explosive	PDD = Point Detonation Delay ⁵ TI = Time Action CP = Concrete Piercing PD = Point Detonation PDD = Point Detonation Delay TI = Time Action VT = Variable Time VTD = Variable Time, Desensitized MRF = Multi-Role Fuze MRP = Multi-Role Fuze, Point Detonation MRT = Multi-Role Fuze Time MRV = Multi-Role Fuze Variable Time MRD = Multi-Role Fuze Delay
203MM MLRS		HEA = High Explosive JED = DPICM Anti-Personnel & Anti-Material Submunitions JEE = ATCMS Anti-Material & Anti-Personnel JEH = Reduced Range Practice Rocket JEM = DEU/GBR Reduced Range Practice Rocket JMT = Anti-Tank Mine JTA = MLRS Terminally Guided Warhead JTB = MLRS SADARM JTC = ATCMS Brilliant Anti-Tank JEL = Extended Range Rocket HEA = High Explosive	PD = Point Detonation PDD = Point Detonation Delay MRD = Multi-Role Fuze Delay TI = Time Action VT = Variable Time
122MM MLRS		HEB = Improved High Explosive ⁷ HEI = ATICM Anti-Tank Submunitions JMT = Anti-Tank Mine HEA = High Explosive JED = DPICM Anti-Personnel & Anti-Material Submunitions	PD = Point Detonation PDD = Point Detonation Delay MRD = Multi-Role Fuze Delay TI = Time Action VT = Variable Time
140.5MM MLRS		HEA = High Explosive JED = DPICM Anti-Personnel & Anti-Material Submunitions	VT = Variable Time

1. Fuze Codes to be used in AFU.AMS
2. Fuze Codes to be used in FM.CFF, FM.MTO, FM.SUB, NNFP.FP

⁵ This includes Short Delay and Delay.

⁶ For NLD this includes the practice round.

⁷ This includes ball fragmented HE.

ANNEX C TO
CHAPTER 2

VULNERABILITIES CATEGORIES

CODE	DEFINITION
1	Casualties to Personnel in Open
2	Casualties to Personnel in Tanks
3	Casualties to Personnel in APCs
4	Casualties to Personnel in Wheeled Vehicles
5	Casualties to Personnel in Earth Shelters
6	Casualties to Personnel in Foxholes
7	Moderate Damage to Exposed Wheeled Vehicles
8	Moderate Damage to Shielded Wheeled Vehicles
9	Moderate Damage to Towed Artillery
10	Moderate Damage to Tanks, APCs, and SP Artillery
11	Moderate Damage to Hard Fixed Bridges
12	Moderate Damage to Soft Fixed Bridges
13	Severe Damage to Supply Depots
14	Severe Damage to Randomly Parked Cargo/Transportation Helicopters
15	Severe Damage to Randomly Parked Light Observation Helicopters

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CHAPTER 3

RADIO TELEPHONE PROCEDURES FOR THE CONDUCT OF ARTILLERY FIRE

SECTION I

GENERAL

301. The passing of calls for fire by radiotelephone demands absolute accuracy and speed. Standardized radiotelephone procedures, correctly applied, increase communications security, decrease the possibility of confusion and shorten the response time of artillery support.

302. The aim of this chapter is to describe the standardized radiotelephone procedures to be used between artillery observers and artillery fire direction centres when calling for fire.

- a. NATO forces will follow the principles described in this chapter when one nation calls for fire from the artillery of another nation using standard calls, terms, procedures and commands.

SECTION II

GENERAL PROCEDURES

303. **Language.** For multi-national operations the working language is normally English. Whenever the national language of the observer is different from that used in the Fire Direction Centre (FDC), it is advised that a fire support liaison officer be attached to the FDC to assist in interpretation.

304. **Phonetic Alphabet.** When necessary to help identify any letter of the alphabet, the standard phonetic alphabet is used (See ACP 125).

305. **Pronunciation of Numerals.** The rules for pronunciation of numerals in ACP125 will be observed, including the rule for the conduct of artillery fire, where the pronunciation of whole hundreds is to be "hundred" instead of "one zero zero". For example:

Numeral	Spoken as
100	ONE -HUNDRED
500	FIVE-HUNDRED

306. **Use of default Values.** In calls for fire between observers and FDC's of different nations, knowledge of national defaults is not to be assumed. This means for fire missions at battalion level and above, that the observer will always describe the target and the FDC will, if possible, report the projectile and fuze function, which will be used at the FFE.

307. **Deviations from ACP 122 and 125.** The radiotelephone procedure used for the adjustment of field artillery fire deviates somewhat from communication procedures published in ACP 122 and 125 in that abbreviated procedure is used in those instances where no confusion will exist. The deviations normally consist of one or more of the following:

a. After the identification phase (included in the warning order of the call for fire), the call sign is NOT repeated anymore.

Under certain circumstances, when identification is required, transmissions are identified by the use of call sign suffix words, letters or numbers only. (FRA identifies all transmissions by the use of call sign and number).

b. A short phrase read-back method of transmission is automatically accomplished without the special operating instruction "READ BACK".

c. Divergence from the normal or abbreviated normal message format. Examples of radiotelephone procedures used for the adjustment of field artillery are given in section V.

308. **Short Phrase Read Back Procedures:**

a. To facilitate the transmission of firing data and to standard requests for repetition which otherwise might be necessary the call for fire, message to

observer, subsequent corrections and fire commands will, where applicable, be transmitted in short phrases consisting of one or more elements of firing data.

b. Each phrase is read back by the receiving operator, without operating instructions to do so, exactly as it was received.

c. The length of each phrase, or the number of elements of firing data included in each transmission should be commensurate with the state of training and experience of the individuals concerned and established procedure.

309. **Examples.** Examples of general procedures are given at in examples 1-6 of the section V below.

SECTION III

SPECIAL APPLICATIONS

310. **General.** There are four instances of special application of the use of radiotelephone in the adjusting of artillery fire of sufficient note to warrant illustrating their use. These are:

- a. The use of a relay station between the artillery forward observer (FO) and FDC.
- b. The use of "SPLASH".
- c. Radiotelephone procedures used in conducting simultaneous missions.
- d. The transmission of fire commands between the FDC and the firing battery(s).

311. **Relay Procedures.** In circumstances where direct radio contact between the FO and FDC cannot be established because of distance, terrain etc., the relay procedure, as given in examples 7-9 of the section V, is to be used.

312. **Splash.** In circumstances where the warning "SPLASH" must be transmitted to the FO, the radiotelephone procedure described in the example 10 of section V will apply.

313. **Simultaneous Missions.** On radio channels where different languages are being used, every effort should be made to avoid using simultaneous procedures (e.g., use of alternative channel), however, there are times when it becomes necessary to fire two or more missions simultaneously on the same fire direction channel. When this situation arises, it is necessary that stations identify their transmissions in order to avoid confusion. All stations, when sending or transmitting, use their one suffix number. In this situation the procedure as shown in example 11 of the section V will apply.

314. **Fire Commands.** National procedures will be used for fire commands between the FDC and the firing batteries. (This assumes that liaison is established at FDC level).

SECTION IV

CHALLENGE AND AUTHENTICATION

315. Challenge and authentication should be considered a normal element of initial requests for fire. The FDC inserts the challenge in the last repeat sequence of the fire request transmission. The observer transmits the correct authentication reply to the FDC immediately following the challenge

316. Subsequent adjustment(s) of fire will be challenged by the fire direction officer or equivalent when in his judgment such a challenge is appropriate and feasible. He must consider security, friendly troop safety, communications, deception and fire support responsiveness to the maneuver force.

- b. Under no circumstances should challenge and authentication reduce fire support responsiveness. When an artillery battery is in a unique high response posture, challenge and authentication may be deferred beyond execution of the initial fire request, but should be accomplished as soon as operationally feasible.

SECTION V

EXAMPLE PROCEDURES

The Forward observer (FO) should make a preliminary call to the Fire Direction Centre/Command Post (FDC/CP) in order to establish communications and to warn of an imminent call for fire.

EXAMPLE 1: WARNING ORDER

Forward Observer (C/S S9C37)	FDC/CP (C/S S8C27)	Remarks
"S8C27, This is S9C37 Fire Mission on target number KT 2015 Over"	" S9C37, This is S8C27 Fire Mission on target number KT 2015 Out"	Note: During mortar procedures an alternate frequency may be assigned to link the observer with the fire unit.

Notes:

*USA call signs and USA artillery battalion organizations are used throughout these examples. Each nation will use its own call signs and organization.

*Other elements (target type, adjustment mission) may be included with the warning order.

EXAMPLE 2a: COMMUNICATIONS NOW ESTABLISHED, THE FO CONTINUES WITH THE CALL FOR FIRE – Applicable when not using ADP systems.

Forward observer (C/S S9C37)	FDC/CP (C/S S8C27)	Remarks
"From KU1234, Direction 5690, Right 600, Add 800, Up 20, Over" "Heavy Armor, radius 80, strength 5, Adjust Fire, At my command, Over" "I authenticate 76 Over"	"From KU1234, Direction 5690, Right 600, Add 800, Up 20, Out" "Heavy Armor, radius 80, strength 5 , Adjust Fire, At my command, Out" "Authenticate 44 Over" "Correct/wrong Out"	Not in ADP process Note: Authentication needs to be regulated by written orders (fire support communications).

Notes:

- c. Voice call signs are dropped after communication has been established.

EXAMPLE 2b: COMMUNICATIONS NOW ESTABLISHED, THE FO CONTINUES WITH THE CALL FOR FIRE – ADP or non ADP procedure

Forward observer (C/S S9C37)	FDC/CP (C/S S8C27)	Remarks
"GRID 14789 93658, Altitude 250, Zone 31 Over" "Heavy Armor, radius 80, strength 5, effect 15, Fire for effect, At my command, Over"	"GRID 14789 93658, Altitude 250, Zone 31 Out" "Heavy Armor, radius 80, strength 5, effect 15, Fire for effect, At my command, Out"	

2. When there is an alternative means of communication or a separate fire direction channel available to the FO, FDC and firing units, the transmission of call signs **is** not necessary. The target number should be included if more than one fire mission is being engaged at the-same time.

- d. The transmission of the target number is advisable when radio is being used and a separate fire direction channel is not available, when communications are difficult or when multiple missions are being fired.

EXAMPLE 3: MESSAGE TO OBSERVER

FDC/CP (C/S S8C37)	Forward observer C/S S9C27)	Remarks
"This is S8C37 on KT 2015, 8 guns in effect firing Two Rounds HEI, At my command, time of flight 45, Over"	"This is S8C27 on KT 2015, 8 guns in effect firing Two Rounds HEI, At my command, time of flight 45, Out"	<ol style="list-style-type: none"> 1. The adjusting fire unit may be indicated. 2. The ammunition type must be sent. Standard defaults for the projectile type is not advisable.

EXAMPLE 4a: SUBSEQUENT CORRECTIONS – Applicable when not using ADP systems.

FDC/CP (C/S S8C27)	Forward observer (C/S S9C37)	Remarks
"Direction 2565 Out" "Shot , Over" "Left 100, Drop 400, Out" "Shot, Over" "Say Again, Over" "Add 200, Out" "Shot, Over" "Add 100, Out" "Shot, Over" "Drop 50, Fire for Effect, Out"	"Direction 2565 over" "Shot , Out" "Left 100, Drop 400, Over" "Shot, Out" "Add 200, Over" "I say again, Add 200, Over" "Shot, Out" "Add 100, Over" "Shot, Out" "Drop 50, Fire for Effect, Over"	

EXAMPLE 4b: SUBSEQUENT CORRECTIONS – ADP or non ADP procedure

FDC/CP (C/S S8C27)	Forward observer (C/S S9C37)	Remarks
"S8C27 this is S9C37 fire mission sub on KT2015 Out" "GRID14189 93858, Altitude 250, Zone 31 Out"	"S8C27 this is S9C37 fire mission sub on KT2015 Over" "GRID14189 93858, Altitude 250, Zone 31 Over"	In part ONE and THREE, only the changing elements (munitions, method of control,etc) will be mentioned.

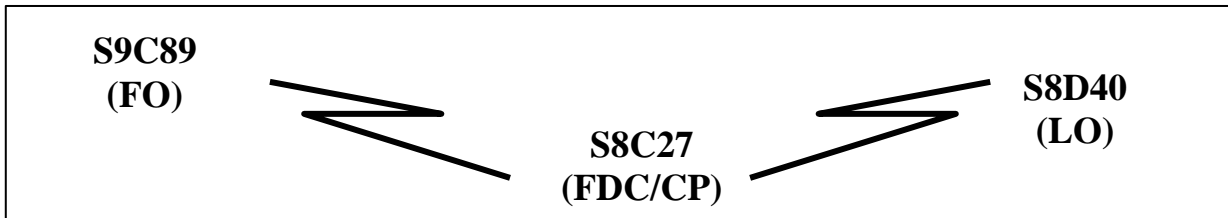
EXAMPLE 5: REPORT TO OBSERVER AFTER FIRE FOR EFFECT

FDC/CP IC/S S8C27)	Forward Observer (C/S S9C37)	Remarks
“Shot, Over”	“Shot, Out”	The FDC/CP informs the FP when the guns start the method of FFE.
“Rounds Complete, Over”	“Rounds Complete, Out”.	The FDC/CP informs the FO when the guns finish the method of FFE.

EXAMPLE 6: END OF MISSION AND BATTLE DAMAGE ASSESSMENT

FDC/CP IC/S S8C27)	Forward Observer (C/S S9C37)	Remarks
End of Mission, moderate damage to tank formation, Out”	“End of Mission, moderate damage to tank formation, Over”	The terms used in the BDA are summed up in annex C of chapter 2

EXAMPLE 7: RELAY PROCEDURES



Participants:

- a. In cases where the FO and FDC/CP are not in direct radio contact a third station that can communicate with both may relay the call for fire. In this example the Fire Support Officer (FSO) with a maneuver battalion is able to contact both the FO and the FDC/CP.
- b. When the FSO hears the FO transmit a preliminary call for fire but does not hear the FDC/CP respond, he automatically transmits the following:

Liaison Officer (C/S S8D40)	FDC/CP (C/S S8C27)	Remarks
“S8C27, This is S8D40, From S9C89, fire mission on KV 2412, Over”	“S8C27, fire mission on KV 2412, Out”	

Note: With communications established, the FO continues his Call for Fire. To permit the

originator to correct any mistakes done by the relay station (FSO in this example), a pause of five seconds is made between the relay station transmission and the read back. The example below applies when not using ADP systems.

Fire Support Officer (C/S S9D40)	FDC/CP (C/S S8C27)	FO (C/S S9C89)
<p>“S8D 40, From Registration point one, Direction 1940, Right 600, Over”</p> <p>“S8D40, Out”</p> <p>“S8D40, Infantry prone, 300 by 150, attitude 1456, strength 50, neutralize, adjust fire, when ready, Over”</p> <p>“S8D40, Out”</p>	<p>(Five second pause) “S8C27, From Registration point one, Direction 1940, Right 600, Over”.</p> <p>(Five second pause) “S8C27, Infantry prone, 300 by 150, attitude 1456, strength 50, neutralize, adjust fire, when ready, Over”</p>	<p>“From Registration point one, Direction 1940, Right 600, Over”</p> <p>“Infantry prone, 300 by 150, attitude 1456, strength 50, neutralize, adjust fire, when ready, Over”</p>

The mission will continue to be sent in this manner until all elements of the call for fire have been received and read back by the FDC/CP. The relay station reads back that portion of the call for fire request transmitted by the FO and transmits the information to the FDC/CP. The call signs suffix number of the originating and receiving stations are not confused.

Fire Support Officer (C/S S8D40)	FDC/CP (C/S S8C27)	FO (C/5 S9C89)
<p>“This is S8D40 on KV 2412, 16 guns in effect firing Two Rounds HE, time in action, Adjust Fire, When ready, time of flight 35, Over”</p> <p>“S8D40, Out”</p>	<p>“This is S8C27 on KV 2412, 16 guns in effect firing Two Rounds HE, time in action, Adjust Fire, When ready, time of flight 35, Over”</p>	<p>(five second pause) “This is S8C27 on KV 2412, 16 guns in effect firing Two Rounds HE, time in action, Adjust Fire, When ready, time of flight 35, Over”</p>

The mission will continue to be sent, relayed and acknowledged in this manner until it is complete.

Notes:

1. The relay example above was accomplished without the aid of operating instructions, e.g. unit address designations. If necessary, the originating station will use whatever transmission instructions as required to accomplish the mission.
2. The ammunition type must be specified. Default options are not to be used in international procedures.

EXAMPLE 8: CORRECTING A MISTAKE DURING THE RELAY PROCEDURE

Fire Support Officer (C/S S8D40)	FDC/CP (C/S S8C27)	FO (C/S S9C89)
<p>“This is S8C40 on KV 2412, 16 guns in effect firing One Round, HE, time in action, Adjust Fire, When ready, time of flight 35, Over”</p> <p>“S8D40, wrong Over”</p>	<p>“This is S8C27 on KV 2412, 16 guns in effect firing Two Rounds HE, time in action, Adjust Fire, When ready, time of flight 35, Over”</p> <p>“S8C27, Wrong Over”</p> <p>“This is S8C27 Wrong, on KV 2412, 16 guns in effect firing</p>	

<p>“This is S8C40 Wrong, on KV 2412, 16 guns in effect firing Two Rounds HEA time, Adjust Fire, When ready, time of flight 35, Over”</p> <p>“S8D40, Out”</p>	<p>Two Rounds HEA time, Adjust Fire, When ready, time of flight 35, Over”</p>	<p>(Five second pause) “This is S9C89, Wrong, on KV 2412, 16 guns in effect firing Two Rounds HE, time in action, Adjust Fire, When ready, time of flight 35, Over”</p>
--	---	---

Note: Some Nations may use the word “Correction” instead of “Wrong”.

EXAMPLE 9: CORRECTING A MISTAKE BY THE TRANSMITTING OPERATOR

<p align="center">Fire Support Officer (C/S S8D40)</p>	<p align="center">FDC/CP (C/S S8C27)</p>	<p align="center">FO (C/5 S9C89)</p>
<p>“S8D40, Right 100, Drop 200, Over”</p> <p>“S8D40, Out”</p>	<p>(Five second pause) “S8C27, Right 100, Drop 200, Over”</p>	<p>“Right 100, Add 200, Correction, Right 100, Drop 200, Over”</p> <p>(Note: “Correction” should not be repeated.)</p>

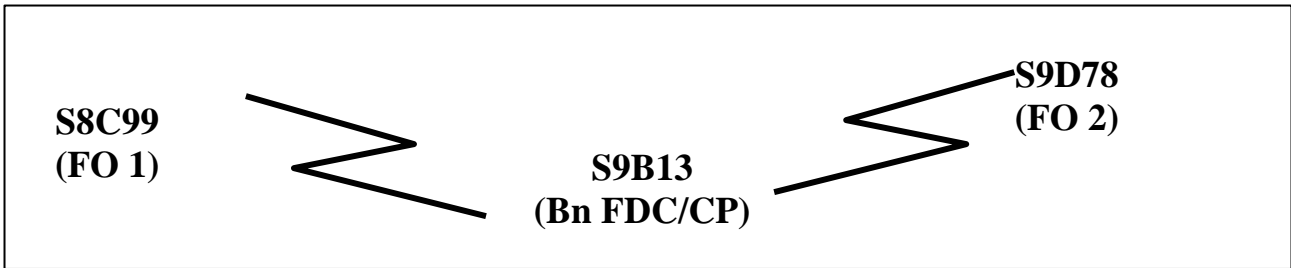
Note: If a transmitting operator makes an error, he transmits the pro-word ‘Correction’ followed by the last word group or phrase that was incorrectly transmitted. The transmission then continues.

EXAMPLE 10: SPLASH PROCEDURE

The following procedure is used when the FO has requested "Splash" or when it is reported by convention (see Chapter 2). After the guns have fired the following transmission is made. It can only be applied in voice procedure.

FDC/CP (C/S S8C27)	FO (C/S S9C89)	Remarks
<p>"Direction 5569, Out"</p> <p>"Shot 4, Over"</p> <p>"Splash"</p> <p>"Left 100, Drop 400, Out"</p> <p>"Shot, Over"</p> <p>"Splash "</p>	<p>"Direction 5569, Over"</p> <p>"Shot 4, Out"</p> <p>"Left 100, Drop 400, over"</p> <p>"Shot, out"</p>	<p>Note. "Splash" is transmitted no later than five seconds before time of impact. Due to short delay before impact, "Splash" is not read back.</p>

EXAMPLE 11: THE SIMULTANEOUS MISSION



In the following example of a simultaneous mission, the Battalion FDC/CP (B13) receives a Call for Fire while already busy with another one. This procedure of the first Call for Fire should only be interrupted during a natural pause. Examples of natural pauses are:

- a. After the initial call for fire and before the first round is fired.
- b. After a report of "Shot" and during the time of flight.

F01 (C/S S8C99)	Bn FDC/CP (C/S S9B13)	F02 (C/S S9D78)
"S9B13 This is S8C99, Fire mission on BE2589, Over"	"S8C99 This is S9B13, Fire mission On BE2589, Out"	
"Grid 432 182, Altitude 125, zone 32, Over" "Light Machine Gun, radius 25, strength ONE, HEI in effect, adjust fire, Over" "This is S8C99 on BE2589, 8 guns, 1 round, HEA time in effect, Adjust fire, time of flight 30, Over"	" Grid 432 182, Altitude 125, zone 32, Out" "Light Machine Gun, radius 25, strength ONE, HEI in effect, adjust fire, Out" "This is S9B13 on BE2589, 8 guns, 1 round, HEA time in effect, Adjust fire, time of flight 30, Over"	
"Direction 4589 over" "Shot 5, Out"	"Direction 4589 Out" "Shot 5, Over"	

F01 (C/S S8C99)	Bn FDC/CP (C/S S9BI3)	F02 (C/S S9D78)
<p>“S8C99 Right 100, Drop 200, Over”</p>	<p>“ This is S9BI3A, Fire mission on BE8756, Out”</p> <p>“S9BI3A, Grid 422 189, altitude 165, Zone 32, Out” .</p> <p>“S9BI3 Right 100, Drop 200, Out”</p>	<p>“S9BI3, This is S9D78, Fire mission on BE8756 Over”</p> <p>“S9D78, Grid 422 189, altitude 165, Zone 32, Over”</p>
	<p>“S9B13A, Work party, radius 100, strength 10, adjust fire, At my command, Out”</p>	<p>“S9D78 Work party, radius 100, strength 10, adjust fire, at my command, Over”</p>
	<p>“S9D78, This is S9BI3A on BE8756, 4 guns, TWO rounds in effect firing HEA Quick, Adjust fire, at my command, Over”</p>	<p>“This is S9B78 on BE8756, 4 guns, TWO rounds in effect firing HEA Quick, Adjust fire, at my command, Out”</p>
<p>“S8C99 Shot, Out”</p>	<p>“S9B13 Shot, Over”</p> <p>“S9B13A, direction 2589, Out”</p> <p>“S9BI3A, Shot 4, Over”</p>	<p>“S8D78, Direction 2589 over”</p> <p>“S9D78, Shot 4, Out”</p>

CHAPTER 4

TARGET NUMBERING SYSTEM

SECTION 1

GENERAL

401. This Chapter describes the basic system of target numbering agreed by NATO forces for use in fire support operations.

402. The objective of the target numbering system is to identify, with alphanumeric characters, points or areas that are to be fired upon or referenced. Such a system must uniquely identify each point or area and must be compatible with automatic data processing equipment.

403. The way in which target letters and numbers is allocated within armies to formations, units and detachments is a matter of national policy AND is not covered by this agreement. In operations where a formation of one Nation using one system is subordinate to a formation from another Nation using a different system, it will be normal for the allotment system laid down in the Standard Operating Procedures of the senior headquarters to be adopted by the junior formation.

SECTION II

TARGET NUMBERING SYSTEM

404. The target number is comprised of six characters, comprising two letters followed by four number positions. (e.g. KT 1764).

405. The two-letter group may be used to indicate the originator of the target number and/or the level holding the target data.

406. Other than the letter Z, there are no permanently assigned first letters for any Nation or organization. The senior land forces artillery headquarters for an operation will establish and publish, in orders, the assigned first letter for junior Nations and organizations. The senior land forces artillery headquarters is not refrained from using any of the letters (less Z) nor are they limited to a sequential use of letters. Coordination should be conducted between major geographic commands to ensure that identical letters are not used in areas close to adjacent boundaries. Nations may use any letter during national training. Standing multinational organizations are recommended to establish a target numbering system within their Standard Operating Procedure (SOP).

407. The following is an example of the assignment of first letters for targeting in an operation:

United States	-	A
United Kingdom	-	B
EUROCORPS	-	E
France	-	F
Germany	-	G
MNC NE Corps	-	M
NRDC – Italy	-	N

408. The Target Number prefix “Z” is reserved for the technical use by Automatic Data Processing Systems in nations. These target numbers are made available for nations’ sole use as required. As an example, the block of 10000 target numbers could be used to automatically generate a target number where there is a mandatory requirement within an interface for a target number in order to ‘track’ a fire mission and to ensure that the appropriate responses are sent to the originator of the fire mission. In order to avoid the simultaneous use of identical target numbers by two or more nations, ‘second letters’ are reserved for individual nations and are listed at Annex A to Chapter 4. Annex A to Chapter 4 will be amended as an “editorial change” when necessary.

ANNEX A
TO CHAPTER 4

TARGET NUMBERING SYSTEM – “Z” PREFIX

The Target Number prefix “Z” is reserved for the technical use by Automatic Data Processing Systems in nations. The following second letters are allocated to nations as specified and are reserved for the sole use of the listed nation.

ZA:	France (FRA)	allocated 14 Nov 05
ZB:	Germany (DEU)	allocated 14 Nov 05
ZC:	Italy (ITA)	allocated 14 Nov 05
ZD:	United Kingdom (GBR)	allocated 14 Nov 05
ZE:	United States (USA)	allocated 14 Nov 05
ZF:	Turkey (TUR)	allocated 14 Nov 05
ZG:	Netherlands (NLD)	allocated 14 Nov 05
ZH:	Portugal (POR)	allocated 14 Nov 05
ZI:	Canada (CAN)	allocated 14 Nov 05
ZJ:	Norway (NOR)	allocated 14 Nov 05
ZK:	Spain (ESP)	allocated 14 Nov 05
ZL;	Poland (POL)	allocated 14 Nov 05
ZM:	Romania (ROU)	allocated June 07
ZN:	Czech Republic (CZE)	allocated June 07
ZO:	Not yet allocated	
ZP:	Not yet allocated	
ZQ:	Not yet allocated	
ZR:	Not yet allocated	
ZS:	Not yet allocated	
ZT:	Not yet allocated	
ZU:	Not yet allocated	
ZV:	Not yet allocated	
ZW:	Not yet allocated	
ZX:	Not yet allocated	
ZY:	Not yet allocated	
ZZ:	Not yet allocated	

NOTE: Amendments and updates to this Annex will be made from time to time under the auspices of the NSA Arty WG. These will be submitted to AartyP-1 (Field Artillery Procedures) as “Changes” to a given “Edition”. This method is being employed in order to shorten the response time and not require the full “Ratification Process” as it is accepted as only being an **editorial** amendment.

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CHAPTER 5
THE FIRE PLAN

SECTION I

GENERAL

501. A fire plan table, together with warning, operational fragmentary orders and standing operating procedures provides the necessary information to give fire support. The fire plan is prepared by the appropriate fire support coordination centre and sent to all participating units. It may consist of any or all of the following items (Examples are provided in Annex A – These are examples only. National formats or procedures may differ from the examples provided):

- a. A target list.
- b. A target overlay.
- c. One or more fire plan tables.

**SECTION II
TARGETS**

502. A target can be an area, complex or installation, force, equipment, capability, function or behaviour identified for possible action to support the formation/manoeuvre commander's objectives, guidance and intent'.

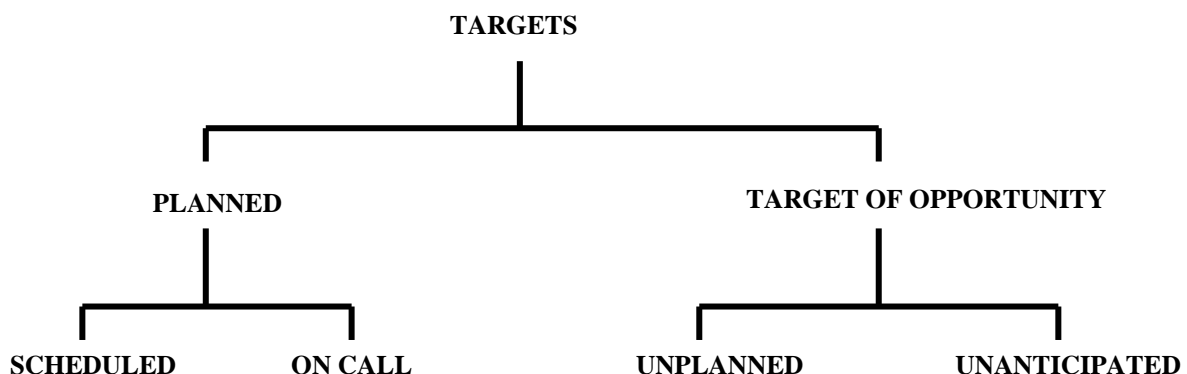
503. Targets include a wide array of mobile and stationary forces, equipment, and other military resources that an adversary commander can use to conduct operations at any level — strategic, operational, or tactical. From a commander's planning and execution perspective, targets fall into two general categories: planned and target of opportunity.

504. Planned targets are those known to exist in an operational area with actions scheduled against them to generate the effects desired to achieve the manoeuvre commander's objectives. Examples range from targets on joint target lists in the applicable campaign plan, to targets detected in sufficient time to list in fire support plans. Planned targets have two subcategories: scheduled or on-call.

505. Scheduled targets are planned targets upon which fires are to be delivered at a specific time. On-call targets are those that do not have fires scheduled to be delivered at a specific time, are known to exist in an operational area, and are located in sufficient time for deliberate planning to meet emerging situations specific to campaign objectives.

506. A target of opportunity appears during combat and which can be reached by ground fire, naval fire, or aircraft fire, and against which fire has not been scheduled.

507. Unplanned targets of opportunity are those that are known to exist in an operational area but are not detected, located, or selected for action in sufficient time to be included in the normal targeting process. Unanticipated targets of opportunity are those that are unknown or unexpected to exist in an operational area but, when detected or located, meet criteria specific to campaign objectives.



**SECTION III
FIRE PLANNING**

508. Fire planning is the continuous process of analyzing, allocating and scheduling of fire. The basis for fire planning is the commander's guidance and intent. Deliberate fire planning is conducted through a formal top-down process, with bottom-up refinement. At all echelons, deliberate fire planning begins immediately on receipt of the mission. Company and battalion FSOs should not wait for a target list from higher echelons before beginning their own fire planning. For the manoeuvre brigade, the process begins with the receipt of targeting information from the division. All HPTs of one level higher will be transmitted to a lower level. Only the HPT's which can be acquired or influenced by the brigade will be included on the brigade's HPTL. The brigade S2 and FSO must refine this division guidance for the brigade area and concept of operation. (The Target List flow diagram is at Annex B.)

509. The FSO receives from the higher level targets that are in his zone and in his area of influence. The FSO works with the S2, S3, and ALO to plan targets in support of the operation. The FSO adds higher and own level targets to his target list work sheet, posts the targets on his overlay, and passes those targets to subordinate units and if appropriate to a DS artillery battalion. Only the HPT's which can be acquired or influenced by the FSO's own unit will be included on the units HPTL.

510. The lower level FSO, in conjunction with the commander, operations officer, and primary and special staffs, is responsible for identifying his fire support requirements. He receives targets from his higher level FSO, modifies them as necessary, and adds targets of concern to his unit commander. Using the target list work sheet and overlay as tools, he forwards his list of targets to subordinate FSOs.

511. These subordinate FSO and manoeuvre commander plan targets to support the their scheme of manoeuvre. The FSO receives targets from the higher level that are within the his area of influence. He modifies them as necessary and adds any other targets according to the manoeuvre commander's priorities. Modifications and additions are submitted to the higher FSO. At the lowest level, the FSO nominates targets in his sector, records this target information on the target list worksheet, and forwards it to the higher level FSO.

512. The higher level FSO considers the target information he receives from each sub units FSOs, consolidates it (by eliminating duplications), adds targets needed by his level, and forwards a copy of the work sheet to the higher level FSO.

513. The higher level receives target list modifications from his subunits FSOs. Using the target list work sheet and overlay, he resolves duplications, adds targets developed by his level TA assets, prioritizes the list, and sends it to the DS battalion and appropriate agencies providing support to the manoeuvre commander. He informs the lower level FSOs of any subsequent changes to their plans. It is important that the FSO allow enough planning time for subordinate headquarters and that he establishes a cut-off time for their submission of modifications so that the plan can be disseminated with adequate time for execution. The FSO records targets on a Target List (Example 1, Annex A).

**SECTION IV
TARGET LIST**

514. An example of a target list is at Example 1, Annex A. An explanation of each heading in the target list is:

- a. **Line Number.** A convenient reference.
- b. **Target Number.** See Chapter 4
- c. **Target location.** See para 210 .a 1
- d. **Altitude.** See para 210. a 2
- e. **Target description.** See para 212 a and b
- f. **Size/Radius.** (optional). See para 212.a (3)
- g. **Attitude.** (optional). See para 212.a (3)
- h. **Remarks.** (optional). Special considerations for attack of the target and a more detailed description of the target.

**SECTION V
FIRE PLAN SCHEDULE**

515. An example of a completed schedule is at Example 3, Annex C. The fire plan schedule allocates targets to fire units. It specifies:

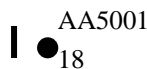
- a. Timings for the engagement of scheduled targets.
- b. Method of engagement expressed as one of the following:
 - (1) Total expenditure of ammunition by each fire unit on each target.
 - (2) Or by rates in rounds per gun per minute
 - (3) Or method of fire for effect (e.g. 10 rounds fire for effect)
 - (4) Or Effect required: neutralize, destroy, suppress.
- c. The type of ammunition to be fired for each target.
- d. On call targets.
- e. Any special instructions.

516. For each phase of an operation, the following may be prepared:

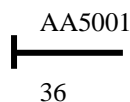
- a. A fire plan schedule.
- b. Instructions for other types of fire support.

517. To prepare a fire plan schedule:

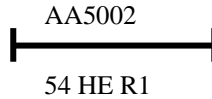
- a. For each target to be fired on:
 - (1) Indicate the timing either by:
 - a. a point or vertical line indicating a TOT.



- b. a point or vertical line followed by a horizontal line indicating the time the first rounds are to impact and the following rounds as soon as possible following standard procedures.



- c. a horizontal line with vertical line ends or points indicating the initial and terminating times. Rounds must be evenly distributed with rounds landing at the start time and the final rounds landing at the end time.



- (2) Indicate the target number above this line/point.
- (3) Show the amount of ammunition or the rate to be fired by the unit below this line/point.

Note. The ammunition type to be fired on each target must be clearly stated on the fire plan schedule. If no indication is given, targets must be engaged with HE/PD. If a target is to be engaged with other ammunition it must be specified in the remarks column.

- b. All initial timings refer to time first rounds arrive on the target. No rounds must arrive on the target after a specified terminating time.
- c. Targets may be engaged, singly, as a group of targets, or a series of targets.
- d. An example of a blank fire plan proforma showing both the Target List and Schedule is at Example 4 Annex A.

**SECTION VI
FIRE PLANNING DEFINITIONS**

518. The following fire planning definitions have been agreed. All are contained in AAP-38, Artillery Glossary.

- a. artillery fire plan table**
A presentation of planned targets giving data for engagement. Scheduled targets are fired in a definite time sequence. The starting time may be on call, at a prearranged time or at the occurrence of a specific event. 1/2/73
- b. final protective fire**
An immediately available prearranged barrier of fire designed to impede enemy movement across defensive lines or areas. 1/12/79
- c. fire plan**
A tactical plan for using the weapons of a unit or formation so that their fire will be coordinated. 1/3/73
- d. group of targets.**
A group of targets consists of two or more targets on which fire is desired simultaneously.
- e. predicted fire**
Fire that is delivered without adjustment. 1/1/83
- f. preparation fire**
Fire delivered before an attack to weaken the enemy position. 18/12/97
- g. priority target**
A target on which the delivery of fire has precedence over all other fire for the designated firing unit or element. The firing unit / element prepares to the greatest extent possible for the engagement of such targets. A firing unit / element may be assigned only one priority target or Final Protective Fire at a time. (AAP-38, PL for AAP-6)
- h. scheduled fire**
A type of prearranged fire executed at a predetermined time. 1/8/74
- i. scheduled target**
In artillery and naval fire support, a planned target on which fire is to be delivered at a specific time. 1/8/76

- j. series of targets**
In artillery and naval fire support, a number of targets and/or group(s) of targets planned to support a manoeuvre phase. A series of targets may be indicated by a nickname. 1/8/76
- k. superimposed**
A term used in fire planning to indicate that an artillery unit is augmenting fire on a target and its fire may be lifted from that target by the authority implicit in its fire support role. 1/8/74
- l. target list**
A tabulation of confirmed or suspected targets maintained by any echelon for information and fire support planning purposes. *Also called "list of targets"*. 1/7/80
- m. target overlay**
A transparent sheet which, when superimposed on a particular chart, map, drawing, tracing or other representation, depicts target locations and designations. The target overlay may also show boundaries between manoeuvre elements, objectives and friendly forward dispositions. 1/8/73

ANNEX A TO
CHAPTER 5

EXAMPLE 1 TARGETLIST

SECURITY CLASSIFICATION:

References: (See STANAG 2014)

- (1) Maps, Charts and relevant documents
- (2) Coordinate location system used
(specify the types of reference system
Used, eg. UTM Grid, Military Grid, etc).

Copy to.....
 Issuing Headquarters.....
 Modifications By :
 Place of Issue (May be coded).....
 Date/Time Group of Signature :.....
 Message Reference No.:.....

Target List Number

DTG:

Line Number	Target Number	Target Grid Reference		Target Altitude	Target Description	Target Size/Radius	Target Attitude	Remarks
	(a)	(b)		l	(d)	(e)	(f)	(g)
01	AY1007	109	679	170	Ammo Dump	400 x 800	1600	50% VT
02	AA1006	108	724	190	OP	20		50% Delay, Group A2B
03	AA1025	110	698	150	Assembly Area	1000	750	
04	AZ1002	992	711	200	Infantry Coy	150		50% Delay, Group A2B
05	AA2002	985	683	160	Plt fighting Psn	100		Smoke
06	AA0019	972	815	180	ADA Radar	50		50% VT, Group A1B, Jose
07	AA1008	982	725	200	ADA Guns	200		On Call, FFE, Group A1B, Jose
08	AZ2120	116	582	220	BN HQ	350		Series Jose
09	AZ2014	121	475	190	POL Site	300 x 500		
10					-			

SECURITY CLASSIFICATION:

EXAMPLE 2 TARGET OVERLAY

(SECURITY CLASSIFICATION)

References: (See STANAG 2014)

(1) Maps, Charts and relevant documents

(2) Coordinate location system used

(specify the types of reference system used, eg. UTM Grid, Military Grid, etc).

Copy to

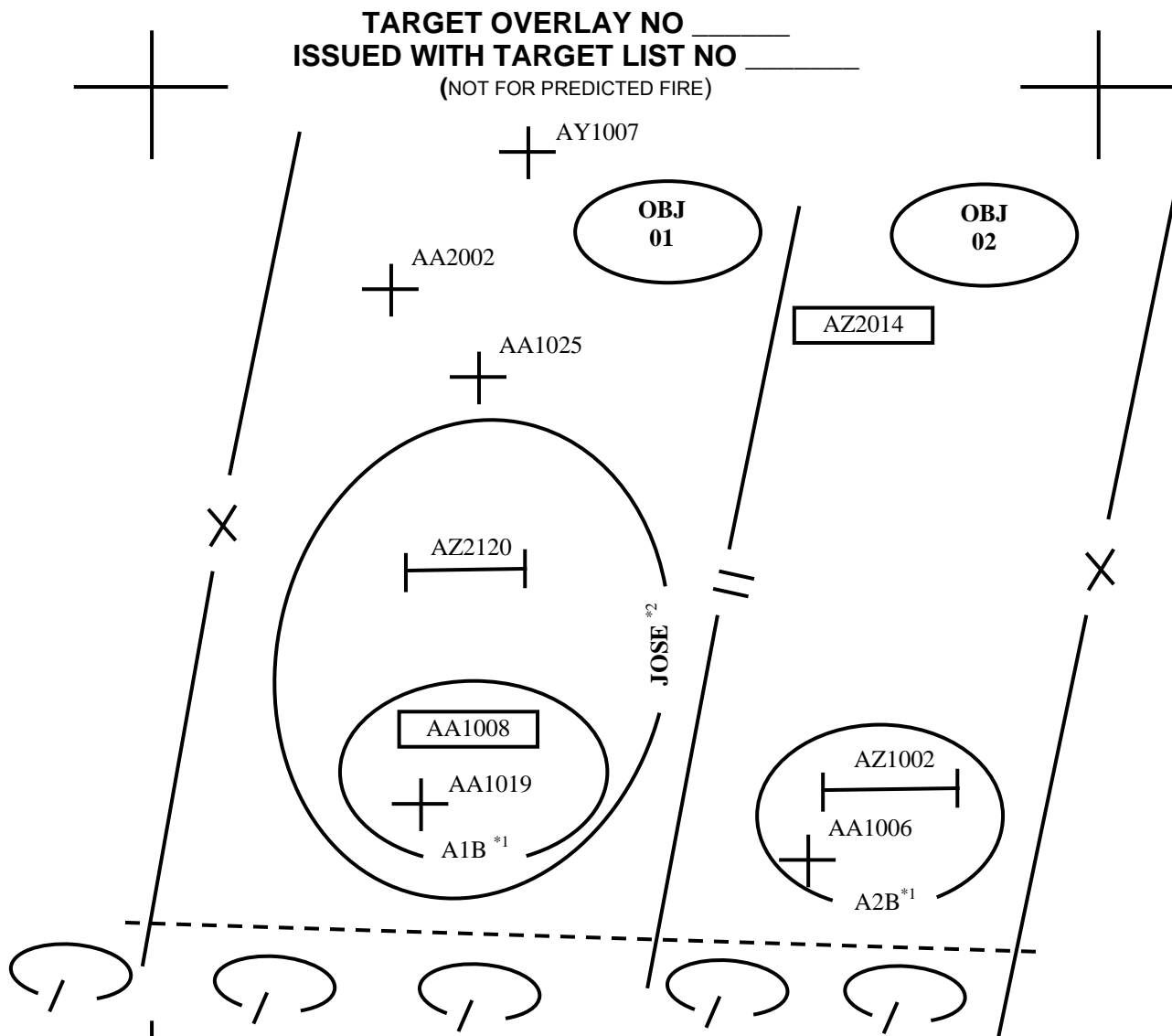
Issuing Headquarters

Modifications By :

Place of Issue May be coded :

Date/Time Group of Signature :

Message Reference No.:



*1: Group Targets

*2: Series Targets

Acknowledge Instructions: _____

Authentication: _____

Distribution: _____

Last Name of Commander: _____

Rank: _____

(SECURITY CLASSIFICATION)

SECURITY CLASSIFICATION:					
References: •Target List No •Operations Order No..... (if applicable)		Sheet1 .. of ...1		Copy to..... Issuing Headquarters..... Modifications By Place of Issue (may be coded)..... Date / Time Group of Signature..... Message Reference No.....	
FIRE PLAN SCHEDULE					
FIRE PLAN _____			H HOUR _____ (Not to be transmitted)		
Line No	ORGANIZATION/FORMATION		SCHEDULED TARGETS	ON CALL TARGETS	REMARKS
	(a)	(b)	(c)	(d)	(e)
	FORMATION	FIRING UNIT			
			H-Hour		
1	1-2 FA (155 mm)	Bty A			(a) 50% PROXIMITY/VT (b) 50% Delay (c) 1 gun smoke (d) 18 Rounds
2	1-2FA (155 mm)	Bty B			
3	1-2FA (155 mm)	Btys C & D			
4	1-2 FA (155 mm)	Bty E		AA 1008 (d)	
Acknowledge Instruction: Authentication Distribution:				Last Name of Commander: Rank:	

EXAMPLE 4 – Artillery Fire Plan Proforma

Fire Plan	<input type="text"/>	Supporting	<input type="text"/>	Originator	<input type="text"/>	Locations by	<input type="text"/>
Superimposed	<input type="text"/>	H Hour	<input type="text"/>	Sheet	<input type="text"/>	of	<input type="text"/>
						Date/Time Group	<input type="text"/>

Target Information

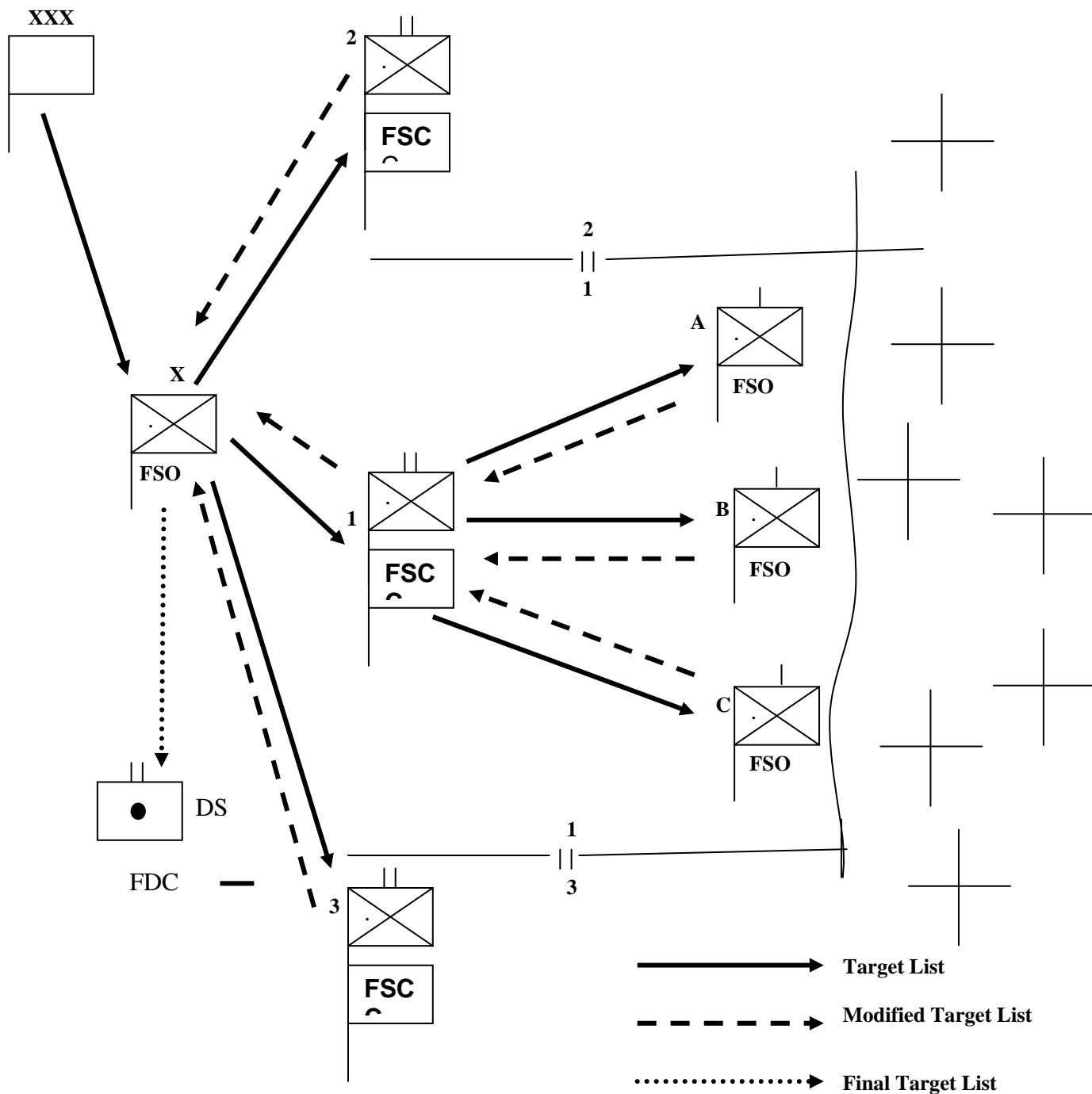
Line	(a) Target No.	(b) Description	(c) Location	(d) Alt	(e) Remarks
1	AY1007	Ammo Dump	109679	170	50% VT
2	AA10061	OP	108724	190	50% Delay, Group A2B
3	AA1025	Assembly Area	110698	150	
4	AZ1002	Infantry Coy	992711	200	50% Delay, Group A2B
5	AA2002	Plt fighting Psn	985683	160	Smoke
6	AA0019	ADA Radar	972815	180	50% VT, Group A1B, Series Jose
7	AA1008	ADA Guns	982725	200	On Call, FFE, Group A1B, Jose
8	AZ2120	BN HQ	116582	220	Series Jose
9	AZ2014	POL Site	121475	190	
10					
11					
12					

Schedule

Line	(f) Regt or Fmn	(g) Fire Units	(h) Timings							
1	1-2 FA (155 mm)	Bty A								
2	1-2 FA (155 mm)									
3	1-2 FA (155 mm)									
4	1-2 FA (155 mm)									
5	1-2 FA (155 mm)	Bty E								
6										
7										
8										
j)	Remarks		(a) 50% VT/Proximity; (b) 50% Delay; (c) 1 gun smoke; (d) 18 rounds							

**ANNEX B TO
CHAPTER 5**

TARGET LIST FLOW DIAGRAM



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CHAPTER 6

FIELD ARTILLERY DELIVERED, SCATTERABLE MINES

SECTION 1

GENERAL REMARKS AND RELATION TO AARTY P-5

601. In certain operations it can be necessary that the field artillery of one nation is required to fire field artillery delivered scatterable mines (SCATMIN) for another nation. Standard procedures have been developed and agreed upon.

602. This chapter has to be read in conjunction with chapter 3, section 9 of the AARTY P-5. In this chapter the definitions, employment and responsibilities are described. The contents of that section describe therefore the tactical part of the use of scatterable mines, while this chapter concentrates on the more technical part of the use of scatterable mines.

SECTION II

REQUEST PROCEDURES

603. Requests for field artillery delivered SCATMIN follow the request format outlined at Annex B. These requests are translated into fire mission orders by the delivery unit. When time is a critical factor (a target of opportunity), a request may be originated, from the manoeuvre element using field artillery communications and standard fire mission procedures. As indicated below, when the field artillery resources of another Nation are used, the necessary clearances are obtained by the originator and the request should be in fire mission format. Planned minefields are normally only used for defensive and delay operations when there are no other delivery means that suffice, and the commander is willing to employ field artillery for such activity. They are planned and delivered before battle is joined or delivered as on call targets. It would be normal to use national resources for this task, however, should it be necessary to employ the delivery system of another nation the information is to be provided in the format at Table 1 in Annex B. Also attached in a form which may be used for submission of planned minefield requests. (See Annex C).

604. Target of opportunity minefields are normally based on one aim point. These minefields are normally fuzed for short SD. Should the target be mobile, the requesting unit must give sufficient reaction time for the mission to be actioned and the mines to arm. An example of a call for fire for an adjusted mission is shown at Tables 2 in Annex B. Missions are requested using standard call for fire procedure in accordance with Chapter 2.

SECTION III

TROOP

SAFETY

605. It is the responsibility of the requesting unit or formation to ensure troop safety. The delivery unit can be asked to provide the single or left and right aim point coordinates of the predicted minefield and its safety zone to permit detailed analysis by the requesting unit or formation. The delivery unit provides a SCATMINREP to the requesting unit for purposes of troop safety.

606. Prior to the emplacement of a SCATMIN minefield, a warning is to be issued by the requesting unit or formation to all units who could be endangered either in their current locations or by their future actions. This warning is to be repeated one hour before expiration of the laid life in order to reduce possible risks and to advise the units of the cessation of the minefield's effectiveness. Minefield reports, warnings and records shall be made in the format given at Annex A. This is the responsibility of the requesting unit or formation, based upon data provided by the delivery unit.

607. It should be noted that the engineer adviser has a special responsibility for reporting minefield locations through the chain of command.

SECTION IV

MINEFIELD REPORTING

608. Minefields consisting of SCATMIN shall be reported in accordance with Annex A. In particular, the delivery unit shall report the completion of laying and effective timing to the staff of the manoeuvre commander requesting the minefield using the format at Annex A. The engineer adviser is responsible for maintaining an up to date SCATMIN record.

ANNEX A TO
CHAPTER 6

SCATTERABLE MINEFIELD REPORT (1)

SUBJECT: SCATMINREP *)
SCATMINWARN *)
SCATMINREC *)

REFERENCES.

<u>Line</u>	<u>Information/Data required</u>
A	APPROVING AUTHORITY
B	TARGET/OBSTACLE NUMBER
C	TYPE DELIVERY SYSTEM
D	TYPES AND NUMBER OF MINES
E	SELF-DESTRUCT/SELF-STERILISE/SELF-NEUTRALISE PERIOD
F	AIM POINTS/CORNER POINTS OF MINEFIELD (STATE WHICH)
G	SIZE SAFETY ZONE FROM AIM POINTS/CORNER POINTS (STATE WHICH)
H	UNIT EMPLACING MINES/REPORT NUMBER
I	PERSON COMPLETING THE REPORT
J	DATE/TIME/GROUP OF EFFECTIVENESS
K	REMARKS

*) Check as appropriate

REMARK

For completion instructions, See next page.

COMPLETION OF THE SCATTERABLE MINEFIELD REPORT, WARNING & RECORD

- A. **Approving Authority.** Enter approving authority.
- B. **Artillery Target/Engineer Obstacle Number.** If the minefield is part of barrier plan, enter the number of major unit and the obstacle number. If the minefield is not part of a barrier plan or does not have an ARTILLERY TARGET NUMBER, then leave blank or enter N/A.
- C. **Type Delivery System.** Enter the type of delivery system that laid the minefield.
- D. **Type And Number / Density Of Mines.** Enter as follows:

Enter AP for anti-personnel mines.
Enter AT for anti-tank mines.
Enter AT/AP if both
Enter the number/density of each.
- E. **Self-Destruct / Self – Sterilise / Sell – Neutralise Period.** Enter the time period in which the minefield will Self-destruct, self-sterilise, or self-neutralise.
- F. **Aim Points / Corner Points Of The Minefield** (STATE WHICH). In requesting, if the system used to emplace the minefield uses a single aim point to deliver the mines, enter that aim point. If the system requires more than one aim point, enter the left and right aim points. If the system has distinct corner points enter those corner points Based on this information, the delivery unit determines the necessary centre line and the aim points. When multiple aim points are required, that data is provided in SCATMINWARN, SCATMINREC etc and is originated by the delivery unit.
- G. **Size Safety Zone From Aim Points / Corner Points** (STATE WHICH).

If an aim point is given in line F, enter size safety zone from that aim point.

If corner points are given in line F, enter size safety zone from these corner points.
- H. **Unit Laying Mines/Report Number.** Reports should be numbered consecutively by each unit. Enter the emplacing unit and their report number.
- I. **Person Completing The Report.** Rank and name of the person who completes the report.
- J. **Date/Time/Group Of Effectiveness.** Enter the date/time/group (based on information provided by the delivery unit for SCATMINWARN).
- K. **Remarks.** Enter any other items the reporting unit may consider important or if they are required by the Authorised Commander.

ANNEX B TO
CHAPTER 6

REQUEST PROCEDURES FOR SCATTERABLE MINE FIRE MISSIONS

TABLE 1

INFORMATION REQUIRED FOR PLANNED TARGETS

(See Paragraph 603)

SERIAL	INFORMATION	EXAMPLE 1	EXAMPLE 2
1	Target Number	ZU 5730	TU 4230
2	Priority	1	2
3	Requesting Unit	HQ 4 CMBG	HQ 3 Armd Div
4	End Points / Aim Points (Notes 1, 5 and 6)	End Points NA 2150 6650 NA 2150 6690	End Points LB 3276 1887 LB 3440 1685
5	Minefield Width and Depth	400 * 400	1500
6	Type of Mines, Density (Note 2)	RAAMS, HIGH ADAM, LOW	MLRS
7	Self Destruct (SD) Time (Note 3)	Short / Long	5
8	Scheduled or On Call	281100Z within 30 min FFE	TOT 121530B
9	Caution NLT Emplacement Time	(If Required)	
10	Approval Authority	(If different from requested)	
11	Date Time Group of Request (Note 4)	280630Z	121015B

Notes:

1. Grid co-ordinates accurate to +/- 10 metres.
2. Density required only for RAAMS/ADAM.
3. RAAMS/ADAM SD Times:
 Short – 4 hours,
 Long – 48 hours.
4. Approval authority refers to Target Number and Date-Time Group of Request.
5. When end points are given it is the responsibility of the delivery unit to translate these details into aim-point co-ordinates.

TABLE 2
EXAMPLE ADJUSTED MISSION

(See Paragraph 604)

EXAMPLE 1	EXAMPLE 2
“(Call Sign) THIS IS (Call Sign)“	“(Call Sign) THIS IS (Call Sign)“
“FIRE MISSION BATTERY”	“ADJUST FIRE, RAAMS AND ADAM”
“GRID 572861 DIRECTION 2400”	“GRID 572861”
“COMPANY IN BMPs. RADIUS 300 STATIC”	“DISMOUNTED INFANTRY COMPANY” SUPPORTED BY 10 TANKS. 300 X 900” (Notes 1, 2 and 3)
“HIGH ANGLE”	
“CONVERGE”	
“RAAMS AND ADAM”	
“ADJUST FIRE”, (Notes 1, 2 and 3)	

Notes:

1. Adjustment is carried out with DPICM M483AI in the self-registering mode.
2. Following adjustment the observer would order FFE and would receive 24 RAAMS and 6 ADAM total. This is the standard FFE for RAAMS/ADAM target of opportunity.
3. All guns in the firing unit are to be CONVERGED onto the centre-point of the module.

ANNEX C TO
CHAPTER 6

MINEFIELD PLANNING SHEET

FIELD ARTILLERY DELIVERED MINEFIELD PLANNING SHEET		
SECTION A – MINEFIELD DATA		
1 TARGET NUMBER	2 PRIORITY	3 REQUESTER
4 MINEFIELD END POINTS (CO-ORDINATES) FROM _____ TO _____		
5 MINEFIELD DEPTH	6 MINEFIELD WIDTH	
7 ADAM (APERS) DENSITY	8 RAAMS (AT) DENSITY	
9 SELF DESTRUCT TIME SHORT <input type="checkbox"/> LONG <input type="checkbox"/>	A. SCHEDULED MINEFIELD _____ HOURS _____ MIN. ON CALL <input type="checkbox"/>	
11 CAUTION NLT. EMPLACEMENT TIME	12 APPROVAL AUTHORITY	13 DATE TIME GROUP.
14 REMARKS		
SECTION B – G3/S3/ENG		
15 DTG. RECEIVED	16 DTG SAFETY ZONE DISSEMINATION	
17 REMARKS		
SECTION C – FSE / FSO		
18.DTG TO UNIT	19 DTG FROM UNIT	20. DTG TO G3/S3/ENG.
21 REMARKS		
SECTION D – FDC DATA		
22 TARGET NUMBER	23 FIRING UNIT	24 RANGE TO MINEFIELD CENTRE
B. TRAJECTORY ADAM <input type="checkbox"/> LOW <input type="checkbox"/> HIGH		26 DELIVERY TECHNIQUE MET + ΔV TRANSFER <input type="checkbox"/> OBSERVER ADJUSTED. <input type="checkbox"/>
		RAAMS <input type="checkbox"/> LOW <input type="checkbox"/> HIGH
27. AIM-POINT CO-ORDINATE (S) (LEFT AND RIGHT OR SINGLE) ADAM: FROM _____ TO _____ RAAMS: FROM _____ TO _____		
28 DTG MISSION COMPLETED		
29 REMARKS		

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CHAPTER 7

BATTLEFIELD ILLUMINATION

SECTION I

GENERAL

701 Aim. The aim of this chapter is to standardize, visible light illuminating procedures for use by NATO forces when operating together on land.

702. NATO forces subscribe to the requirements, limitations and principles, and employ the techniques, patterns, method of requesting and adjusting illumination, and preparing the Illumination Plan as described in this chapter. It must be understood that the artillery is not responsible for the production of the Illumination Policy or Plan, albeit that artillery staffs assist in their formulation.

SECTION II

GENERAL PROCEDURES

703. **Requirements.** The capability to illuminate the battlefield, at an appropriate point, is essential to the full use of most target identification and engagement systems and to the development of maximum combat power. Requirements for illumination can originate at any level from an individual soldier to a formation headquarters.

704. **Limitations.** The use of illumination has the following inherent difficulties:

- a. Illumination can compromise measures for the concealment of friendly elements in the area.
- b. Inconsistent orders with regard to the use of illumination by different units/formations along a front resulting in an uneven application of illumination policies along the FEBA, which can make the locating of friendly force unit/formation boundaries relatively simple for the enemy.
- c. Use of illumination by one unit can interfere with the operation of night observation equipment in use by adjacent units.

705. **Principles.** The following general principles govern illumination:

a. **Command and Control:**

- 1) The use of illumination is a command responsibility.
- 2) Command and control must be exercised by the manoeuvre commander in the area to be illuminated.
- 3) Illumination must follow the Commanders illumination policy and be co-ordinated with adjacent units and formations to prevent disclosure of positions and operations to the enemy and to preclude the possibility of interference with friendly image intensification, and thermal imagery equipment.
- 4) Co-ordination will normally be accomplished by the manoeuvre commander in the area to be illuminated.

b. **Employment:**

- 1) Illumination, once provided to support troops, must be continued without interruption until it is no longer required. Illumination missions will have to be carefully controlled when committing scarce stocks of artillery and mortar illuminants and consideration should be given to other battlefield illuminants.

- 2) Illumination should, whenever possible, be provided by a source not directly in contact with the enemy being engaged. A unit providing such support must be in direct communication with the commander of the unit/formation in contact.
 - 3) Illumination when used should be provided by two or more independent sources to ensure continued availability and reliability.
- c. Illumination should be provided by the highest level practicable in order to conserve illumination resources available to subordinate echelons.

SECTION III

MISSION PROCEDURES

706. **General.** Mortar illuminant is used in instances which arise unexpectedly and in which speed of illumination is essential.

707. **Artillery and Mortar Procedures.** Call for fire procedures are to be in accordance with Chapter 2.

708. **Planned Illumination Tasks.** The call for fire must include the following information:

- a. Date illumination is required.
- b. Purpose (manner in which requesting unit/formation intend to employ the illumination).
- c. Time and duration of illumination requested (e.g., "3 Minutes, On Call as of 2150 Hours").
- d. The grid reference and height of the point(s) or areas(s) to be illuminated.
- e. Method of control.

709. **Naval Gunfire Procedures.** See ATP-4.

SECTION IV

THE ILLUMINATION PLAN

710. **General.** The illumination plan is:

- a. Prepared and co-ordinated at the appropriate level.
- b. Based upon requests of supported units or as directed by higher formation headquarters.
- c. Included in operational plans and orders, normally –as an Annex.
- d. Included in the Field Artillery Support Plan.

711. **Co-ordination.** Co-ordination is accomplished at all levels to ensure the integration of battlefield illumination with fire support and the co-ordination of the use of all means of illumination.

712. **Format.** The illumination plan may consist of the same elements and have the same format' as the artillery fire plan (Chapter 5) with the following changes:

- a. As the expenditure of rounds largely depends upon the atmospheric conditions, the number of rounds to be expended for each mission in the table will be replaced by the duration of the mission, given in minutes, and recorded in the "Remarks" column.
- b. For all missions the size of the area to be illuminated given in the target list in the column "Size" is expressed as the diameter or its rectangular dimension in metres. In the case of a mission to be fired by an artillery unit the pattern of illumination (Chapter 5) will also be given in the column remarks.
- c. The "Artillery Fire Plan Table" becomes the " Illumination Plan Table"

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CHAPTER 8

ARTILLERY SURVEY

SECTION 1

GENERAL

801. Many Nations now use Inertial Navigation Systems (INS) and/or Global Positioning System (GPS) to produce both fixation and orientation while retaining the capability to use traditional survey techniques. The purpose of this Chapter is to:

- a. Standardize the method of expressing artillery survey accuracy criteria for weapon platforms, target acquisition, surveillance and meteorological systems.
- b. Standardise which data is to be recorded for artillery survey control points and fixation points and the proforma to be used by NATO forces.

802. An artillery survey control point is defined for use in this Chapter as a point at which the co-ordinates and the altitude are known and from which the bearings/azimuths to a number of reference points are also known.

803. A fixation point differs from a survey control point in that the fixation point carries no data for orientation. The prime function of a fixation point is to allow INS systems to be updated for fixation.

SECTION II

SURVEY ACCURACY REQUIREMENTS

804. Survey accuracy requirements are expressed in terms of probable error (PE), Circular Error Probable (CEP) and Standard Deviation (SD or SIGMA).

805. PE and CEP are derived from the positive standard deviation of the measurement (sigma - σ) as follows:

- a. σ = Positive standard deviation of the measurement (sigma).
- b. PE = 0.6745 σ .
- c. CEP = 1.1774 σ .
- d. CEP = 1.7456 PE.

Notes:

-PE is a value which, is exceeded as often as it is not i.e. it has a 50% probability of occurrence.

-CEP is the radius of the circle centred about the true position, such that any measured or calculated position has a 50% probability of lying within that circle.

806. The NATO Standards for orientation and fixation are:

<u>System</u>	<u>Orientation (PE) (Mils)</u>	<u>Fixation (CEP) (M)</u>	<u>Altitude (PE) (M)</u>	<u>Remarks</u>
Guns and rockets (except MLRS)	1.0	20	10	If this standard is not achieved, the fact must be reported
MLRS	Only fix required. MLRS has a Gyro laying system.	35	10	
Meteorological Tracking Equipment	5.0	50	10	

SECTION III

FIXATION POINTS AND ARTILLERY SURVEY CONTROL POINTS

807. A survey control point enables users to fix and orient their equipment on the grid system applicable to the area while a fixation point provides only fixation. Fixation point data may be published on a map or annotated air or satellite photograph but must contain the same data as is used on the survey control point proforma except for the details at sub-paragraphs 1108 f, I and j.

808. The artillery survey control point proforma (Annex B) allows the survey control point to be identified and provides the necessary data. The following data is required:

- a. A control point number and possibly a name of the locality.
- b. A map series and sheet number.
- c. The GRID co-ordinates and altitude (above sea level) of the control point.
- d. The type of grid system used. The standard is WGS 84.
- e. The accuracy of the data.
- f. The survey methods used.
- g. A diagram showing the location of the point. This is given to enable the point to be found.
- h. The description of the point i.e. how it is marked on the ground.
- i. The grid bearings/azimuths in mils to at least four reference objects. Two of these reference objects must be between 100 and 500 metres of the control point.
- j. A description and sketch showing the exact point of lay and the approximate distance of each object from the control point.
- k. An information block containing:
 - (1) The unit producing the data.
 - (2) By whom prepared.
 - (3) By whom checked.
 - (4) The date.

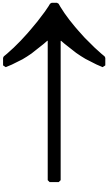
Notes.

-There are several ways of writing data by hand, e.g. some nations use 17.11 while others use 17,11. Either method may be used but they must not be mixed.

-When an artillery survey control point is near a UTM zone border and two sets of data are available, a separate proforma must be prepared for each UTM zone.

-The Artillery Survey Control Point Proforma may be printed in national languages but the format must not be altered.

ANNEX A TO
CHAPTER 8

BEARING PICKET CARD/ARTILLERY SURVEY CONTROL POINT				
UTM Zone	UTM Square	Station Name		Accuracy
		Station Number		E + N:
		Map Series & Sheet Number		Azimuth:
				Altitude:
How Marked		E:	N:	Altitude
		Long:	Lat:	
<p>N</p> 				

Description	Sketch	Distance	Grid Bearing/Azimuth		
			Mils:	Degrees:	Grads:
			Mils:	Degrees:	Grads:
			Mils:	Degrees:	Grads:
			Mils:	Degrees:	Grads:
			Mils:	Degrees:	Grads:
			Mils:	Degrees:	Grads:
Method of Determination		Unit:			
Horizontal:		Produced By:			
Vertical:		Checked By:			
Bearing/Azimuth		Date			
Notebook Reference:					

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ANNEX A TO
CHAPTER 8

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CHAPTER 9

WEAPON LOCATING RADARS

SECTION I

COMMAND AND CONTROL

GENERAL

901. In order to exercise effective command and control of counter battery radars, the commander of the supported unit must be aware of the Command and Control Relationships which exists between himself and units allocated to him for his mission. The relevant terms for artillery units including weapon locating radars are listed in AArtyP-5 Chapter II.

902. Throughout this chapter, it is acknowledged that different radar equipments have varying capabilities and can produce results in either target information form and/or as a call for fire. In recognition of this fact, the word “system” should be viewed in the widest context to include, if desirable, the Fire Support C³I system as well. This chapter does therefore not mandate where the result is to be produced – it can be either on the radar itself, or it could be within the C³I System to which the radar is connected. In any case, the “supported” nation should be made aware of the capabilities, limitations and specific requirements of a “supporting” radar by such means as liaison officers or radar commanders.

903. Weapon locating radars play a key role in defeating the enemy’s surface-to-surface indirect fire support systems. Without accurate targeting data, our own indirect fire systems are of limited value. These weapons locating radars (WLR) are one of the primary means of locating enemy indirect fire systems. They provide a 24 hour capability to detect and identify hostile weapons systems. Specific functions of WLRs include:

- a. Locating enemy indirect fire systems.
- b. Generating artillery target information.
- c. Generating fire missions.
- d. Registering and adjusting friendly artillery and mortars.
- e. Validating the location of friendly fires.
- f. Providing information to allow friendly forces to take force protection measures.
- g. Electronic support measures e.g. passive listening.

EMPLOYMENT FACTORS

904. The essential factors to be considered when employing radars include:

- a. Designate positioning areas for weapon locating radars.
- b. Define a locating zone (LZ) for weapon locating radars.
- c. Establish zones (not relevant for all radar types).
- d. Establish cueing guidance.
- e. Designate cueing agents.
- f. Control radar movement.
- g. Designate who receives radar targets.

CENTRALIZED CONTROL

905. Counter battery radars may be held under centralized control. Centralized control optimizes coverage to support the commander's intent. Regardless of which headquarters exercises control, subordinate battalions may be tasked to provide logistical, survey, and security support because of the dispersal of weapon locating radars across the area of operation.

DECENTRALIZED CONTROL

906. Under decentralized control, weapon locating is tactically tasked to subordinate units such as FA Battalions for their control and employment. The FA battalion is then responsible for providing the deployment data as outlined above. Decentralized control speeds up the response to acquisitions.

SECTION II

RADAR ZONES AND PRIORITIZATION

GENERAL

907. Doctrinal employment considerations, in conjunction with templates and intelligence produced during the Intelligence Preparation of the Battlefield (IPB) process, dictate the areas in which the radar search should be focused, normally Named Areas of Interest (NAI)⁸ and Target Areas of Interest (TAI)⁹. The location of friendly boundaries or fire support coordinating measures may also affect the assignment of locating zones.

RADAR ZONES

908. Radar Zones are a collection of tools unique to radar operations. Certain ones are used to prioritize radar operations into areas of greater or lesser importance to the commander. Zones are used to focus radar coverage on commander's battlefield priorities. It is noted that not all radar systems are capable of using zones, in which case other means may be used depending of the system. The importance is that the system must be able to prioritize the product from the radars.

909. A zone is a geometric shape defined by a series of grid coordinates or a circle of specified radius. The only exception to this is the Locating Zone which is defined by an azimuth to indicate the left of arc and an azimuth to indicate the right of arc. Targets developed by the radar are displayed for transmission or transmitted automatically depending on the system in order of priority based on the zone from which they were developed.

910. Radar Zones are designed to assist the user in understanding the desired outcome. There are seven types of zones:

- a. Locating Zone (LZ)
- b. Critical Friendly Zone (CFZ)
- c. Engagement Zone (EZ)
- d. Acquisition Target Report Zone (ATRZ)
- e. Censor Zone (CZ)
- f. Inhibit Zone (IZ)
- g. Remaining Area (RA)

⁸ AJP 3-9

⁹ AJP 3-9

Locating Zone (LZ)

911. An LZ is used to define the entire area that is required to be covered by the counter battery radars and it is the area in which the radars/platoon is to search. NAIs and/or TAIs can be used to outline the LZ for the radar platoon. The LZ is used as a technical tool to optimise the antenna. It may also be referred to as a sector (grid coordinates) or arcs (left and right azimuth).

Critical Friendly Zone (CFZ)

912. A CFZ is an area established around a friendly unit or location that is critical to the success of a commander's plan. When the radar predicts an enemy round will impact in a CFZ, a Priority Call for Fire is generated on the location from which the round was fired. The CFZ does not have to be within the radar's LZ.

Engagement Zone (EZ)

913. An Engagement Zone (EZ) is an area inside the LZ where the supported unit wants to engage hostile firing systems. An EZ may be placed around an enemy fire support position identified during the IPB process as a TAI. A target identified in an EZ normally generates a call for fire mission, if all requirements for accuracy are fulfilled. An EZ must be in the radar's Locating Zone.

Acquisition Target Report Zone (ATRZ)

914. An ATRZ is an area that the commander wishes to monitor closely. Any weapon detected in an ATRZ will be reported ahead of all acquisitions other than those from CFZs or Ezs. An ATRZ must be in the radar's Locating Zone.

Censor Zones (CZ)

915. Censor Zones (CZ) are areas from which the radar is prohibited from reporting acquisitions. A CZ is normally placed around friendly weapon systems to prevent them from being acquired by friendly radars. Care must be used when employing a CZ since the radar ignores all acquisitions coming from the CZ. This may remain true in certain systems even if the hostile weapon is firing from inside a CZ and into a CFZ.

Inhibit Zone (IZ)

916. Inhibit Zones (IZ) are areas bounded by grid references, within the LZ into which the radar should not radiate. It must be recognized that a given radar will be inhibited throughout the sector or arcs within which the IZ lies.

Remaining Area (RA)

917. The Remaining Area (RA) is that area of the LZ, not including the IZ, which is not covered by ATRZ, CFZ, CZ or EZ. Reports of activity are generated for the RA. A

weapon located in the remaining area of the LZ will result in a report being sent to the FDC.

PRIORITIZATION

918. Of all the zones, four are used to prioritize the areas and ensure that the appropriate speed of response is applied for that area. The four zones which indicate priority are, in order; CFZ, EZ, ATRZ and RA.

919. All acquisitions generate an acquisition report. This is normally in the form of an ATI.ATR message giving the firing locations of the hostile weapon system. Depending upon the priority of the zone in which the hostile firing is situated, a call for fire may be initiated, normally in the form of an FM.CFF message. In any case, the zone will indicate to the operator the degree of urgency to be accorded to that information. As an example, a hostile system identified as firing into a CFZ will normally result in an immediate FM.CFF.

920. Some current weapon locating radars have the capability to filter the calibre of weapons system which has been detected and thus prioritize the report. Care must be taken by the staff to understand the capabilities of the radar being made available to them and to optimize its functionality.

RADAR ZONE MANAGEMENT

921. Radar zones are managed to comply with the commander's guidance and intent and are an important part of force protection and the prioritization of fire support efforts. Understanding the manoeuvre commander's plan, and integrating fire support officers into the development, refinement and activation of planned zones are the key to successful radar zone management. Furthermore the provision of overlapping radar coverage may be essential to the success and must therefore be included in the planning.

922. At all levels, the staff is responsible for the employment of counter battery radars. Accordingly, the staff must be aware of the planning implications and fully understand the counter battery radar support requirements. The staff is directly involved in the planning, refinement and activation of radar zones. Thus, it is the staff who prioritizes requirements, allocates radar zones to support the scheme of manoeuvre and develops the essential radar deployment information and plan.

923. Basic staff guidelines for zone planning include:

- a. Planning is done by the staff at the upper levels and refinement is done by the radar command post at the lower levels.
- b. Include the radar zone plan in the manoeuvre operations order.
- c. The upper level staffs manage zones by resolving duplication, time phasing zones by priority and including zones on the FS execution/synchronization matrices.
- d. Refine and update zones as the operation progresses.

SECTION III

COORDINATION

GENERAL

924. Target duplication between radars is likely to occur during combat operations. In addition, the volume of targets passed from the radars may overwhelm the systems, especially if the radars are under centralized control.

925. Methods of reducing or eliminating target duplication are:

- a. Time separation e.g. turn on and turn off times to individual radars
- b. Area separation e.g. the establishment of unique zones to individual radars
- c. Weapon separation (dependent on the radar capability), whereby individual radars are instructed only to identify certain weapons systems

CUEING

926. Cueing is the process designed to prompt or notify the radar to begin radiating to acquire hostile firing systems. The critical factor when planning radar cueing is responsiveness. Cueing should allow the radar to locate enemy positions during initial volleys of fire, preferably the first rounds. There are two techniques for cueing: situational (pro-active), and demand (reactive). Situational and demand cueing may be used separately or in conjunction with each other.

SITUATIONAL CUEING

927. Situational cueing is the preferred technique for cueing radars and is the most responsive. This method ties cueing to events that are determined during the IPB and planning process. For example, during offensive operations an event may be a breaching or air-assault operation. In a defensive operation, cueing may be tied to suspected enemy phases of fire depicted on the decision support template. Situational cueing focuses the radar on the manoeuvre commander's intent and that which is important.

DEMAND CUEING

928. Demand cueing is the activation of a radar once the enemy is known to have begun firing. For demand cueing to be effective, cueing agents must be designated and a responsive communication system between the agents and radar must be established. Specific cueing guidance must also be established to fully exploit the radars' capabilities and minimize or eliminate unnecessary radiation. The situation will dictate who is the best agent to cue the radar and under which specific conditions it should be cued. Possible cueing agents may include:

- a. Forward observers (Fos).

- b. Reconnaissance elements including UAVs.
- c. Acoustic Weapon Locating systems.
- d. Any unit reporting incoming fire through the headquarters.

929. Cueing must be based on near real-time information so that the radar has a high probability of tracking projectiles, when it is turned on.

SECTION IV

DEPLOYMENT

930. The deployment of counter battery radars is an integral part of fire support planning.

931. The deployment plan is an important outcome from the planning process. It takes the fire support plan, the intelligence collection plan, the effects guidance matrix and the survivability requirements into account and produces a plan for the deployment of the counter battery radars. It involves locations to move to, timings for movement and mission tasking. Several factors influence the deployment plan.

932. These include:

- a. The tactical situation especially:
 - (1) Named Areas of Interest (NAIs), and
 - (2) Targeted Areas of Interest (TAIs).
- b. Survivability issues based on the enemy threat.
- c. Available real estate; taking into account topography, routes, weather and other units.
- d. The characteristics (e.g. detecting range and mobility) of the counter battery radars in use.
- e. Combat Service Support.

933. Coordinating the deployment of counter battery radars is a challenge for formation staffs at all levels. There is always great demand for real estate during operations and it is inevitable that counter battery radars areas overlap with those of manoeuvre units' or artillery units' present or planned deployments. During the planning process the staff selects Artillery Manoeuvre Areas (AMA) or Artillery Reserved Areas (ARA) for each radar or TA unit in conjunction with the manoeuvre G3/S3 staff. The AMA/ARA list is then issued to all formations/units in the operation order.

934. Some counter battery radars and C2I systems have the ability to create a visibility diagram or capabilities diagrams to support/optimize the selection of positions for radars. This ability should be used whenever available to support the bottom up refinement.

935. At a minimum the following information should be supplied to the radar:

- a. Mission
- b. Tactical Task
- c. Purpose
 - (1) Locate enemy systems

- (2) Adjust friendly fires
- (3) Predict impacts of enemy fires
- (4) Electronic support measures

- d. Location (Primary and Alternate)

- e. Time to be ready to operate

- f. Locating Zone
 - (1) A polygon identified by grid coordinates
or
 - (2) A Primary Azimuth, and/or
 - (3) A Left Arc and Right Arc, and if required
 - (4) A Minimum and/or Maximum Range, if required

- g. Threat Assessment (especially EW)

- h. Cueing (Unit designation(s) or timing)

- i. Communications (units to report to)

- j. Zone Data
 - (1) Grid Coordinates of Corner Points
or
 - (2) Grid Coordinate of Centre Point and Radius

SECTION V

COMMUNICATIONS

GENERAL

936. Weapon locating radars normally use voice and/or digital communications to communicate with the supported unit. Radar acquisitions and mission data are normally transmitted to the supported FDC or controlling headquarters.

937. The enemy situation must be considered when planning and conducting communications. Enemy EW capabilities may dictate changes in normal radar communication procedures. Furthermore, the Emission Control (EMCON) policy must be strictly observed.

COMMUNICATION NETS

938. Counter battery radars normally operate on nets laid down in the parent or supported units' SOP or command instruction.

939. If digital communications are unavailable, the radar operator uses standard voice procedures to pass target information and fire missions to the parent or supported unit FDC. In most cases, the supported unit must provide all communications information.

SECTION VI

OTHER SPECIFIC SUPPORT CONSIDERATIONS

METEOROLOGICAL

940. Accurate MET data is crucial to the accuracy of hostile weapon location and friendly fire data. The MET parameters entered during radar initialization affect radar performance by correcting for atmospheric refraction. They are also important in estimating the effect of wind, temperature, and density on the projectile's trajectory.

941. Digital MET messages are transmitted to the radar using the MET:CM and/or MET:TA message format. The supported unit must be prepared to receive any requests for MET (MET.RFM). If an automated data processing system is not available then message must be passed by hand/voice and subsequently entered manually. Data elements used by most radars are:

- a. Relative humidity
- b. Temperature
- c. Barometric pressure
- d. Altitude of MET data station.
- e. Wind speed
- f. Wind direction

942. Some radar systems' software extrapolates temperature, pressure, and relative humidity back to the radar's altitude assuming the standard atmospheric lapse rate and constant relative humidity. However, the most accurate correction for refraction is obtained from the temperature and relative humidity measured at the surface as near the radar as possible.

SURVEY

943. Accurate survey is essential for successful employment of counter battery radars. The specific survey data required for typical counter battery radar systems is described below:

- a. Site location (normally within 10 meters CEP).
- b. Orientation. Azimuth (normally to 1 mil).
- c. Vertical angle (normally less than 1 mil).
- d. Altitude (normally within 5 meters CEP).

944. If the accuracy of the survey is in doubt then the supported headquarters must be advised of the likely lower quality of data from the radar. If the supported unit cannot provide the survey data to the accuracies required, the parent unit of the radar may be required to continue to provide survey support.

SECURITY

945. Because of its small size, the weapon locating radar cannot provide its own security in a tactical situation. For this reason, the radar must fall under the security of an adjacent unit. Similarly, when deployed, the radar cannot perform other security or administrative functions, such as local defence. The radar falls under the responsibility of the supported unit for these functions.

CHAPTER 10

ACOUSTIC WEAPON LOCATING SYSTEMS

SECTION I

COMMAND AND CONTROL

GENERAL

1001. In order to exercise effective command and control of Acoustic Weapon Locating Systems (AWL), the commander of the supported unit must be aware of the Command and Control Relationships which exists between himself and units allocated to him for his mission. The relevant terms for artillery units including AWL are listed in Aarty P-5.

1002. AWL Systems play a role in defeating the enemy's surface-to-surface indirect fire support systems. Without accurate targeting data, friendly indirect fire systems are of limited value. These AWL systems are one mean of locating enemy indirect fire systems. They provide a 24 hour capability to detect and identify hostile weapons systems. Specific functions of Acoustic Weapon Locating systems may include:

- a. Locating enemy indirect fire systems.
- b. Generating artillery target information.
- c. Generating fire missions.
- d. Registering and adjusting friendly artillery and mortars.
- e. Validating the location of friendly fires.

EMPLOYMENT FACTORS

1003. The essential factors to be considered when employing AWL include:

- a. Time.
- b. Survey.
- c. Weather.
- d. Terrain.

CENTRALIZED CONTROL

1004. AWL Systems may be held under centralized control. Centralized control optimizes coverage to support the commander's intent. Regardless of which headquarters exercises control, subordinate battalions may be tasked to provide logistical, survey, and security support because of the dispersal of AWL Systems across the area of operation.

DECENTRALIZED CONTROL

1005. Under decentralized control, AWL Systems are tactically tasked to subordinate units such as FA Battalions for their control and employment. The FA battalion is then responsible for providing the deployment data as outlined above. Decentralized control speeds up the response to acquisitions. Decentralized control may be used in the case of DAM/RA.

SECTION II
COORDINATION

GENERAL

1006. Target duplication between AWL Systems and also between AWL Systems and WLRs is likely to occur during combat operations. In addition, the volume of targets may overwhelm the systems, especially under centralized control.

1007. Methods of reducing or eliminating target duplication are:

- a. Area separation e.g. the establishment of unique areas to individual SRS
- b. Weapon separation (dependent on the SRS capability), whereby individual SRS are instructed only to identify certain weapons systems

SECTION III

DEPLOYMENT

1008. Doctrinal employment considerations, in conjunction with templates and intelligence produced during the Intelligence Preparation of the Battlefield (IPB) process, dictate the areas in which the AWL Systems search should be focused, normally Named Areas of Interest (NAI)¹⁰ and Target Areas of Interest (TAI)¹¹. The location of friendly boundaries or fire support coordinating measures may also affect the assignment of locating areas.

1009. The deployment of AWL Systems is an integral part of fire support planning.

1010. The deployment plan is an important outcome from the planning process. It takes the fire support plan, the intelligence collection plan, the effects guidance matrix and the survivability requirements into account and produces a plan for the deployment of the SRS. It involves areas to move to, timings for movement and mission tasking. Several factors influence the deployment plan.

1011. These include:

- a. The tactical situation especially:
- b. Named Areas of Interest (NAIs), and
- c. Target Areas of Interest (TAIs).
- d. Survivability issues based on the enemy threat.
- e. Available real estate; taking into account topography, routes, weather and other units.
- f. Combat Service Support.

1012. Coordinating the deployment of AWL Systems is a challenge for staffs at all levels. There is always great demand for real estate during operations and it is inevitable that AWL Systems areas overlap with those of manoeuvre units' or artillery units' present or planned deployments. During the planning process the staff selects Artillery Manoeuvre Areas (AMA) or Artillery Reserved Areas (ARA) for each AWL Systems unit in conjunction with the manoeuvre G3/S3 staff. The AMA/ARA list is then issued to all formations/units in the operation order.

1013. Deployment of AWL Systems may need lot of time. Therefore it should be ordered timely e.g. to provide time for necessary survey.

¹⁰ AJP 3-9, Study Draft 1, Oct 04

¹¹ AJP 3-9, Study Draft 1, Oct 04

1014. At a minimum the following information should be supplied to the AWL Systems:

- a. Designate position for each microphone.
- b. Designate position for analysis centre.
- c. Define a locating area (LA).
- d. Define alignment.
- e. Control AWL Systems movement.
- f. Designate who receives target information

SECTION IV

COMMUNICATIONS

GENERAL

1015. AWL normally use voice and/or data communications to communicate with the supported unit. AWL acquisitions and mission data are normally transmitted to the supported FDC or controlling headquarters.

1016. The enemy situation must be considered when planning and conducting communications. Enemy EW capabilities may dictate changes in normal AWL communication procedures.

COMMUNICATION NETS

1017. AWL Systems normally operate on nets laid down in the parent or supported units' SOP or command instruction.

1018. If digital communications are unavailable, the AWL Systems operator uses standard voice procedures to pass target information and fire missions to the parent or supported unit FDC. In most cases, the supported unit must provide all communications information.

SECTION V

OTHER SPECIFIC SUPPORT CONSIDERATIONS

METEOROLOGICAL

1019. Weather has a significant impact on the dispersion of sound waves.

1020. Accurate MET data is crucial to the accuracy of AWL Systems.

1021. Digital MET messages are transmitted to the AWL Systems using the MET.CM and/or MET.TA message format. The supported unit must be prepared to receive any requests for MET (MET.RFM). If an automated data processing system is not available then message must be passed by hand/voice and subsequently entered manually.

SURVEY

1022. Accurate survey is essential for successful employment of AWL Systems.

1023. If the accuracy of the survey is in doubt, the supported headquarters must be advised of the likely lower quality of data from the AWL Systems.

SECURITY

1024. Because of its small size, the AWL unit may not be able to provide sufficient security for itself in a tactical situation. For this reason, the staff must give consideration to this fact by ensuring that AWL Systems falls under the umbrella of the overall unit/formation defence plan.

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CHAPTER 11

FIELD ARTILLERY INTEROPERABILITY AND LIAISON

SECTION I

GENERAL

1101. Interoperability between NATO field artillery units requires an understanding of *NATO Land Forces Doctrine (ATP 35)* and *NATO Field Artillery Tactical Doctrine (A Arty P-5)*. Detailed Information Exchange Requirements and references to standards covering these requirements, are in APP-11 and the A Arty P-3.

1102. Fire support liaison officers (FSLO) must be exchanged when artillery formations or units enter a command and control relationship with artillery formations or units of a different nationality.

1103. The purpose of this exchange is to establish and maintain close, continuous communication between formations and units. An artillery FSLO speaks on behalf of the artillery commander and should be an experienced officer of appropriate rank who has the confidence of the commander. The FSLO should be fully aware of his own commander's mission, intent, plan and main effort. The FSLO should also have a detailed knowledge of the parent formation or unit and its equipment, order of battle (ORBAT) and tactical doctrine.

SECTION II

DUTIES OF AN ARTILLERY FIRE SUPPORT LIAISON OFFICER (FSLO)

1104. The duties of an artillery FSLO are:

- a. To assist in the passage of fire orders, other artillery orders – such as deployment orders – and information between the two units or formations.
- b. To convey own commander's verbal and written orders and instructions, including fire plans. The FSLO must be prepared to amplify the commander's intent and points of detail when appropriate.
- c. To provide his own commander with situational awareness of latest information and intentions.
- d. To be aware of the national reservations to STANAGS.

1105. Information Requirements. In addition to the guidance in STANAG 2101 (Duties of a Liaison Officer), the following information is to be obtained by an artillery FSLO prior to departure and updated on a regular basis:

- a. Artillery commander's mission, intent, plan and main effort;
- b. Current and planned changes to:
 - (1) ORBAT,
 - (2) C² relationships,
 - (3) Tactical tasking and responsibilities of artillery unit and sub-units, and
 - (4) Artillery Reserved Areas (ARA) and Artillery Manoeuvre Areas (AMA).
- c. Tactical situation including details of enemy artillery and ground forces, and latest intelligence and threat update;
- d. Intelligence, Surveillance and Target Acquisition and Reconnaissance (ISTAR) Plan, including an understanding of own formation key Named Areas of Interest (NAI), Target Areas of Interest (TAI) and associated Decision Points;
- e. Target engagement priorities;
- f. Fire Support Coordination Measures;
- g. Locations of formations, units and sub-units;
- h. Zones of responsibility of fire units;

- i. Location and zones of observation of observers;
- j. Authorisation of observers and/or the allocation of priority of fire;
- k. Zones of responsibility of weapon locating and combat surveillance equipment;
- l. States of survey
- m. Availability of meteorological data;
- n. Airspace control measures;
- o. AD coverage and weapon control status;
- p. Condition of roads;
- q. General state of equipment and vehicles; and
- r. Artillery CSS plan. (Ammunition holdings, restrictions on ammunition expenditure and dumping policy).

1106. Communications. A FSLO must be able to communicate with the parent formation or unit. Prior to departure the FSLO must confirm the method of communication to be employed and the requirement to deploy with communications equipment and data links, communications instructions and codes. Communications must be tested prior to departure.

1107. Artillery FSLO may be required to deliver documents to another formation or unit. FSLOs must be prepared to brief on the content of any documents to be delivered and should anticipate likely questions. Where appropriate, the following documents may be collected prior to departure:

- a. Artillery Operations Orders and Administrative Orders;
- b. Fire plan orders including target lists and overlays; and
- c. Artillery formation and/or supported formation SOPs, as appropriate.

SECTION III

INTERFACE BETWEEN SYSTEMS

1108. The interoperability of field artillery is based upon the exchange of messages between field artillery units. This exchange of messages can be accomplished in the following ways:

- a. **A digital system to another digital system.** This transfer of information is based upon the messaging formats developed in A-ARTY-P3..
- b. **A digital system to a voice system.** The transfer of information is done with the assistance of the Artillery FSLO, who takes the digital information and relays it in voice to the unit.
- c. **A voice system to a digital system.** The transfer of information is done with the assistance of the Artillery FSLO, who takes the voice information and either enters it into the digital system or sends the information on the appropriate net in voice
- d. **A voice system to a voice system.** The transfer of information is done with the assistance of the Artillery FSLO, who takes the information sent on one national radio net and relays it on his own radio net.
- e. Physical Transfer by Courier.

1109. This message exchange usually takes place as follows:

- a. For conventional tube artillery units, at the FDC level.
- b. For rocket artillery units at the FDC/CP level, however, the aim is to lower this to the battery level.

1110. FSLOs normally communicate with FDC/CPs of their own nationality, who may in turn transmit the message to allied units.

CHAPTER 12
ARTILLERY DEPLOYMENT
SECTION I
GENERAL

1201. The aim of this chapter is to outline artillery deployment. This process is an integral part of fire support planning. The term “real estate” refers to deployment areas or positions.

1202. The deployment plan is an important outcome from fire support planning. It takes the fire support plan, the fire plan and survivability requirements and produces a plan for the movement of the field artillery units. It involves both locations to move to and timings for movement. Several factors influence the deployment plan. These include:

- a. The tactical situation especially:
 - (1) fire planning – the target areas; weights of fire required, duration of fire and timings.
 - (2) survivability issues based on the enemy threat.
- b. Available real estate; taking into account topography, routes, weather, airspace control measures and other units.
- c. The characteristics (e.g. firing range and mobility) of the field artillery system(s) in use.
- d. Combat Service Support.

**SECTION II
ARTILLERY DEPLOYMENT**

1203. AMA vary in size¹² depending on the ground, phase of battle, or the number of elements deploying into the area. AMA are not reserved for the artillery, rather, they are areas in which the artillery has priority for deployment. AMA assist the deployment of artillery by establishing a basis for resolving terrain conflicts at the lowest levels.

1204. ARA – ARA are areas reserved for the exclusive use of artillery. Batteries using static deployment methods may be allocated an ARA. So may any artillery element of sufficient size to preclude use of that area by another unit, e.g. an ammunition control point (ACP).

¹² An AMA can be large enough for only a battery, or it can be big enough to accommodate a Regiment/Battalion while leaving room for alternate positions within the AMA.

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CHAPTER 14

PRECISION GUIDED MUNITIONS (PGM)

SECTION I

GENERAL

1401. Aim. An important trend in the development of (artillery) munition is the development of Precision Guided Munitions (PGM). These PGM provide a significant increase in range and accuracy for they have the ability to seek, find and engage (land) targets with a high degree of autonomy. The tactics, techniques and procedures however, still have to be developed. The aim of this chapter is to explain what kinds of PGM are available and what their effects are.

1402. Some reasons for the trend towards PGM are:

- a. The increased effectiveness due to the higher probability of delivering effects compared to conventional munitions;
- b. The reduction of collateral damage due to the high accuracy of these munitions;
- c. The possibility to accomplish missions that are impossible with conventional munitions.

1403. A general doctrinal basis for precision is:

- a. It shapes "the fight" through destruction of High Payoff Targets (HPT's) and centers of gravity;
- b. It provides stand-off precision engagement to fix enemy formations and to set the conditions;
- c. It makes fire missions quicker, enabling increased operational tempo through rapid destruction of HPT's and other targets;
- d. It gives the opportunity to expand mission set to include urban operations by minimizing collateral damage;
- e. It reduces the dependence on and frequency of ammunition resupply because of the increased efficiency and lethality;
- f. It enhances close support through reduction in danger close distances.

SECTION II

PRINCIPLES

1404. PGM are munitions for which the effect and its point of delivery, in time and space, may be controlled, either internally or externally, after departure from the launch platform. PGM are divided, by looking at the way they are launched, into:

- a. Gun launched PGM;
- b. Rocket launched PGM;
- c. Mortar launched PGM;
- d. By plane or helicopter (precision bombs, projectiles and rockets)

SECTION III

TYPES OF PRECISION GUIDED MUNITIONS

1405. Historically, first experiments with guided bombs began during World War II were so called television-guided bombs, flare sighted bombs and other steerable munitions were developed. In the 60's, the electro-optical bomb or "fire and forget" camera bomb was introduced, a bomb which was equipped with television cameras and steerable flare sights in which the bomb would be steered until the flare superimposed the target (radio controlled and visually guided munitions). During the 80's, so called laser guided munitions were used. Nowadays, many types of PGM are under development or even already in production, sometimes using the experiences from yesterday.

1406. PGM is to be divided in the following types:

- a. Laser Guided Projectiles (LGP);
- b. Terminally Homing Projectiles (THP);
- c. Trajectory Correctable Munitions, including Course Correcting Fuzes (CCF);
- d. Sensor Fuzed (Sub) Munitions.

LASER GUIDED PROJECTILES

1407. The precision of Laser Guided Projectiles is gained by illuminating (or "painting") the target by a laser target designator, on the ground or on an aircraft. The laser target designator sends its beam in a series of encrypted pulses so that the projectile cannot be confused by other means. Examples of LGP that are fielded:

- a. Gun launched Copperhead (USA);
- b. Gun launched Krasnopol (RUS);

TERMINALLY HOMING PROJECTILES

1408. By using terminal guidance it is possible to guide the projectile actively to the target. The THP may use a seeker to lock onto the target and steers the projectile towards the target or it may follow a third party target designation such as a laser. Some THP operate in an autonomous heat seeking mode which can recognize targets and discriminate targets among decoys and burning targets/devices. Example of THP that is fielded: mortar launched Strix (SWE).

TRAJECTORY CORRECTABLE MUNITION, incl. COURSE CORRECTING FUZES

1409. TCM is in the near future to be considered as a modular 155mm projectile that can incorporate different kinds of payload. The precision of these projectiles is gained by the combination of a guidance system, based on GPS and an Inertial Navigation System

(INS) and the use of canards and/or thrusters to make corrections during the flight possible. The location of the target is set into the GPS. The guidance system is build into the projectile. Examples of TCM which will be fielded soon: gun launched XM982 Excalibur (USA and SWE)

1410. A new development is the Course Correcting Fuze. The guidance and steering mechanism is build into the fuze. By adding these kind of fuze onto a “dumb” projectile, it is possible to create a TCM. Examples of CCF are:

- a. Spacido and Samprass (FRA);
- b. Korrekturzunder Junghans (DEU);
- c. Precision Guidance Kit (USA).
- d. Non of these CCF is fielded yet but are still in a development phase.

SENSOR FUZED (SUB) MUNITION

1411. SFSM provides cannon artillery with the capability to effectively deliver effects to threats ranging from light armoured targets up to main battle tanks. SFSM consists of a thin wall carrier shell (cargo shell), a base, a submunition expulsion charge and the sensor fuzed sub munitions. Precision is gained through the submunitions. The systematic search the target area and the intelligent evaluation of sensor signals, in combination with a high penetration performance of the Explosively Forged Penetrator (EFP) make it possible to detect and destroy (effect) individual (pinpoint) targets in the target area. It is important to know that in this stage the SFSM carrier shell is still a “dumb” one. For having the desired effect on the target you still have to bring the SFSM carrier shell as close and precise as possible above the target. For this reason, developments are going on to have the submunitions into a TCM cargo shell. Examples of SFSM are:

- a. SMART 155 (DEU);
- b. BONUS (SWE)

In the near future, BONUS submunitions will be added to the Excalibur.

RECORD OF NATIONAL RESTRICTIONS

Notes

- 1. All Restrictions are annotated in the relevant chapter**
- 2. Nations not ratified are at page ii.**

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RECORD OF SPECIAL CONSIDERATIONS	
Notes	
1. All Restrictions are annotated in the relevant chapter	
2. Nations not ratified are at page ii.	
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