CHAPTER 8

ADJUSTMENT OF OTHER FIRE SUPPORT MEANS

Section I

CLOSE AIR SUPPORT

This section implements STANAG 3736.

8-1. TYPES OF REQUESTS

a. There are two types of CAS requests: preplanned and immediate. Actual request procedures are outlined in the FM 6-20 series manuals. The CAS requests may be initiated by any level and must include the following elements:

- Observer identification.
- Warning order (immediate or preplanned CAS request).
- Target type and quantity.
- Target location:
  - Six-digit grid
  - Elevation (in mean feet above sea level).
- Desired time on target.
- Results desired on target (destroy, neutralize, or interdict).
- Final control:
  - call signs.
  - Frequencies.
  - Contact points.
- Remarks:
  - Friendly locations.
  - Weather.
  - Threats.

b. The procedures for the forward air controller or the acting FAC included in this chapter conform to the methods and procedures in TC 90-7 and FM 90-20. (Normally, the Air Force air liaison officer [ALO] or other tactical air control party [TACP] personnel will perform FAC duties.)

8-2. EMPLOYMENT

a. Control Measures. There are three control measures for CAS missions (Figure 8-1) with which the company FSO will be concerned.

(1) The **contact point** (CP) is the point at which the aircraft will make initial radio contact with the ground controller (company FSO).

(2) The **initial point** (IP) is the point from which the aircraft starts the timed run toward the pull-up point (PUP).

(3) The **pull-up point** is the point at which an aircraft at low level begins a climb to identify the target and to gain altitude for the strike on the target.

b. Processing. The maneuver battalion fire support element determines if the target and the current situation are appropriate for a CAS request. If so, a CAS request (preplanned or immediate, as appropriate) is submitted. If the request is approved, the ALO or the FSO obtains mission data, prepares attack information, and transmits these data to the individual who directs the mission. (If no Air Force FAC is in position to control the mission and the aircraft are equipped with FM radios, the company FSO directs the mission.) Examples of mission data and attack information are given in paragraphs c and d.

c. Mission Data. Mission data (also referred to as lineup) may be as follows:

- Mission number: 1210027.

- Fighter call sign: HAMMER 11.
- Type and/or number of aircraft: Two A-7s.
- Ordnance: Six Mavericks (antitank missile) and 20-mm.
- On-station time (loiter time): 30 minutes.

d. Attack Information. This information in the nine-line brief format (Figure 8-2) may be as follows:

- Initial point: (Grid) NP459854.
- Heading (IP to target): 069 (degrees magnetic) (offset L or R).
- Distance (IP to target): 9.8 (nautical miles).
- Target elevation 1,140 (feet above mean sea level).
- Target description: Five tanks attacking west.
- Target location (Grid) NP 675920.
- Type mark WP (or beacon or laser and code).
- Location of friendlies: l,000 meters southwest of target.
- Egress: Northwest to avoid artillery suppression

NOTE: The observer must transmit the attack information to the aircraft if the pilots do not already have the information.

Figure 8-1. **CAS MISSION CONTROL MEASURES**

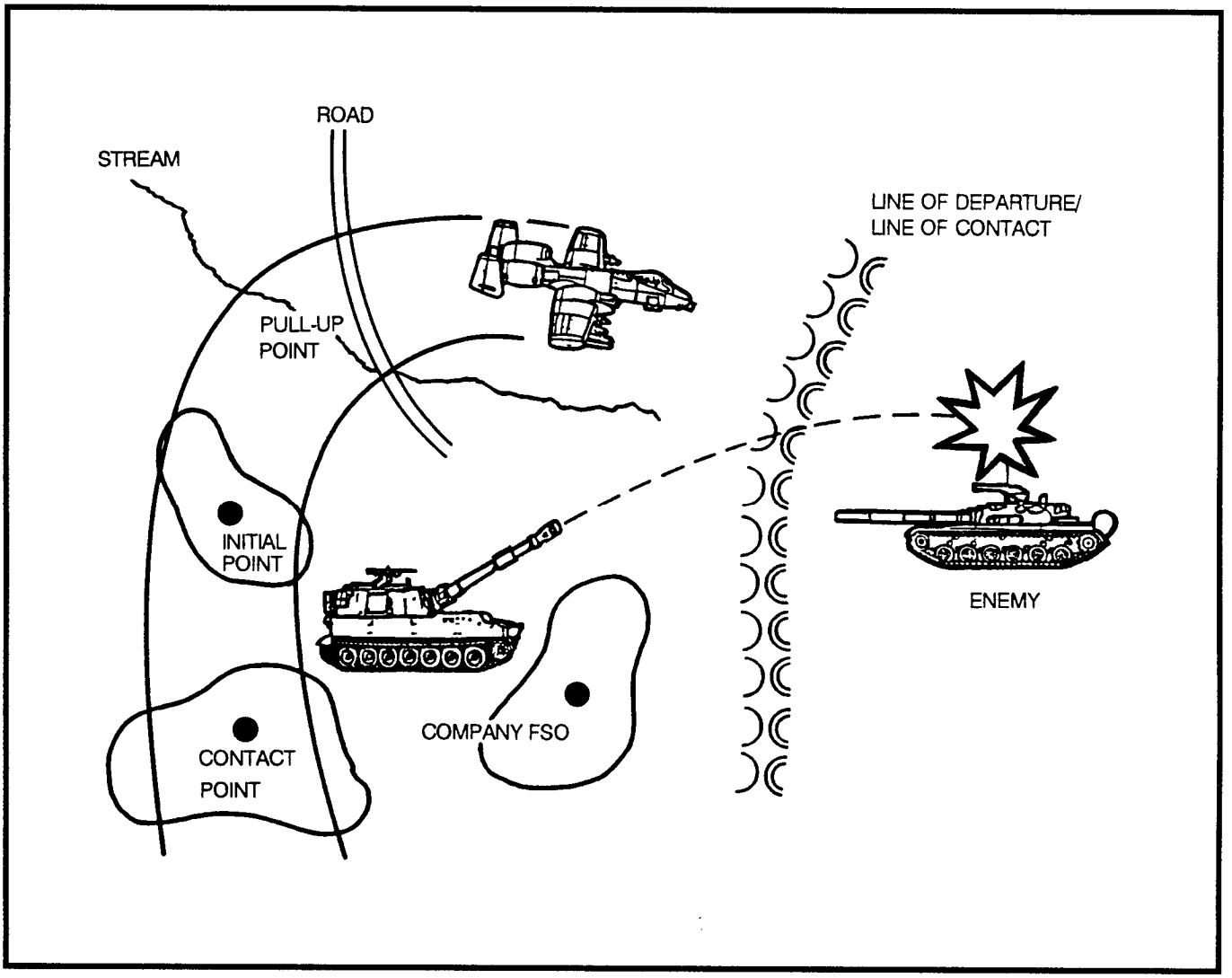


Figure 8-2. **SAMPLE CAS BRIEF**

(1. INITIAL POINT (IP)) NP459854 (or) XRAY

(2. HEADING (IP TO TARGET)) 069 MAGNETIC
(OFFST: LEFT/RIGHT)

(3. DISTANCE (IP TO TARGET)) 9.8 (NAUTICAL MILES)

(4. TARGET ELEVATION) 1,140 (FEET ABOVE MEAN SEA LEVEL)

(5. TARGET DESCRIPTION) 5 TANKS ATTACKING WEST

(6. TARGET LOCATION) NP675920 (UTM, LAT/LONG, VISUAL REFERENCES, ETC.)

(7. TYPE OF MARK) LASER (CODE) 372

(8. LOCATION OF FRIENDLIES) 1,000M SW OF TARGET

(9. EGRESS NW TO AVOID ARTILLERY SUPPRESSION

(REMARKS) _____

(TIME ON TARGET) TOT _____

(TIME TO TARGET (TTT)) STANDBY _____ PLUS _____
(minutes) (seconds)

OMIT DATA NOT REQUIRED. LINE NUMBERS ARE NOT TRANSMITTED. ALL UNITS OF MEASURE ARE STANDARD. SPECIFY IF OTHER UNITS OF MEASURE ARE BEING USED.

e. Target Marking.

(1) The most accurate method of marking a target is by use of a laser (if the available aircraft has-an airborne passive laser tracker, Pave Penny). The Pave Penny is mounted on A-7, A-10, and some F-16 aircraft. If this is the method to be used, the laser PRF codes will normally be passed as part of the attack aircraft information or CAS brief (Figure 8-2). To make the Air Force four-digit code match the laser designator three-digit code, simply insert a 1 as the first digit when transmitting the code to the pilot. For example, a PRF code of 381 will be sent to the pilot as 1381. The target is designated when the pilot commands **LASER ON** or as the aircraft approaches the apex of the PUP maneuver, whichever happens first. Designation continues until the pilot has identified the target, he commands **TERMINATE,** or 20 seconds has elapsed, whichever occurs first.

(2) Alternate methods of marking a target for a CAS mission are with smoke, WP, or ground burst illumination. As a rule of thumb, the marking round should impact no later than 20 seconds before the aircraft reaches the target. The company FSO can get the aircraft IP-to-target time from the ALO or battalion FSO and the time of flight of the round from the FDC. The time to fire the marking round is determined by adding 20 seconds and TOF and then subtracting that total from the aircraft IP-to-target time. The answer is the time that should elapse from when the aircraft departs the IP until the marking round is fired. If smoke is used to mark the target, an additional 10-second buildup time must be added.

NOTE: If smoke is used to mark the target, ensure that the smoke is beyond or downwind of the target. This will keep the smoke from obscuring the target from the pilot's view. In describing the target, distance and direction should be given from the base of the smoke.

EXAMPLE

IP-to-target time for aircraft is 2 minutes 30 seconds.
Time of flight of round is 35 seconds.
WP is being used.
20 seconds + 35 seconds (TOF) = 55 seconds.
2 minutes 30 seconds (IP-to-target time) -55 seconds = 1 minute 35 seconds.
Fire round 1 minute 35 seconds after aircraft departs the IP.

8-3. MISSION CONTROL

a. The company FSO's control of the mission begins when the flight leader makes initial contact at the CP. Once communication is established, the company FSO must ask the flight leader for his lineup information. The company FSO must then verify that the flight leader has the current attack information. The received mission data may differ from the mission data provided earlier by the ALO. If the pilot does not have the attack information or if some information has changed, the company FSO transmits the needed information to him in the format of the CAS brief (Figure 8-2).

b. Before the aircraft reaches the IP, the company FSO must determine the desired back-off time for firing the marking round. He should send his fire mission to the battery as an at my command mission.

c. Once ready, the company FSO clears the aircraft to depart the IP. He asks the flight leader to report his departure so that the company FSO can determine the time to fire the marking round. The company FSO should be prepared to fire the marking round at the desired time even if communication with the aircraft is interrupted.

d. The company FSO must watch for the aircraft. As soon as it is in sight, he orients the flight leader to the marking smoke by using the clock method with the nose of the aircraft being 12 o'clock. Once the flight leader has identified the marking smoke, the company FSO gives him a cardinal direction and a distance in meters to the target from the marking smoke. Once the company FSO is certain the flight leader has identified the target correctly and the aircraft is pointed at the target, he clears the aircraft to strike the target (cleared hot). The company FSO must be prepared at any time before actual ordnance delivery to call off the attack (abort) if the aircraft starts to attack the wrong target. He must be ready to reattack the target if additional ordnance is required or if the pilot requests a reattack.

NOTE: It is the company FSO's responsibility to ensure that the correct target is attacked and that friendly troops are not needlessly endangered.

The three mandatory radio transmissions for CAS missions with which the company FSO will be concerned are discussed below.

(1) Cleared to Depart the Initial Point. This transmission must be made when all preparations are complete for the attack and the FAC or company FSO is in position to observe and control the attack.

(2) Cleared Hot. This transmission is made when the FAC or company FSO is certain that it is safe for the aircraft to release the ordnance without endangering friendly ground forces. It is given as soon as possible after the aircraft is pointed at the target area.

(3) Cleared for Reattack. This transmission is given if the pilot requests permission to reattack the target. Normally, permission to reattack the target is given if there are no planned fires scheduled for the target immediately after the first attempt to attack the target.

EXAMPLE
CAS MISSION USING THE G/VLLD

FLIGHT LEADER (HAMMER 11)	COMPANY FSO (K12)
K12 THIS IS HAMMER 11, NOW AT CP.	
	THIS IS K12, REQUEST LINEUP, OVER.
HAMMER 11, MISSION NUMBER 1210027. I HAVE 2 A-7s, 6 MAVERICKS AND 20-MM ON EACH. ON STATION FOR 20 MINUTES.	
	THIS IS K12, ROGER. DO YOU HAVE ATTACK INFORMATION? OVER.
HAMMER 11, AFFIRMATIVE.	
	THIS IS K12, ROGER, OUT.
K12 THIS IS HAMMER 11, APPROACHING IP.	
	THIS IS K12, ROGER. YOU ARE CLEARED TO DEPART IP. REPORT DEPARTING IP, OVER.
HAMMER 11, DEPARTING IP.	
	HAMMER 11 THIS IS K12, I HAVE YOU IN SIGHT. TARGET IS AT YOUR 2 O'CLOCK, OVER.
HAMMER 11, ROGER. **HAMMER 11, LASER ON.**	
	THIS IS K12, LASER ON, OVER.
HAMMER 11, I HAVE THE SPOT.	
	THIS IS K12. YOU ARE CLEARED HOT, OVER.
HAMMER 11, TERMINATE.	
	HAMMER 11 THIS IS K12, END OF MISSION. T-62s DESTROYED, OVER.

EXAMPLE
CAS MISSION USING A MARKING ROUND

FLIGHT LEADER (HAMMER 11)	COMPANY FSO (K12)	BATTERY (K28)
K12 THIS IS HAMMER 11, NOW AT CP, OVER.		
	THIS IS K12, REQUEST LINEUP, OVER.	
HAMMER 11, MISSION NUMBER 1210027. I HAVE TWO A-7s,6 MAVERICKS AND 20-MM ON EACH. ON STATION FOR 20 MINUTES.		
	THIS IS K12, ROGER. DO YOU HAVE ATTACK INFORMATION? OVER.	
HAMMER 11, AFFIRMATIVE.		
	THIS IS K12, ROGER, OUT. **K28 THIS IS K12, FIRE FOR EFFECT, OVER. GRID NK132968, OVER. MARKING ROUND WP AT MY COMMAND, REQUEST TIME OF FLIGHT, OVER.**	
		Message to observer: **KILO, AA7000, OVER.** **THIS IS K28, READY, TIME OF FLIGHT 46 SECONDS, OVER.**
K12 THIS IS HAMMER 11, NOW APPROACHING IP.		
	THIS IS K12, ROGER. YOU ARE CLEARED TO DEPART IP. REPORT DEPARTING IP, OVER.	
HAMMER 11, DEPARTING IP.		
	K28 THIS IS K12, FIRE, OVER.	
		THIS IS K28, SHOT, OVER.
	HAMMER 11 THIS IS K12, I HAVE YOU IN SIGHT. DO YOU SEE SMOKE AT YOUR 10 O'CLOCK? OVER.	
HAMMER 11, AFFIRMATIVE.		
	THIS IS K12, YOUR TARGET IS 200 METERS SOUTH OF THE SMOKE. A GROUP OF T-62 TANKS ON THE RIDGE. CAN YOU IDENTIFY? OVER.	
HAMMER 11, ROGER, I SEE THE TARGET.		
	THIS IS K12. YOU ARE CLEARED HOT, OVER. HAMMER 11 THIS IS K12, END OF MISSION. T-62s DESTROYED, OVER.	
	K28 THIS IS K12, END OF MISSION, OVER.	
		THIS IS K28, END OF MISSION, OUT.

NOTE: For simplicity, read-back transmissions between the company FSO and the battery are not shown.

e. In a low-threat situation, the same basic procedures may be used. The aircraft may proceed from the IP to the target at higher altitudes; thus, they can see the target area from a greater distance. They may also be able to orbit the target area before their attack, allowing time for a good verbal description of the target by the company FSO. The timing of the marking round can be much less restricted (if the aircraft altitude is above the maximum altitude of the round), and the verbal description can be much more thorough. Therefore, the probability of the aircraft locating and successfully attacking the desired target could increase significantly.

Section II

ATTACK HELICOPTERS

8-4. MISSION AND EMPLOYMENT

The primary mission of an attack helicopter (AH) is to destroy armor and mechanized threat forces. Attack helicopters are used as maneuver forces in combined arms operations. This maximizes their weapon and aircraft system capabilities. They are ideally suited for situations in which rapid reaction time is important or terrain restricts ground forces.

8-5. FIRE SUPPORT ROLE

Infrequently, on the basis of the commander's risk versus payoff assessment, attack helicopters may be tasked to provide fire support when no other assets are available. The attack helicopter, when tailored for this mission, loses its primary antiarmor capability. It is tasked to trade precision antiarmor weapon systems for area suppression weapons.

8-6. CAPABILITIES

Attack helicopters can fire aerial rockets indirectly at extended ranges; however, the fires are not accurate enough to warrant the large amount of ammunition needed for this type mission. The loiter time of the attack helicopter is a function of the armament and fuel load it is configured to carry. For example, a heavy antiarmor mission profile results in the aircraft being loaded with tube-launched, optically tracked, wire-guided missiles (TOWS) or Hellfire missiles but carrying the minimum fuel needed to conduct the mission. This gives it a relatively short loiter time.

8-7. ATTACK AND SCOUT TEAMS

Attack and scout helicopters are always used as a team. Within each team, there is a team leader. He controls the actions of the team, coordinates the battle with ground forces, adjusts artillery fires, and directs tactical air units,

8-8. ARMY AND AIR FORCE COORDINATION

The joint air attack team (JAAT) is a combination of Army attack and scout helicopters and Air Force close air support aircraft. Normally, the team operates with ground maneuver forces, field artillery, mortars, and air defense weapon systems to attack high-priority targets. These systems complement and reinforce each other when used together. Fire support team members and fire support officers from company to brigade levels are involved in coordinating and supporting this joint effort. Target hand-over procedures are the method by which they help accomplish the mission of attack helicopters.

8-9. TARGET HAND OVER

a. If attack helicopters are operating in the company zone of action, the FIST or COLT can use its G/VLLD to designate targets for attack helicopters. This can be done in several different ways. When the attack helicopters are carrying TOWS, the FIST hands over the target to the aeroscout, and the scout maneuvers the attack helicopter into position to engage. Or, the FIST can hand over directly to an attack helicopter. If Hellfire is the weapon system to be used, other options are also available. Hellfire can be guided by the attack helicopter, the aeroscout, or the FIST. Thus, the FIST or COLT can lase for the attack helicopter with the aeroscout or the FIST coordinating. The target can be passed to the aeroscout by the FIST, and he can designate for the attack helicopter. Hellfire has a lock-on-after-launch local function. That means that if someone besides the attack helicopter is designating, the attack helicopter does not have to unmask to fire its missile.

b. To prevent the Hellfire missile from locking onto the designator instead of the target, the Angle T formed between the designator-target line and the missile-target line should be less than 1,065 roils (600). Before engaging

the target, the observer should relay his position to the helicopter so the pilot can position the aircraft properly for safety. To keep the missile from tracking laser backscatter energy, the designator should keep a clear, unobstructed line of sight to the target. Special care should be taken to avoid lasing through dust, trees, or other obstructions which could cause the Hellfire to impact near the designator. This is especially true in designating moving targets.

Section III

NAVAL GUNFIRE

This section implements STANAG 1034.

8-10. INTRODUCTION

a. On most occasions when naval gunfire is available, elements of an air and naval gunfire liaison company (ANGLICO) will be attached to the appropriate Army unit. Normally, at the maneuver company level, a firepower control team will be attached to control and coordinate naval gunfire. If an NGF spotter is not available, the FIST is responsible to call for and adjust naval gunfire. The procedures, except for a few differences, are the same as already outlined. It is essential for the company FSO to be aware of these differences if he wishes to accomplish the mission in a timely reamer.

b. Table 8-1 shows types of Navy ships and characteristics of their armament.

Table 8-1. **NAVAL SHIPS AND THEIR ARMAMENT**

SHIP	GUN SIZE/CALIBER	RANGE (METERS) MAXIMUM/MINIMUM	RATE OF FIRE (ROUNDS PER MINUTE) MAXIMUM/SUSTAINED	AMMUNITION AVAILABLE
Battleship	16-inch/50 5-inch/38	35,909/910 15,700/910	2/1 22/15	HE, AP, ICM HE, WP, illum
Guided missile cruiser (CGN and CG)	5-inch/38 5-inch/54	15,700/910 22,999/910	22/15 40/20	HE, WP, illum HE, WP, illum
Guided missile destroyer (DDG)	5-inch/54	22,999/910	40/20	HE, WP, illum
Destroyer (DD)	5-inch/54	22,999/910	40/20	HE, WP, illum
Guided missile frigate (FFG)	5-inch/38	15,700/910	22/15	HE, WP, illum
Frigate (FF)	5-inch/38 5-inch/54	15,700/910 22,999/910	22/15 40/20	HE, WP, illum HE, WP, illum
Amphibious assault ship (LHA)	5-inch/54	22,999/910	40/20	HE, WP, illum

LEGEND:

AP	=	armor piercing	DDG	=	guided missile destroyer
CG	=	guided missile cruiser	FF	=	frigate
CGN	=	guided missile cruiser, nuclear	FFG	=	guided missile frigate
DD	=	destroyer	LHA	=	amphibious assault ship, general purpose

8-11. COMMUNICATIONS

The spotter, if attached, conducts NGF missions over the NGF ground spot net with a high frequency (HF) radio. The lack of an HF radio may pose a problem if any observer other than a spotter is required to adjust naval gunfire. To solve this problem, the observer should contact the supporting arms liaison team (SALT) officer who is located in the battalion FSE. The SALT officer can talk to the ship over the NGF ground spot net, and the adjustment can be relayed through him.

8-12. FIRE UNIT STATUS

When a ship arrives in its assigned firing position (fire support station [FSS] or fire support area [FSA]) and it has completed its prefiring tasks, it will report ON STATION AND READY FOR CALL FOR FIRE. A fire unit status report may be sent. It includes pertinent information such as types and quantities of ammunition available for naval gunfire support. This information may be requested by the observer.

8-13. ELEMENTS OF THE CALL FOR FIRE

To perform the duty of providing naval gunfire, the observer must communicate effectively with the fire support ship. To do this with the least confusion and the greatest speed, the observer uses a standardized call for fire. The call for fire is transmitted to the ship in two transmissions, consisting of six elements, with a read-back break after each transmission. The sequence of these two transmissions is as follows:

- Spotter identification and warning order and target number.
- Target location, target description, method of engagement, and method of fire and control.

8-14. SPOTTER (OBSERVER) IDENTIFICATION

This element tells the ship who is calling. The observer and the ship use call signs. Once given, call signs are normally omitted from subsequent transmissions in the course of the mission.

8-15. WARNING ORDER AND TARGET NUMBER

a. The warning order tells the ship that a call for fire is being transmitted. It clears the net and warns the ship that naval gunfire support is desired. For naval gunfire, the warning order consists of the words **FIRE MISSION.**

b. For the ship and the naval gunfire liaison officer (NGLO) who is monitoring the call for fire to keep track of each location being fired upon, each mission is assigned a target number. The observer gives the target number to the ship. The target number consists of two letters followed by four numbers. For targets of opportunity, the FIST assigns each fire mission a number in numerical sequence from the block of target numbers allocated by the battalion fire support element (battalion FSO), or the battalion FSO may assign the target number. In the case of planned targets, the observer uses the previously assigned target number from the fire plan. The assignment of target numbers to fire missions in the call for fire does not cause the targets to be recorded as targets. An example of the warning order and target number element in the call for fire is **A1B THIS IS C2D, FIRE MISSION, TARGET NUMBER AB2135, OVER.**

8-16. TARGET LOCATION

This element gives the ship information needed to plot the target and determine firing data. Target location data are determined in the same manner as for artillery. Target location data are transmitted as follows:

- Grid: The observer provides the grid coordinates of the target; the altitude of the target (in meters, measured from sea level); and if the method of control is spotter (observer) adjust, direction.
- Polar: The observer provides the OT direction to the target, the distance (in meters), and a vertical shift (in meters).
- shift from a known point The observer identifies the known point (target number) in the warning order of the call for fire. He includes in the target location element the OT direction, the lateral and/or range shift, and the vertical shift.

8-17. TARGET DESCRIPTION

This element gives a brief description of the target. The observer considers the items below when formulating this element.

a. Type of Target. What the target is and what the target is doing (for example, troops digging in).

b. Size. Number of elements in the target or its physical dimensions (for example, 5 trucks or 400 x 200, attitude 0700).

c. Degree of Protection. Does the target have protection (in the open or dug in)?

8-18. METHOD OF ENGAGEMENT

a. Danger Close. The term **DANGER CLOSE** is included in the call for fire when there are friendly troops or positions within a prescribed distance of the target. Depending on the caliber of the gun and the ammunition being fired, there are three different distances that are considered danger close for naval gunfire (Table 8-2).

Table 8-2. DANGER CLOSE DISTANCES FOR NAVAL GUNFIRE

CALIBER OF THE GUN	ORDNANCE	DANGER CLOSE DISTANCE
Less than 6-inch	All	750 meters
6-inch or larger (including 16-inch)	HE/Q or time	1,000 meters
16-inch	ICM or HE/CVT (controlled variable time)	2,000 meters

(1) The observer reports **DANGER CLOSE** followed by a cardinal direction and a distance in meters from the target to the nearest friendly position. The observer also designates the place where the first salvo is to impact. The first salvo can be either offset or directed at the target.

(a) The first salvo should be offset to impact on the opposite side of the target from the friendly position. This is done by making a normal correction (left or right, add or drop) in relation to the OT direction or by giving a cardinal direction. The offset between the nearest friendly position and the first salvo can be any distance specified by the observer. However, it is normally used to place the first salvo at least the applicable danger close distance (Table 8-2) from friendly troops.

EXAMPLES

DANGER CLOSE, SOUTH 350 SOUTH 350 indicates friendly position in relation to the target.

FIRST SALVO AT ADD 400: ADD 400 positions the offset at least 750 meters from the nearest friendly position (350 + 400 = 750).

(b) The first salvo may be directed at the target when the tactical situation does not permit an offset; for example, **FIRST SALVO AT TARGET.**

(2) The creeping method of adjustment is always used in danger close missions. The observer makes corrections by moving each round toward the target in increments of 100 meters. The combined effect of each correction should not exceed 200 meters. If more than one gun is to fire for effect, the observer should check the mean point of impact of all guns to be used before entering fire for effect.

(3) In a danger close situation, the tires may be crept to within minimum safe distance of friendly positions. Recommended minimum safe distance for an adjusted salvo of a 5-inch gun is 200 meters when firing parallel to the front lines, or 350 meters when not firing parallel to the front line. The ship normally advises the observer when a predicted fall of shot approaches minimum safe distance.

b. Trajectory. Because of the high muzzle velocity and the flat trajectory of naval gunfire, intervening terrain may prevent engagement of targets in defilade. Also, a reduced charge may be required to prevent ripping of the illumination parachute or to increase accuracy at short ranges. The observer or the ship can raise the trajectory, thereby increasing the angle of fall, by announcing **REDUCED CHARGE.** If this subelement is omitted in the call for fire, the ship will fire full charge. Once a reduced charge has been initiated, it can be terminated by the command **CANCEL REDUCED CHARGE.**

c. Ammunition. Several types of ammunition are available to the observer. If the type of ammunition is not specified in the call for fire, shell HE with fuze quick will be fired during the adjustment and FFE phases. If a different type of ammunition or fuze action is required during either the adjustment or the FF3 phase, the observer must specify the type desired. As much warning as possible should be provided to the ship when a mission requires a nonstandard projectile, such as WP. This allows time to ready the ammunition in the gun mount.

(1) Projectile. The observer must specify all projectiles except HE; for example, **SHELL WP.**

(2) Fuze. The observer must specify all fuzes except fuze quick; for example, FUZE DELAY. (When illumination is fired, the fuze is understood to be fuze time.)

d. Armament. When supported by a multicaliber ship (such as a battleship with 5-inch and 16-inch guns), the observer may specify if he desires main or secondary armament. Main (larger caliber) armament is understood if this element is omitted.

e. Number of Guns. The observer may specify the number of guns for effect. If not specified, it is understood to be the same number as in adjustment. One gun is considered standard and need not be specified. An example command is **TWO GUNS.**

f. Number of Salvos. This element is sent when entering fire for effect. The term *salvo* refers to the method of fire in which a weapon or a number of weapons are fired at a target. It indicates the number of rounds to be fired from each gun. For example, **1 GUN 5 SALVOS** means 5 rounds are to be fired, while **2 GUNS 5 SALVOS** means 10 rounds are to be fired. If the method of control is spotter (observer) adjust, this element is omitted until the observer is ready to enter fire for effect; or it can be included if the observer wants to adjust with multiple salvos. If omitted, the ship fries only one salvo. An example command is **2 SALVOS.**

g. Special Instructions. Various special instructions the observer may use in attack of the target are discussed below.

(1) Interval. This is used to cause FFE rounds to be fired with a specific time interval between each salvo. The observer announces **INTERVAL** followed by a desired time interval (seconds understood); for example, **10 SALVOS, INTERVAL 30, FIRE FOR EFFECT.**

(2) Sustained Fire. If there is a requirement for fire for effect to be spread over a specific period of time, the observer may specify **SUSTAINED FIRE.** The command includes the number of salvos and the period of time in which they are required to be fired; for example, **20 SALVOS, SUSTAINED FIRE, 5 MINUTES, FIRE FOR EFFECT.**

(3) Time on Target. The observer may require the initial salvos in fire for effect to impact on the target at a specified time.

(4) Coordinated Illumination. The observer may inform the ship that the firing of illuminating and HE projectiles will be coordinated to illuminate the target and surrounding area only at the time required for spotting and adjusting the HE fires. He does this by announcing **COORDINATED ILLUMINATION.**

(5) Continuous Illumination. The observer may require constant light on a target. He may specify a period of time the illumination is to be effective. The ship determines the interval to fire the subsequent illumination salvos based on the burning time of the projectile. The observer commands **CONTINUOUS ILLUMINATION.** This command should be used with discretion to avoid excessive expenditure of ammunition.

8-19. METHOD OF FIRE AND CONTROL

This element of the call for fire indicates the observer's desire and ability to control the delivery of fires. Methods of control are announced by the observer by using the terms described below.

a. Spotter (Observer) Adjust. When the observer believes that an adjustment must be made, he adjusts the salvos until he is sure fire will take effect on the target. This method is understood to be standard if omitted from the call for fire. It may be used when the observer wishes to revert to adjustment anytime during the mission.

b. Ship Adjust. This method of control is used when the observer believes the ship has a better view of the target than he does. Since direct fire is faster and more accurate, this method is used whenever possible. After the observer positively identifies the target to the ship, he announces **SHIP ADJUST.** The ship then takes the target under fire. The observer may assist the ship by providing range spottings along the GT line, particularly when he is looking perpendicular to the GT line.

c. Fire for Effect. The observer should strive for fire for effect with the first round or as soon as possible in the adjustment phase. When determining whether to fire for effect on the first round, the observer must consider the target location and how accurately the ship has been firing its initial rounds on previous missions. He must also consider the dispersion pattern of naval gunfire. If the first salvo is believed to have effect on the target, the best results are normally achieved by surprise fire. When fire for effect is desired, the observer specifies the number of salvos (and guns if different from that used in adjustment) and announces **FIRE FOR EFFECT;** for example, **6 SALVOS, FIRE FOR EFFECT or 2 GUNS, 6 SALVOS, FIRE FOR EFFECT.**

d. Cannot Observe. The command **CANNOT OBSERVE** is used when neither the observer nor the ship can see the target yet the target must be engaged. Normally, the location is received through intelligence sources. **FIRE FOR EFFECT** and the number of salvos are always transmitted with this method of control; for example, **2 GUNS, 4 SALVOS, FIRE FOR EFFECT, CANNOT OBSERVE.**

e. At My Command. The command **AT MY COMMAND** is used as a modifier to the methods of control. If the observer needs to control when the ship fires each round, he includes **AT MY COMMAND** in the method of control. When the ship is prepared to fire each round, it transmits **READY OVER.** The observer then commands **FIRE** when he is ready for the ship to fire the

round. At my command remains in effect throughout the mission or until the observer announces **CANCEL AT MY COMMAND.** This method of control is often used by aerial observers. To initiate it, the observer announces **FIRE FOR EFFECT, AT MY COMMAND.**

8-20. PREFIRING REPORT

After the ship receives the call for fire and determines firing data, a report will be made to the observer before tire is begun. The observer reads back this transmission to the ship and commands **BREAK...FIRE, OVER.** Information the ship reports is discussed below.

a. Gun-Target Line. The ship reports its firing direction, using the same north reference and units used by the spotter. The ship notifies the observer of subsequent changes to the GT line of 200 mils (10°) or more. If the direction used for adjustment is the GT line, the ship reports changes of 100 roils (5°) or more.

b. Line of Fire. When the ship fires an illumination mission, wind drift may cause the flare parachute to miss the target. To indicate a different firing direction, the ship reports **LINE OF FIRE** for illumination missions; for example, **LINE OF FIRE, 110 DEGREES TRUE.** This direction is to the new illumination aiming point, not the GT line.

c. Summit. If the observer is airborne, the ship routinely reports the highest altitude above mean sea level the projectile will reach on its flight path to the target. Summit may also be requested by ground observers or the NGLO. Summit is reported in feet to air observers and in meters to ground agencies (observer or NGLO).

d. First Salvo at (Point of Aim). When the observer has reported a danger-close situation the ship confirms the first salvo aiming point identified previously by the observer; for example, **FIRST SALVO AT ADD 300.**

e. Any Changes. If the ship must change any portion of the observer's fire request, it notifies him of the change. For instance, if the observer requests **SHELL WP IN EFFECT** and the ship has none remaining, the ship announces **CANNOT COMPLY WITH WP, HE IN EFFECT.**

f. Ready and Time of Flight. When the ship is prepared to fire the first salvo, it reports **READY** followed by the time of flight in seconds. The observer reads back the entire prefiring report and commands **FIRE.** If the method of control included at my command, the ship also reports **READY** before firing each round. The ship informs the observer when there is a time of flight change of more than 5 seconds. An example of a prefiring report follows.

EXAMPLE

SHIP TRANSMISSION	OBSERVER TRANSMISSION
GUN-TARGET LINE 1680, READY 17, OVER.	
	GUN-TARGET LINE 1680, READY 17, BREAK... FIRE, OVER.
FIRE, OUT.	

8-21. AUTHENTICATION

To avoid deception, the ship should initiate authentication procedures upon establishing initial communications with the observer.

8-22. REPORT UPON FIRING

The ship transmits the **SHOT** and **SPLASH** reports to the observer each time an adjustment salvo is fired and for the first salvo only in the FFE phase.

a. SHOT is transmitted at the moment the guns are fired.

b. SPLASH is transmitted 5 seconds before the round is expected to detonate. **SPLASH** is not reported during fire for effect when two or more ships are conducting a massed-fire mission. In illumination missions, it is reported for star shells before the beginning of the HE adjustment phase of coordinated illumination missions and thereafter for the HE round only; for example, **SHOT...SPLASH, OUT.**

8-23. CORRECTION OF ERRORS

Errors by the observer or by the ship are sometimes made in transmitting data. The procedures below should be used to correct the data.

a. Correction. If the observer realizes he has made an error in his transmission, he immediately transmits the word **CORRECTION** followed by the corrected data. If the correction affects other subelements, his correction includes a restatement of the entire data.

b. Wrong. If an error is made during a read back, the word **WRONG** followed by the correct data is transmitted at the end of the transmission. The word **WRONG** is then read back, along with the corrected version.

8-24. EXAMPLES OF NAVAL GUNFIRE CALLS FOR FIRE

Shown below are examples of various NGF calls for fire.

EXAMPLE

SPOTTER (OBSERVER) ADJUST MISSION, GRID

OBSERVER TRANSMISSION	SHIP TRANSMISSION
E6R THIS IS N7R, FIRE MISSION, TARGET NUMBER AF3001 , OVER.	
	N7R THIS IS E6R, FIRE MISSION, TARGET NUMBER AF3001 , OUT.
GRID MB786543, ALTITUDE 05, DIRECTION 2660,50 TROOPS IN THE OPEN, FUZE CVT IN EFFECT, OVER.	
	GRID MB786543, ALTITUDE 05, DIRECTION 2680, 50 TROOPS IN THE OPEN, FUZE CVT IN EFFECT, OUT.
	GT LINE 0870, READY 13, OVER.
GT LINE 0870, READY 13, BREAK... FIRE, OVER.	
	FIRE, OUT.

SPOTTER (OBSERVER) ADJUST MISSION, AMC, POLAR

OBSERVER TRANSMISSION	SHIP TRANSMISSION
E6R THIS IS N7R, FIRE MISSION, TARGET NUMBER AF3002, OVER.	
	N7R THIS IS E6R, FIRE MISSION, TARGET NUMBER AF3002, OUT.
DIRECTION 4880 MAGNETIC, DISTANCE 2900, UP 35, THREE TRUCKS REFUELING IN OPEN, SHELL WP IN EFFECT, AT MY COMMAND, OVER.	

EXAMPLE (Continued)

OBSERVER TRANSMISSION	SHIP TRANSMISSION
	DIRECTION 4880 MAGNETIC, DISTANCE 2900, UP 35, THREE TRUCKS REFUELING IN OPEN, SHELL WP IN EFFECT, AT MY COMMAND, OUT.
	GT LINE 0260 MAGNETIC, READY 17, OVER.
GT LINE 0260 MAGNETIC, READY 17, BREAK..FIRE, OVER.	
	FIRE, OUT.

FIRE-FOR-EFFECT MISSION SHIFT FROM A KNOWN POINT METHOD

OBSERVER TRANSMISSION	SHIP TRANSMISSION
E6R THIS IS N7R, FIRE MISSION, TARGET NUMBER AF3003, OVER	
	N7R THIS IS E6R, FIRE MISSION, TARGET NUMBER AF3003, OUT.
FROM TARGET NUMBER AB3772, DIRECTION 3470, LEFT 260, ADD 500, SUPPLY DEPOT IN DEFILADE, RADIUS 200, REDUCE CHARGE, 2 GUNS 5 SALVOS, FIRE FOR EFFECT, OVER.	
	FROM TARGET NUMBER AB3772, DIRECTION 3470, LEFT 280, ADD 500, SUPPLY DEPOT IN DEFILADE, RADIUS 200, REDUCE CHARGE, 2 GUNS 5 SALVOS, FIRE FOR EFFECT, OUT.
	GT LINE 5340, READY 31, OVER.
GT LINE 5340 READY 31, BREAK... FIRE, OVER.	
	FIRE, OUT.

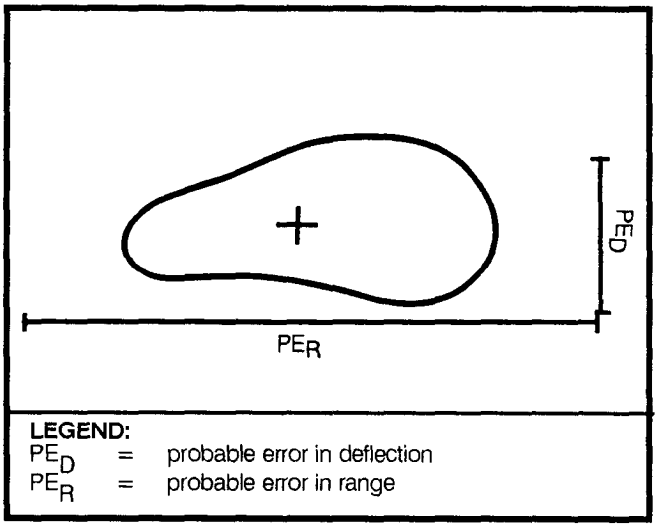
8-25. ADJUSTMENT OF NAVAL GUNFIRE

The following paragraphs apply to adjustment procedures unique to naval gunfire. The characteristic flat trajectory and high muzzle velocity of naval gunfire make the NGF adjustment somewhat difficult, particularly on flat terrain. The observer must use sound observed firing procedures discussed previously, such as accurate target location. He also must take the actions discussed below.

a. Identify the Gun-Target Line. When notified of the GT line in the prefiring report, the observer must visualize its position in relation to the target and his own position. This provides the basis for the observer to identify round-to-round dispersion in adjustment.

b. Be Aware of the Dispersion Pattern of Naval Gunfire. The fall of shot of naval gunfire can be described as a narrow, elongated pattern as seen along the GT line. The size of the pattern varies with range. For example, at 2,100 meters, the 5-inch gun mount causes a round-to-round dispersion pattern which is about 150 meters long and 50 meters wide. Figure 8-3 shows the dispersion pattern of naval gunfire.

Figure 8-3. NGF DISPERSION PATTERN



c. Predict Each Fail of Shot Before Impact. While the ship determines firing data for the next round, the observer should visualize the fall of shot based on his corrections. He compares the actual impact of the round with the predicted fall of shot. Differences that occur along the GT line may indicate round-to-round dispersion.

d. Ignore Errors to the Fall of Shot Attributed to Round-to-Round Dispersion. If a round impacts contrary to its predicted fall of shot as a result of dispersion, the observer makes a correction from its predicted point of impact instead of its actual impact. This should result in the next fall of shot impacting as predicted. This avoids the observer getting a "ping-pong" effect in adjustment.

EXAMPLE

The observer visualizes the GT line. His first spotting is **SHORT, 35 MILS RIGHT** (OT factor = 2). He transmits a correction of **LEFT 70, ADD 200.** His predicted fall of shot is **OVER, ON LINE.** The second spotting is **OVER, 25 MILS LEFT.** (The apparent error is along the GT line.) The observer transmits a correction of **DROP 100.** The third spotting impacts as predicted **(SHORT, ON LINE).** The observer's final correction is **ADD 50, 5 SALVOS, FIRE FOR EFFECT.**

e. Correct From the Mean Point of Impact. When consecutive rounds impact differently from their predicted fall of shot, the observer should make a correction from the average or mean point of impact of the rounds.

EXAMPLE

The first spotting is **SHORT, 35 MILS RIGHT** (OT factor = 2). The first correction is **LEFT 70, ADD 200.** The predicted fall of shot is **OVER, ON LINE.** The second spotting is **OVER, 25 MILS LEFT.** (The apparent error is along the GT line.) The spotter transmits a correction of **DROP 100.** The third spotting is **SHORT, 30 MILS LEFT.** The observer notes that two consecutive rounds have impacted left of their predicted point of impact. The final correction is **RIGHT 50, ADD 50,5 SALVOS, FIRE FOR EFFECT.** The observer made his deviation correction from the MPI of the last 2 rounds **(25 MILS LEFT** and **30 MILS LEFT).**

f. Use Multiple Rounds in Adjustment. At times, the observer may need to adjust with multiple rounds, firing multiple salvos from a single gun or using multiple guns in adjustment. This method requires the observer to adjust from the mean point of impact of all rounds fired. Normally, this method is used in firing on a large area target, in firing 16-inch projectiles, or in visualizing the GT line. The technique can also be used for observers having difficulties in range dispersion in adjustment.

g. Use Elevation or Height-of-Burst Adjustment of Impact Fires. On steep terrain, **UP** or **DOWN** corrections may be used to bring the fall of shot to the same elevation as the target. These corrections are reflected on the ground with reference to the GT line.

(1) **UP** or **DOWN** corrections are transmitted in increments of 5 meters. Using the map helps to determine these corrections.

(2) Avoid mixing **ADD** or **DROP** with **UP** or **DOWN** corrections for impact fires. Both of these corrections involve an elevation change on the gun, and the results will be unpredictable. Deviation and range adjustments along the OT line usually equate to elevation changes on the gun when transformed to GT line corrections. Use **UP** or **DOWN** corrections to bring the impacts to the same altitude as the target; then switch to deviation and/or range corrections.

8-26. ADJUSTMENT OF AIRBURSTS

In time fires, special fazes are used to achieve an airburst over the target. These fuzes include mechanical and electronic time fuzes which require a time setting before firing. Airbursts may also be delivered by proximity fuzes (VT and CVT) designed to explode at an optimal height of burst according to a radio-activated signal (20 meters for 5-inch, 7 meters for 16-inch CVT). Time fires using time or electronic time fuzes must be adjusted to ensure detonation at an optimal HOB (20 meters) in fire for effect. Proximity fuzes do not require adjustment.

a. Adjustment of Time Fires. The observer announces **FUZE TIME IN EFFECT** in the method of engagement element of his call for fire. He conducts adjustment with fuze quick in the same manner as discussed previously. He enters the time phase of the adjustment process when –

- Splitting a 200-meter bracket for an area target.
- Splitting a 100-meter bracket for a point target.
- An adjusting round has effect on the target.

The transmission to enter the time phase of adjustment is **FUZE TIME** followed by a correction (or **REPEAT);** for example, **FUZE TIME, RIGHT 30, ADD 50, OVER** or **FUZE TIME, REPEAT, OVER.**

b. Height-of-Burst Corrections.

(1) If the initial time round is spotted as **GRAZE,** the correction is **UP 40.** A 40-meter HOB correction will be applied until a spotting of **AIR** is obtained. Consecutive **GRAZE** spottings may indicate an error in the altitude of the target reported in the call for fire or an error by the mechanical fuze setter on the gun. The observer must avoid making deviation and range corrections from a graze burst. Usually, a graze burst will be over the target on the GT line.

(2) Once an initial **AIR** spotting is achieved, the observer measures the spotting (to the nearest roil) and computes an HOB correction by multiplying the spotting by the OT factor. The HOB correction is made to the nearest 5 meters to correct the HOB to 20 meters. If a correct HOB can reasonably be expected, the observer enters fire for effect. If the **AIR** spotting is excessively high (60 meters or greater), the observer should observe another salvo before entering fire for effect. Excessively high bursts will normally be short on the GT line and out of the target area because the fuze functioned prematurely in the projectile trajectory.

(3) If a graze burst is obtained after an airburst, the correction is **UP 20.** Fire for effect is never begun when the last burst observed resulted in a spotting of **GRAZE.**

8-27. ILLUMINATION

Battlefield illumination facilitates observation for both the observer and the combat unit and restrains the enemy's freedom of movement. Illuminating shells can be used –

- To illuminate areas of suspected enemy activity.
- To provide illumination during adjustment of night fire missions.
- To harass the enemy.
- For incendiary effects.

The two methods of employing illumination are continuous and coordinated.

a. Continuous Illumination. In some situations, an observer may need continuous light on the target area. This method of illumination can be used in surveillance and will be used automatically during the FFE phase of coordinated illumination missions. When firing continuous illumination, the ship fires one round about every 15 seconds. Thus, three fired rounds will result in one round bursting, one flare at midpoint of descent, and one flare near burnout. This technique should be used with discretion to avoid wasting the limited number of star shells (illuminating projectiles) available in the ship's magazine.

b. Coordinated Illumination. This is the common technique used by NGF observers to adjust fire during darkness. The observer transmits a call for fire for a suspected target the location of which is not sufficiently

accurate to fire for effect. The ship fires an illuminating round over the initial target location. The observer then moves the illumination by subsequent adjustments. When the flare is adjusted to provide good target location, the observer informs the ship of the moment of best illumination by transmitting the command **STANDBY, MARK.** The ship then computes gun data to fire the initial round for HE adjustment to impact directly under the point of illumination burst at the moment of best illumination. There will be a single salvo of HE fire for each adjustment. When fire for effect begins, the ship will fire enough continuous illumination to ensure the observer can see the target.

c. Illumination Call for Fire. The observer uses the standard call for fire format. He announces either **CONTINUOUS ILLUMINATION** or **COORDINATED ILLUMINATION** in the special instructions subelement of the call for fire. The number of guns is omitted, since one gun is standard. The ammunition (illuminating projectile and fuze) is also omitted. To prevent ripped chutes, the mission may require reduced charge, particularly in firing at ranges of less than 7,000 meters. An example of a coordinated illumination call for fire is shown below.

EXAMPLE
AIB THIS IS C2D, FIRE MISSION, TARGET NUMBER AF1011,OVER.
GRID MB344677, ALTITUDE 55, DIRECTION 2680, SUSPECTED ENEMY ACTIVITY, COORDINATED ILLUMINATION, OVER.

d. Prefiring Report. To differentiate between the illumination trajectory and that to be used for subsequent HE, the ship announces **LINE OF FIRE** followed by **READY** and **TIME OF FLIGHT** for the illuminating projectile. The observer must consider the path of the empty canister and its probable impact point along the line of fire. The observer reads back the prefiring report and commands **FIRE.**

e. Illumination Adjustment Procedures. Spottings are made to determine the location of the flare at the midpoint of its descent and the height of burnout of the flare. The flare is normally corrected to position it over (behind) the target along the OT line to achieve a silhouette of the target. If the target is on a slope, the flare normally is positioned short of the target to allow the light to shine back onto the target. The direction and speed of the wind also affect the positioning of the flare.

(1) Deviation and Range Corrections. These corrections are given in multiples of 100 meters with a minimum correction of 100 meters. Because the lighted area is large, bold corrections normally are used instead of bracketing.

(2) Height of Burnout. The height of burnout should be between O (as it touches the ground) and 50 meters above the ground. Corrections are given in multiples of 50 meters with a minimum correction of 50 meters.

(a) If the flare **burns on the ground,** the observer counts the number of seconds it burns on the ground, multiplies by the rate of descent, and rounds up to the nearest 50 meters. For the 5-inch illuminating projectile, the rate of descent is 10 meters per second. For example, a flare burns on the ground for 4 seconds. The correction is **UP 50** (4 seconds x 10 meters per second = 40 meters [≈ 50 meters]).

(b) If the flare **burnout is in the air,** the observer must determine the height of burnout. This can be done by using binoculars (measure roils x OT factor). A second technique is to count the number of seconds that it takes the flickering ember from the flare to reach the ground and then multiply by the rate of descent. After rounding down to the nearest 50 meters, a correction is given to place the height of burnout between O and 50 meters. For example, a flare burns out in the air. The observer counts 7 seconds from the burnout until the ember touches the ground. The correction is DOWN 50 (7 seconds x 10 meters per second = 70 meters [≈ 50 meters]).

f. Continuous Illumination Procedures. The observer adjusts the illumination as discussed above. Once the target has been properly lit, the observer can begin the FFE phase of the mission. In this phase, the ship fires illuminating projectiles at such a rate of fire that they keep the target area continuously lit. The observer may increase or decrease the rate of fire by ordering an interval or sustained fire. Examples of entering the FFE phase are shown below.

EXAMPLES
10 SALVOS, FIRE FOR EFFECT, OVER. (The ship determines the rate of fire.)

SUSTAINED FIRE, 5 MINUTES, FIRE FOR EFFECT, OVER.

10 SALVOS, INTERVAL 10, FIRE FOR EFFECT, OVER.

(1) When the observer wants to terminate illumination early during the FFE Phase, he should transmit **CEASE ILLUMINATION.**

(2) The observer may acquire a target during a continuous illumination mission and want to change to coordinated illumination. He should transmit the command **COORDINATED ILLUMINATION.** This command should be followed by desired illumination corrections, target description, method of engagement, and method of control changes; for example, **COORDINATED ILLUMINATION, LEFT 200, TROOPS IN THE OPEN, FUZE CVT IN EFFECT, OVER.** The ship will fire one illuminating projectile and be prepared to mark. Coordinated illumination procedures are described below.

g. Coordinated Illumination Procedures. The observer's request for coordinated illumination may result from acquiring a target during a continuous illumination mission, or it may be a part of the observer's method of engagement in the initial call for fire. This request alerts the ship that the observer will adjust the illumination and that he will subsequently request and adjust HE projectiles timed to impact at the moment of best illumination. During the illumination adjustment phase of the mission, the ship will time every illuminating projectile fired. It will be prepared to mark when commanded by the spotter.

(1) Illumination Adjustment. The observer adjusts the illumination on the target area by the procedures outlined previously.

(2) Marking Procedure. Once the illuminating flare has been positioned to yield the optimum light on the target, the observer transmits **STANDBY...MARK, OVER.** The **MARK** informs the ship of the optimum illumination. The ship responds **MARK, OUT.** The ship then times the firing of each HE projectile to impact at the optimum, or marked, time.

(3) High-Explosive Adjustment. Immediately after receiving the read back of **MARK, OUT,** the observer begins the HE adjustment phase. He transmits any subsequent corrections to improve the accuracy of the initial HE salvo. If no HE correction is sent, the ship fires the initial HE projectile at the point of flare deployment. That point may be positioned off the target location (for silhouette or wind purposes). Example corrections are **HE LEFT 200, DROP 200, OVER** and **HE REPEAT, OVER.**

(a) The ship transmits a new prefiring report for the HE projectile. The observer reads it back and commands **FIRE.**

(b) The ship transmits **SHOT** for the illuminating projectile and **SPLASH, OUT** for the HE.

(c) The observer must preface each command with the type of projectile to which the correction is to be applied. Examples are **ILLUM ADD 200, HE LEFT 200, OVER** and **HE ADD 50, 10 SALVOS, FIRE FOR EFFECT, OVER.**

(4) Mark Modification. During the mission, the observer may want to change the timing between the illuminating and HE projectiles. To modify this interval, the observer uses the term **ADVANCE** or **RETARD.**

(a) Advance. If the observer wants the HE to fire and impact sooner, he commands **HE ADVANCE (so many)** (seconds are understood); for example, **HE LEFT 200, ADVANCE 05, OVER.**

(b) Retard. If the observer wants the HE to impact later, he commands **HE RETARD (so many)** (seconds are understood); for example, **HE RETARD 03, OVER.**

(5) Fire for Effect. During the fire-for-effect phase, the ship automatically fires limited continuous illumination. This ensures that the observer has enough illumination for surveillance. The ship fires the last illuminating projectile immediately after the last impact round in FFE unless the observer commands **CEASE ILLUMINATION** sooner.

h. Illuminating Projectile Malfunctions. Two types of malfunctions are unique to illuminating rounds. Special procedures for ships and observers to compensate for these malfunctions are discussed below.

(1) Ripped Chutes. Because of high muzzle velocity at shorter ranges, flare chutes may rip or separate upon deployment. Should this occur, the observer reports to the ship **RIPPED CHUTE, REPEAT** or **RIPPED CHUTE, REDUCED CHARGE, REPEAT.** The procedure to use depends upon how often ripped chutes occur and whether the reduced charge can range the target area. The observer also may request that the ship increase the range.

(2) Dark Star. A dark star is an illuminating round that fails to deploy at all or fails to ignite. Such malfunctions are due to either faulty ammunition or improper fuze settings. When a dark star occurs, report **DARK STAR, REPEAT, OVER.** The ship should immediately check its time fuze settings and note the time fuze lot being used. If further dark stars occur, there is probably an error in the time fuze lot.

8-28. FRESH TARGET SHIFT

Anytime during a mission, before transmitting **END OF MISSION,** an observer may want to shift fire to a higher priority target. To do this, he uses the fresh target shift technique. The advantage of this technique is that the ship can shift to the fresh target more quickly than if another call for fire with new target location data were introduced into the gunfire control computer. The fresh target shift

lets the observer temporarily suspend the adjustment of fire for the original target, bring fire onto a higher priority target, and then resume fire on the original target if desired. Procedures are discussed below.

a. Call for Fire. The observer sends an abbreviated call for fire, applying corrections from the impact of the last salvo to the fresh target. If started before the impact of the first salvo, corrections are made from the target location data sent in the call for fire. The abbreviated call for fire is discussed below.

(1) Observer identification is omitted.

(2) Warning order and target number are transmitted as **FRESH TARGET, TARGET NUMBER**(next succeeding target number). There is no break in transmission.

(3) Target location is expressed as deviation, range, and/or altitude correction from the last salvo fired (at the original target) to the fresh target. The shift is based on the **original** OT direction. The direction to the fresh target is not transmitted until after the first salvo of the fresh target shift has been fired. Then it is sent only if it differs from the original direction by more than 100 roils or 5°.

(4) Target description must always be included.

(5) Method of engagement is omitted unless a change from the initial call for fire is required. Since the essence of the fresh target shift is timeliness, changes that may cause a delay, such as changes in ammunition, should be avoided. The observer may consider using a less preferred shell-fuze combination to retain a timely response.

(6) Method of control is omitted unless a change from the initial call for fire is desired. If the observer was in the FFE phase on the original target, that phase will continue unless the observer announces, **SPOTTER (OBSERVER) ADJUST, OVER.**

b. Adjust Fire. Once the first salvo impacts for the fresh target shift, the observer transmits a new OT direction (if required) and conducts adjustment onto the fresh target.

c. Complete Firing. The observer continues adjustment until he has achieved the desired effects on the fresh target. If he wants to resume firing on the original target, he again uses the fresh target shift technique to return to the original target. The target is referred to by its original target number.

d. Record as Target. If the observer wants the ship to record a target for future firing, he must transmit **RECORD AS TARGET, TARGET NUMBER (so-and-so)** after fire for effect on that target is completed but before sending **END OF MISSION.**

e. End Mission. When he is satisfied with the effects on each of the targets (fresh and original targets), the mission is terminated in target number sequence. Each target must be referred to by target number in reporting the damage assessment. For example, **END OF MISSION, TARGET NUMBER AB4007** (original target), **3 TRUCKS DESTROYED, TARGET NUMBER AB4008** (fresh target), **SAGGER WEAPON SILENCED, OVER.**

8-29. SIMULTANEOUS ENGAGEMENT OF TWO TARGETS

The procedures for the simultaneous engagement of two targets differ from those of the new target shift in that the target location is not sent by using the shift from the last salvo. If the ship can conduct multiple missions (MK-86 or two separate gunfire control systems [BB]), the observer can adjust fire onto two targets simultaneously.

a. The call for fire for the second target in simultaneous engagement is the standard six-element call for fire listed in paragraph 8-13.

b. The observer must preface each correction with the target number to which it is to be applied.

c. The ship will not transmit **SPLASH** in order to provide more time for the observer to transmit corrections.

8-30. FIRING ON A RECORDED TARGET

If fires are desired on a previously recorded target or a planned target, the observer sends an abbreviated call for fire as discussed below.

a. Observer identification is required.

b. Warning order and target number consist of the word **FIRE** followed by the target number; for example, **FIRE TARGET NUMBER (so-and-so).** There is no break in transmission.

c. Target location is omitted. It is already known by the ship.

d. Target description is omitted unless changed from the recorded description.

e. Method of control is transmitted as required. If firing a recorded target from the same ship in the same firing track as when the data were recorded, a first-salvo FFE may be feasible.

8-31. 16-INCH NAVAL GUNFIRE MISSIONS

Adjusting fire from the 16-inch guns of a battleship is somewhat different than adjusting that from the 5-inch guns.

a. Characteristics. The 16-inch gun produces a significantly larger dispersion pattern than does the 5-inch. The pattern is about 150 meters (or greater) wide and 500 meters (or greater) long. The pattern depends on the terrain, target range, and number of guns in effect. The observer should expect 2 to 5 minutes between transmitting a correction and shot of the next salvo.

b. Call for Fire. The standard call for fire is used. The armament and number of guns must be considered.

(1) Armament. If the observer does not specify the armament, the main (16-inch) gun will be fired. If the observer wants the 5-inch gun fired, he announces **SECONDARY ARMAMENT.**

(2) Number of Guns. Ship operating procedures may differ in the number of mounts and / or turrets to be used in adjustment and fire for effect. Coordination with the battleship is encouraged on this subject.

c. Corrections. Because of the rather large dispersion pattern and the slow response time for each shot, observers should use bold corrections to hit the target as rapidly as possible. Bracketing is not feasible.

d. Erratic Rounds. The observer may want to use the MPI adjustment technique. On occasion, the dispersion pattern will contain an erratic round. When determining the MPI, the observer should ignore erratic rounds and determine the MPI from those impacts which form a reasonable group.

8-32. DESTRUCTIVE FIRE

Destructive fire missions by NGF ships involve deliberate, accurate gunfire normally using a single gun or turret against each target. This can be expensive in ammunition and take a considerable amount of time to execute. During the mission, the gun or turret and ammunition lot are not changed. The ship should be positioned to allow for the best conditions and orientation with respect to the GT line and the terrain in the target area. The GT range should be as short as possible in order to reduce the dispersion zone.

a. Adjustment. Ship adjustment should be used if possible. If the observer conducts the adjustment, he does so in the normal manner described previously until the MPI is at the split of the 100-meter range bracket.

b. Fire for Effect. Groups of rounds, usually five for a single gun, are fired and the averages for deviation and range spottings are noted. A correction based on the MPI of all the rounds is then sent. Five rounds are fired again. The correction is made as accurately as possible; for example, **RIGHT 10, DROP 25, REPEAT, OVER** or **LEFT 5, REPEAT, OVER.**

8-33. MASSED FIRE

a. Two or more ships may be required to engage large or important targets simultaneously. If they have not already been given a direct support mission, gunfire request procedures must be started.

b. A collective call sign is used. All orders from the observer are read back by the senior ship. The other ships acknowledge the transmissions. The first ship to report **READY** is adjusted onto the target in the normal manner. The other ships are individually adjusted as they report **READY.** Usually, one or two bold corrections are used to bring the MPI into the required target area. To facilitate observer control, **AT MY COMMAND** may be used. At the completion of adjustment, the observer announces **CANCEL AT MY COMMAND, ALL GUNS (required number) SALVOS, FIRE FOR EFFECT, OVER.**

8-34. SPECIAL NAVAL GUNFIRE COMMANDS AND REPORTS

a. The commands below are given for **safety reasons.**

(1) **CHECK FIRING.** Anyone can command **CHECK FIRING** when an unsafe situation becomes apparent. This command causes the ship to instantly stop firing.

(2) **CANCEL CHECK FIRING.** The originator of check firing must announce **CANCEL CHECK FIRING** for the fire mission to continue.

b. The commands below would be given by the observer.

(1) **SPREADING FIRES.** This command is used after fire for effect has been delivered. It notifies the ship that the observer wants to distribute the fires over a large area. The words **SPREADING FIRES** are followed by a correction and the command **REPEAT** (pertaining to the volume of fire); for example, **SPREADING FIRES, RIGHT 200, REPEAT, OVER.**

(2) **TREND.** The observer may notice the rounds drifting away from the target. Then this report, along with an indication of direction and drift in meters, is sent to the ship. This facilitates the identification of the gunnery problem by the ship. An example command is **TREND, SOUTHWEST, 100 PER SALVO.**

(3) **STRADDLE.** A multigun salvo may bracket a target. Then the observer announces **STRADDLE,** followed by a correction, to place the MPI on the target. The term is normally used during a ship-adjust or massed-fire mission.

(4) **CHECK SOLUTION.** This command is transmitted if the observer suspects an error in the gunnery solution for a salvo. Before sending **CHECK SOLUTION,** the observer should check his target location data, particularly direction if the error is in a subsequent salvo. Another common cause for errors in adjustment is a change in the OT factor resulting from a target location error. The ship will respond with either **SOLUTION CHECKS** or **NEGLECT.**

c. The commands below would come from the **ship.**

(1) **NEGLECT.** This report is sent by the ship to report that the last salvo was fired with incorrect data. The ship corrects the settings and transmits **READY, OVER** when it is prepared to fire.

(2) **DELAY.** This command is followed by an estimate of time in minutes. It means that the ship is not ready to fire until the given time has elapsed – usually a short duration. When the ship is prepared to fire, it reports **READY, OVER.**

(3) **WILL NOT FIRE.** This command is followed by an explanation, It means that the ship will not continue the mission for the stated reason. Normally, the reason is a gun mount malfunction (mount casualty), a higher priority mission, or a circumstance such as counterbattery fire.