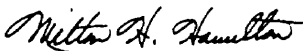


FM 90-20  
11 FEBRUARY 1994

By Order of the Secretary of the Army:

GORDON R. SULLIVAN  
General, United States Army  
Chief of Staff

Official:



MILTON H. HAMILTON  
*Administrative Assistant to the  
Secretary of the Army*

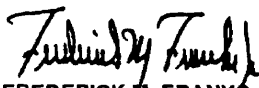
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## FOREWORD

This publication has been prepared under our direction for use by our respective commands and other commands as appropriate.



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**FM 90-20/FMFRP 2-72/ACCP 50-28  
USAFEP 50-9/PACAFP 50-28  
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Norfolk, Virginia

11 FEBRUARY 1994

## ***J-Fire***

# **Multi-Service Procedures for Joint Application of Firepower**

\* This publication supersedes FM 90-20, FMFRP 2-72, TACP 50-28, USAFEP 50-9, PACAFP 50-28, and AACCP 50-28, 25 July 1989.

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## **PREFACE**

### **PURPOSE**

*J-Fire* provides a pocket-sized, quick reference guide for requesting **fire support**. *J-Fire* contains calls for fire, a format for joint air strike requests, a format for briefing pilots who provide close air support and close-in fire support, structures of communication nets, and data on weapons.

### **SCOPE**

*J-Fire* applies *to* the tactical operating forces of the Army, Marine Corps, Navy, and Air Force. It is a US unilateral-only **document**, but it includes NATO formats where appropriate. Information in *J-Fire* has been extracted **from** existing applicable service directives. It is intended primarily for use by members of **battalion-level combat units**. **Naval and Marine information** has been coordinated with Headquarters, Atlantic **Fleet** and the Marine Corps Combat Development Command (MCCDC), respectively.

### **IMPLEMENTATION PLAN**

Participating major Service command offices of primary responsibility (**OPRs**) will review this publication for joint procedural **information**. Once they validate the information, they should reference and incorporate it into the appropriate Service manuals, regulations, and curricula.



## **Army**

The doctrine and procedures contained herein will be incorporated into **Army** field manuals, training circulars, and **curricula** as directed by the Commander, US Army Training and Doctrine Command (TRADOC).

## **Marine Corps**

The doctrine and procedures contained herein will be incorporated in Marine Corps doctrinal and training publications as directed by the **Commanding** General, Marine Corps Combat Development Command.

## **Air Force**

Air Combat Command (ACC) will incorporate procedures according to HQ ACC OI 5-1 (**OPR: HQ ACC/XPJ**). United States Air Forces Europe (USAFE) and Pacific Air Forces (**PACAF**) will validate and incorporate appropriate procedures in accordance with applicable major command (MAJCOM) **and** other governing directives. Possible places for inclusion are—

Air-Ground Operations School (AGOS) curricula.

- **FM 100-26/AFM 2-XX, Army-Air Force Joint Air-Ground Operations.**
- **MCM 3-1, Mission Employment Tactics (S-NF), Volume I, Tactical Employment, General Planning, and Employment Considerations.**
- **MCM 3-1, Mission Employment Tactics (S-NF), Volume III, Tactical Employment, A-10.**

**MCM 3-1, *Mission Employment Tactics (S-NF), Volume VIII, Tactical Employment, Forward Air Controller.***

- **MCM 3-1, *Mission Employment Tactics (S-NF), Volume V, Tactical Employment, F-16.***

**ACCP 55-51, *Tactical Air Control Party Handbook.***

## **USER INFORMATION**

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Langley AFB, VA 23665-2778**

**Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.**

# ARTILLERY/MORTAR FIRE

## COMMUNICATIONS

<b>Agencies:</b>	Observer to artillery/mortars
<b>Nomenclature:</b>	Fire direction <i>net/fire</i> control net (USA) Conduct of fire net (USMC)
<b>Frequency:</b>	30.00 to 75.95 Mhz, VHF-FM
<b>Compatible Equipment:</b>	<b>USA:</b> PRC-77, VRC-46, GRC-160 <b>USMC:</b> PRC-77, VRC-12 <b>USAF:</b> PRC-77, PRC-119, VRC-46

## ARTILLERY/MORTAR SUPPORT PLANNING

Supporting unit: \_\_\_\_\_



If this unit or *direct* communications are unavailable, indicate the unit through which support will be requested: \_\_\_\_\_

Call sign: \_\_\_\_\_

Frequency: \_\_\_\_\_

Period effective from: \_\_\_\_\_ to: \_\_\_\_\_

**Table 1. Artillery Weapons Capabilities**

Weapon			%	Sustain- % (HPM)	Ammo	Fuzes
105-mm	M101A1 (USMC)	11,600	14,500	3	HE, WP, ILLUM, HEP, HC, AP, ICM, CHEM, RAP	PD, MT MTSQ VT, CP
105-mm	M102	11,500	15,100	3	HE, WP, ILLUM, HEP, HC HEAT, CM, CHEM, RAP, APERS-T	PD, VT, BD, MT, MTSQ CP
105-mm	M119	14,000	23,500	3	HE, WP, ILLUM, HEP, HC, AP, ICM, CHEM, RAP	PD, VT, BD, MT, MTSQ, CP
155-mm	M109A3	18,100	19,300	1	RAP, ICM HC, ILLUM, CPHD, CHEM, WP, HE, DPICM, ADAM, RAAM	PD, VT, MTSQ, CP, MT
155-mm	M114A2	14,600	30,000	1	HE, RAP, CHEM, ILLUM, ICM, ADAM, RAAM, WP, CPHD, DPICM, HC	PD, VT, MTSQ, CP, MT

**Table 1. Artillery Weapons Capabilities (continued)**

Weapon	Model	Maximum Range (m)	Range of RAP (m)	Sustainment Rate (RPM)	Ammo	Fuzes
155-mm	M198	24,000	30,000	2	HE, RAP, ICM, CPHD, HC, CHEM, DPICM, ILLUM, WP, ADAM, RAAM	PD, VT, MTSQ, CP, MT
203-mm	M110A2	22,900	30,000	0.5	HE, HES, ICM, CHEM, DPICM, RAP	PD, VT, CP, MT, MTSQ
MLRS	M207	30,000	NA	12	DPICM	TI
ATACMS	M207	100+ /-KM	NA	2	APAM	TI

**Table 2. Mortar Weapon Capabilities**

Gun/Mortar	Maximum Range (m)	Minimum Range (m)	Maximum Rate of Fire (RPM)	Sustainment Rate (RPM)	Ammo	Fuzes
60-mm	3,500	50	30	15	HE, WP, ILLUM,	Multioption
81-mm	4,789	70	20	8	HE, WP, ILLUM	PD, VT
107-mm	5,650	920	18	3	HE, WP, ILLUM, CHEM	VT, PD, TI



Polar plot:

**"Direction \_\_\_\_\_"** in mils/degrees

**"Distance \_\_\_\_\_"** in meters

**"Up/down \_\_\_\_\_"** in meters

Shift from known point:

**"Shift \_\_\_\_\_"**  
(target/known point number)

**"Direction \_\_\_\_\_"** in mils/degrees

**"Left/right \_\_\_\_\_"** in meters  
(lateral shift)

**"Add/drop \_\_\_\_\_"** in meters  
(rangeshift)

**"Up/down \_\_\_\_\_"** in meters

NOTE: Minefield location is center of target area. Minefield point must be at least 425 meters from friendly troops for adjust-fire missions and 700 meters for FFE missions.

3. Target description: " \_\_\_\_\_ "

4. Method of engagement.

Type of adjustment: " \_\_\_\_\_ "  
(such as danger close, *destruction*)

Trajectory: " \_\_\_\_\_ "  
(high/low angle)

**Artillery/Mortar Fire** \_\_\_\_\_

Ammunition: “ \_\_\_\_\_ ”  
(such as *HE, WP, ICM*)

Distribution of fire: “ \_\_\_\_\_ ”

NOTE: Control Copperhead by individual round at a minimum of 30 seconds apart. If the FDC controls firing, rounds will be at 30-second intervals.

5. Method of fire and control: “ \_\_\_\_\_ ”  
(such as *at my command, when ready, TOT*)

6. Observer: “*Direction* \_\_\_\_\_ *over.*”

NOTE: Transmit as required; must be transmitted prior to sending any corrections.

**FIELD ARTILLERY AERIAL OBSERVER  
CALL FOR FIRE**

1. Observer: “ \_\_\_\_\_ this *is* \_\_\_\_\_ ,  
(artillery/mortar) (observer's ID)  
*adjust fire, over.*”

2. Target location: “*Grid* \_\_\_\_\_ *over.*”  
(coordinates)

3. Target description: “ \_\_\_\_\_ ”  
\_\_\_\_\_

NOTE: Observer may request ranging rounds, TOT, and splash. For adjustments, observer may use gun target line (from ranging rounds), observer target line (aircraft heading indicator), cardinal direction (given in mils), or reference to a readily identifiable terrain feature.



## MESSAGE TO OBSERVER

Units to fire: “ \_\_\_\_\_ ”

Changes to call for fire: “ \_\_\_\_\_ ”

Number of rounds: “ \_\_\_\_\_ ”

Target number: “ \_\_\_\_\_ ”

## ARTILLERY/MORTAR QUICK SMOKE REQUEST

1. observer: “ \_\_\_\_\_, *this is* \_\_\_\_\_, *adjust fire* ”  
(artillery/mortar) (observer's ID)
2. “*Grid* \_\_\_\_\_ ”  
(coordinates)
3. Target description: “ \_\_\_\_\_ ”  
\_\_\_\_\_ *smoke/WP in effect* ”  
(include target length, wind direction, desired smoke duration; for example, 300 m, crosswind, 10 min)
4. Adjust fire up/down.  
For ground burst: “*up 100*”  
For canisters bouncing: “*up 50*”  
For canisters spread out: “*down 50*”

**ARTILLERY/MORTAR ILLUMINATION  
REQUEST - CALL FOR FIRE**

**WARNING: Use of illumination requires care and adequate coordination to avoid adverse impact on adjacent and supporting units using night-vision devices.**

1. Observer: " \_\_\_\_\_ *this is* \_\_\_\_\_ "  
(artillery/mortar) (observer's ID)
2. Warning order: " \_\_\_\_\_ , *over*,"  
(such as *adjust fire, fire for effect*)
3. Target location: " \_\_\_\_\_ , *over*."  
(such as *grid, polar, plot*)
4. Target description: " \_\_\_\_\_ "  
\_\_\_\_\_ "
5. Method of engagement: " \_\_\_\_\_ "  
(illumination)
6. Method of fire control: " \_\_\_\_\_ , *over*."  
(such as *by shell, at my command*, etcetera)
7. Adjustment of illumination:  
"*Direction*, \_\_\_\_\_ , *over*."  
corrections include—  
"*Right/left* \_\_\_\_\_ " in 200-m increments  
"*Add/drop* \_\_\_\_\_ in 200-m increments  
"*Up/down* \_\_\_\_\_ " in 50-m increments

When target is verified, adjust illumination over adjusting point and transmit:

*"Coordinated illumination."*

Call for fire for target attack, such as HE, ICM, etcetera. ■

When maximum target illumination is obtained, the observer transmits—

*"Illumination mark"*

and adjusts and fires for effect with the attack munitions.

**NOTE:** Coordinated illumination directs the FDC to calculate and direct the firing of the illumination and the attack munitions at a time that should result in the attack munitions impacting when the target is at maximum illumination. Observers desiring to control the firing of both the illumination and the attack munitions should transmit—

*"By shell, at my command"*

To receive two-or four-gun illumination at any time during the illumination mission, transmit—

For two-gun illumination: *"Range spread"* or *"Lateral spread"*

For four-gun illumination: *"Range and lateral spread"*

**Table 4. Artillery/Mortar Illumination Factors**  
 (Danger-close distance is 600 meters for all rounds)

Weapon	Shell Type	HOB (m)	Burn Time	Rate of Fall (m/sec)
60-mm	M83A2	---	--	-
60-mm	M83A3	160		
81-mm	M301A3	600	60	6
105-mm	M314A2	750	60	10
105-mm	M314A3	750	70-75	10
107-mm	M335	700	60	10
107-mm	M335A1	700	70	10
107-mm	M335A2	400	90	5
155-mm	M118	750	60	10
155-mm	M485A	600	120	5
203-mm (8-in)	NA	NA	NA	NA

**ARTILLERY COUNTERFIRE INFORMATION  
FORM**

**1. SHELREP, MORTREP, BOMREP.**

a. Unit of origin: \_\_\_\_\_  
(call sign)

b. Position of observer: \_\_\_\_\_  
(encoded UTM grid coordinates)

c. Direction: \_\_\_\_\_ ; angle of fall: \_\_\_\_\_  
(flash, sound, or groove)

d. Time from: \_\_\_\_\_

e. Time to: \_\_\_\_\_

f. Area shelled: \_\_\_\_\_  
(encoded UTM grid coordinates)

g. **Number/nature** of delivery: \_\_\_\_\_

h. Nature of fire: \_\_\_\_\_  
(such as ***adjust fire, fire for effect***)

i. Number, type, and caliber of shells: \_\_\_\_\_

j. Flash-to-bang time: \_\_\_\_\_ seconds  
(**elapsed time between impact and sound**)

(Flash-to-bang time in **sec X 350-m** = distance in meters)

k. Damage: \_\_\_\_\_  
(**encoded as required**)

**Artillery/Mortar Fire** \_\_\_\_\_

l. Remarks: \_\_\_\_\_

2. Location report.

m. Serial number: \_\_\_\_\_

NOTE: Each location produced by a locating unit is given a serial number.

n. Target number: \_\_\_\_\_

(if target number has  
already been assigned)

o. Position of location: \_\_\_\_\_

(grid reference or grid  
bearing of located weapon)

p. Accuracy: \_\_\_\_\_

q. Time of location: \_\_\_\_\_

r. Target description: \_\_\_\_\_

3. Counterfire action.

s. Time fired: \_\_\_\_\_

t. Fired by: \_\_\_\_\_

u. Number of rounds, type of projectile, and fuze: \_\_\_\_\_

\_\_\_\_\_

# CLOSE AIR SUPPORT

## REQUEST COMMUNICATIONS

<b>Agencies:</b>	<b>TACP to ASOC (USAF), DASC/FSCC, TACC/SACC (USMCNSN)</b>
<b>Nomenclature:</b>	Tactical air request net <b>(USMC/USN)</b> Air Force air request net (USAF)
<b>Frequency:</b>	2 to 30 Mhz, HF
<b>Secondary:</b>	<b>30.00 to 75.95 Mhz, VHF-FM</b>
Compatible Equipment:	USA-GRC-106, PRC-77, PRC-104, <b>GRC-193</b> USMC-PRC-104, GRC-193, MRC-110, VRC-12 MRC-138, PRC-77 USAF-PRC-104/119, VRC-46, PRC-77, GRC-206, MRC-107/108/144

Close Air Support \_\_\_\_\_

## CONTROL COMMUNICATIONS

**Agencies:** ALO/AO/FAC to fighter/attack aircraft

**Nomenclature:** Tactical air direction net

**Frequency:** 225.0 to 399.975 MHz, UHF

**Secondary:** 30.00 to 75.95 MHz, FM  
(Unusable by F-111, A-6, USN F-14)

**Secondary:** 121 to 143.95 MHz, VHF  
(Usable by OV-10, A/OA-10, F-16, F-18)

**Compatible**

**Equipment:** USA aviation unit - VRC-12,  
PRC-77, **VRC-24**  
USMC - PRC-75, PRC-77,  
PRC-113, VRC-12/83/85  
USAF - PRC-66, **MRC-107/108/144**,  
PRC-77, GRC-119, PRC-113,  
**VRC-46**

## CLOSE AIR SUPPORT PLANNING

Supporting TACP: \_\_\_\_\_

**NOTE:** If this TACP or direct communications are unavailable, indicate the unit through which support will be requested:



Call sign: \_\_\_\_\_

Frequency: \_\_\_\_\_

Period effective from: \_\_\_\_\_ to: \_\_\_\_\_

**IMMEDIATE CLOSE AIR SUPPORT REQUEST**  
(This format is also used to request USMC close-in fire support and may be used to request USAF AC-130 gunship support.)

1. TACP: “ \_\_\_\_\_, *this is* \_\_\_\_\_ with an  
(ASOC/DASC/AOC/SACC) (TACP’s ID)
- immediate CAS request.”*

**NOTE:** Await acknowledgment.

2. “*Immediate.*”
3. Target description: “ \_\_\_\_\_ ”
4. Target location: <sup>3</sup>“ \_\_\_\_\_, elevation  
(UTM grid coordinates) \_\_\_\_\_ feet ”
5. Time on target: “ \_\_\_\_\_ ”
6. Desired ordnance/results: “ \_\_\_\_\_ ”

<sup>3</sup> USMC/USN A-6 aircraft require latitude and longitude coordinates for target location.

**Close Air Support** \_\_\_\_\_

NOTE: When identifying position coordinates for joint operations, include the map data that location coordinates are based on. Desert Storm operations have shown that simple conversion to **latitude/ longitude** is not sufficient. **The location may be reierenced on severai different data bases, for example, land-based versus sea-based data).**

7. Final control.

**"Call sign:** \_\_\_\_\_ **"**

**"Frequency:** \_\_\_\_\_ **"**

**"Contact point or IP:** \_\_\_\_\_ **"**

8. Remarks, such as—

**"Friendly location** \_\_\_\_\_ **"**

**"weather** \_\_\_\_\_ **"**

**"Threats** \_\_\_\_\_ **"**

NOTE: The appropriate agency will approve or disapprove as well as request additional data required to execute the mission.

**US AIRCRAFT CHECK-IN BRIEFING**

(Aircraft transmits to controller)

Aircraft: “ \_\_\_\_\_ , this is \_\_\_\_\_ ”  
(controller call sign) (aircraft call sign)

1. Identification/mission number: “ \_\_\_\_\_ ”

NOTE: Authentication and appropriate response suggested here.

2. Number and type of aircraft “ \_\_\_\_\_ ”

3. Ordnance: “ \_\_\_\_\_ ”

4. Play time: “ \_\_\_\_\_ ”

5. Abort code: “ \_\_\_\_\_ ”  
(from applicable communications authentication tables)

**US FORWARD-AIR-CONTROLLER-TO-ATTACK AIRCRAFT BRIEFING (9-Line)**

(Omit **data** not required; do not transmit line numbers. Units of measure are standard unless otherwise specified.)

US FAC: “ \_\_\_\_\_ , this is \_\_\_\_\_ ”  
(aircraft call sign) (US FAC call sign)

1. Initial point (IP)/attack point (AP):<sup>4</sup> “ \_\_\_\_\_ ”

<sup>4</sup> Minimum essential in limited communications environment.

**Close Air Support** \_\_\_\_\_

2. Heading:<sup>4</sup> “ \_\_\_\_\_ ”(magnetic).  
(IP to target)  
“Offset \_\_\_\_\_ feet”  
(left/right)
3. Distance:<sup>4</sup> “ \_\_\_\_\_ ”  
(IP to target in nautical miles/AP to target in meters)
4. Target elevation<sup>4</sup> “ \_\_\_\_\_ ” in feet—MSL
5. Target description:<sup>4</sup> “ \_\_\_\_\_ ”
6. Target location:<sup>4</sup> “ \_\_\_\_\_ ”  
(latitude and longitude or grid coordinates or offsets or visual)

(See note on page 24.)

7. Type mark: “ \_\_\_\_\_ ” Code: “ \_\_\_\_\_ ”  
(WP, beacon, laser) (actual code)

**(For USAF laser target marking, include laser-to-target line.)**

“ \_\_\_\_\_ degrees ’

**(For USMC laser procedures, include laser-to-target information in the Remarks section.)**

Remarks: “ \_\_\_\_\_ ”

<sup>4</sup> Minimum essential in limited communications environment.

**NOTE:** USMC laser target-marking operations require the laser-to-target line to be the first item passed to the aircrew.

8. Location of hiendlies: " \_\_\_\_\_ "

9. "Egress \_\_\_\_\_ "

In the event of a beacon bombing request, insert beacon bombing chart line numbers here. (See pages 28 and 29.)

Remarks: \_\_\_\_\_ "

(such as attack clearance, J-SEAD, threats,

restrictions, abort codes, hazards)

Time on target: "TOT \_\_\_\_\_ "

or

Time to target (TTT): "**Stand by** \_\_\_\_\_ "

plus \_\_\_\_\_ **hack,**"

**BEACON BOMBING CHART**

Different aircraft require different information on beacon bombing. Select the appropriate **Line numbers**. Transmit only after confirming the aircraft type. Follow this information with TOT or TTT.

 **A-6 (USMC, USN) Line Numbers**

10. "**Bearing** \_\_\_\_\_" magnetic or  
(beacon to target)  
"**Beacon grid** \_\_\_\_\_"  
(coordinates)

11. "**Range** \_\_\_\_\_" in feet or  
(beacon to target)  
"**Target grid** \_\_\_\_\_"  
(coordinates)

12. "**Beacon elevation** \_\_\_\_\_" in feet—MSL

 **F-111 Line Numbers**

F-111A/E requires lines 10 and 11.<sup>5</sup>

F-111D/F requires lines 10, 11, and 14 or lines 12, 13, and 14.

10. "**Bearing** \_\_\_\_\_" true (beacon to target)

11. "**Range** \_\_\_\_\_" in feet (beacon to target)

---

<sup>5</sup>F-111A/E (Avionics Modification Program [AMP]) requires offsets from target to beacon.

12. "**Beacon** grid \_\_\_\_\_" (latitude, longitude)  
(See note on page 24)
13. "**Target** grid \_\_\_\_\_" (latitude, longitude)  
(See note on page 24)
14. "**Beacon** delay \_\_\_\_\_" (in milliseconds)
15. "**Beacon** elevation \_\_\_\_\_" (feet MSL)
16. "**Target** elevation \_\_\_\_\_" (feet MSL) " \_\_\_\_\_"<sup>1</sup>
- F-16 Line Numbers
10. "**Bearing** \_\_\_\_\_" (*true*)  
(beacon to target)
11. "**Range** \_\_\_\_\_" (feet)  
(beacon to target)
12. "**Beacon** Elevation \_\_\_\_\_" (feet-MSL)
13. "**Target** Elevation \_\_\_\_\_" (feet-MSL)
14. "**Beacon** Time Delay \_\_\_\_\_" (milliseconds)

## NATO FORMATS

### NATO Fighter Check-In Briefing

(Use this format with NATO forces only.)

Aircraft transmits to controller

1. FAC/controller call sign: “ \_\_\_\_\_ this is \_\_\_\_\_ ”
2. Fighter call sign/mission number: “ \_\_\_\_\_ ”
3. Authentication: “ \_\_\_\_\_ ”
4. FAC authentication response: “ \_\_\_\_\_ ”

The following may be requested after initial check-in.

- a. Number and type of aircraft: “ \_\_\_\_\_ ”
  - b. Armament: “ \_\_\_\_\_ ”
  - c. Position and altitude: “ \_\_\_\_\_ ”
  - d. Time on station: “ \_\_\_\_\_ ”
  - e. Target allocation: “ \_\_\_\_\_ ”
  - f. Additional information: “ \_\_\_\_\_ ”
- 

**NATO Format Only**



## NATO Forward-Air-Controller-to-Attack Aircraft Briefing

(Use this format with NATO forces only.)

Controller transmits to aircraft.

1. Initial point (IP):<sup>6</sup> “ \_\_\_\_\_ ”
  2. Target location:<sup>6</sup> (See note on page 24)
    - a. If requested, 6-digit UTM grid coordinates: “ \_\_\_\_\_ ”
    - b. Latitude/longitude: “ \_\_\_\_\_ ”
    - c. Bearing: “ \_\_\_\_\_ ” magnetic  
(IP/offsets to target)
    - d. Distance: “ \_\_\_\_\_ *nautical miles* ”  
(IP/offsets to target)
  3. Target description:<sup>6</sup>
    - a. Description: “ \_\_\_\_\_ ”
    - b. Best attack heading: “ \_\_\_\_\_ ” magnetic
    - c. Weather (if clearly a factor): “ \_\_\_\_\_ ”
- Friendly forces:<sup>6</sup> “*Wh*” or “*Within* \_\_\_\_\_ ” in meters

Attack aircraft will read back **IP** and target location.

---

<sup>6</sup> Minimum essential in a limited communications environment.

**NATO Format Only**

Close Air Support \_\_\_\_\_

5. Attack clearance:<sup>6</sup>
- a. "ASAP" or "TOT in \_\_\_\_\_ minutes"
  - b. "Hold at \_\_\_\_\_"
  - c. "Cleared hot."

Add the following information as required.

6. Navigation details:
- a. Bearing: " \_\_\_\_\_ " magnetic
  - b. Distance: " \_\_\_\_\_ nautical miles"
  - c. Elevation: " \_\_\_\_\_ feet-MSL"
7. Target indication/identification: " \_\_\_\_\_ "  
(such as smoke, light, laser)
8. Threats: "None" or " \_\_\_\_\_ "
9. Hazards: "None" or " \_\_\_\_\_ "
10. Local altimeter setting, wind:
- a. " \_\_\_\_\_ millibars" or " \_\_\_\_\_ inches"
  - b. " \_\_\_\_\_ / \_\_\_\_\_ knots"  
(wind direction) (velocity)
11. Other items as required.

---

<sup>6</sup> Minimum essential in a limited communications environment.

**NATO Format Only**

NOTE: Read-backs of additional items not required; pilot acknowledges with "Roger."

**NATO Fighter Departing Initial Point**

(Information sent to coordinating **element** as a one-line transmission)

“ \_\_\_\_\_ *departing IP*, \_\_\_\_\_ ”  
(mission number) (abortcode)



**NATO Format Only**

## JOINT AIR ATTACK TEAM

### Communications

**Nomenclature:** FM 1 - Ground to air  
FM 2 - Air to air  
UHF - Air to air,  
AM - Air to air

**Agencies:** 30.00 to 75.95 MHz, VHF-FM

**Frequency:** 121 to 143.95 MHz, VHF-AM  
225 to 400 MHz, UHF

**Compatible Equipment:** USA - PRC-77, VRC-12, VRC-24  
USMC - PRC-77, VRC-12,  
PRC-75, PRC-113  
USAF - PRC-77/119, VRC-46,  
PRC-66, PRC-113,  
MRC-107/106/144

### Briefings

#### JAAT AMC to the TACP/FAC/TAC-A

(Omit data not required; do not transmit line numbers.)

JAAT AMC: “ \_\_\_\_\_, this is \_\_\_\_\_ ”  
(FAC call sign) (JAAT AMC call sign)

1. Target description: “ \_\_\_\_\_ ”

<sup>7</sup> Not all Army helicopters have two FM radios.

2. Target location: “ \_\_\_\_\_ ”<sup>PI</sup>  
(grid coordinates [See note on page 24])
  3. Type mark: “ \_\_\_\_\_ ” Code: “ \_\_\_\_\_ ”  
(WP, beacon, laser) (beacon, laser)
- For laser target marking, include laser-to-target line.
4. Location of **friendlies**: “ \_\_\_\_\_ ”<sup>II</sup>
  5. Time over target: "TOT \_\_\_\_\_ "<sup>PI</sup>  
or  
Time to target (TTT): “**Hack time will be** \_\_\_\_\_ ”
  6. **Attack sectors/timing**: “ \_\_\_\_\_ ”
  7. Threats: “ \_\_\_\_\_ ”  
(type and location)
  8. Restrictions: “ \_\_\_\_\_ ”

After initial contact with the attack aircraft, the TACP/FAC/TAC-A will brief the flight lead using the appropriate standardized J-Fire briefing format (9-line or NATO). In the Remarks section of the brief, the TACP/FAC/TAC-A will provide the AMC’s call sign and radio frequency, then direct the flight lead to contact the AMC.

**JAAT AMC to the Attack Aircraft Flight Lead**  
(Format is flexible and depends on TACP/FAC/TAC-A availability)

JAAT AMC: " \_\_\_\_\_ , this is \_\_\_\_\_ "

1. Target description: " \_\_\_\_\_ "

2. Target location: " \_\_\_\_\_ "  
(grid coordinates and visual reference, if possible)

3. Threats: " \_\_\_\_\_ "  
(type and location)

4. Attack sectors/timing: " \_\_\_\_\_ " <sup>JI</sup>

5. Time over target: "TOT \_\_\_\_\_ " <sup>IP</sup>

OR  
Time to target (TTT): "Stand by \_\_\_\_\_ "  
(minutes )  
plus \_\_\_\_\_ , hack."  
(seconds)

6. Restriitions: " \_\_\_\_\_ "

7. Coordination call: "Call \_\_\_\_\_ seconds."

8. Remarks: " \_\_\_\_\_ "  
(specific attack roles, laser codes)

**Attack Aircraft Flight Lead to JAAT AMC**

I. Departing IP: " \_\_\_\_\_ , departing IP."

2. Coordination/weapon call: “ \_\_\_\_\_ ,  
 (aircraft call sign)  
 \_\_\_\_\_ seconds, \_\_\_\_\_ J1  
 (ordnance)

3. J-Laser<sup>8</sup> call: “10 seconds”  
 “Laser on”  
 “spot”  
 “Shift”  
 “Terminate”

**Table 5. Attack Helicopter Weapons Capabilities  
 AC-130 CALL FOR FIRE**

Weapon	Effective Maximum Range (m)	Maximum Load (rounds)
2.75RX,10-LB	9,300	76
2.75RX,17-LB	5,500	62
7.62-mm minigun	1,100	4,000
20-mm cannon	1,500	750
30-mm cannon <sup>9</sup>	3,000	1,200
40-mm grenade launcher	1,600	265
TOW	3,750	8
Hellfire	5,000	16
5.00RX <sup>10</sup>	7,200	8
CBU-55FAE <sup>10</sup>	NA	4

<sup>8</sup> J-Laser calls should be prefaced with the appropriate call signs. The “Lock-Launch” advisory call indicates that standoff ordnance is in-bound.

<sup>9</sup> USA only.

<sup>10</sup> USMC only.

**Close Air Support** \_\_\_\_\_

1. AC-130 call sign: “ \_\_\_\_\_ ”
2. Friendly location: “ \_\_\_\_\_ ”
3. Friendly location marked by: “ \_\_\_\_\_ ”
4. Threats: “ \_\_\_\_\_ ”
5. Target elevation (optional): “ \_\_\_\_\_ ” in feet.
6. Beacon type and code (if used): “ \_\_\_\_\_ ”
7. Magnetic bearing from your position to TGT: “ \_\_\_\_\_ ”
8. Distance in meters from your position to TGT: “ \_\_\_\_\_ ”
9. Target description: “ \_\_\_\_\_ ”

**Table 6. AC-130 Data**

<b>Recommended Side Distance (Peacetime)</b>	<b>AC-130 Available Radios</b>	<b>Armament-AC-130 (Refuelable)</b>
20-mm-500 meters	Two UHF's	Two 20-mm miniguns - HE, HEI, mesh, metal
40-mm-500 meters	Two HF's	One 40-mm gun - HE, mesh, metal
105-mm-650 meters	Two FM's	One 105-mm howitzer - WP, HE, VT
	One VHF AM	
	One SATCOM	



**Table 7. Risk-Estimate Distance for Aircraft-Delivered Ordnance**

**WARNING: See pages 54 through 56 for factors in determining these distances.**

Item	Description	Risk-Estimate 10 % PI	Distance 0.1 % PI
MK-82 LD	500-lb bomb	250	425
MK-82 HD	500-lb bomb (retarded)	100	375
MK-82 LGB	500-lb bomb (GBU-12)	250 <sup>11</sup>	425 <sup>11</sup>
MK-83 HD	1,000-lb bomb	275	475
MK-83 LD	1,000-lb bomb	275	475
MK-83 LGB	1,000-lb bomb (GBU-16)	275 <sup>11</sup>	475 <sup>11</sup>
MK-84 HD/LD	2,000-lb bomb	325	500
MK-84 LGB	2,000-lb bomb (GBU-10/22)	225 <sup>11</sup>	500 <sup>11</sup>
MK-20 <sup>12</sup>	Rockeye (antiarmor CBU)	150	225
MK-77	500-lb napalm (FAE)	100	150
CBU-55/77 <sup>12</sup>	Fuel-air explosive (FAE)	11	11
CBU-52 <sup>12</sup>	CBUs (all types)—	275	450
CBU-58/71 <sup>12,13</sup>	CBUs (all types)	350	525
CBU-87 <sup>12</sup>	CBUs (all types)	175	275
CBU-89/78 <sup>14</sup>	CBUs (all types)	175	275
2.75 FFAR	Rocket with various warheads	160	200

<sup>11</sup> Risk-estimate distances are to be **determined**. For LGBs, the values shown are for weapons that do not glide and that follow a ballistic trajectory similar to GP bombs.

<sup>12</sup> Not recommended for use near troops in **contact**.

<sup>13</sup> CBU-71/CBU-84 bombs **contain** time-delay fuzes that detonate at random times after impact. CBU-89 bombs are **antitank** and antipersonnel mines and are not recommended for use near troops in **contact**.

**Table 7. Risk-Estimate Distances for Aircraft-Delivered Ordnance (continued)**

Item	Description	Risk-Estimate 10 % PI	Distance 0.1 % fl
5.00 FFAA	Zuni with various warheads	150	200
SUU-11	7.62-mm minigun	11	11
M4, M12 SUU-23, M61	20-mm Gatling gun	100	150
GAU-12	25-mm gun	100	150
GPU-5A GAU-8	30-mm Gatling gun	100	150
AGM-65 <sup>14</sup>	Maverick (TV, IIR, laser-guided)	25	100
MK-1/MK-21	Walleye II (1,000-lb TV-guided bomb)	275	500
MK-YMK-23	Walleye II (2,400-lb TV-guided bomb)	11	11
AGM-123A	Skipper (1,000-lb laser-guided, rocket-booster bomb)	275 <sup>11</sup>	500 <sup>11</sup>
AC-130	105-mm cannon	500 <sup>15</sup>	500 <sup>15</sup>

<sup>14</sup> The data listed applies only to AGM-65A, B, C, and D models. AGM-65E and G models contain a larger warhead and risk-estimate distances are not currently available.

<sup>15</sup> This distance is used for all AC-130 engagements as it has the largest fragmentation pattern for the largest weapon system on board.

# NAVAL SURFACE FIRE SUPPORT COMMUNICATIONS

<b>Agency:</b>	Observer to ship
<b>Nomenclature:</b>	Naval surface fire ground spot net, HF Air spot net, UHF
<b>Frequency:</b>	2 to 30 Mhz, HF
<b>Compatible Equipment:</b>	USA - GRC-106, GRC-193 USMC - PRC-104, GRC-193, MRC-138, PRC-77, PRC-75, PRC-41 USAF - PRC-104, MRC-107/108/144, GRC-206

## PLANNING

Supporting ship: \_\_\_\_\_  
(include gun type and number of guns)

If this unit is unavailable or direct communications are unavailable,  
indicate the unit through which support will be requested: \_\_\_\_\_

Call sign: \_\_\_\_\_

Frequency: \_\_\_\_\_

Ship: \_\_\_\_\_

Gun type : \_\_\_\_\_

Number of guns : \_\_\_\_\_

Period effective from : \_\_\_\_\_ to \_\_\_\_\_

### CALL-FOR-FIRE

(Give in three separate transmissions)

Observer transmits to ship.

1.<sup>16</sup> “ \_\_\_\_\_ *this is* \_\_\_\_\_ ”  
(ship ID) (observer ID)

2.<sup>16</sup> “*Fire mission*” and, if known, “*target number* \_\_\_\_\_”  
(provided by field artillery FSO, USMC FSCC, or USN SACC)

**NOTE:** Wait for read-back.

3.<sup>16</sup> Location of target. Select the appropriate method.

Grid coordinates:

“*Grid* \_\_\_\_\_”

“*Altitude* \_\_\_\_\_ in meters

“*Direction* \_\_\_\_\_” in mils/grid  
(Mils are in relation to grid north. Any other combination may be used but must be specified; for example, “*Direction 180 degrees magnetic.*” [See note on page 24.]

---

<sup>16</sup> Required only for air spotters.

- Polar plot:

"Direction \_\_\_\_\_" in mils/degrees

"Distance \_\_\_\_\_" in meters

"Up/down \_\_\_\_\_" in meters  
(vertical shift)

- Shift from known point:

"From \_\_\_\_\_"  
(target number/reference point)

"Direction \_\_\_\_\_" in mils/degrees  
(from observer to target)

"Spotter-TGT Line \_\_\_\_\_" in mils/degrees

"Left/right \_\_\_\_\_" in meters  
(lateral shift)

"Add/drop \_\_\_\_\_" in meters  
(range shift)

"Up/down \_\_\_\_\_" in meters  
(vertical shift)

4. Target description: <sup>17</sup> " \_\_\_\_\_"  
(type, size, cover)

<sup>17</sup> Mandatory elements.

5. Method of engagement: “ \_\_\_\_\_ ”<sup>16</sup>

*danger close*  
*fuse*  
*number of salvos*  
*armament*  
*reduced charge (ammunition)*  
*number of guns*

special instructions such as—

*continuous/coordinated illuminator*  
*internal, sustained fire*  
*time on target*

6. Method of control:<sup>17</sup> “ \_\_\_\_\_ ”

*fire for effect*  
*ship adjust*  
*spotter adjust* (specific adjustment)<sup>18</sup>  
*cannot observe*  
*at command* (can apply to each of the four methods above)

---

<sup>17</sup> Mandatory elements.

<sup>18</sup> Spotter adjust is standard information and does not need to be included for brevity. However, if the observer desires something other than this standard spotter adjustment, he must be specific in the correction.

MESSAGE TO OBSERVER

"Gun target line \_\_\_\_\_"  
 (direction from gun to target)

"Ready \_\_\_\_\_" in seconds  
 (time of flight)

"First salvo at \_\_\_\_\_"  
 (dangerdose missions only)

"Summit"<sup>19</sup> \_\_\_\_\_ in feet or meters  
 (in feet, if air spotter; in meters, if ground spotter)

Table 8. Naval Surface Fire Support Capabilities

Weapon	Full Charge Max Range (m)	Reduced Charge Max Range (m)	Fin Rate /Tube (max/sust)	Ammo	Fuzes
5"/54 MK 45	23,100	12,200	20/20	HE, ILLUM, WP	Q, MT, CVT, VT, DEFL
76-MM <sup>20</sup>	12,700	NA	80/NA	WP	PD

<sup>19</sup> Required only for air spotters.

<sup>20</sup> Units equipped with 76-mm weapons are not normally assigned naval surface fire support missions except in extraordinary circumstances.

**Table 9. Naval Surface Fire Support Illumination Factors**

Weapon	Shell Type	HOB (m)	Burn Time (sec)	Rate of Fall (m/sec)
5"/54	MK 88/91	500	45172	10 / 2

**Table 10. Naval Surface Fire Support Danger-Close Distances**

Weapon	Distance (m)
5"/54	750



## LIAISON ELEMENTS

### ARMY FIRE SUPPORT ELEMENTS

#### Mission

Responsibility for command, control, and coordination of fire support begins with the force commander. From the corps down to the company and team, all levels have fire support elements (FSEs). The FSEs assist the maneuver commander in the decision and execution process, advise on fire support capabilities, and assist in the planning and coordination of fire support.

#### Organization

FSEs have a fire support coordinator (FSCoord) and a supporting staff but will otherwise vary according to the available fire support assets. An FSE will usually include an air liaison officer (ALO); representatives from such elements as the air and naval gunfire liaison company (ANGLICO); Army aviation units, and electronic warfare support elements (EWSEs); mortars; and other assets required by the force commander.

**Echelons Above Corps.** The battlefield coordination element (BCE) is the major Army organization involved in coordinating fire support. Its primary responsibility is allocating resources, especially air support assets, and the corresponding requirements for joint suppression of enemy air defenses (J-SEAD).

**Corps and Division.** The FSEs provided at the corps and division levels are similar in structure. Both are

located in the main and tactical command posts and in the rear tactical operations centers.

**Brigade and Battalion.** The FSCOORD at brigade level is usually the commander of the direct support battalion. The brigade FSCOORD establishes fire support organizations in each maneuver battalion and company. The FSEs at brigade and battalion levels are located in the maneuver tactical operations center (TOC).

**Company.** The fire support organization at company level is the fire support team (FIST). The FIST is headed by the company FSO, who is also the company FSCOORD. The field artillery and mortars provide the primary fire support to the company. The FIST coordinates these assets and, when available, coordinates CAS and naval resources through the appropriate agencies. The FIST also provides forward observer capabilities to the company.

## **MARINE CORPS TACTICAL AIR CONTROL PARTY**

### **Mission**

The Marine TACP establishes and maintains facilities for liaison and communications between supported units and appropriate control agencies. The TACP is led by the air officer (AO), who informs and advises the ground unit commander on the employment of supporting aircraft and requests and coordinates air support missions.

## Organization

The battalion TACP has two forward air control (FAC) parties, while the regimental and division TACPs have none.

**Division.** The division TACP has 2 officers and 11 enlisted communications personnel. They assist the division AO by monitoring all immediate air support requests from supporting units, by supervising the operation of aviation nets in the division fire support coordination center (FSCC), and by keeping the fire support coordinator (FSC) advised of the general air situation and specific requests of subordinate units.

**Regiment.** The regimental TACP has one regimental air officer (RAO) and four enlisted communications personnel. The RAO advises and assists the regimental commander regarding all aviation matters, consolidates all preplanned and support requests from subordinate units, coordinates with the regimental FSC, functions as the air representative with the regimental FSCC, and facilitates the disposition of immediate air support requests if necessary.

**Battalion.** The battalion TACP has 3 officers and 12 enlisted communications personnel. The senior naval aviator/naval flight officer functions as the battalion air officer, and each of the other two officers is the leader of a FAC party.

## **AIR AND NAVAL GUNFIRE LIAISON COMPANY**

### **Mission and Employment**

The ANGLICO supports a US Army or allied division, or elements thereof, by providing the control and liaison agencies for the employment of naval surface fire and naval air support in amphibious assault or other operations. The ANGLICO is normally attached to the supported force for a joint or combined operation in which US fleet assets are employed. The ANGLICO can provide fleet firepower to help offset the lack of heavy combat support initially available in most expeditionary environments. To support airborne and special operations forces, the ANGLICO maintains an airdrop capability.

### **Organization**

The ANGLICO maintains a high degree of organizational flexibility and can task-organize to meet the needs of the supported force. A company, if fully committed, can support an entire US Army division of three maneuver brigades. An ANGLICO consists of a company headquarters and three brigade air/naval gunfire liaison platoons. The ANGLICO headquarters performs command and staff functions necessary to administer, plan, direct, and supervise the execution of assigned missions and to advise the supported commander on the employment of the company.

The company headquarters can form a task-organized division air/naval gunfire liaison team as necessary to support a division or comparable-sized allied unit. Each

platoon has one brigade liaison team to effect fire support coordination at the US Army combat brigade or equivalent level, two supporting arm liaison teams (SALTs) to effect fire support at the maneuver battalion level, and four firepower control teams (FCTs) to provide control of naval surface support, naval air support, and artillery support at the company level.

**Division Air and Naval Gunfire Liaison Team.**

The division air and naval gunfire liaison team is task-organized to provide support to an Army division or comparable-sized allied unit. The division team usually attaches to the supported division headquarters FSCC, FSE, or a comparable agency for planning, liaison, control, coordination, and employment of supporting arms.

**Brigade Air and Naval Gunfire Team.** The brigade air and naval gunfire team provides support to a maneuver brigade. The air and naval gunfire teams are task-organized to support an Army maneuver battalion or comparable-sized allied unit. The brigade team usually attaches to the supported brigade TOC or comparable supporting arms for an Army brigade or comparable-sized allied unit.

**Battalion Supporting Arms Liaison Team.** SALTs provide the capability to support a battalion. They are task-organized to support an Army maneuver battalion or a comparable-sized allied unit. The SALT usually attaches to a supported battalion TOC or a comparable agency for planning, requesting, coordinating, and controlling supporting arms for an Army battalion or comparable-sized allied unit, as well as for liaison.

**Firepower Control Team.** FCTs provide terminal control of naval gunfire and USN and USMC CAS to a supported maneuver company. They are task-organized to support an Army maneuver company or a comparable-sized allied unit. Company commanders employ FCTs much as they would TACPs, FISTs, or comparable agencies– to plan, request coordinate, and provide terminal control of supporting arms for an Army maneuver company or comparable-sized allied unit-as well as for liaison.

## **AIR FORCE TACTICAL AIR CONTROL PARTY**

### **Mission**

The Air Force TACP is a control element stationed with and supporting an Army combat unit. The TACP provides the interface between the Army unit it supports and the combat Air Force unit that provides combat air support. The TACP advises the ground commander on the capabilities and limitations of combat aircraft and weapons and assists in planning for combat air support. The airborne forward air controller (AFAC), the air liaison officer (ALO), and the enlisted terminal attack controller (ETAC) in the TACP provide final attack control for CAS missions.

### **Organization**

TACPs are located at corps, division, brigade, and battalion levels and are tailored in reaming and skills to the Army unit they support. While employed, TACPs are under the operational control of an air support

operations center (ASOC) or the senior TACP element deployed.

**Corps and Division.** At corps and division levels and sometimes at the field army level, the TACP has a senior ALO, plus the fighter and airlift liaison officers and tactical air command and control specialists (TACCSs).

**Brigade.** The brigade TACP has a brigade ALO, fighter and airlift liaison officers, and TACCSs.

**Battalion.** The battalion TACP has one ALO and two TACCSs assigned. At least one TACCS will also be ETAC-qualified.

████████

## RISK-ESTIMATE DISTANCES

Risk-estimate distances are based on the following assumptions. Any changes to the assumptions will increase the risk-estimate distances from those given in Table 6. Risk-estimate distances allow the ground forces commander or combat air commander to estimate the risk in terms of the percent of friendly casualties that may result from an air strike against an enemy threat along the forward line of own troops (FLOT). Risk-estimate distances are based on fragmentation patterns.

## COMPUTATIONS

All attacks are parallel to the FLOT. Distances are computed from the intended impact point of the center of a stick of bombs or a pod of rockets. Deflection distance (from the aiming point toward the friendly troops) is built into the risk-estimate distance. The deflection distance equals the distance from the aircraft centerline to the farthest outboard station, plus the lateral distance that a weapon travels because of rack-ejection velocity.

**Risk-estimate distances are for combat use and are not minimum safe distances for peacetime training use.**

## RELATIONSHIPS BETWEEN WEAPON IMPACT AND POINT OF INTERSECTION

For all determinations in Table 6, the position of a prone man was assumed to be on a line perpendicular to the line of flight (or line of weapon impacts) at the midpoint of the line (stick) of weapons. For all sticks of weapons, a weapon was assumed to impact at the point



of intersection of these two lines. Thus, for the weapons evaluated, the following relationships between weapon impact and the point of intersection were assumed:

- GP bombs - center bomb of stick impacts at point of intersection.
- Rockets - center rocket.
- Cluster weapons - pattern center of the center dispenser.
- Guns - center of pattern.
- Maverick - single-weapon delivery impacting at point of intersection.

### **WEAPON RELIABILITY AND DELIVERY PARAMETERS**

A weapon reliability of 1.0 was used for all weapons evaluated. Delivery parameters and considerations for specific weapons are in (C) FM 101-50-3 I/TH 61A1-3-9/FMFM 5-2G-6/NAVAIR 00-130ASR-9<sup>21</sup>.

### **CASUALTY CRITERION**

The casualty criterion is the 5-minute assault criterion for a prone soldier in winter clothing and helmet. The probability of incapacitation (PI) means a soldier is physically unable to function in an assault within a 5-minute period after an attack. The 0.1 percent PI value can be interpreted as being less than or equal to one chance in one thousand.

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<sup>21</sup> *Joint Munitions Effectiveness Manual/Air-to-Surface (JMEM/AS): Risk Estimates for Friendly Troops.* 19 December 1986.

## TROOPS IN CONTACT

The FAC should regard friendlier within 1 kilometer of targets as a *troops-in-contact* situation and advise the ground commander accordingly. The ground commander must accept responsibility for friendly risk when targets are inside 0.1 percent PI. The passing of the ground commander's initials indicates his acceptance of the risk for intentional ordnance delivery inside the 0.1 percent PI distance.

# FIRE SUPPORT AND AIRSPACE COORDINATION

## FORMAL COORDINATION

The FSCOORD establishes fire support and airspace coordination, with input from his ALO counterpart at the appropriate level of command and control. Formal measures are usually published in the fire support plan and the airspace coordination order (ACO). Formal coordination can be either permissive or restrictive.

### Permissive

Permissive coordination consists of the following:

**Coordinated Fire Line.** A line beyond which conventional or improved conventional indirect fire weapons (mortars, field artillery, and naval gunfire) may fire at any time within the zone of the establishing headquarters without additional coordination.

**Fire Support Coordination Line.** A line beyond which any weapon system may attack targets without endangering troops or requiring additional coordination with the establishing headquarters.

**Free-Fire Area.** A designated area in which any weapon system can fire conventional or improved munitions without additional coordination and is normally established on identifiable terrain.

## Restrictive

Permissive coordination consists of the following:

**No-Fire Area.** An area in which no fires or the effects of fires are allowed without prior clearance from the establishing headquarters, except if the commander's force must defend against an engaging enemy force within the no-fire area.

**Restrictive Fire Area.** An area in which specific restrictions are imposed and in which fires that exceed those restrictions are prohibited without prior coordination from the establishing headquarters.

**Restrictive Fire Line.** A line established between converging forces. It prohibits fires or the effects of fires across the line without coordination from the establishing headquarters.

**Airspace Coordination Area.** A three-dimensional block of airspace in which friendly aircraft are reasonably safe from friendly surface fires.

## INFORMAL COORDINATION

Informal coordination consists of procedures to deconflict aircraft from other fire support assets, primarily artillery. The terminal air controller (FAC, ALO, ETAC) establishes informal measures in response to the FSCOORD's fire support plan and implements them for a short period of time to permit CAS operations. Informal measures are heavily dependent upon good FSCOORD-ALO interface.

### Heading Offset

The terminal air controller selects an IP and specifies a lateral offset from the IP-to-target run-in to deconflict fighters from other supporting fires. Item 2 of the J-Fire 9-line must include the words “*offset left/right*” as appropriate after the magnetic heading so that fighters understand the offset is a restriction. A distance to offset may be included, for example, “*270 degrees, offset left, 2 kilometers.*”

### Heading Direct

The terminal air controller selects an IP so that the IP-to-target run-in is deconflicted from other supporting fires by at least 2 nautical miles either side of the centerline. Item 2 of the J-Fire (-line must include the word “*direct*” after the magnetic heading so that fighters understand the heading is a restriction, for example, “*270 degrees direct.*”

### Informal Airspace Coordination Area

The terminal air controller establishes a two-dimensional area where fighters can operate and be reasonably safe from friendly surface fires. While the area should be established along easily identifiable terrain features, it can be established using grid lines. The Remarks section of the J-Fire 9-line must include ACA boundaries and effective times, for example, “*No arty fires south of the Green River; ACA in effect UFN*” or “*No arty fires west of the 20 or south of the 14 grid lines; ACA in effect for 10 minutes.*”

### **Maximum Ordinate**

The terminal air controller obtains the maximum ordinate of supporting fires and provides the fighters with an altitude mean sea level (MSL) to work above. The maximum ordinate can only be used for deconfliction when the artillery is firing low angle and threats or weather permit medium-altitude operations. The Remarks section of the J-Fire 9-line must include a maximum ordinate if used, for example, "*Max ord is 6000' MSL; work above.*"

### **Target-to-Gun Line**

The terminal air controller provides the fighters with both the artillery impact area and the target-to-gun line (TGL). Fighters are deconflicted from other supporting fires if they avoid both the artillery target and the TGL. The Remarks section of the J-Fire 9-line must include both the artillery impact coordinates and the TGL, for example, "*Arty impact at NK 414678; TGL is 100 degrees.*"

### **Gun-to-Target Line**

The terminal air controller provides the fighters with both the artillery location and the gun-to-target line (GTL). Fighters are deconflicted from other supporting fires if they avoid both the firing location and the GTL. The Remarks section of the J-Fire 9-line must include both the artillery location, via authentication tables or secure voice, and the GTL, for example, "*Arty location. . . in the clear, NK. . . I set AB . . . I send JOELDB; GTL is 100 degrees.*"

### Shift/Check Fire

The terminal air controller works with the FSCOORD to shift supporting fires for a short time to another area so that CAS operations can occur and be reasonably safe from friendly surface fires. Although uncommon, supporting fires may also be checked in order to permit cyclical operations between artillery and CAS assets, for example, “*C Battery, check fire. . . fighters inbound.*”

## GLOSSARY

<b>AAGS</b>	army air-ground system
<b>ABCCC</b>	airborne battlefield command and control center
<b>ACA</b>	airspace coordination area
<b>ACC</b>	air component commander
<b>ACE</b>	air command element
<b>ACIF</b>	artillery counterfire information form
<b>ADA</b>	air defense artillery
<b>ADAFCO</b>	air defense artillery fire control officer
<b>ADAM</b>	area-denial artillery munitions
<b>ADCOORD</b>	air defense coordinator
<b>AFAC</b>	airborne forward air controller (USAF)
<b>ALO</b>	air liaison officer
<b>AMC</b>	air mission commander
<b>AMLS</b>	airspace management liaison section
<b>ANGLICO</b>	air and naval gunfire liaison company
<b>AO</b>	air officer (USMC)
<b>AOC</b>	air operations center (USAF)
<b>AP</b>	attack position/antipersonnel
<b>APAM</b>	antipersonnel antimateriel
<b>APERS-T</b>	antipersonnel-tracer
<b>ARLO</b>	air reconnaissance liaison officer
<b>arty</b>	artillery
<b>ASOC</b>	air support operations center



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<b>ATACMS</b>	Army Tactical Missile System
<b>ATK</b>	attack
<b>AWACS</b>	airborne warning and control system
<b>A<sup>2</sup>C<sup>2</sup></b>	army airspace command and control
<b>B</b>	
<b>BCE</b>	battlefield coordination element
<b>BD</b>	base detonating
<b>BOMREP</b>	bombing report
<b>C</b>	
<b>CAS</b>	close air support
<b>CBU</b>	cluster bomb unit
<b>CCT</b>	combat control team
<b>CFL</b>	coordinated fire line
<b>CHEM</b>	chemical
<b>COC</b>	combat operations center (USMC)
<b>CP</b>	concrete-piercing; command post
<b>CPHD</b>	copperhead
<b>CRC</b>	control and reporting center
<b>CRP</b>	control and reporting post
<b>CVT</b>	controlled variable time
<b>D</b>	
<b>DASC</b>	direct air support center (USMC)
<b>DEL</b>	delay
<b>DIR</b>	direction
<b>DPICM</b>	dual-purpose improved conventional munitions

**DTACC** deployed tanker/airlift control center

**E**

**ET** electronic time

**ETAC** enlisted terminal attack controller

**EWSE** electronic warfare support element

**F**

**FA** field artillery

**FAC** forward air controller, forward air control

**FACP** forward air control post

**FAE** fuel-air explosive

**FCT** firepower control team

**FDC** fire direction center

**FFA** free fire area

**FFAR** folding-fin aerial rocket

**FFE** fire for effect

**FIST** fire support team

**FLOT** forward line of own troops

**FSC** fire support coordinator (USMC)

**FSCC** fire support coordination center

**FSCL** fire support coordination line

**FSCoord** fire support coordinator (USA)

**FSE** fire support element

**FSO** fire support officer

**FTR** fighter

**G**

<b>GLO</b>	ground liaison officer
<b>GP</b>	general
<b>GTL</b>	gun to target line
<b>H</b>	
<b>HC</b>	smoke
<b>HD</b>	high drag (also snakeye and air-inflatable retarded (AIR))
<b>HE</b>	high explosive
<b>HEAT</b>	high explosive, antitank
<b>HEP</b>	high explosive, plastic
<b>HES</b>	high-explosive, spotting
<b>HOB</b>	height of burst

**I**

<b>ICM</b>	improved conventional munitions
<b>IIR</b>	imaging infrared
<b>ILLUM</b>	illuminating
<b>IP</b>	initial point

**J**

<b>JAAT</b>	joint air attack team
<b>JOC</b>	joint operations center
<b>J-SEAD</b>	joint suppression of enemy air defenses

**L**

<b>LAT</b>	latitude
<b>LCC</b>	land component commander
<b>LD</b>	low drag

**LGB** laser guided bomb (GBU-10/12/24)

**LONG** longitude

**M**

**m** meter

**MAG** magnetic

**MAGTF** Marine air-ground task force

**max** maximum

**MCC** Marine component commander

**MLRS** multiple-launched rocket system

**mm** millimeter

**MORTREP** mortar bombing report

**MSL** mean sea level

**MT** mechanical time

**MTSQ** mechanical time, superquick

**N**

**NA** not applicable

**NAO** naval aviation observer

**NAVAIR** naval air

**NCC** naval component commander

**NFA** no fire area

**NM** nautical mile

**NSFS** naval surface fire support

**P**

**PD** point detonating/delay

**PI** probability of incapacitation

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	<b>Q</b>	
<b>Q</b>	quick	
	<b>R</b>	
<b>RAAM</b>	remote antiarmor mine system	
<b>RAO</b>	regimental air officer	
<b>RAP</b>	rocket-assisted projectile	
<b>RECCE</b>	reconnaissance	
<b>RFA</b>	restricted fire area	
<b>RFL</b>	restricted fire line	
<b>RPM</b>	revolutions per minute	
	<b>S</b>	
<b>SACC</b>	supporting arms coordinating center	
<b>SALT</b>	supporting arms liaison team	
<b>sec</b>	second	
<b>SHELREP</b>	shelling report	
<b>sust</b>	sustained	
	<b>T</b>	
<b>T</b>	tracer	
<b>TAC (A)</b>	tactical air coordinator (airborne)	
<b>TACC</b>	tactical air control center(USN)/ tactical air command center (USMC)	■
<b>TACCS</b>	tactical air command and control specialist	
<b>TACP</b>	tactical air control party	
<b>TACS</b>	theater air control system	
<b>TALCE</b>	theater airlift coordination element	
<b>TALO</b>	theater airlift liaison officer	

<b>TAOC</b>	tactical air operations center (USMC)
<b>TAR</b>	tactical air reconnaissance
<b>TGL</b>	target to gun line
<b>TGT</b>	target
<b>TI</b>	time
<b>TOC</b>	tactical operations center
<b>TOT</b>	time on target
<b>TOW</b>	tube-launched, optically tracked, wire-guided missile
<b>TTT</b>	time to target
<b>TV</b>	television
	<b>U</b>
<b>UFN</b>	until further notice
<b>USA</b>	United States Army
<b>USAF</b>	United States Air Force
<b>USMC</b>	United States Marine Corps
<b>USN</b>	United States Navy
<b>UTM</b>	universal transverse mercator (grid)
	<b>V</b>
<b>VT</b>	variable time
	<b>W</b>
<b>WOC</b>	wing operations center
<b>WP</b>	white phosphorus