
APPENDIX E

COMMUNICATIONS

The TAB will be widely dispersed during combat. The communications lines for the elements of the TAB will also be dispersed across the division. As the communications lines become more complex, commanders must determine the most feasible method of communication. They must consider all methods to include messenger. The communications plan must support the deployment of TA assets within the division zone.

RESPONSIVENESS

Communications must be fast enough to ensure that target information flows from detection to attack before the targets can be repositioned. As the mobility of targets increases, the demand for responsiveness in TA communications also increases. While equipment or organization may impose physical limitations on the TA system, responsiveness is enhanced by operator performance. All personnel involved in target acquisition must understand the need for timeliness of information.

SECURITY

The enemy's ability to degrade our communications through such techniques as jamming, direction finding, and interception must be dealt with in planning and conducting communications operations. Contact the staff signal officer for information on the EW threat to communications and procedures to counter it. Additional information can be obtained from the IPB.

FIREFINDER RADAR SECTION COMMUNICATIONS

The Firefinder radar section sends enemy mortar, artillery, and rocket locations or friendly fire data to a supported FDC or to a TACFIRE,

BCS, or FDS by wire and/or radio communications. Wire is preferred whenever possible. Use of wire minimizes the effects of massive jamming by the enemy during his artillery strikes. It also minimizes the possibility of enemy intercept and location of radar radio transmissions by use of direction finders.

Radio Communications

Each radar section operates in two tactical FM radio nets as directed by the controlling headquarters. Two AN/VRC-90 radios are in the radar section operations control group shelter for this purpose. These radios are equipped with KY-57 speech secure devices for secure voice transmissions.

The AN/TPQ-36 section normally operates in a battalion operations/fire (ops/F) net (VHF-FM) (D) and a command net (VHF-FM) (V). Usually, these two nets belong to the supported DS battalion.

The AN/TPQ-37 section normally operates on the TA/intel net (VHF-FM)(D) and a command net (VHF-FM)(V). The AN/TPQ-37 usually is under the control of the div arty or FA brigade TOC and passes target information directly to the counterfire officer at the controlling TOC. Also, the radar may be directed to pass targets to a DS or GS battalion.

In such cases, the supported unit S3 assigns a radio net and frequency.

Digital Communications

Digital communications addresses and authentication codes are prescribed in current cryptographic and authentication manuals. If digital communications are not available, the radar operator uses standard voice procedures to pass target information over the DS battalion operations/fire net or the force artillery command/fire net to the supported unit FDC.

Wire Communications

Wherever possible, wire lines are installed for voice and digital communications with the supported unit. Radios are then used as backup.

VOICE TRANSMISSION PROCEDURES

When digital communications are not possible, the radar section must report targets by voice. A target that would normally be sent digitally in FM;RFAF format will be sent as a call for fire. The radar section should initiate a fire-for-effect mission with the supported FDC. The call for fire contains six elements. These elements are listed below in the order in which they are used. For a detailed explanation of each element, see FM 6-30,

- Observer identification (or radar call sign).
- Warning order (for example, fire for effect).
- Target location (grid of target).
- Target description (for example, enemy artillery).
- Method of engagement.
- Method of fire and control.

Although direction is not one of the six elements of the call for fire, it is transmitted by the radar section as part of the initial call for fire.

Targets acquired that would normally be sent to the controlling headquarters digitally in ATI;CDR format will be sent by voice as a target report (SHELREP). The format for the target report is prescribed in STANAG 2008. The same report format (DA Form 2185-R) is used in case of enemy air attack (BOMREP), enemy mortar (MORTREP) or rocket fire (rocketing report [ROCKREP]), and location of an enemy target. (See Appendix B.)

DIGITAL MESSAGES

The Firefinder radar systems interface digitally with TACFIRE, BCS, and FDS. Firefinder is equipped with a DMD emulator to permit this digital interface. Computer data needed for interface are input during initialization and can be changed by use of function codes.

Digital communications can be transmitted either secure or nonsecure; that is, data may be sent and received in either coded or uncoded form. However, since the DMD emulator does not have a speech secure device, the operator must manually perform off-line encoding and decoding to transmit secure digital messages.

TACFIRE messages used by Firefinder (FF) radars are divided into two groups—receive messages and transmit (or send) messages. Firefinder can receive nine and send six different types of digital messages. Messages are displayed according to the priority level of the message. There are three priority levels for messages – 1 (highest), 2, and 3 (lowest). See the digital message format table for a display of which messages are received and/or transmitted from specific TACFIRE devices.

AUTHENTICATION METHODS

All messages sent and received by Firefinder in the digital mode should be authenticated. Three methods of authentication are available for Firefinder—algorithm (ALGOR), table, and manual.

DIGITAL MESSAGE FORMAT (TACFIRE VERSION 9)

PRIORITY	MESSAGE TITLE	FORMAT	FF	TACFIRE (BATTALION)	TACFIRE (DIV ARTY) ¹	MLRS	BCS
3	Priority or censor zone (CFZ, CFFZ, ATI)	SPRT;FILTER	R	T	T		
3	Radar search area	SPRT;SEARCH	R	T	T		
3	Met data	MET;TA	R	T	T		
3	Radar location	FM;OBCO	RT	RT	RT		RT
2	Friendly fire battery	FM;INTM	R	T			T
2	Friendly fire target	FM;MTO	R	T			T
2	Radar ready/ registration report	FM;SUBS	RT	RT			RT
1	Radar ready/fire mission	FM;FOCMD	RT	RT	RT	RT	RT
2 ²	Priority target report	FM;RFAF	T	R	R	R	R
3	Target report	ATI;CDR	T	R	R		
1	Plaintext message	SYS;PTM	RT ¹	RT	RT	RT	RT

LEGEND: R = receive T = transmit RT = receive and transmit

¹ Applies to FA brigade, division artillery, and corps artillery TACFIRE.

² Can be upgraded to Priority 1 based on priority zones and commander's criteria. See Chapter 4.

Algorithm Authentication

Algorithm authentication uses a code matrix to generate authentication codes for transmitted and received messages. The ALGOR matrix is entered by the operator and can be written onto a cassette tape by unit maintenance support. After ALGOR authentication has been selected and the matrix has been entered, no further operator action is needed. The computer automatically generates authentication codes for

transmitted messages and checks authentication codes of received messages.

Table Authentication

Table authentication uses an operator-entered table to automatically supply authentication codes for transmitted messages. The code contains up to 100 two-character pairs that are entered. Table authentication may be selected for only one net member.

Manual Authentication

Manual authentication is the default method used when an incomplete ALGOR matrix has been entered or when all available table authentication codes have been used. When prompted, the operator enters authentication codes for each message.

DIGITAL NET COMMUNICATIONS

Firefinder Radars

The Firefinder radar can store net member data (member identifications and unit types) for up to ten receivers of six various types. These types of receivers include:

- TACFIRE.
- BCS.
- MLRS (FDS).
- Firefinder radars.

- Howitzer improvement program (HIP).
- Other types.

Firefinder radars can communicate digitally with any of the types of receivers listed above. However, only one net member at a time may be selected for communications.

Moving-Target-Locating Radars

Unless equipped with a digital message device, the AN/TPS-25A and AN/TPS-58B MTLRs cannot communicate directly with TACFIRE. When not equipped with a DMD, the MTLR must report targets by voice to the targeting element. The targeting element can use a VFMED to access TACFIRE target files or to initiate a fire mission.

The DMD is not equipped with a COMSEC device. To report critical information (such as radar site location) on the DMD, the operator should manually encode this information and send it as a plaintext (coded) message.