

CHAPTER 2

Integrating Jamming Into Combat Operations

The objective of jamming is to disrupt the enemy's effective use of his combat forces by reducing the effectiveness of his communications. The function of jamming is to disrupt or deny the enemy the reception of his electromagnetic signals radiating from his radio transmitters. Jamming can be subtle and difficult to detect, or it can be overt and obvious when mission requirements arise which override survivability. Jamming integration is explained in a step-by-step process (Table 2-1), which is based on the following war-game scenario:

The mechanized division's commander directs the G3 to plan an operation to seize Hill 322. Intelligence reports indicate elements of the enemy's 231st Motorized Rifle Regiment are active in this area. The G3, in coordination with the G2, tasks the collection management and dissemination section to determine the enemy unit's location. The operation plan requires the division to attack through the regimental area. The 2d Brigade will lead the main attack and the 1st Brigade will conduct a supporting attack.

Table 2-1. Six steps of jamming integration.

FUNCTIONS		ACTION OFFICE
STEP 1	FOCUS ON THE TACTICAL OBJECTIVE.	COMMANDER, G2, AND G3
STEP 2	PLACE ENEMY UNITS IN PRIORITY ORDER.	G2 AND G3
STEP 3	PLACE IDENTIFIED SYSTEMS AND FUNCTIONS IN A PRIORITY ORDER.	G2 AND G3
STEP 4	IDENTIFY ENEMY ELECTRONICS USED TO CONTROL WEAPONS SYSTEMS AND THREAT FUNCTIONS.	EWS
STEP 5	PROVIDE TECHNICAL DATA.	TCAE
STEP 6	COMPUTE JAMMING DATA AND TASK ASSETS.	TCAE

The first three steps are always accomplished by close coordination between the G2 and G3. These actions are never formally labeled, except as a part of a mental war-gaming of a sequence of actions and counteractions. These three steps are a form of tactical threat analysis, which identifies potential threats posed by enemy maneuver or weapon systems. Identified potential threats are then placed in priority order for jamming. The second three steps involve the technical considerations for jamming.

FOCUS ON THE TACTICAL OBJECTIVE

In step 1 (Figure 2-1), the G3 is acting for the commander. The G3 provides the same focus for integrating jamming as he would for integrating any other division weapon system. In the electronic warfare annex of the operation order, the G3 directs that priority jamming support be provided to the 2d Brigade. This, in effect, focuses the jamming support on a specific unit or operation and establishes the guidelines for integrating jamming into the combat operation.

Until this is done, jamming support cannot be integrated into the combat operation.

The initial guidance provided by the G3 makes planning and coordinating easier for the mission managers. An artillery unit cannot furnish integrated support until it receives the necessary data on where and when to fire. Likewise, jamming cannot support combat operations effectively until it is focused on the threat confronting our forces.

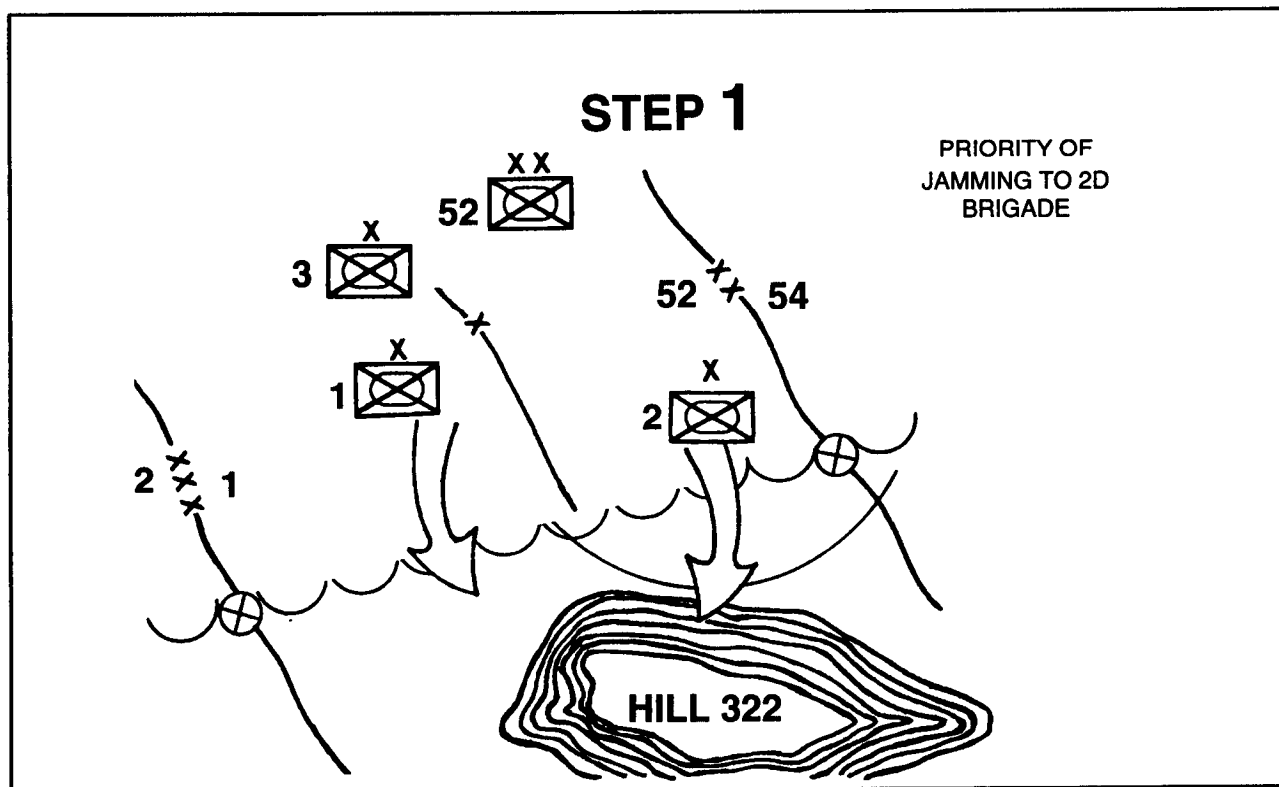


Figure 2-1. Focus on the tactical objective.

This initial focusing step narrows the area of concentration. It also identifies any conflicts among jamming, intelligence collection, and friendly use of the electromagnetic spectrum. This conflict resolution involves the G2, G3, signal officer, and MI assets to perform the overall

assessment of the target and friendly force's use of the electromagnetic spectrum. If jamming is integrated into the operation, the signal officer may have to realign the signal operation instructions.

PLACE ENEMY UNITS IN PRIORITY ORDER

In step 2 (Figure 2-2), the G2 and G3 consider the enemy units that could prevent the accomplishment of the division's mission. These units are placed in a priority order for jamming,

based on their potential threat to the mission. (In combat, priorities are normally situation dependent.)

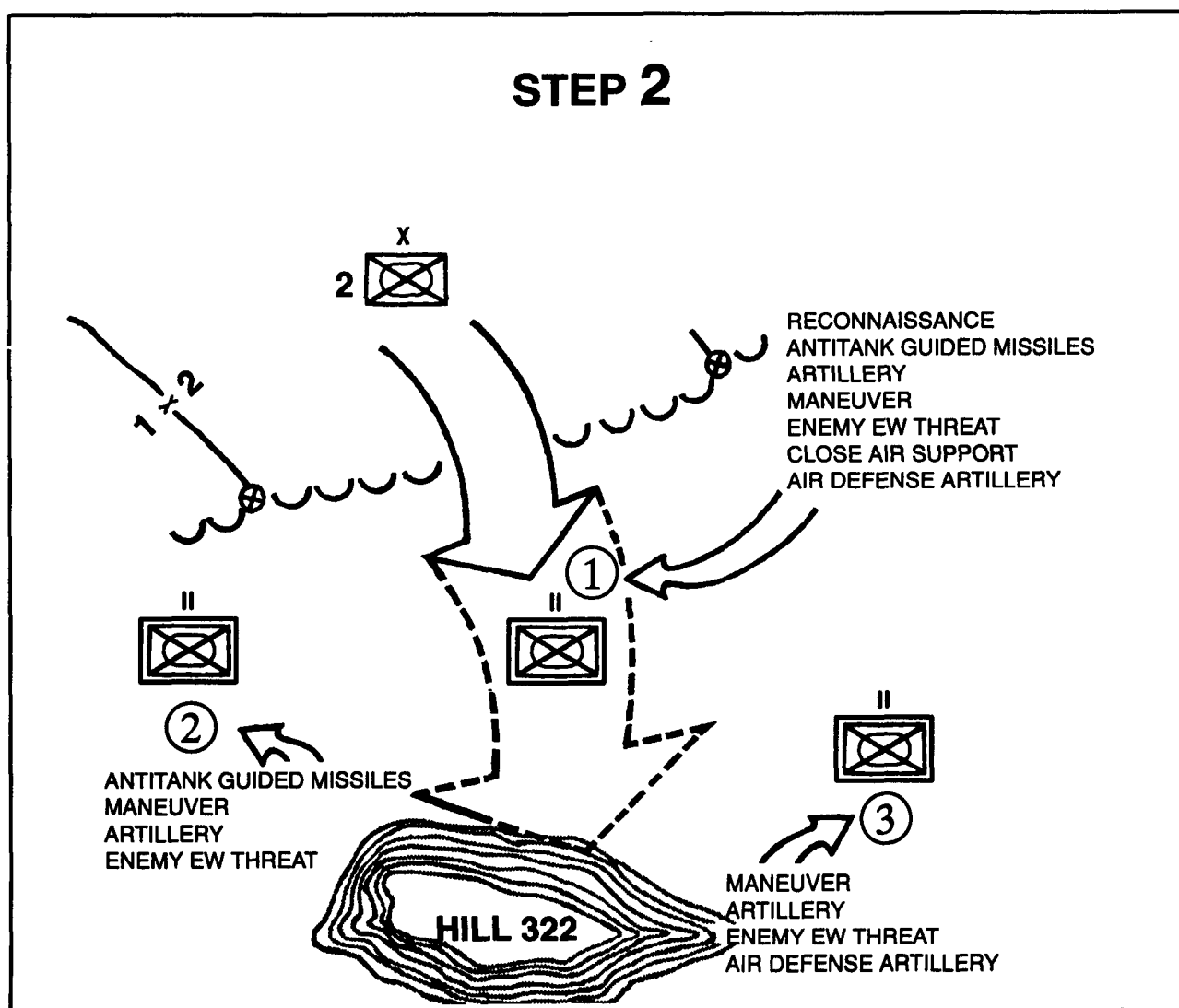


Figure 2-2. Priority order for jamming enemy units.

PLACE IDENTIFIED SYSTEMS AND FUNCTIONS IN PRIORITY ORDER

In step 3 (Figure 2-3), the G2 and G3 identify the various weapons systems and threat functions available to the units listed in step 2. These weapons systems and threat functions are then placed in priority order on the basis of the greatest danger to the attacking friendly force.

The second and third steps are constrained to fit into the specific guidelines as directed by the G3 (in step 1). The further the mission progresses on the battlefield, the more specific the direction becomes.

Enemy Reconnaissance

In step 2, we circled enemy units in priority order (1 through 4) on the basis of their potential threat

to the tactical operation. Listed near each unit (also in priority order, as shown in Figure 2-2) are weapon systems and threat functions which impose the greatest threat to the attack. The greatest threat imposed by the priority one unit is the enemy's reconnaissance elements. This is expected since reconnaissance elements tip-off other forces and weapon systems. If we successfully jam the reception of their reports, we can delay their reporting of the 2d Brigade's point of attack. The jamming will, in turn, delay the enemy's reaction time against our attacking force.

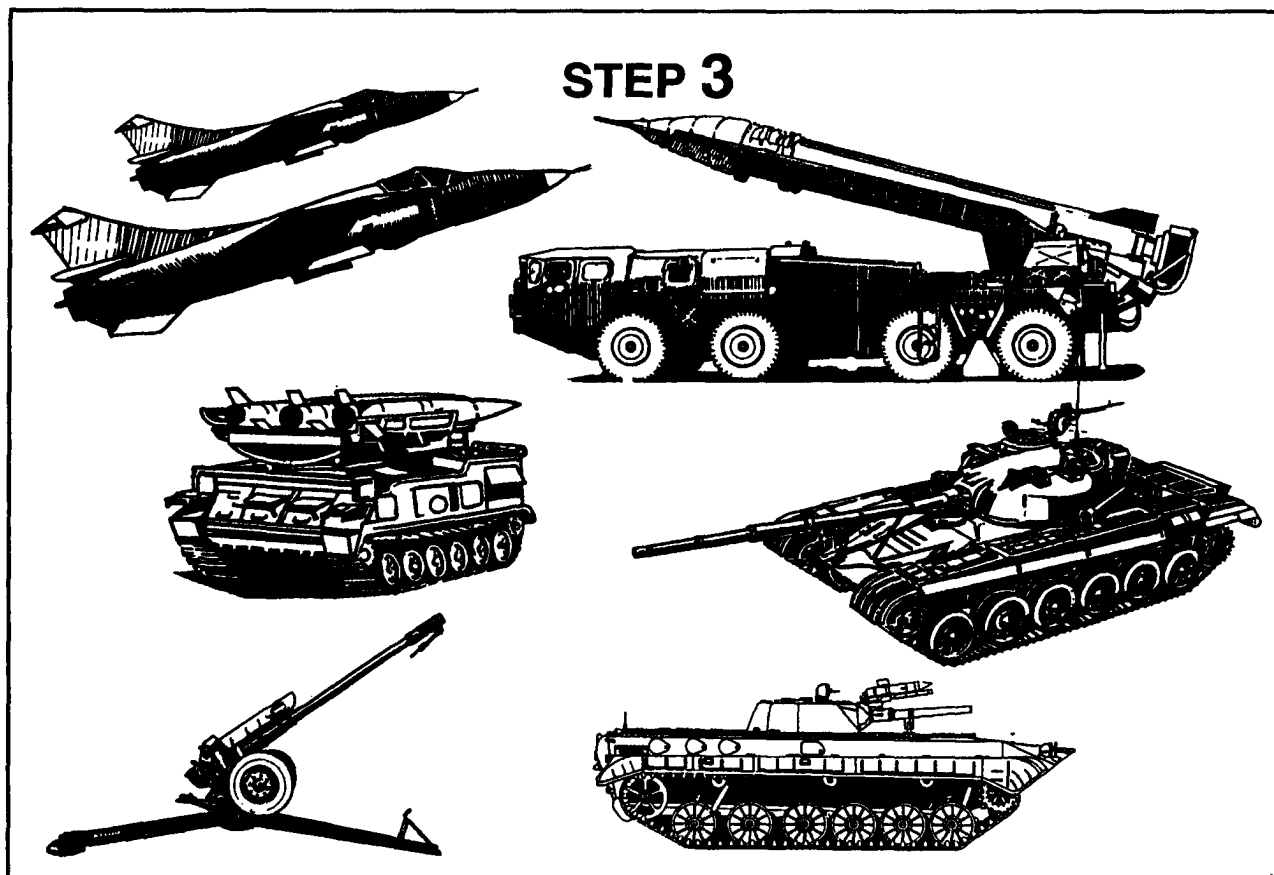


Figure 2-3. Identify and place enemy weapons systems and threat functions in priority order.

Enemy Antitank Guided Missile Control Nets

The next threat under the priority one unit is the enemy's antitank guided missile control nets. The enemy will eventually detect our attacking force and will begin to target our key elements. Key elements include personnel, weapons systems, tanks, and armored personnel carriers. Jamming the communications controlling the antitank guided missiles reduces the effective coordination and movement of their weapons systems.

Artillery Threat

The artillery threat is listed in the third priority. Therefore, we jam their fire request and fire direction net between the command and observation post (COP) and the firing battalions. The division commander may also want the artillery threat destroyed. In that case, the electronic warfare support measures assets can be

used to locate these targets for our own artillery or close air support.

Maneuver

Maneuver is listed fourth since this particular enemy unit appears to be in a defensive position.

Enemy Electronic Warfare Threat

The enemy electronic warfare threat, especially jammers, is listed next. We can get to this point of attack without an overdependence on our radios. Since we have just started the attack, all of the unexpected events which complicate preplanned coordination have not begun. As we continue to attack, our radios become increasingly important. To ensure our continued use of these radios, we must use our DF assets to locate enemy jammers. Once located, these jammers must be destroyed by friendly artillery or close air support (Figure 2-4).

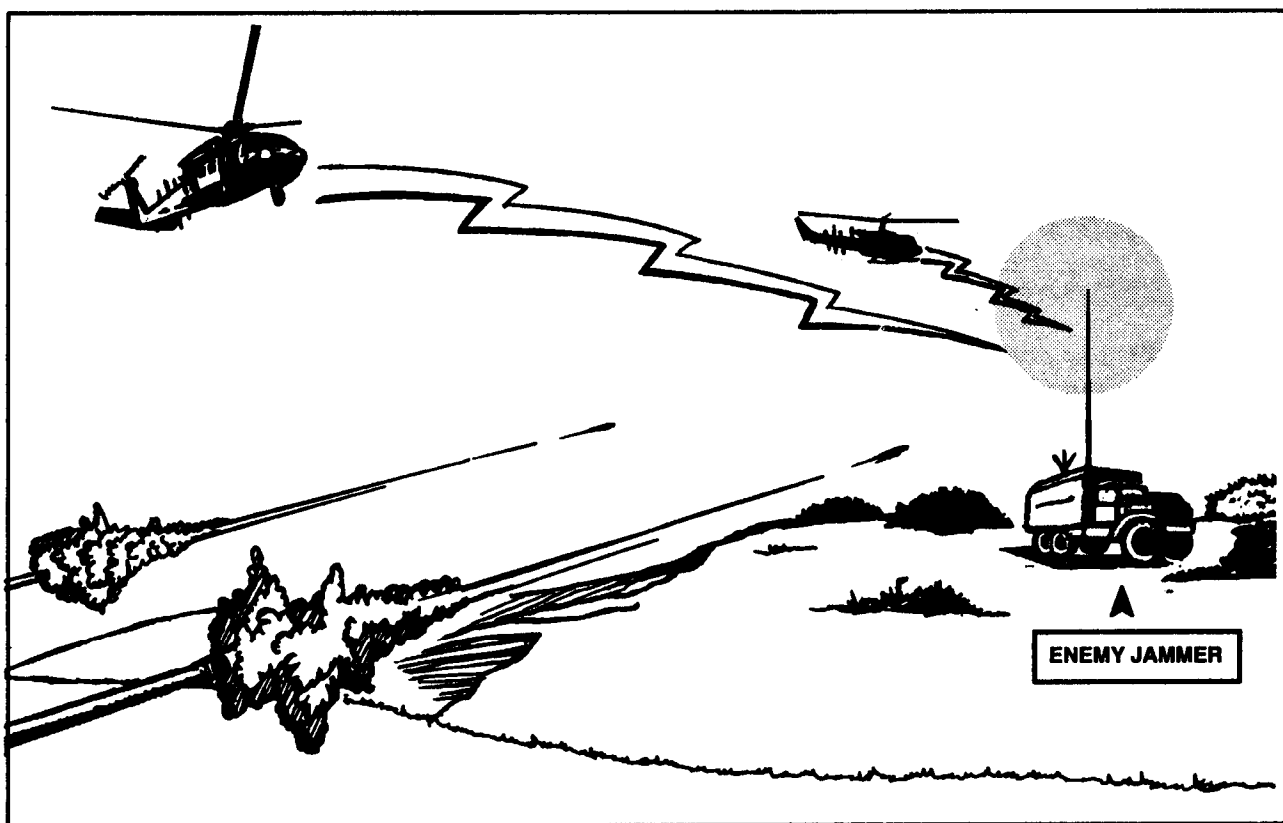


Figure 2-4. Enemy jammer destruction.

Close Air Support Threat

The close air support threat is listed next to last because the enemy normally will not react until our point of attack has been established. As the attack continues, the close air support threat becomes more important and must be given a higher priority.

Air Defense Artillery Threat

The air defense artillery threat is listed last only because our attack may not require air assets. It is listed to alert the electronic warfare support measures assets concerned with locating enemy radars in the combat zone. If our attack stalls, we can use close air support to regain the momentum. Close air support can attack enemy radars located by electronic warfare support measures, while our jammers attack their communications.

The priority two unit has only four threats identified. This is done, primarily, to show them as possible targets of opportunity since that unit

should be preoccupied with the 1st Brigade's supporting attack. The threats imposed by this enemy unit are also placed in priority order since the enemy unit could target our armor or maneuver against the flank of the 2d Brigade's attack.

Priority three is outside the zone of influence, but as we advance, so will our zone of influence. This enemy unit could maneuver against us, attempt a limited counterattack, or direct artillery against our advance. The electronic warfare and air defense artillery threats gain more importance as our advance progresses.

These first three steps are always accomplished by close coordination with the G2 and G3. As previously stated, we have never really labeled these actions other than as a part of the mental war-gaming of a sequence of actions and counteractions. These three steps identify the potential threat from enemy maneuver or weapon systems. Identified potential threats are then prioritized, jammed, or attacked by fire.

IDENTIFY ENEMY ELECTRONICS USED TO CONTROL WEAPONS SYSTEMS AND THREAT FUNCTIONS

The initial jamming mission planning begins with step 4. It is the transition point between tactical and technical jamming considerations. We must now identify those enemy electronics used to control the weapons systems and threat functions of greatest concern. We can do that by answering two questions. What communications systems are associated with each threat function? And, what technical and operational characteristics are known about these systems? We already know about the enemy's electronic systems in general. We know some systems can use the same radios. We know jamming can be more effective against some threats than against others. We also know that jamming alone will not totally defeat the enemy. At this point, we progress with the


planning phase just as we would for constructing a schedule of fires, except that we are putting jamming on the target, not artillery fire.

The electronic warfare section (EWS) searches its electronic order of battle files. The search is for enemy communications systems serving each weapon system and threat function. The EWS concludes that the 231st Motorized Rifle Regiment's reconnaissance element uses a very high frequency (VHF) frequency modulated (FM) radio. This radio has a maximum power output of 20 watts. The EWS also determines that the net control station will receive the initial reports of our point of attack. The net control station is located about 8 kilometers (km) to the rear of the

231st Reconnaissance Battalion. The EWS also knows that the enemy target acquisition batteries are deployed in our zone of attack. These batteries use battlefield surveillance radars to detect moving targets. The EWS further resolves that a target acquisition battery uses VHF FM

radio to report information. The EWS continues through the enemy electronic order of battle inventory, identifying any additional data useful to the TCAE or other operational elements. Steps 1, 2, and 3 must be completed before step 4 (Figure 2-5).

STEP 4



☐ RECONNAISSANCE

☐ ANTITANK GUIDE MISSILES

☐ ARTILLERY

☐ MANEUVER

☐ ENEMY EW THREAT

☐ CLOSE AIR SUPPORT

☐ AIR DEFENSE ARTILLERY

231st RECON BN _____

VHF FM RADIO

20 WATTS

25 kHz BW

LPA ANTENNA

8 km DISTANCE TO NCS

231st TA BTRY _____

GSR

VHF RADIO

311th BN _____

VHF FM RADIO

Figure 2-5. Identify enemy electronics used to control weapons systems and threat functions.

PROVIDE TECHNICAL DATA

In step 5 (Figure 2-6), technical data is provided to the TCAE. This requires detailed coordination with the EWS. The TCAE provides jamming mission planning to the MI battalion's S3 based on the initial planning by the G2 and G3 as well as input from the EWS. The TCAE lists the targets from the electronic warfare annex in priority order and then enters technical and operational characteristics for each target. The following information on each enemy target is entered:

- Unit.
 - Frequency.
- Call signs.
 - Power.
 - Antenna type.
 - Antenna height.
 - Link distance.
 - Enemy transmitter location.
 - Enemy transmitter location elevation.
 - Target receiver location.
 - Target receiver location elevation.

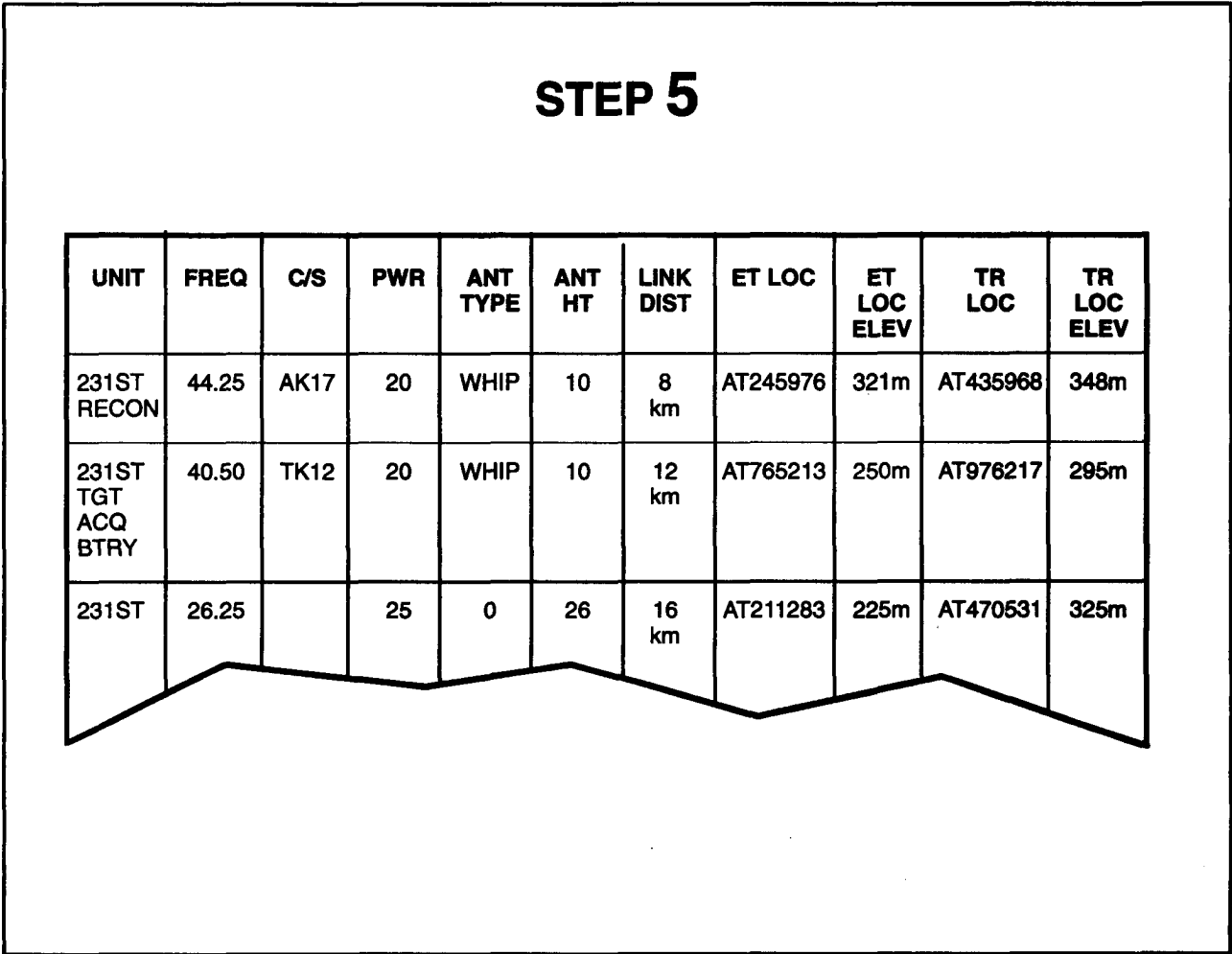


Figure 2-6. Provide technical data.

COMPUTE JAMMING DATA AND TASK ASSETS

In step 6 (Figure 2-7), the TCAE uses the technical data listed in step 5 to compute the minimum jammer power output required for jamming to be effective. This means that the jammer must be capable of producing at least this amount of power output for the jamming mission to be effective. The same data can also be used to compute the maximum distance the jammer location can be located from the target receiver location based on the jammer's maximum power output. This same information, plus target priorities and jamming on-off times, are a part of the multiple asset tasking message sent to the jamming assets.

The jamming computations are further refined by successive planning and directing by the TCAE

personnel (Figure 2-8, page 2-10). The TCAE's efforts conform to the requirements initially provided by the G3.

In steps 5 and 6, we have entered some of the data available from the enemy electronic order of battle. For example, in step 5, we indicated that the radio station associated with the first priority target (the 231st Reconnaissance Battalion) transmits on 44.25 megahertz. The alternate frequency is unknown. This radio station uses the call sign **AK17**. Its transmitter radiates 20 watts of power with a 25 kilohertz bandwidth from a vertically polarized whip antenna. The whip antenna is omnidirectional. The TCAE has calculated that 100 watts of power are needed to jam the target receiver from coordinates

STEP 6

TGT #	PRI #	FREQ	C/S	TARGET AZ MAG	JAMMER			TIME ON	TIME OFF	REMARKS
					PWR	LOC	ANT			
1	1A	44.25	AK17	42°	100	EZ341795	WHIP	H-30	H-15	32.25
2	1B	40.50	TK12	53°	150	EZ341795	WHIP	H-40	H-35	32.25

Figure 2-7. Tasking data.

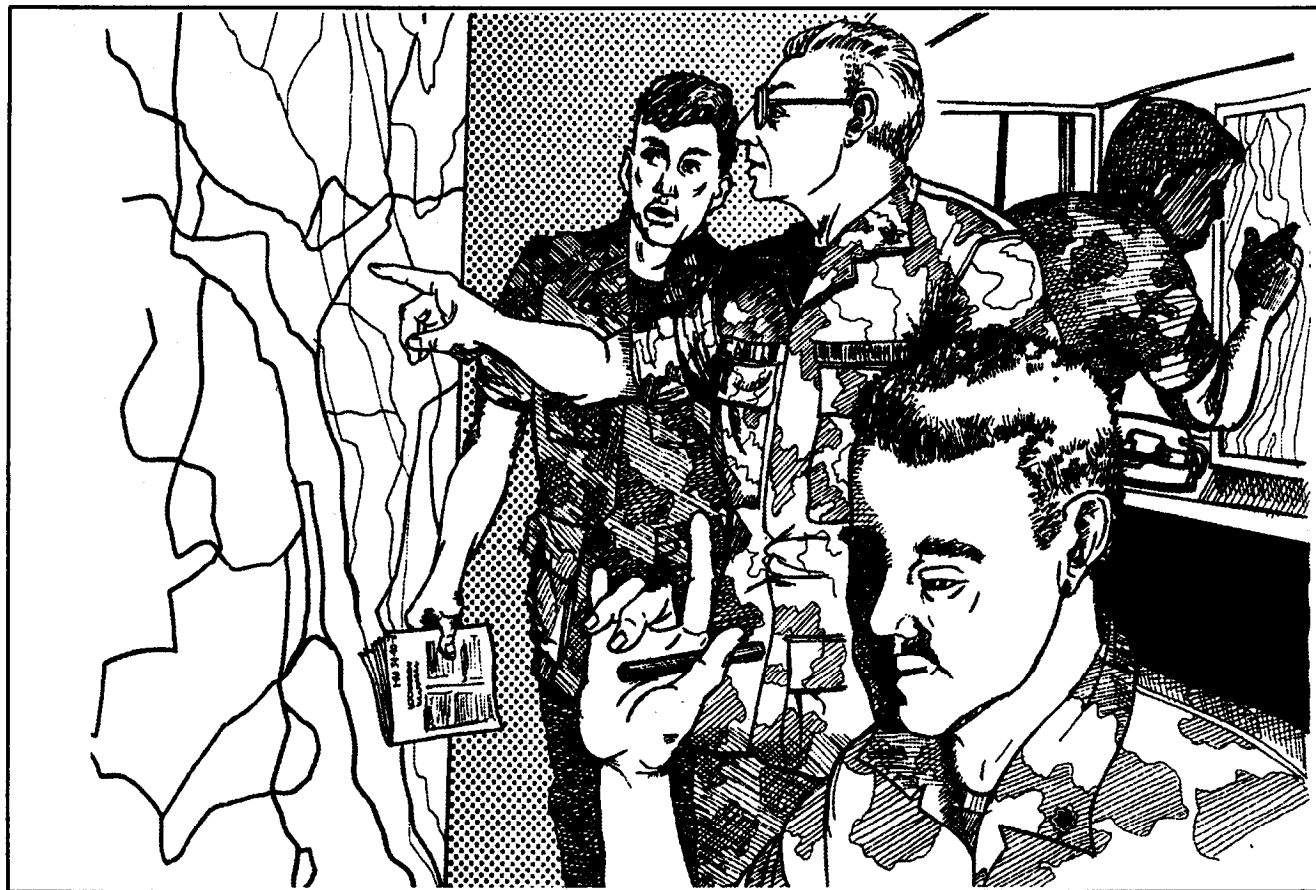


Figure 2-8. TCAE planning.

EZ341795 (Hill 345). This calculation was made using the Electronic Warfare Jamming Calculator, GTA 30-6-5 (see appendix). The various zones are calculated based on different jammer outputs using the GTA 30-6-5.

In step 6, we calculated that the jammer would have to be on Hill 345 in Zone B to be effective. Figure 2-9 shows that the battlefield has been cross-referenced and assigned zones for locating the jamming teams.

Assigning zones also provides greater flexibility to the jamming teams and permits them to adapt to local conditions and restrictions. In the remarks block of Figure 2-7, we identified the ON-OFF control frequency. This frequency must be monitored by the jamming teams to facilitate

positive control so jammers can be turned on and off for careful synchronization with other battlefield systems (for example, artillery preparatory fire, a diversion, or a deception operation) or if unexpected problems arise (for example, jamming a frequency used by a medical evacuation helicopter).

We have discussed the sequence of actions required by several different echelons when integrating jamming into combat operations. It is important to understand the relationships that take place among the tacticians (as the managers), technicians, and operating elements. The G3 or S3 implements the commander's guidance by integrating jamming with the rest of the battle plan.

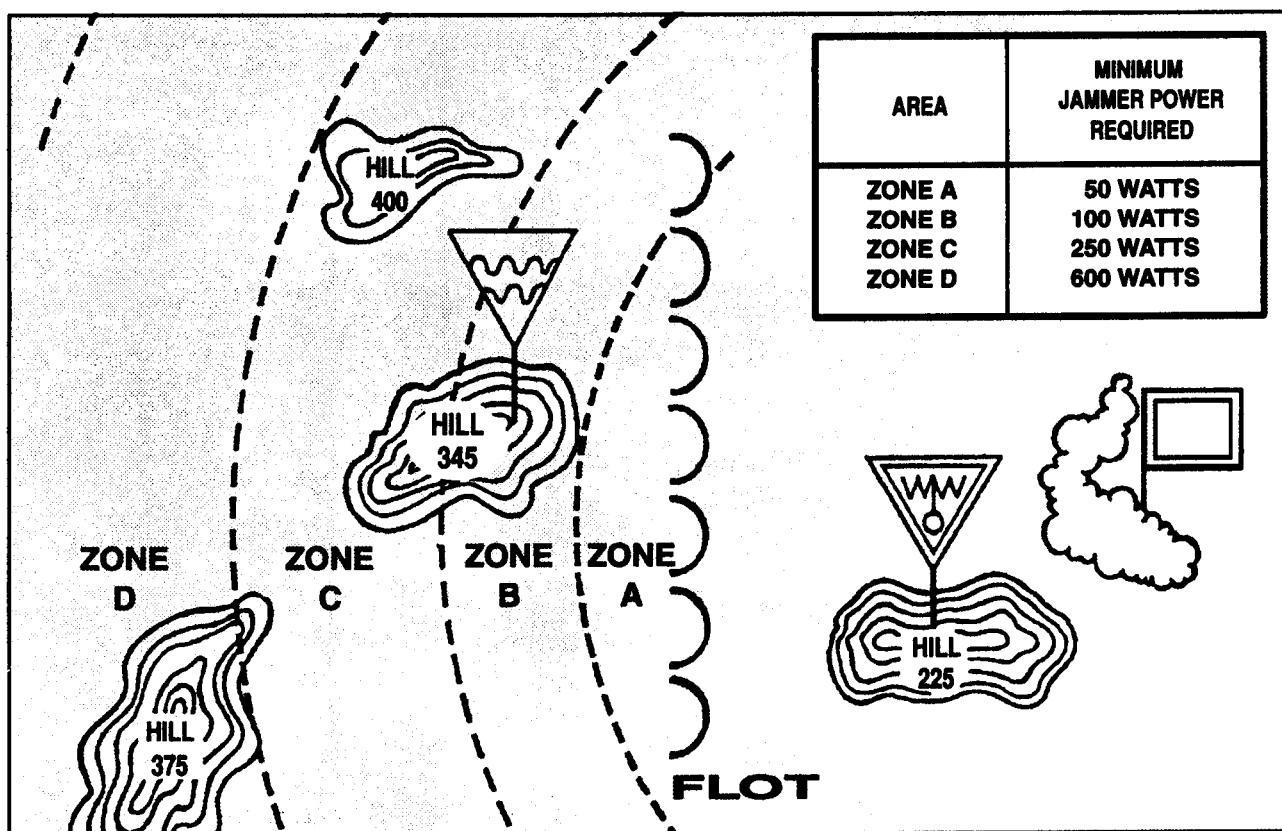


Figure 2-9. Jammer positions.