Chapter 6

Developing the Artillery Fire Plan

The artillery fire plan is a tab to the fire support appendix of the supported unit's operation order (OPORD). It is developed using the Marine Corps Planning Process methodology (see MCWP 5-1, Marine Corps Planning Process). Upon receipt of warning orders from higher or supported units, planning commences to ensure that the artillery fire plan is developed in concert with maneuver planning (i.e., parallel planning). Embedded into the MCPP is an "artillerized" IPB process and target process (see MCRP 3-16A, Tactics, Techniques, and Procedures for the Targeting Process). The final product of the MCPP, the artillery fire plan, must be synchronized with the maneuver's fire support plan. ***See figure 6-25 for a graphical depiction of synchronizing the Artillery Fire Plan with maneuver planning.***

6001. General

The artillery fire plan is the artillery commander's tactical plan for employing the fires of all available supporting artillery. It is based on the guidance and instructions from the fire support appendix of the supported unit's OPORD, supplemented by verbal information received from the liaison personnel in the FSCC. The artillery fire plan ensures the most efficient use of artillery support by providing coordinated actions necessary to carry out the decisions of the artillery commander in support of maneuver elements. The use of essential fire support tasks ties the artillery fire plan to the maneuver's plan. It is also used as a stand-alone document for artillery units in reinforcing, general support-reinforcing, and general support missions. The operations officer of the supporting artillery unit is responsible for preparation of the plan.

6002. Fire Support Tasks

The FSC uses the specified or implied tasks identified during mission analysis, commander's intent, commander's guidance pertaining to fire support, high payoff targets, and scheme of maneuver for a specific course of action (COA) to identify specific fire support tasks. The FSC must then assign each fire support task to specific supporting arms agencies. These tasks frame the role of supporting arms agencies in the overall plan and serve to focus their efforts in supporting the scheme of maneuver and the supported commander's intent. Tasks should describe the effect fire support is intended to achieve by delaying, limiting, disrupting, or destroying a specific enemy function or capability to support friendly maneuver. The timing of fires with maneuver is essential. Therefore, the FSC must develop and articulate the timing of fires with relation to maneuver. This can be event driven (triggered by anticipated friendly or enemy actions), at a particular time on a universal clock (prep fires, SEAD, etc.) or a combination of both techniques. Tasks should also be measurable so that success or failure to accomplish them can be assessed and reasoned decisions made for re-attack. To make the most efficient use of fire support capabilities, these tasks must contain a sufficient level of specificity for the supporting arms agency to clearly understand their role in supporting the scheme of maneuver.

NOTE: See MCWP 3-16, *Tactics, Techniques, and Procedures for Fire Support Coordination* for a detailed discussion on the development of fire support tasks as they relate to artillery.

6003. Essential Artillery Tasks

The fire support tasks that the maneuver commander identifies to be accomplished by artillery become essential artillery tasks for the supporting artillery unit. The artillery staff planning process enables the FSC and staff to ensure that the necessary support is provided in the form of the right targets, attacked with the best available munitions, at the correct time, and in synchronization with the maneuver plan. Just as fire support tasks utilize the task, purpose, method, effect (TPME) methodology, essential artillery tasks use TPME to ensure that the essential fire support task is accomplished in support of the maneuver plan (see figures 6-1 and 6-2 for examples of Essential Artillery Tasks).

- The **Task** describes the **effects** of the fires against a specific enemy formation in terms of Destroy, Neutralize, Suppress, Screen or Obscure (or, "fire FASCAM or SEAD" as an example of a special case).
- The **Purpose** must clearly tie the essential artillery task to the fire support task it supports. It is a statement of the fire support task's Task and Purpose.
- The **Method** is a concise statement of *how* the artillery task will be accomplished to include what must be done to complete the essential artillery task. This entails describing priorities of fire (PoF) and survey; position areas and routes to them; azimuths of fire (AoF); target numbers, priority targets, FPFs, and ammunition types and amounts; radar zones; triggers for movement / survivability move criteria; fire support coordinating measures (FSCM). These are referred to as *Priorities*, *Allocations* and *Restrictions*.
- The **Effect** is a description of what success will look like: As much as possible, quantify the effect as an observable result. Also, describe the location of the firing element(s) (i.e., will the battery move after executing the task?).

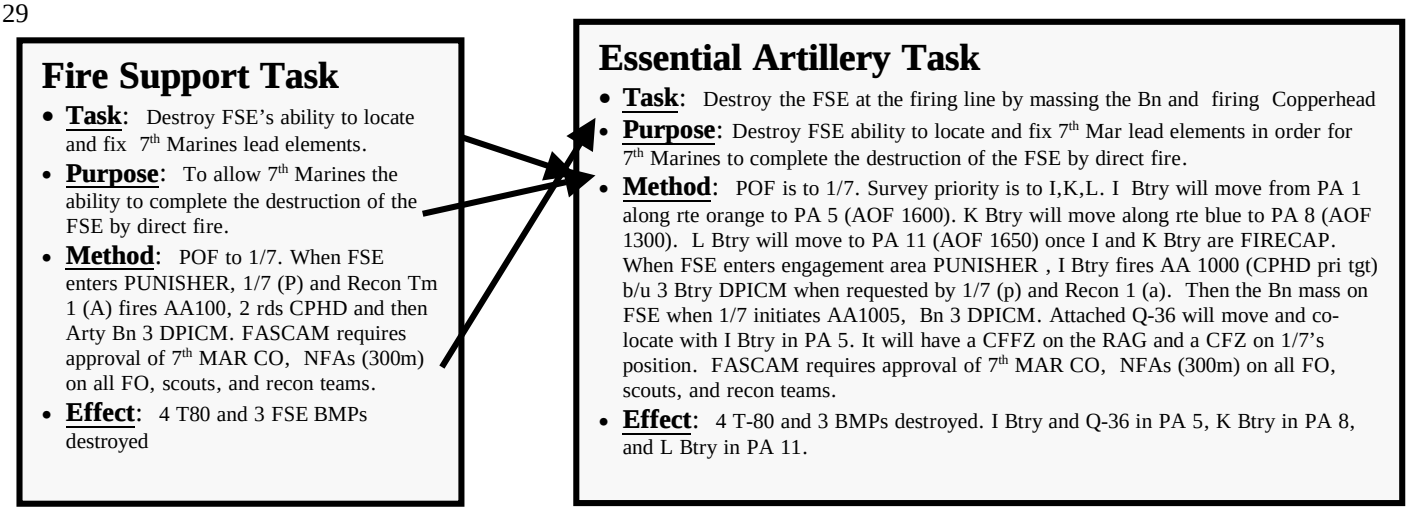

Figure 6-1. Fire Support Task and Essential Artillery Task Relationships

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TASK	PURPOSE	METHOD	CCLs	EFFECTS
Mass Battalion	Same as the purpose addressed with the EFST.	Battery(ies) in place at grid _____RTF NLT_____ Target # is_____ # of rounds fired at target is_____ Trigger to fire mission is_____ Conduct survivability move to grid_____ immediately upon completion of mission Ensure battery has current MET Battery conducts MASS PCC	A1 / G2	Same as the EFFECTS addressed with the EFST.
Fire Fascam		Emplace FASCAM medium density (200X800) Low Angle, 8 RAAM aim points, 4 ADAM aim points; use one howitzer/aim point technique Ensure RAAMs complete before firing ADAMs Minefield requires 96 RAAMs(12/aim point) and 24 ADAM (6/aim point) Battery(ies) in place at grid _____RTF NLT_____ Ammo section delivers 96 RAAMs and 24 ADAMs to grid_____ NLT_____ Trigger to fire FASCAM minefield is_____ Conduct survivability move to grid_____ immediately upon completion of mission Ensure battery has current MET Battery conducts FASCAM PCC	C2	
Fire SADARM		Battery(ies) in place at grid _____RTF NLT_____ Target # is_____ # of rounds fired at target is_____ Trigger to fire mission is_____ Conduct survivability move to grid_____ immediately upon completion of mission Ensure battery has current MET Remind battery uses altitude correction chart Battery conducts SADARM PCC		
Fire Copperhead		Battery(ies) in place at grid _____RTF NLT_____ Target # is_____ # of rounds fired at target is_____ Trigger to fire mission is_____ Conduct survivability move to grid_____ immediately upon completion of mission Verifty PRF code with observer Verifty Angle T Confirm observer location Verify GT Range Check OT range Battery conducts COPPERHEAD PCC	F (FDO DIRECT PROP)	
Fire Illumination		Battery(ies) in place at grid _____RTF NLT_____ Target # is_____ Confirm 1 gun illum, range spread, lateral spread, or range and lateral spread # of rounds fired at target is_____ Trigger to fire mission is_____ Conduct survivability move to grid_____ immediately upon completion of mission Ensure battery has current MET Confirm observer location Ensure the correct HOB is used Battery conducts ILLUMINATION PCC	E2	

Figure 6-2. Example Essential Artillery Tasks.

TASK	PURPOSE	METHOD	CCLs	EFFECTS
Fire Smoke	This is the same as the purpose addressed with the EFST.	Battery(ies) in place at grid _____RTF NLT_____ Target # is_____ Length of smoke screen is_____ Attitude of smoke screen is_____ Wind direction is_____ Consult appropriate Pasquill table and compute initial volley and sustaining rounds Compute aim points # of rounds fired at target is_____ Trigger to fire mission is_____ Conduct survivability move to grid_____ immediately upon completion of mission Ensure battery has most MET Battery conducts SMOKE PCC	E2	This is the same as the EFFECTS addressed with the EFST.
Counterfire		Battery(ies) in place at grid _____RTF NLT_____ Target # is_____ # of rounds fired at target is_____ Trigger to fire mission is_____ Conduct survivability move to grid_____ immediately upon completion of mission Ensure battery has most current MET Ensure long range munitions are available to engage targets (ERDPICM or RAP w/ M203) Establish CFZs over firing battery locations Establish CFFZs over templated or known enemy artillery positions Rehearse TOC counterfire drill Establish counterfire net and verify commo with radar Battery conducts COUNTERFIRE PCC	B1 / D4	
Fire Sead		Battery(ies) in place at grid _____RTF NLT_____ Target # is_____ and will be fired at _____ # of rounds fired at target is_____ Trigger to fire mission is_____ Conduct survivability move to grid_____ immediately upon completion of mission Ensure battery has current MET Rehearse fire plan with all Platoon FDCs Battery conducts SEAD PCC	G2	
Perform Artillery Raid		Battery(ies) in place at grid _____RTF NLT_____ Route to take to the firing area is _____ Target # is_____ # of rounds fired at target is_____ Trigger to fire mission is_____ Conduct survivability move to grid_____ immediately upon completion of mission Ensure battery has current MET Coordinate for security forces to accompany battery Battery conducts ARTILLERY RAID PCC	F (FDO DIRECT PROP LOAD)	

Figure 6-2. Example Essential Artillery Tasks (cont).

Section I. The MCPP as it Applies to the Artillery Fire Plan

The MCPP consists of six steps (see figure 6–3), each of which is dependent on the inputs from the previous step. Poor staff planning performed early in the process will escalate throughout the entire process and could result in commanders determining inaccurate COAs. Following the MCPP improves staff coordination due to the natural framework of the process.

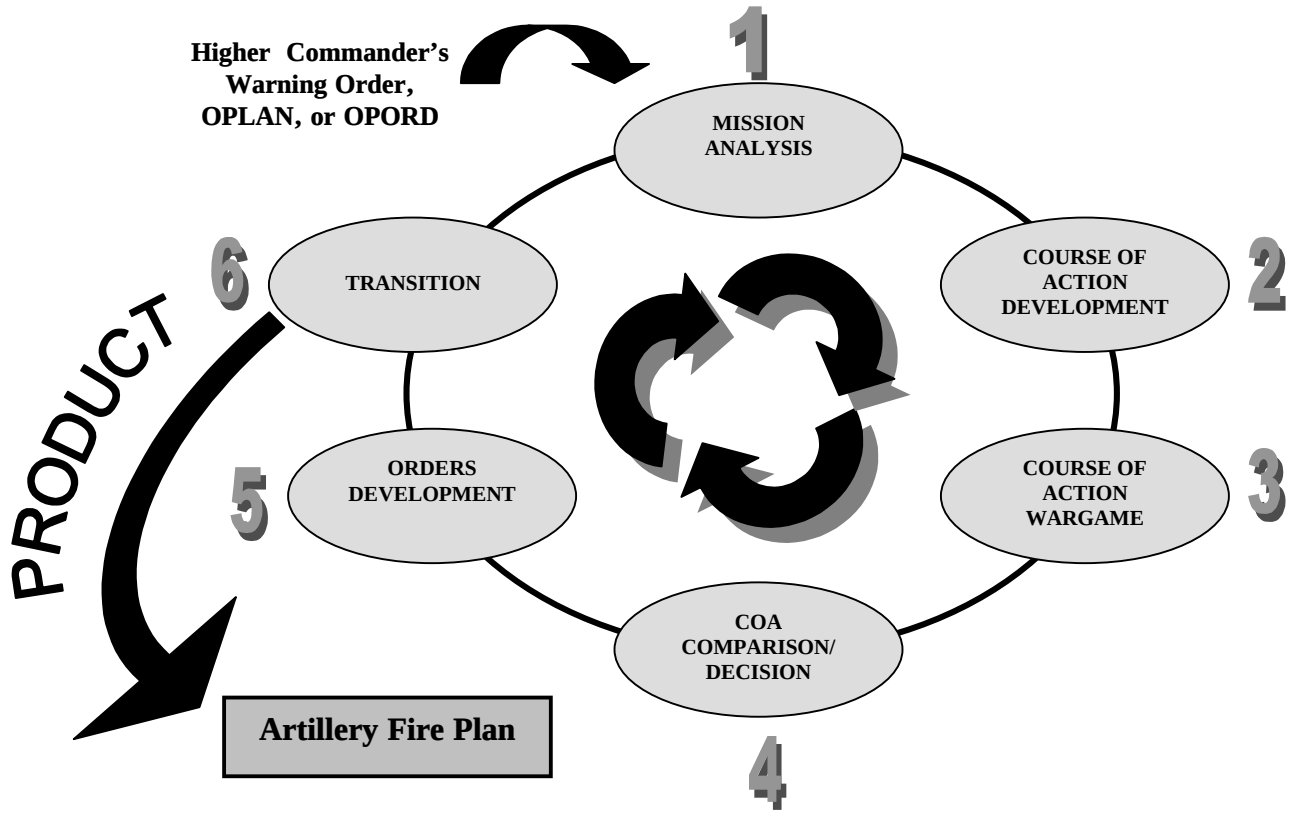


Figure 6-3. Steps in the Marine Corps Planning Process.

6101. Mission Analysis

The first step in the MCPP is **mission analysis**. This step drives the entire MCPP and allows the artillery commander to begin his commander's battlespace area evaluation (CBAE). Each of the six steps in the MCPP can be best understood from the perspective of inputs, process, and outputs. Figure 6-4 depicts this perspective for the first step. The artillery commander and his staff begin their planning upon receipt of a warning order from higher headquarters. Included with this warning order should be their intelligence preparation of the battlefield (IPB), staff estimates, and facts and assumptions. The artillery commander and his staff utilize this information as inputs into their planning process.

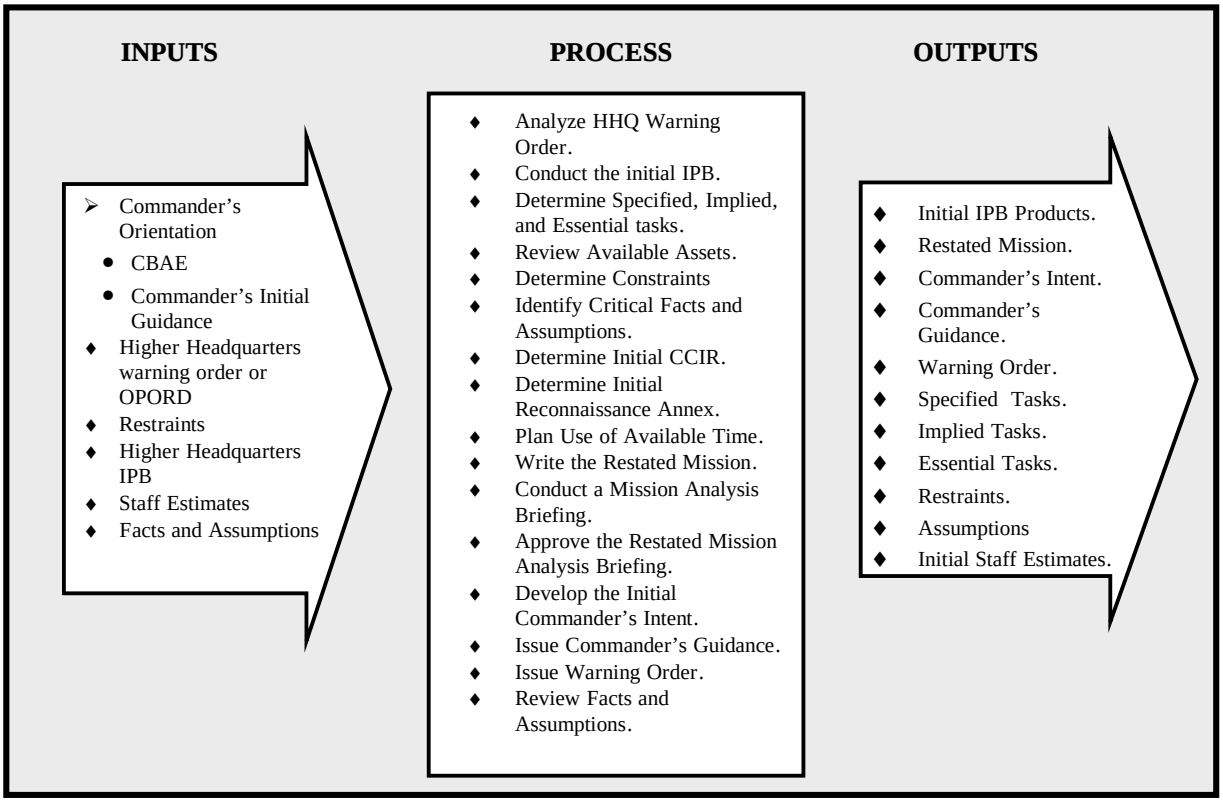


Figure 6-4. Mission Analysis.

a. Analyze Higher Headquarter's Order. This is higher headquarters' warning order or OPORD. The need for concurrent planning does not allow the artillery staff to wait for the completed maneuver order before they begin planning, however once completed the higher's final OPORD should be analyzed. Understanding where the operation will occur and the type of operation will allow the staff to begin the MCPP.

b. Conduct the Initial IPB. The cornerstone of the MCPP is the S-2's Intelligence Preparation of the Battlefield. Each staff member depends on the S-2 to provide an accurate estimation of how the enemy will fight before he can begin to perform his portion of the MCPP for the commander. The IPB process for maneuver units is outlined in several publications such as MCWP 2-12 *MAGTF Intel Analysis and Production* and MCRP 2-12A *Intelligence Preparation of the Battlefields*. Add discussion and stuff from 6-20-1.

c. Determine Specific, Implied, and Essential Tasks. The concepts of specified and implied tasks are the same as those used by the maneuver regimental staff. Examples of specified tasks are: position forward; move behind maneuver units; plan CFZ at breach site; preposition smoke/RAP forward. Essential tasks for artillery units are called Essential

Artillery Tasks. These are derived from the essential fire support tasks in the maneuver's fire plan.

d. Review Available Assets. The artillery commander and his staff must examine additions to and deletions from the tactical situation, current task organization, support relationships, and status (capabilities and limitations) of all units. They consider the relationship between specified and implied tasks and available assets. From this they determine if they have the assets to perform all specified and implied tasks. If there are shortfalls, they identify additional resources required for the mission's success. The staff must pay particular attention to deviations from what the commander considers his normal task organization. Some examples of assets that may be considered are: radars, observers, or artillery units with R or GSR missions that are to be included in a fire plan.

e. Determine Constraints. A higher artillery commander may place some constraints on his subordinate commanders that restrict their freedom of action. Constraints may take the form of a requirement to do something (for example, maintain at least 25% of ICM) or a restraint on action (for example, no smoke or dud-producing munitions on the eastern-most objective). The commander and his staff must identify and understand these constraints. They are normally found in the concept of operations, or coordinating instructions paragraphs from the maneuver's operation plan.

f. Identify Critical Facts and Assumptions. ***Facts*** are statements of known data. ***Assumptions*** are suppositions concerning the current or future situation that are assumed to be true in the absence of facts. They take the place of necessary, but unavailable, facts and fill the gaps in what the commander and staff know about a situation. The tests of validity and necessity are a technique to use. Validity means the assumption is likely to be true. Necessity is whether or not the assumption is essential for planning. If planning can continue without the assumption, it is not necessary and should be discarded. Whenever possible, assumptions are cleared with the higher headquarters to ensure consistency with higher headquarters' plan. Assumptions are replaced with facts as soon as possible. Assumptions should answer the following four questions: Is it logical?, Is it realistic?, Is it essential for planning to continue?, and Does it avoid assuming away a threat capability? To determine assumptions, planners should—

- List all appropriate assumptions received from higher headquarters.
- State expected conditions over which the commander has no control but which are relevant to the plan.
- List conditions that would invalidate the plan or its concept of operations.

g. Determine Initial Commander's Critical Information Requirements (CCIRs). The CCIR identify information needed by the commander to support his CBAE and to make critical decisions, especially to determine/validate courses of actions. The CCIRs should be limited. The CCIRs are time-sensitive in that they drive decisions at decision points. The key question is, "What does the commander need to know in a specific situation to make a particular decision in a timely manner?" The staff nominates information requirements (IRs)

to become CCIRs. CCIRs are situation-dependent and specified by the commander for each operation. He must continuously review the CCIRs during the planning process and adjust them as situations change. CCIRs usually arise from the IPB and war gaming. The CCIRs are normally expressed as **priority intelligence requirements (PIRs)—**information about the enemy; **essential elements of friendly information (EEFI)—**information needed to protect friendly forces from the enemy's information-gathering systems; and **friendly forces information requirements (FFIRs)**—information about the capabilities of his or adjacent units. Staff should also attempt to identify the enemy's center of gravity. Center of gravity - it is that characteristic, capability, or location from which enemy and friendly forces derive their freedom of action, physical strength, or the will to fight. Attacking the center of gravity should be the focus of all operations.

h. Plan Use of Available Time. The artillery commander and his staff refine their initial plan for use of available time. They compare the time needed to accomplish essential artillery tasks to the maneuver's time line to ensure mission accomplishment is feasible in the allotted time. They also compare the time line to the enemy time line developed during the IPB. The commander and his staff specify *when* and *where* they will conduct the briefings that result from the planning process and *when, where,* and *in what form* they will conduct rehearsals. The artillery commander can optimize planning time by sending additional warning orders as detailed planning develops. This permits parallel planning by subordinate units.

i. Write the Restated Mission. The purpose of artillery and essential artillery tasks are the foundation for mission statement development. Planners should evaluate whether or not the purpose of artillery and essential artillery tasks are still valid before writing a restated mission. A proper mission statement answers the following questions:

- **Who** – The artillery units which will conduct the operation.
- **What** – The type of operation or essential artillery tasks.
- **When** – The time the operation will start and end.
- **Where** – The location of the battlespace or area of operation the artillery must support.
- **Why** – The purpose of the operation.

NOTE: The *"who", "what", "when",* and *"where"* are derived from the essential artillery tasks. The *"why"* is derived from the ***purpose*** of the fire support task.

j. Conduct a Mission Analysis Brief. The mission analysis briefing is **not** a unit readiness briefing, but the staff officers must understand the status of subordinate and supporting units to brief relevant information as it applies to the situation. The staff should use standardized charts to monitor/consolidate this data to give the commander a quick snapshot of his unit. The mission analysis briefing is given to the commander **and** his staff. The briefing focuses on relevant conclusions reached as a result of the mission analysis. This helps the commander and his staff to develop a shared vision of the requirements for the upcoming operation. *Time permitting, the staff briefs the commander on its mission analysis using the*

same outline discussed previously (see figure 6-10 for an example mission analysis briefing format and figure 6-11 for a mission analysis briefing checklist):

- Mission and commander's intent of higher headquarters and the headquarters two levels up.
- Maneuver's Mission, commander's intent, concept of the operation, and deception plan (if DS).
- Review of commander's initial guidance.
- Initial IPB products.
- Specified, implied, and essential tasks.
- Constraints and restraints on the operation.
- Forces available.
- Hazards and their risk.
- Recommended initial CCIR.
- Recommended time lines.
- Recommended restated mission.

1. S-3 – Introduction and Orientation

2. S-2 – Initial INTEL Estimate
- **a**. Terrain Analysis
  - MCOO
  - KOCOA
- **b**. Weather Analysis
  - Forecast
  - Light Data/NVG Windows
  - Effects on friendly/enemy
- **c.** Threat Evaluation
  - Enemy Order of Battle
    - Maneuver Forces
    - Artillery
  - Enemy Most Likely COA
  - Enemy Most Dangerous COA
  - Enemy Timelines
  - Artillery Range Fans
- **d**. Proposed CCIR: PIR, FFIR, EEFI

3. S-3 – Operational Overview
- **a**. Two Higher's Mission and Intent
- **b**. Higher's Mission and Intent
- **c**. Higher's Concept of the Operation
- **d**. Task Organization
- **e**. Assumptions
- **f**. Requirements for: Special Munitions, Movement, LNO
- **g**. ROE, FSCMs, Ammo, and CSR
- **h**. Limitations and Risk Management

4. S-3A – Fire Support Tasks

5. S-1
- **a**. Personnel Status
- **b**. Anticipated Personnel Status
- **c**. Personnel Shortages
- **d**. Critical Shortages
- **e**. Forecasted Losses

Figure 6-5. Example Mission Analysis Briefing Format.

1

6. S-4
- **a**. Class I, II, IV, II, VIII, IX
- **b**. MSRs
- **c**. Issues
- **d**. PLS Status
- **e**. PLS Locations
- **f**. Battery Ammo Status
- **g**. ASP Status

7. FDO
- **a**. IFSAS/AFATDS/LCU Status
- **b**. Communications with Observers/Higher
- **c**. Range to Target Considerations
- **d**. Terrain Considerations
- **e**. Recommended RSR
- **f**. Essential Artillery Tasks

8. S-6
- **a**. Communications Status
- **b**. Anticipated Communications Status (potential problems due to range and/or terrain)
- **c**. Retrans Status and Plan

9. NBCD Officer
- **a**. NBCD Equipment Status
- **b**. Contaminated Areas/Projected Strikes
- **c**. Current MOPP Status
- **d**. Proposed Decon Sites
- **e**. Contaminated Routes (Dirty Routes)
- **f**. Uncontaminated Routes (Clean Routes)
- **g**. Recommendations

10. Survey Officer
- **a**. Priority Of Survey
- **b**. Equipment Status

11. Surgeon
- **a**. Ambulance Status
- **b**. Medical Support Provided
- **c**. Class VII Status
- **d**. Aid Station Location

12. S-3
- **a**. Proposed Restated Mission (Approval)
- **b**. Artillery Fire Plan Timeline
- **c**. Commander's Guidance
- **d**. Issue Warning Order to Subordinate Units
  - Restated Mission
  - Directed Rehearsal Requirements
  - Orders Timeline

2

3 **Figure 6-5. Example Mission Analysis Briefing Format (cont).**

S-1	S-2	S-3
Current personnel status Anticipated personnel status Critical shortages Personnel shortages Forecasted Losses Forecasted replacements Issues	Prepare / refine artillery MCOO Prepare enemy situational template Prepare event template (time available?) Determine enemy order of battle Maneuver forces Develop enemy phases of fire Determine avenues of approach Determine weather & its effects Forecast Light data / NVG windows Prepare enemy courses of action Most likely Most dangerous Prepare recommended CCIRS Determine radar status Issues	DIV & REGT missions received REGT commander's intent received Fire SPT annex to REGT order received REGT opord received FA organization for combat identified Identify key facts & assumptions Identify specified tasks Essential fire support tasks Tasks to subordinate units Target list Special munitions requirements? Identify implied tasks Ranging requirements Movement requirements Passages of lines Liaison requirements? Special munitions requirements? Identify which tasks are essential Identify constraints Position restrictions Movement restrictions Observed vs unobserved fires Special ROE requirements Ammo or CSR limitations Required controls? Prepare order preparation timeline
S-4		
CLASS I - Any specific problems CLASS III Fueler Status Specific problems CLASS II/IV – Specific problems CLASS V – Critical shortages CLASS VIII - Critical shortages SLANT REPORT Current Anticipated @ LD Reinforcing Unit CLASS IX - Critical Shortages MSRs Host Nation support Issues		

Figure 6-6. Mission Analysis Checklist.

k. Develop the Initial Commander's Intent. During mission analysis, the commander develops his intent for the operation. The artillery commander's intent should briefly address the purpose of fires, the desired endstate, and the methods to be used to achieve the endstate. After reviewing the mission analysis briefing and the restated mission, he modifies his intent statement as necessary. The commander's intent is a clear, concise statement of what the unit must perform to succeed with respect to the enemy, the terrain, and to the desired endstate. It provides the link between the mission and the concept of operations by stating the key tasks that, along with the mission, are the basis for subordinates to exercise initiative when opportunities arise, or when the original concept of operations no longer applies. Intent is normally expressed in four or five sentences and is mandatory for all orders. The mission and the commander's intent must be understood two echelons down. Key tasks are those tasks the maneuver commander says the artillery must perform to achieve the stated purpose of the operation. Key tasks are not tied to a specific source of action, but identify what is fundamental to the unit's success. The commander personally prepares his intent statement and when possible, he delivers it, along with the order, personally. Commanders from battery level up prepare an intent statemt for each OPORD. The intent statement at any level must support the intent of the next higher commander. For any OPORD, there is only one commander's intent. Annexes (including appendixes, tabs, and enclosures) to the OPORD do not contain an intent statement; they contain a concept of support. For example, the Fire

Support Appendix (Appendix 18) to an OPORD contains a concept of support, but not an intent statement. The Artillery Fire Plan issued to an artillery battalion supporting a maneuver regiment contains the intent statement of the artillery battalion commander.

l. Issue the Commander's Guidance. The commander's guidance is essential for timely COA development and analysis. By stating the planning options he does or does not desire his staff to consider, the commander can save staff time and effort by allowing them to concentrate on developing COAs that meet his intent. Commander's guidance may be written or oral, but must focus on the essential tasks conducive to mission accomplishement. The guidance emphasizes in broad terms *when*, *where*, and *how* he intends to mass his fires to accomplish the mission according to his higher headquarters commander's intent. It should include priorities for all combat, CS, and CSS elements and how they will support his concept. The more detailed the guidance, the more quickly his staff can complete the plan, but this increases the risk of overlooking or insufficiently examining things that might affect mission execution. Commander's guidance should include:

- Specific artillery COA to consider or not consider, both friendly and enemy, and the priority for addressing them.
- Prioritized essential artillery tasks.
- CCIR.
- Risk guidance.
- Mobility and counter-mobility guidance.
- Security measures to be implemented.
- Time plan.
- Type of rehearsals to conduct.
- Munitions mix.
- Retransmission guidance and survey priorities.
- Any other information the commander wants his staff to consider.
- Additional specific priorities for combat support and combat service support.
- Type of order to issue.

n. Issue a Warning Order. Immediately upon the commander providing his guidance, his staff should issues a warning order that contains, as a minimum:

- The restated mission.
- The prioritized essential artillery tasks.
- The CCIR.
- Reconnaissance to be initiated by subordinate units.
- Deception guidance.
- Specific priorities.
- Guidance on rehearsals.
- The commander's intent.
- The unit's AO (a sketch, an overlay, or some other description).
- Security measures.

- Mobility and countermobility guidance.
- The time plan.

o. Review Facts and Assumptions. During the rest of the MCPP, the commander and his staff periodically review all available facts and assumptions. New facts may alter requirements and analysis of the mission. Assumptions may have become facts or may have become invalid. Whenever the facts or assumptions change, the commander and his staff must assess the impact of these changes on the plan and make necessary adjustments.

NOTE: Upon completion of mission analysis, the second warning order is issued to subordinate elements (See figure 6-12 for a graphic depiction of the orders process during mission analysis).

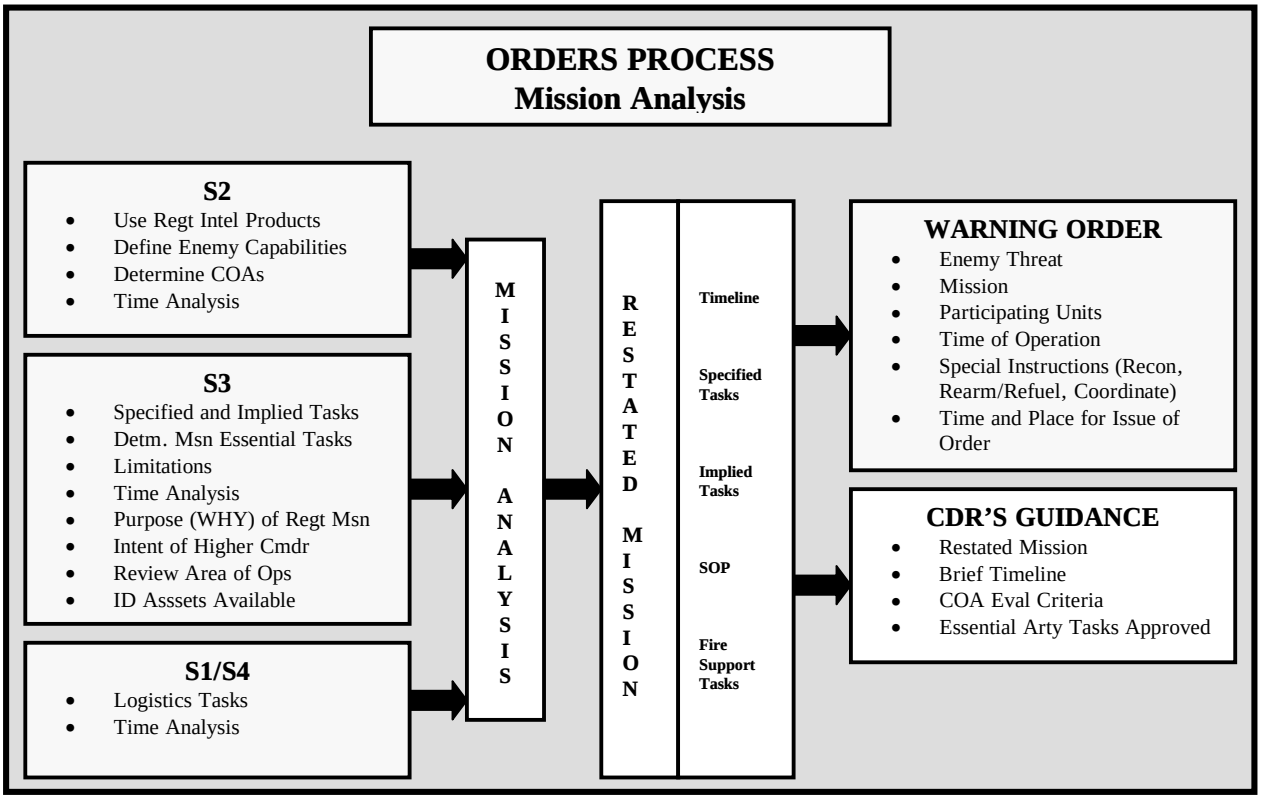


Figure 6-7. Orders Process for Mission Analysis.

The mission analysis activities outlined above produce products that are vital inputs to all subsequent steps in the MCPP. The only required outputs from mission analysis are the artillery commander's outputs of restated mission, commander's intent, and commander's guidance. Additional staff outputs are listed in figure 6-4.

6102. Course of Action Development

A course of action is a broadly stated, potential solution to an assigned mission. It must be suitable, feasible, acceptable, distinguishable (when multiple COAs are developed) and complete. The process of developing a COA is discussed in detail in MCWP 5-1, Marine Corps Planning Process.

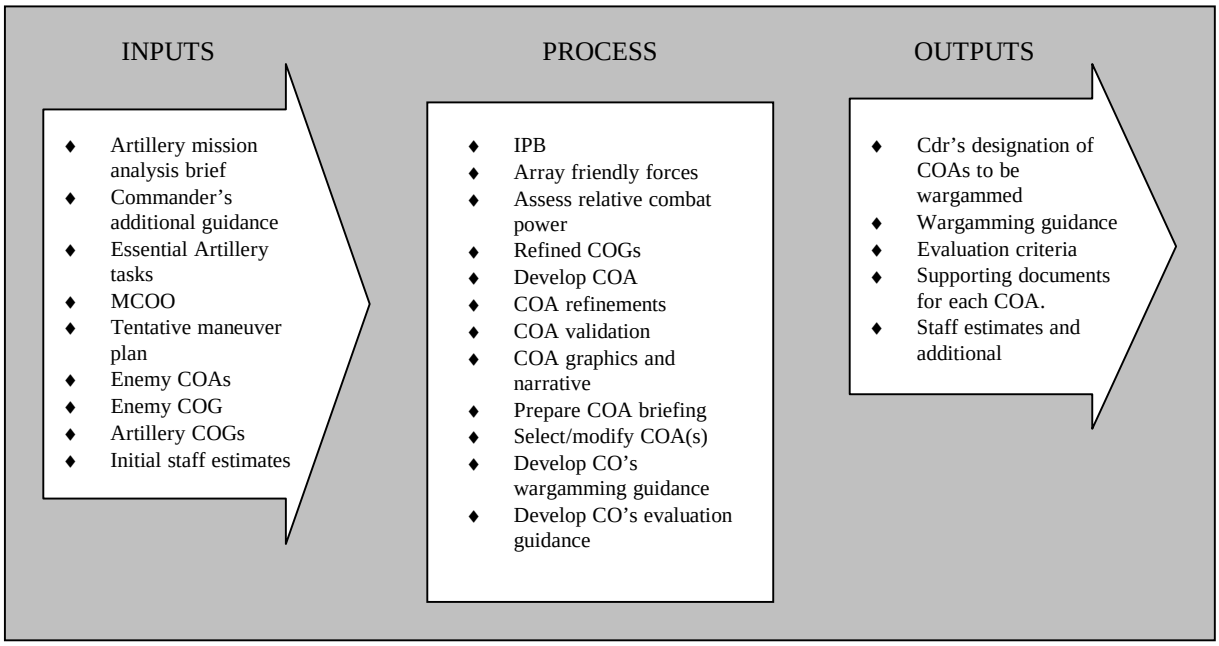


Figure 6-8. Course of Action Development.

The outputs from mission analysis (at a minimum include a restated mission, commander's intent, and commander's guidance) become the inputs for course of action development (see figure 6-13). A key tool for development of the artillery fire plan is the integration of essential artillery tasks and the maneuver commander's guidance for fire support (provided by the FSC) into the COA development. COA development, like mission analysis, requires the interaction of the entire staff. Members bring their expertise and the information developed during mission analysis to COA development. This information, with the addition of commander's intent and guidance, is the focal point for development of COAs.

During COA development, planners will use METT-T, threat versus friendly capabilities, and essential artillery tasks to determine likely employment options to support maneuver elements. Planners should consider two fundamental questions:

- *What do I do to support maneuver elements?*
- *How am I going to do it?*

Answering the question of "how" is the essence of COA development. The following techniques assist the staff in developing courses of action:

a. Intelligence Preparation of the Battlefield (IPB). The S-3 should start COA development with analyzing the S-2's MCOO. This overlay will be placed under the maneuver operations graphics. High payoff targets or critical target areas by phase based on the high payoff target list, maneuver fire support plan, or by templating are plotted. The FDO will provide the quantities of the propellants available. Using the greatest percentage of propellant/shell mix available, the S-3 will determine optimal ranges to target that will dictate range fans used to determine position areas. This information is also given to the FSC so the maneuver commander knows the predominant ranges of his fire support assets.

b. Array Friendly Forces. The intelligence officer will receive a SITEMP from the supported unit. This SITEMP will not address all the concerns of the artillery and must be refined to focus on fire support issues. The development of an "artillerized" SITEMP is discussed in detail in paragraph 6202d. The S-3 will use the SITEMP to deconflict positioning of firing units and supporting units (i.e., radar). Position areas are eliminated that are on likely threat avenues of approach, objectives, or chemical strike areas. The operations officer considers positioning units that will cause delivery problems for the threat. This may cause the enemy to execute high angle missions, which facilitates friendly target acquisition capabilities.

c. Assess Relative Combat Power. By determining strengths and weaknesses of enemy and friendly artillery, the staff can determine what assets are required to accomplish essential artillery tasks, what vulnerabilities exist, and how enemy artillery can influence friendly operations. The commander seeks to protect his weaknesses while exploiting the threat's vulnerabilities.

d. Refine Center of Gravity (COG) Analysis. Based upon essential artillery tasks, information determined in the IPB process, and staff estimates, the COGs and critical vulnerabilities are refined and used to formulate COAs.

e. Develop Initial Courses of Action. Artillery COAs should be developed for each maneuver COA. These artillery COAs should be based upon the essential artillery tasks derived from the essential fire support tasks of the maneuver warning or OPORD. If a course of action does not accomplish these tasks, then the COA is not suitable for further consideration. Within COA development, the operations officer should also consider factors such as HPTs and critical target areas, predominant propellant mix, fire support coordinating measures, radar zones, retrans sites, or any other measures that will influence support to maneuver elements.

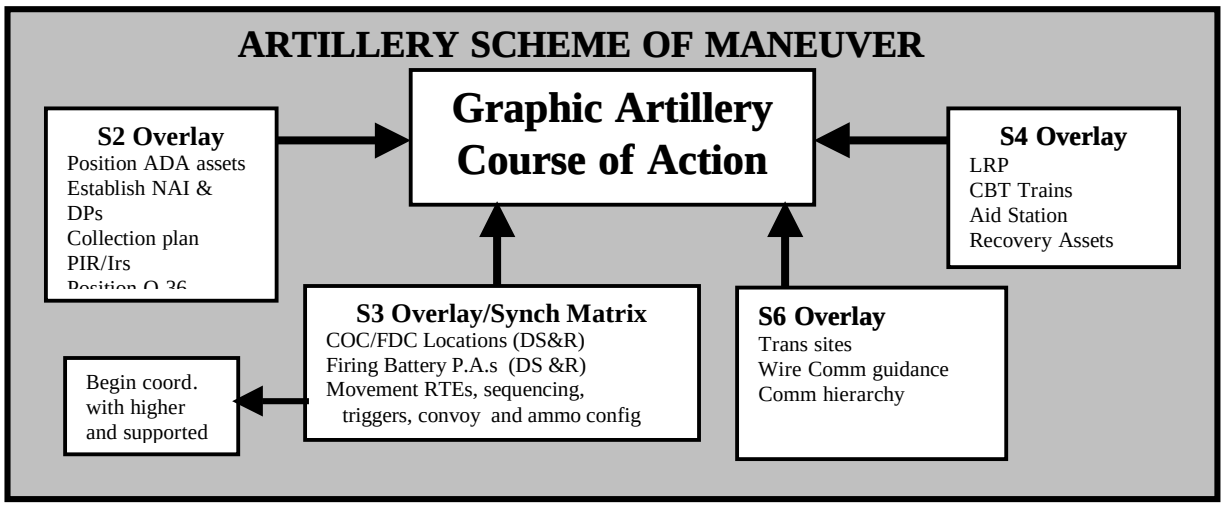


Figure 6-9. Artillery Scheme of Maneuver.

f. Course of Action Graphic and Narrative. For each COA, graphics are created to portray how the organization will accomplish the mission. This includes FSCMs, position areas, range fans, essential artillery tasks, and radar coverage. Figure 6-14 depicts the various inputs for COA graphics.

g. Course of Action Criteria. Before briefing the COAs, the following questions should be asked:

- Is the COA suitable?
- Is the COA feasible?
- Is the COA acceptable?
- Is the COA distinguishable?
- Is the COA complete?

h. Prepare COA Briefing. Once COAs are developed, they are briefed to the artillery commander to confirm that his guidance has been met. The briefing may include:

- Updated IPB.
- Possible enemy COAs focusing on artillery.
- Restated mission of the artillery commander.
- Maneuver commander's intent and guidance for fire support.
- Artillery commander's planning guidance
- COA statement and graphic.
- Rationale for COA, including
  - Considerations that may effect enemy COAs.
  - Deductions resulting from a relative combat power analysis.
  - Reasons units are arrayed on the graphic.
  - Reason for selected control measures.
- Updated facts and assumptions.

i. Select/Modify Courses of Action. The commander will determine which COAs will be wargamed. He may give further guidance concerning evaluation criteria that will focus the wargaming effort.

COA development activities produce outputs that drive subsequent steps of MCPP. Required outputs of COA development are:

- ***The commander's wargaming guidance**. The commander may decide to give further guidance on the direction the staff will take the wargaming. This is based upon additional guidance received from higher or supported unit or his on his own judgement.*
- ***Evaluation criteria**. Before evaluating the COA, the end state must be understood in order to determine which COA best supports the commander's guidance and scheme of maneuver.*
- ***Supporting documents for each COA**. Graphics and overlays.*
- ***Staff estimates and additional information**. Special staff officers will help the primary staff by analyzing the COAs based upon their areas of expertise, indicating how they can best support the operation. Every member of the staff must determine force requirements for external support, the risks, and each COAs strength and weakness.*

6103. Course of Action Wargaming

Wargaming is a detailed analysis of the courses of action prepared by the staff. It is an attempt to visualize the flow of a battle. The process considers friendly dispositions, strengths, and weaknesses; enemy assets and probable COAs (likely and most dangerous); and characteristics of the area of operations. It focuses the staff's attention on each phase of the operation in a logical sequence. Wargaming is the most valuable step during the orders process but is time consuming. During this period the commander and staff may change an existing COA or develop new COA after identifying unforeseen critical events, tasks, requirements, or problems. While wargaming courses of action do not forget the following:

- *Remain objective.*
- *Accurately record advantages and disadvantages.*
- *Continually assess feasibility, acceptability, and suitability.*
- *Avoid premature conclusions.*
- *Avoid COA comparison.*
- *Identify possible branches and potential sequels for further planning.*

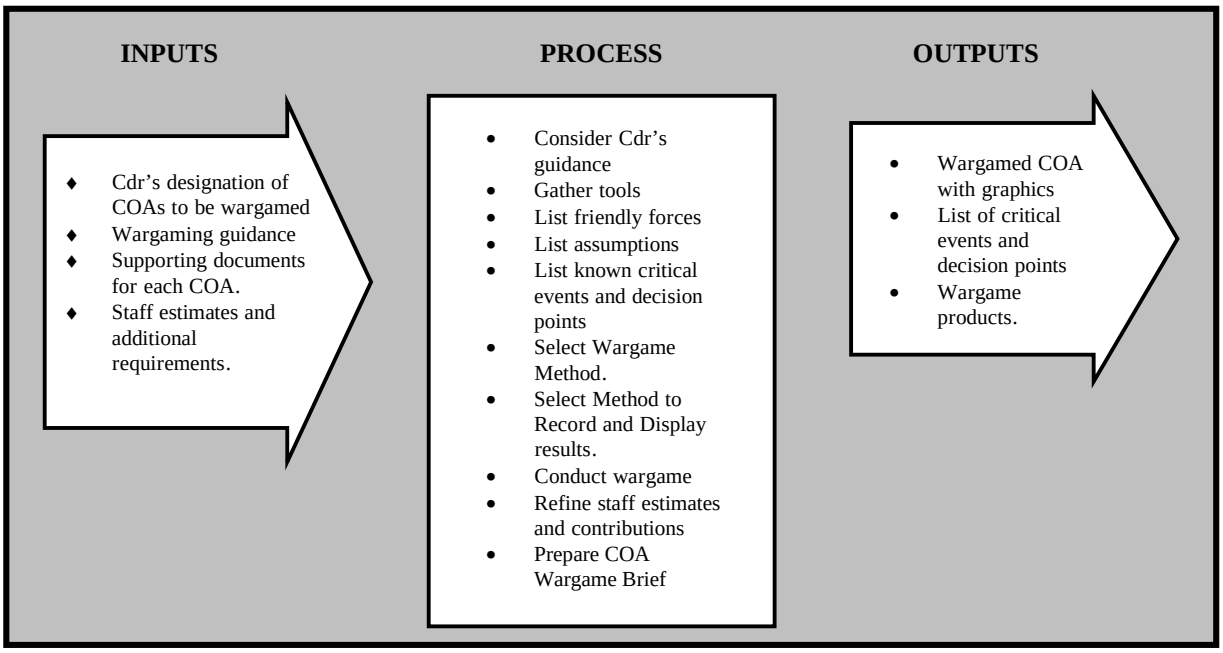


Figure 6-10. Course of Action Wargaming.

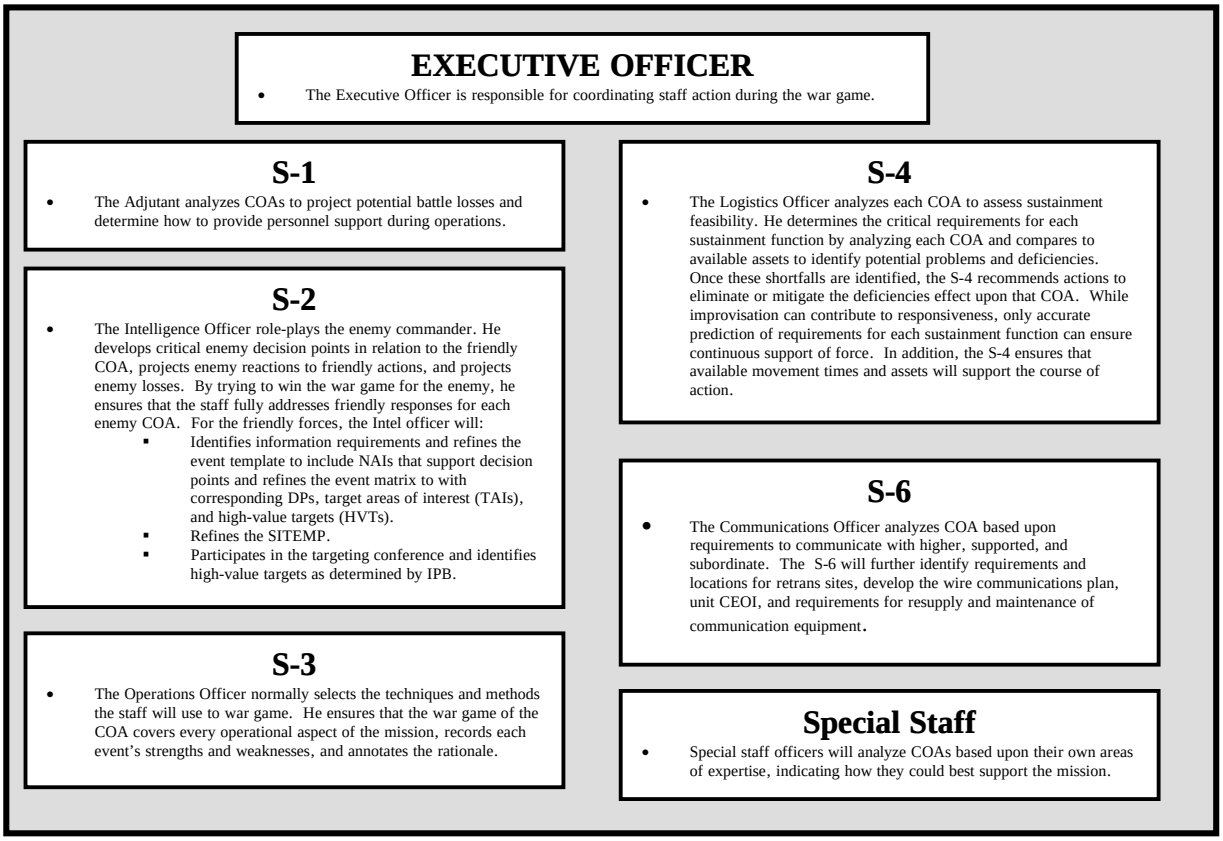


Figure 6-11. War Gaming Responsibilities.

From COA development outputs, the staff will take important information in order to begin the war gaming process. This information includes the COA chosen by the commander to be war gamed, any additional guidance the commander may have for war gaming, estimates and requirements that the staff has to support the COAs (see figure 6-16). Responsibilities of the staff during war gaming are outlined in figure 6-17. The war gaming methodology can be described utilizing the following ten step process:

a. Consider the Commander's War Gaming Guidance and Evaluation Criteria. The commander will assess the time available at the conclusion of COA development. The degree to which a COA achieves the essential artillery tasks allows the commander to decide which COA is optimal based upon the time, space, and resources available. His evaluation criteria will address specific issues/questions that the commander wants his staff to determine during the conduct of the war game, however the focus will be to determine if the essential artillery tasks can be realistically accomplish by the COA. The commander should take into account the options and capabilities of the threat commander and yet be mindful of his own vulnerabilities when developing his war gaming guidance.

b. Gather the Tools. At the beginning of war gaming the staff should have the following information available.

- Approved mission statement.
- Commander's intent and planning guidance.
- Maneuver commander's intent for fires and scheme of maneuver.
- Assumptions.
- Constraints and restraints. To include ammuntion available and communication ranges.
- CCIRs.
- Maps covering the entire area of operations.
- Friendly force list.
- Enemy order of battle.
- MCOO with weather and terrain analysis and probable position areas.
- Current and projected enemy situation overlays.
- Current and projected friendly situation overlays.
- Enemy SITEMP for each COA.
- Enemy event template.

In addition the staff should have the following information from COA development:

- Assessment of relative combat power. Specifically, the enemy's indirect fire support assets and counterfire ability.
- COAs
- Graphics and narratives.
- Decision support matrix/template.
- War game rules.
- Recording tools (synchronization and COA development matrices).

c. List Friendly Force List. List all friendly forces arrayed on the battlefield.

d. List Assumptions. The staff reviews previous assumptions to determine if they are still valid or have changed. The staff will have to brief the commander how these assumptions influenced the outcome of the war game.

e. List and Graphically Display Known Critical Events and Decision Points. From the IPB products developed during mission analysis, a decision support template is used to relate the event template with decision points that are significant to the artillery unit. The event template overlays the operations graphics to depict time phase lines (TPL) on the battlefield (paragraphs 6005b (8) and 6005b(8)(b) have a detailed discussion of event template/TPL refinement). The operations officer will list essential artillery tasks, which may include massing missions, special munitions missions, unit movement, survey emplacement, etc. The DST does not dictate decisions to the operations officer but identifies critical events and threat activities relative to time and location that may require tactical decisions.

f. Select the War Game Method. The four methods used are: sequence of essential tasks, avenue in depth, belt, and box. See MCWP 5-1, *Marine Corps Planning Process* for a detailed discussion of each technique.

g. Select Method to Record and Display Results. One method for recording the results is the synchronization matrix (see figure 6-18). It allows the staff to synchronize the COA across time and space in relation to the enemy COA. An advantage of this method is that it can be readily translated into a graphic decision-making product. The first entry is time or phase of the operation. The second entry is the most likely enemy action as determined by the S-2. The third entry is the decision point for the friendly COA. The remainder of the matrix is developed around selected functional areas or major subordinate commands.

Critical Event or Time						
Friendly action						
Enemy reaction						
Friendly counteraction						
Decision point						
Intel	NAI					
	TAI					
	Collect					
Arty Ops	Move					
	PoF					
	Priority Tgt					
	Survey					
	Radar					
	Met					
	Subord. Tasks and purpose					
Spt Ops	M/CM/S					
	NBC					
	CSS					
	C2					
	Risk					
	External Coord					
	Notes					

Figure 6-12. Sample COA Synchronization Matrix

h. War game the battle

- War game each essential artillery task. The intelligence officer will discuss the timing of the battle off the TPL, the operations officer addresses essential fire support tasks, and the FDO briefs mission execution times (TOF, shift times, first round to last).
- War game the fire plans to make sure they are executable and support the fire support plan. The S-2 describes what the enemy is doing and their rate of march, the S-3 adds the type of target, artillery impact area (front, rear, center of formation), and the number of rounds and volleys required. The FDO then states whether or not units are laid on the target, who will fire, shift time required, TOF, and total time. It is critical to use honest times based upon the unit's level of experience and not just standard MCCRE times. Using this information and the TPL, place a decision point (star) on the operations graphics that represents the final time that the artillery can attain its greatest effects upon the enemy located at that point. Decision points in the forward battle area may not be observable by organic assets. These decision points should correspond to a trigger point of the supported unit who is watching the decision point. As the S-2 identifies threat forces at or near decision points, the S-3/FDO is alerted and expects calls for fire for the target tied to the decision point.

- Use the DST to determine decision points for other critical events such as unit movements, special munitions missions, radar queing times, logistics operations, etc.

i. Refine staff estimates and contributions. Once the war game is complete and the results annotated, the staff refines their estimates and contributions. Examples of contributions are listed in figure 6-19.

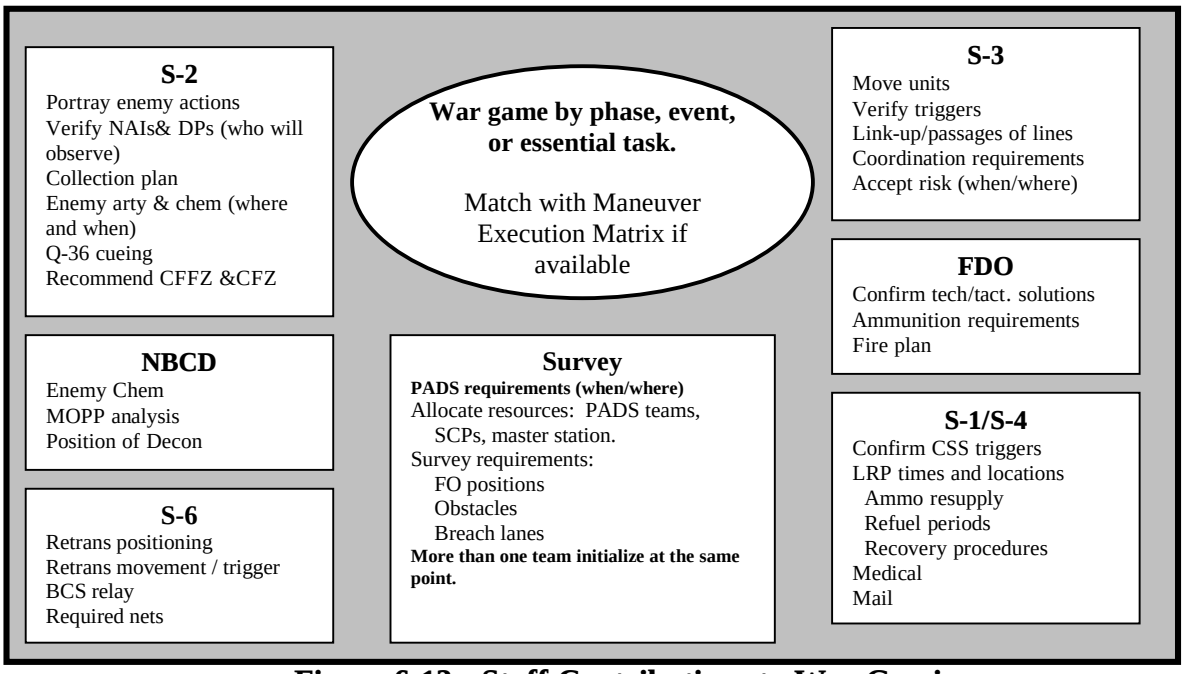


Figure 6-13. Staff Contributions to War Gaming.

j. Prepare COA War game brief. Upon completion of the COA wargaming, the staff will brief the commander on the advantages and disadvantages of the COA and any suggested modifications.

Once war gaming is complete and the staff briefs the commander on the results, the staff will then take, at a minimum, the war gamed COA and graphics, list of critical events and decision points, and information on the commander's evaluation criteria to be used in follow-on steps.

6104. Course of Action Comparison and Decision

Once war gaming is complete, each of the war gamed COAs are now compared against each other to determine which COA will be chosen to execute. The staff will use the COA graphics, critical events and decision points, the commander's evaluation criteria, and other information such as staff estimates to aid them in recommending the best course of action (see figure 6-20).

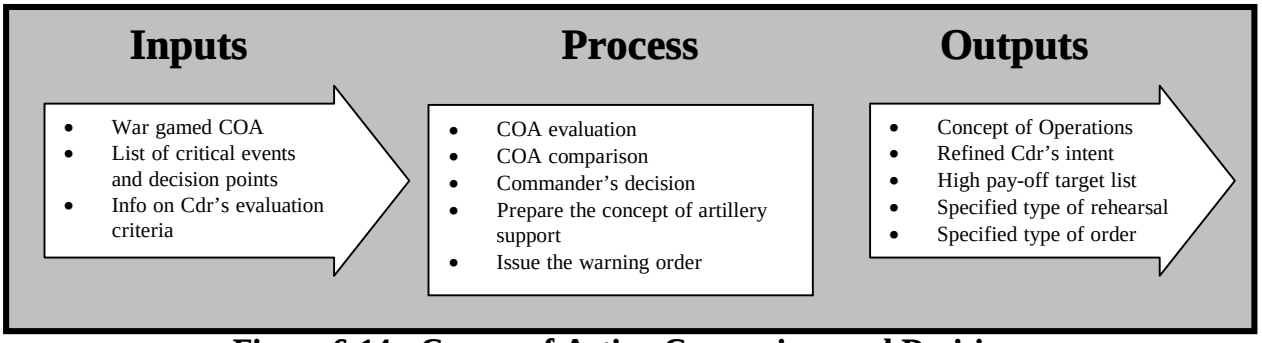


Figure 6-14. Course of Action Comparison and Decision.

a. Course of Action Evaluation. During this phase, each COA is evaluated against the commander's evaluation criteria. Advantages and disadvantages are discussed and recorded. A matrix (example in figure 6-21.) can be used to assist the staff in making their recommendations for a particular COA.

COA Comparison
Advantages and Disadvantages

	COA 1	COA 2	COA 3
Advantages	RISK – Best limiting of risk	COUNTER-FIRE – Simplicity	MSN/TASKS – Best means of accomplishing essential artillery tasks
Disadvantages	FIRES – Essential artillery tasks difficult to accomplish	C2 – Difficult to control due to mobile plan	RISK – accepts most risk.

Figure 6-15. Advantages and Disadvantages Matrix.

b. Course of Action Comparison. The staff ranks each COA with respect to advantages and disadvantages in addition to evaluation criteria such as: mission accomplishment, essential artillery tasks, and battlespace functions. These ranks are totaled and compared. This comparison gives the commander the information that he needs to make a sound decision. However, these rankings may be more subjective than objective numbers indicate. The commander and staff must examine the matrix for sensitivity. For example, one course of action may be determined to be the "best," however, it may not be supportable by one of the battlespace functions (logistically, communications, etc.). The commander must take this into account and determine if additional support is required or the COA must be adjusted or thrown out. Figure 6-22 below is an example of a comparison matrix.

CRITERIA	COA 1	COA 2	COA 3
Intelligence	3	2	1
Force Protection	2	1	3
Maneuver	2	1	3
Decisive action	3	2	1
Simplicity	3	2	1
Movement – number and length	2	3	1
Mission/Fires – accomplish essential artillery tasks	3	2	1
Counterfire	1	3	2
Command and Control – Retrans crit.	2	3	1
CSS supportability	3	2	1
Other	2	1	3
TOTAL	26	22	18

Figure 6-16. Comparison Matrix.

c. Commander's Decision. The staff will compile the information from the comparison matrices and then briefs the commander. Upon selecting a COA, the commander will review the COA to determine if it must be modified or combined with elements of different COA to mitigate disadvantages. He reviews the mission statement and may refine his commander's intent. He then issues any additional guidance on priorities for CSS (particularly for resources he needs to preserve his freedom of action and to ensure continuous service support).

d. Prepare Concept of Artillery Support. The staff now prepares the framework for the orders process. The concept of artillery support is a general description of how the artillery will support maneuver forces and a generic organization for combat. The concept of artillery support normally includes graphics and a narrative.

e. Issue the warning order. Once the concept of artillery support is complete, the commander should issue a warning order to allow his subordinate commanders to perform concurrent planning.

Once a course of action is chosen and the concept of artillery support is completed, the staff will turn to completing the orders process using this concept of artillery support, a refined commander's intent, high pay-off target list, and additional information such as: updated IPB, decision support tools, updated CCIRs, staff estimates, synchronization matrix, and the warning order. The commander will also determine the type of order written and his timeline for rehearsals.

6105. Orders Development

Based on the commander's decision and final guidance, the staff refines the COA and completes the plan and prepares to issue the Artillery Fire Plan. The COA statement and graphics become the basis for the concept of artillery support and the operations overlay. The

concept of artillery support is the commander's clear concise statement of where, when, and how he intends to concentrate combat power to accomplish the essential artillery tasks from the supported units fire support plan. Orders and plans must provide all necessary information subordinates require for execution, but without unnecessary constraints that would inhibit subordinate initiative. Prior to issuing the order, the commander will review the order to ensure that it meets his commander's intent.

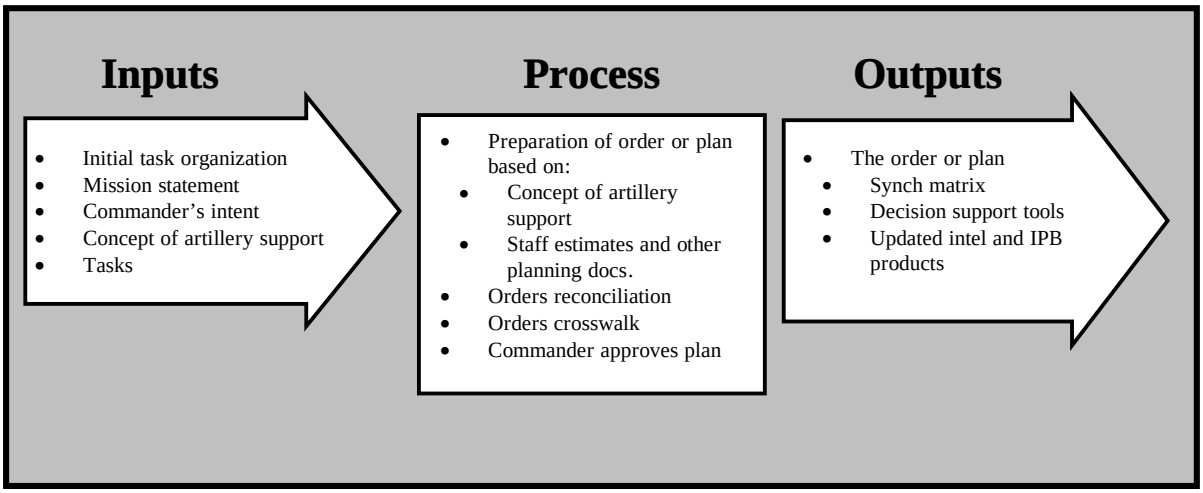


Figure 6-17. Orders Development.

The executive officer coordinates the staff to assist the operations officer in developing the order. The XO will dictate, from guidance of the CO, the format of the order, set and enforce timelines, and determine which enclosures will be published and by which staff section (see figure 6-24 for an example format of the Artillery Fire Plan brief).

a. Preparation of the Order or Plan

(1) Situation: Expands upon higher or supported unit OPORD/fire support appendix situation. Focus on fire support issues and assets.

- **Enemy forces**: Address the number, type, and capabilities of the enemy fire support assets to include expected number of air sorties. Describe any ground or air threats to subordinate units. Identify the enemy COG or critical vulnerabilities.
- **Friendly forces**: Contains the missions of higher artillery HQ or supported maneuver unit. Missions of adjacent and supporting are also included. State the maneuver commander's intent for fires if DS or the higher artillery commander's intent if GS or GS/R.
- **Attachments and Detachments**: if any, describe when and how long this is effective and for whom.
- **Assumptions**: List any additional assumptions not in higher or supported orders.

(2) Mission: The mission statement is a concise statement of what the artillery is to accomplish. If there are any reinforcing units, include them in you mission statement.

(3) Execution

- **Commander's Intent**: Artillery commander's intent. This is where he briefly describes essential artillery tasks, what he sees as the friendly and enemy COG, and his desired end state with respect to the relationship among the force as a whole, the enemy, and terrain.
- **Concept of artillery support**: This is the commander's visualization of artillery support for the operation, by phase or essential artillery task, to the desired end state. It is written in sufficient detail to enable appropriate action by subordinate units in the absence of more specific instructions. This paragraph should tie in the concept of fires with the supported unit's scheme of maneuver.
- **Organization for combat**: This is a clear statement of organization for combat and tactical missions assigned to subordinate units. "On order" and "be prepared to" missions are included in this paragraph.
- **Tasks to subordinate units**: These instructions detail specific tasks assigned to batteries, including specific essential artillery tasks. These should be by battery or reinforcing unit, by phase.
- **Coordinating instructions**: As the last paragraph of the "execution' paragraph, it includes instructions and details that pertain to two or more subordinate elements. Some of these instructions may be developed into enclosures to the artillery fire plan. This sub-paragraph may address the following:

  - Target Acquisition
  - Survey
  - Automated Fire Control
  - HPTL
  - Attack Guidance Matrix
  - NBC Defense/MOPP Level
  - MET
  - Liaison Requirements
  - Schedules/Programs of Fire
  - PIR
  - Ammunition Restrictions
  - Antifratricide Measures
  - Checkpoints
  - Rehearsal Times

(4) Admin and logistics:

- **Administration**: Times, location, and format of personnel accountability and strength reports are detailed.
- **Logistics**: This paragraph describes how the artillery unit will logistically support itself in the accomplishment of the mission. Ammunition resupply, maintenance procedures, location of field and combat trains, deployment of the unit's aid station. Procedures to request logistics support is described.

(5) Command and Signal:

- **Command**: This sub-paragraph lists the locations of unit CPs/COCs, location of the commander, and succession of both fire direction responsibility and command.
- **Signal**: Includes the updated CEOI, wire plan, special signal instructions, retrans locations and priority, and digital subscriber tables. This section will also describe specified uses of pyrotechnics for signalling and the challenge and password.

1. S-3 – Map Orientation

2. S-2 – Intel Estimate

a. Terrain Analysis
- MCOO
- KOCOA

b. Weather Analysis
- Forecast
- Light Data/NVG Windows
- Effects on friendly/enemy

c. Threat Evaluation
- Enemy Order of Battle
  - Maneuver Forces
  - Artillery
- Enemy Most Likely COA
- Enemy Most Dangerous COA
- Enemy Timelines
- Artillery Range Fans
- CCIR

3. S-3 – Friendly Situation
- Higher's Mission
- Higher Commander's Intent
- Higher's Concept of Operations
- Priority of Fires

4. S-3 – Unit's Mission

5. S-3, S-2, FDO – Unit's Concept for Fire Support
- Tasks to Subordinate Units
  - Smoke Missions and alternate
  - FASCAM Missions and alternate
  - CPHD Missions and alternate
  - Counterfire Plan
  - Reinforcing Unit
- Movement Plan and Triggers
  - Position Areas
  - Reinforcing Unit's Position Areas

6. FDO – Scheme of Fires/Target Responsibilities
- Fire Order Standards
- Ammo Requirements
- MET Status
- Digital Device Status

7. Survey Officer – Survey Plan
- Priorities
- Link Up Points
- Hand Off Instructions
- Frequencies
- SIMO Station Location

8. NBCD Officer – NBCD Plan
- MOPP Level
- Anticipated Enemy Use
- Decon Sites and Priorities

9. S-2 – Target Acquisition
- Radar Location
- Movement Plan and Triggers
- Radar Zones

10. S-4 – Concept of Logistics Report
- Location of Combat and Field Trains
- Ration Cycle
- Anticipated Replacement Flow
- Special Considerations

11. Surgeon – Medical Plan
- Aid Station Locations

12. S-4 – Ammunition Plan
- PLS Locations
- PLS Configurations
- Resupply Triggers

13. S-6 – Communications Plan
- COC Location
- COC Movement Plan and Triggers
- Retrans Locations
- Retrans Priorities and Procedures

14. S-3 – Significant Coordinating Instructions
- Directed Rehearsals/Status

15. S-3 – Review Timeline
- Rehearsal Time and Location
- Time Sync

16. Commander – Guidance and Remarks

Figure 6-18. Example Artillery Fire Plan Briefing Format.

b. Orders Reconciliation. This is an internal process that the staff uses to ensure that the basic order and all enclosures are complete and in agreement. It identifies discrepancies or gaps that the staff must correct. In particular, the staff compares the commander's intent, mission, and CCIRs against the concept of artillery support and supporting concepts.

c. Orders Crosswalk. The staff compares the order with the orders of higher, adjacent, and supported commanders. This helps achieve unity of effort and ensure that the higher commander's intent is met.

d. Commander's Approval of Order or Plan. The final action taken is the approval of the order by the commander.

The actual output of this process is the operations order or plan that will be executed. Along with the order is all the supporting documentation such as overlays, matrices, and enclosures.

6106. Transition

Transition ensures the successful shift from planning to execution. It is meant to enhance the situational awareness of those who will execute the order, maintains the intent of the concept of artillery support, promotes unity of effort, and generates tempo. Transition is a continual process that requires a free flow of information between the commander, staff, and subordinate elements by all means available. The basis for the transition is the approved operations order or plan, along with products of continuing staff action such as updated IPB or synchronization matrices (see figure 6-24).

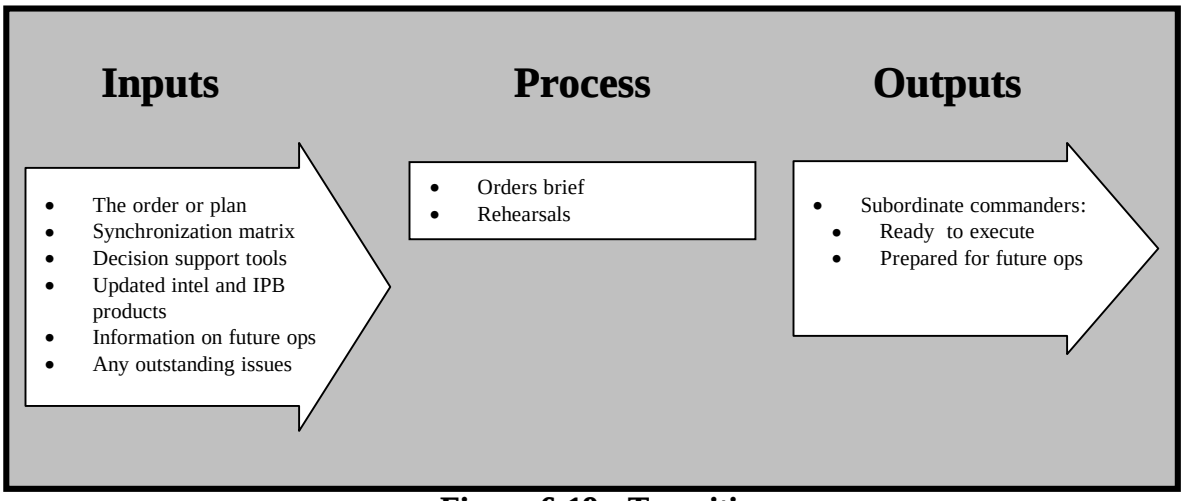


Figure 6-19. Transition.

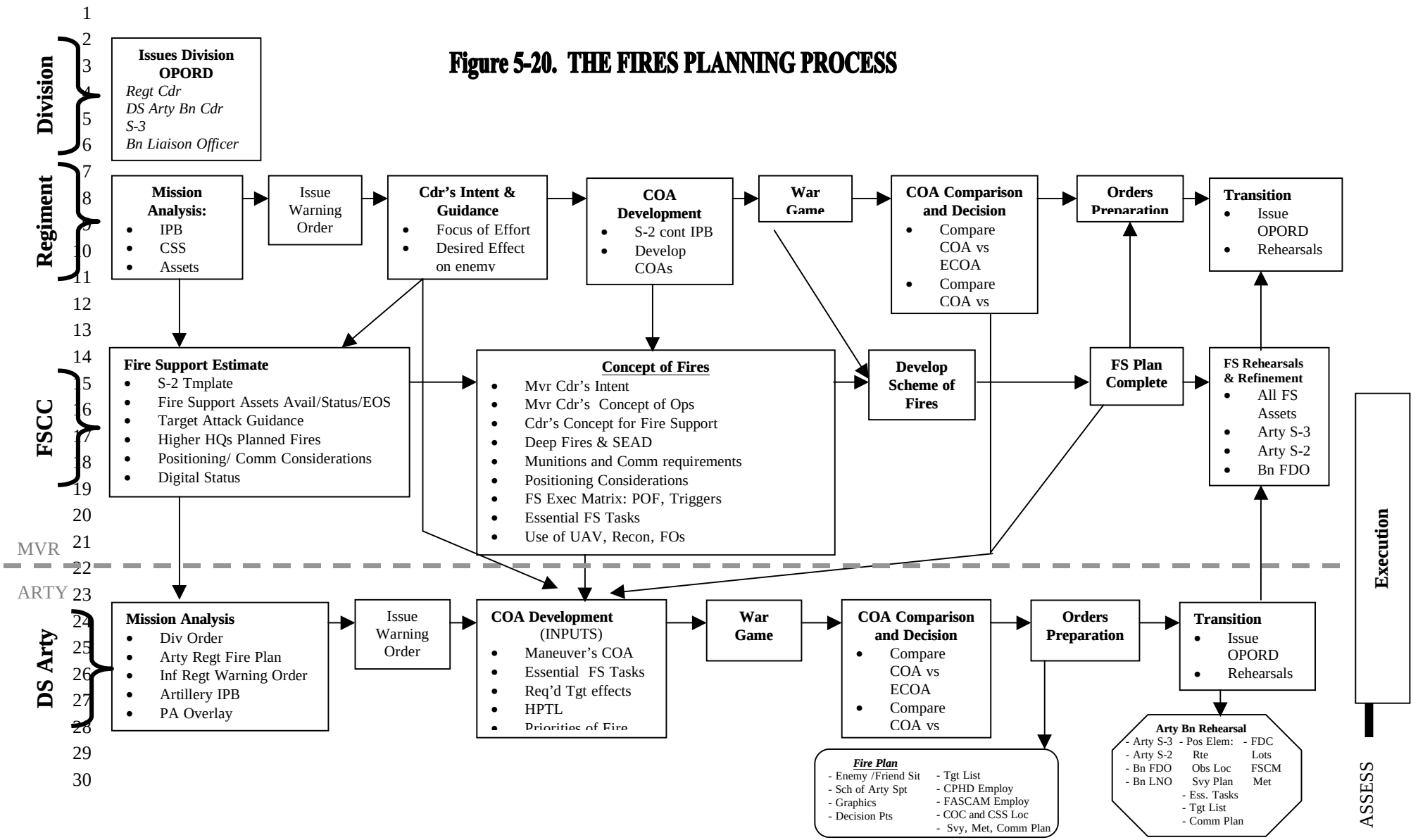
a. The orders brief. The transition begins with issuing the order to subordinate commanders. This can be by written, matrix, or verbal order depending upon time available.

b. Rehearsals. The five types of rehearsals are the confirmation brief, back brief, combined arms brief, support brief, and battle drill or SOP rehearsal.

- Confirmation brief: Routinely performed by subordinate commanders *immediately after* receiving any instructions, such as OPORD, FRAGO, etc. Subordinate commanders brief the higher commander on their understanding of the commander's intent, their specific tasks and purpose, and intra-relationship of all units in the plan.
- Back brief. The back brief is normally conducted throughout the planning process. This rehearsal allows the commander to clarify his intent early in the subordinates' planning process, identify problems in the concept of artillery support, and understand how subordinates plan on accomplishing the mission.
- Combined arms rehearsals. This rehearsal is normally conducted by the maneuver unit's headquarters after subordinate units have issued their OPORDs. It ensures that maneuver and fire support units are synchronized to achieve the mission and intent of the higher commander.
- Support rehearsals. Separate battlespace functions will conduct rehearsals throughout the planning process. Examples of these rehearsals are the communications or fire support rehearsal.
- Battle drill or SOP rehearsal. A battle drill or SOP rehearsal ensures that all participants understand a technique or a specific set of procedures.

By issuing the order and conducting rehearsals the commander can feel a measure of assurance that his subordinates are ready to execute the plan and are prepared for future operations.

Figure 5-20. THE FIRES PLANNING PROCESS



Section II. Artillerization of IPB

This section focuses on Artillery specific intelligence preparation of the battlespace. The artillery S-2 should receive initial IPB products from either the supported or higher unit's G/S-2. This IPB should be expanded and focused toward the mobility and survivability of the artillery unit. IPB is the process of understanding the battlespace, the enemy, and options available. It consists of an analysis of the terrain, weather, enemy doctrine, and enemy actions. The purpose is to aid in the early determination of the enemy's most probably course of action.

6201. Pre-Battle Preparation

a. The S-2's must focus on studying the doctrine of the likely threats his unit will face in battle, then building order of battle (OOB) data bases on those units. The S-2 has many resources available to build his threat data base and obtain an understanding of how the threat fights.

b. The artillery S-2's OOB studies must focus on:

(1) Threat Maneuver Force Doctrine

- Numbers of vehicles and weapons by type (light vs heavy).
- Formations used.
- Movement rates: day, night, security zone, MBA, prebattle, battle, etc.

(2) Threat Artillery Doctrine and Capabilities

- Weapon types.
- Number of tubes per battalion.
- Capabilities of each system: ammunition mix, ranges, rates of fire.
- Dispositions: deployment distances between firing units in relation to maneuver missions of each echelon, location and amount of any specific artillery groupings.
- Counterfire capability and response time.
- EW threat to friendly counterfire radars: detection capability, jamming capability.
- Types of fire by maneuver phase: What type of indirect fires will the enemy conduct during each maneuver phase of the battle.

(3) Threat Air defense Artillery Doctrine

- Numbers by echelon.
- Disposition: deployment on the battlefield.
- Capabilities.
- Air phases of support.

NOTE: These are the minimum information requirements. The S-2 must continuously research potential threat forces to build, maintain and refine his threat OOB data base.

6202. Artillerized IPB Process

a. IPB is a systematic and continuous process of analyzing the enemy, weather, and terrain. The IPB process integrates enemy doctrine with weather and terrain to determine how the weather and terrain will influence the enemy's fight. The IPB process consists of four functions:

- Define the battlespace.
- Determine battlespace effects--terrain and weather.
- Evaluate the threat--threat evaluation.
- Determine threat courses of action (COA)--threat integration.

b. The MCOO is an in-depth study of the battlespace incorporating terrain and weather. The MCOO graphically depicts the first two components of the IPB process (battlespace evaluation, terrain and weather analysis) on one overlay which can be initiated prior to combat and then refined once deployed to the area of operations (AO). Before beginning the MCOO, the S-2 must first establish the criteria for the MCOO. The criteria on which the artillery S-2 must focus are those which affect the use of artillery and fire support, such as:

- Site to crest.
- Intervening crests.
- Howitzer cant.
- Range to target.
- Soil composition.
- Intervisibility lines.
- Mobility corridors.
- Avenues of approach.

(1) Terrain. From the artillery perspective the S-2 identifies severely restricted, restricted and unrestricted terrain. On an overlay he marks severely restricted terrain with crosshatch marks and restricted terrain with single-hatch marks. Artillery units must identify terrain which affects firing as well as mobility. Severely restricted terrain for artillery causes extreme difficulty for weapon emplacement and firing. Restricted terrain hinders emplacement and firing to a lesser degree and probably requires a detailed reconnaissance effort to locate suitable positions. During the orders brief the S-2 addresses possible problem areas if artillery must occupy questionable position areas (PA). To determine severely restricted, restricted, and unrestricted areas the artillery S-2 analyzes the following factors:

- **Elevations**. Identify the elevations in the battle space that may cause problems for firing units. The fire direction officer can assist the S-2 in

determining these problem areas. The S-2 must discuss with the FDO, given positioning of firing units in relation to terrain, what elevations will cause site to crest, intervening crest and vertical interval problems. Try to identify those position areas that will reduce XO's min QE problems and eliminate the need to recompute fire missions for high angle due to site to crest problems.

- **Slope**. Identify possible slopes in the battle space that may cause cant problems for firing units. 90 mils (approximately 5 degrees) is the maximum allowable cant for all series howitzers, and MLRS launchers. Terrain which causes a cant of 90 mils or more is severely restricted for artillery.

- The most reliable information on slope is reconnaissance, however, topographical maps are also important sources of information on slope. To determine the slope of an area from a map, divide the contour interval by the horizontal distance between the contour lines and multiply by 100. The purpose is not for the S-2 to conduct a time intensive map study to determine the slope for all possible position areas; rather, the S-2 can use this analysis to identify areas where units may encounter cant problems. Once identified these areas are classified as restricted until verified by actual ground reconnaissance. With this information the S-2 can assist the S-3 in directing firing batteries to conduct reconnaissance of areas with possible cant problems.

NOTE: On version 7.0 of the Rosetta Stone CD there is a Terrabase program. This program can be utilized to study terrain of an area by simply inputting a grid to a possible position area and it will allow the operator to traverse 6400 mils to analyze the terrain.

- **Soil composition**. Identify areas of possible poor soil composition which may cause problems for towed howitzers. For example, very rocky, sandy or boggy areas may cause mobility, emplacement or displacement problems. Frequently there is information about soils, or evidence to their characteristics, on maps and in reports concerning climate and geography. For instance, orchards are usually planted in well drained, sandy soils; agricultural fields in low areas become wet and boggy during periods of rain.

- As with slope determination, ground reconnaissance is the best and only method to verify the actual suitability of areas to support howitzers. However, the S-2 can assist the S-3 by identifying areas with soil composition which may require reconnaissance prior to occupation. Once these areas are identified, classify them as restricted until verified by actual ground reconnaissance.

- **Mobility Problems**. Highlight all areas which will cause mobility problems for artillery and channelize enemy movements. The higher maneuver headquarters' IPB product will probably already have identified most of the terrain which is severely restricted and restricted for mobility. (See figure 6-5).

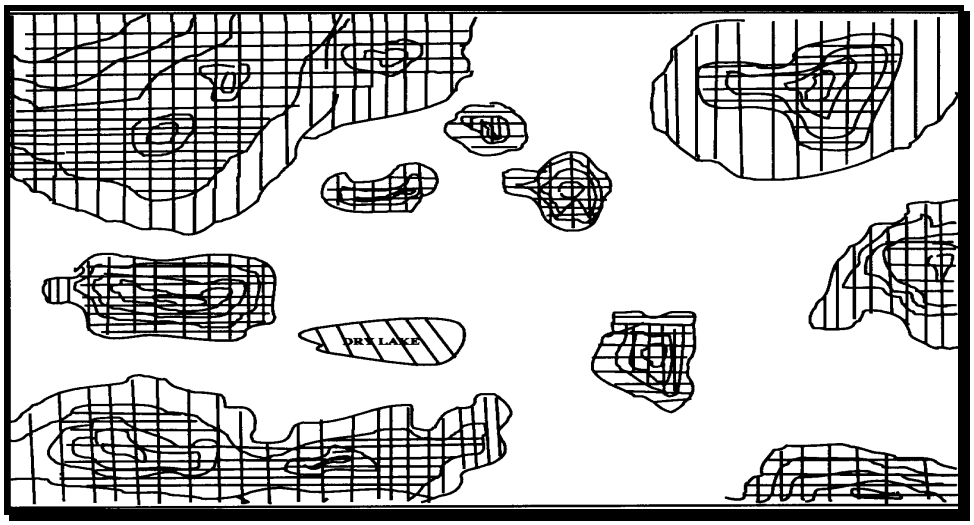


Figure 6-21. MCOO with restricted and severely restricted terrain marked.

(2) Intervisibility (IV) Lines. On the same overlay graphically depict the areas which deny visibility between opposing forces by drawing IV lines where the terrain dictates. An IV line is an area on the battlefield beyond which opposing forces cannot observe. Examples are ridge lines, wadi systems, fingers, forested areas, etc. IV lines will become particularly important in identifying PAs which are hidden from enemy avenues of approach. Aerial and satellite imagery, if available, are useful to the S-2 in further analyzing the terrain. (See figure 6-6.)

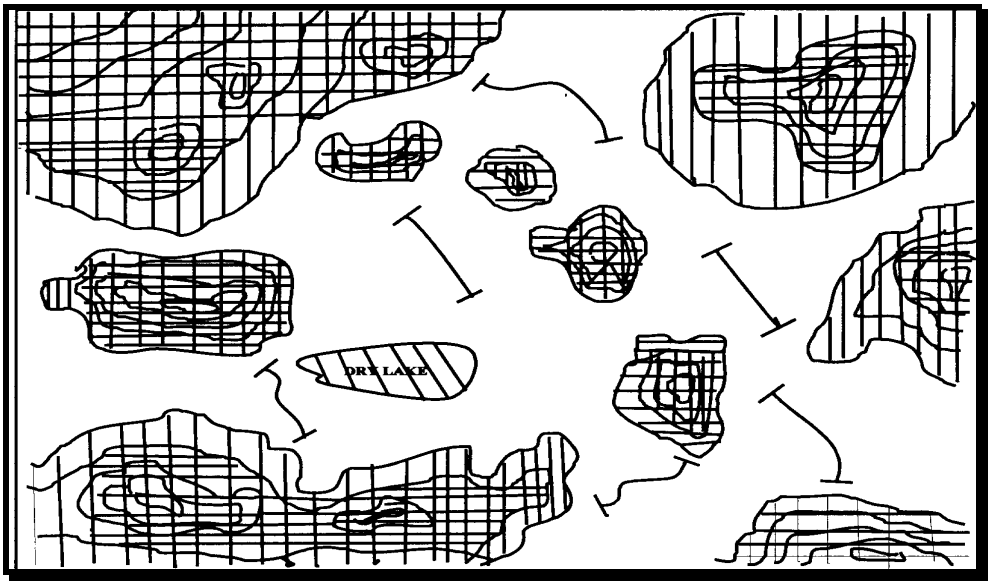


Figure 6-22. MCOO with intervisibility (IV) lines identified.

(3) Avenues of Approach. Using the standard symbols in FM 34-130, graphically depict the ground and air avenues of approach on the MCOO. During construction of these avenues of approach, the artillery S-2 refines the higher headquarters' IPB products to depict regimental and battalion sized avenues of approach which can affect artillery movement and positioning plans.

- The S-2 begins by depicting all enemy mobility corridors of platoon size and above which can affect the artillery's AO. The S-2 focuses his effort down to enemy platoon level because of the threat an enemy platoon poses to artillery units. One tank passing through or near an artillery PA can easily destroy a firing battery. If the MCOO becomes too busy and unreadable because of too many platoon sized mobility corridors then go one level higher. Lastly, combine the mobility corridors into their appropriate battalion and regimental avenues of approach. During this process the S-2 must depict the avenues of approach through the artillery's battle space.

- During course of action (COA) development, the S-3 selects possible PAs away from the enemy mobility corridors and avenues of approach. If the situation dictates that the S-3 must position some units on these enemy air or ground avenues of approach then the S-2 must ensure he briefs the affected battery commanders on the threat they may face. This provides the battery commander with critical information he uses during his own planning. (See figure 6-7.)

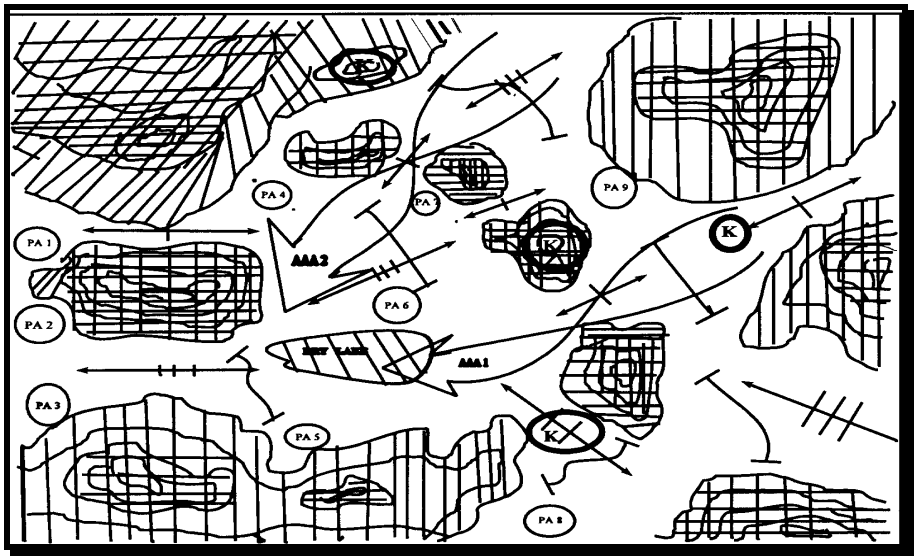


Figure 6-23. MCOO depicting mobility corridors, avenues of approach, key terrain and possible PAs.

(4) Key and Decisive Terrain. On the same MCOO overlay, mark key terrain with a "K" in a circle. Exactly what constitutes key terrain is situationally dependent. During COA

development, the S-3 will avoid positioning batteries in these areas because this is where the close in fight will likely take place. (See figure 6-7).

(5)Position Areas. The S-2 now evaluates the battle space and templates all possible battery size PAs given the considerations identified in paragraphs a - d. Template all PAs for use during current and future operations. Now the S-2 can provide a product to the S-3 that can greatly assist him in choosing appropriate battery PAs during COA development. This works well during operations in which the staff has limited planning time. (See figure 6-7).

This process helps to avoid the S-3 conducting his own limited terrain analysis and drawing battery "goose eggs" on the operations overlay without reference to the elements the S-2 considers in paragraphs a - d. Without a process such as this, S-3s tend to choose PAs based only on considerations of range and enemy avenues of approach.

c. The MCOO and COA Development

(1) The S-2's MCOO allows the S-3 to quickly focus on the best terrain for battery positions. The S-2 must ensure the MCOO is readily available to the S-3 so he can begin COA development through analyzing the MCOO.

(2) The process of choosing battery position areas begins with the S-3 hanging the MCOO on the operations map and placing the operations overlay over it. Then, based on the maneuver FSC's guidance, the S-3 determines critical targets, by phase. Based on available ammunition, the S-3 and FDO determine the predominant gun-target planning range under standard conditions. This information, passed through the FSC, also provides the maneuver commander with an accurate planning range for his direct support artillery.

(3) Once a correct planning range is determined, the S-3 draws a range fan starting from the critical target area backwards to the proposed PAs. All PAs on the MCOO which are inside this range fan are identified as optimal PAs for engaging the target area. Any PAs outside of the range fan are considered less than optimal. During this process the FDO refines the planning ranges for existing conditions, in particular addressing issues of powder temperatures, gun above or below target, MET, and average MVVs (if known). (See figure 6-8)

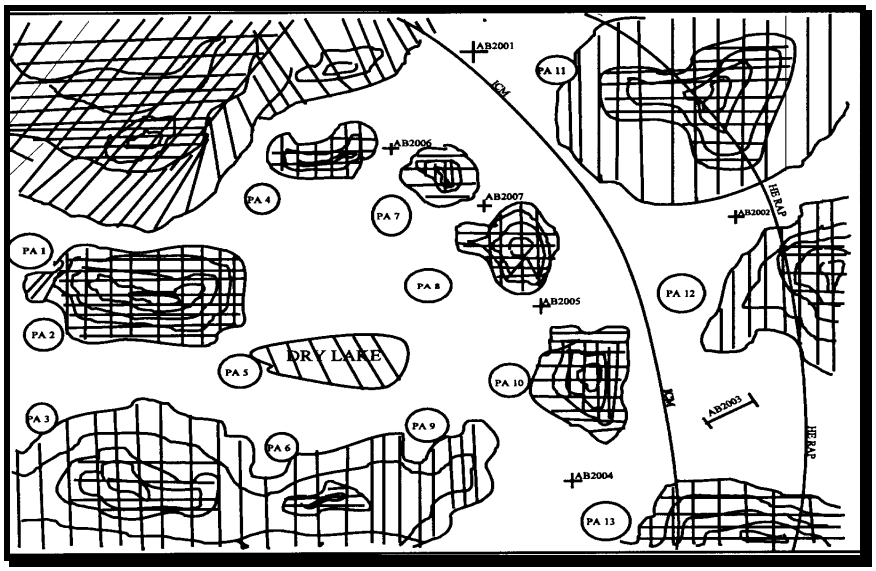


Figure 6-24. Overlay depicting critical targets and range fans.

(4) Once the S-3 identifies the optimal PAs for each target area, by phase, he copies them onto the operations overlay, and gives the MCOO back to the S-2. If the S-3 must use some of the less than optimal PAs, he does so understanding the constraints of those PAs. The FDO now looks at each PA and identifies any technical fire delivery issues (site-to-crest, intervening crests, traverse limits, etc.) which must be resolved. When any of these issues are identified, the FDO shoots dry fire missions in the computer using data from the PA to determine if the concerns are valid. If the S-3 directs occupation of any of these PAs the FDO specifically address these concerns with the battery FDO.

d. Situation Templating. The artillery S-2 will normally receive a situation template (SITEMP) from the supported infantry unit. This SITEMP, however, does not address the concerns of the artillery and must be refined to focus on fire support issues. At a minimum, the artillery S-2 must develop two SITEMPs: the most probable threat COA, and the most dangerous threat COA.

(1) Enemy Artillery. Graphically depict the enemy artillery locations down to battery level which will affect artillery. This is performed by analyzing the artillery range capabilities of the enemy artillery battalions and determining the approximate location of each battalion given its doctrinal mission and which phases of fire each will participate. Once the S-2 determines the approximate location of each battalion, he situationally templates each battery location given the constraints of terrain and opposing forces. Once the S-2 has templated the battalion locations, he now templates the artillery range fans for each weapon system (e.g., 2S1, 2S-3, 2S5, BM21, etc.).

NOTE: FM 100-2-1 is very specific in describing the enemy phases of artillery fire for former Soviet type threats.

(2) Threat Maneuver Forces. Graphically depict the formations of enemy maneuver forces at each point where the artillery will mass or fire special munitions missions. This is particularly important for the artillery staff because the FSC must understand the type of target which best supports the maneuver commander's fire support guidance (e.g., group, series, linear target, etc.). The FSC must also advise the maneuver commander on the engagement criteria to use against each formation, disposition, and purpose (neutralization, suppression, or destruction). An accurate SITEMP greatly assists in making these critical decisions.

(3) Threat Avenues of Approach and Objectives. Graphically depict the threat's avenues of approach and objectives. The S-2 predicts which avenues of approach the threat will use based on information from the formations he templated for each phase of battle. Threat objectives are predicted from the S-2's knowledge of threat doctrine. This is important when continuing COA development so the S-3 does not position batteries on avenues of approach and objectives.

(4) Threat Chemical Strikes. Now the artillery NBCDO becomes involved in templating the threat's possible persistent and nonpersistent strikes. The NBCDO can provide advice on burst radius and downwind hazard effects. The S-3 must avoid positioning batteries in likely chemical strike and downwind hazard areas.

(5) Rear Area Threats. Template the rear area insertion sites which the threat airborne/air assault units may infiltrate. If possible, nominate named areas of interest (NAIs) on these sites for artillery to watch. Since it may be difficult to avoid these areas, covering them with reconnaissance and surveillance (R&S) may be the best available option. This will impact on the execution and support of rear area operations.

e. Integrating the Situation Template into COA Development and Wargaming. When the SITEMP is completed the S-3 overlays it on the operations map and deconflicts positioning of firing units. The S-3 ensures that PAs are not on avenues of approach, regimental objectives, or templated chemical strikes. Because it is very difficult to position out of range of the threat's artillery, the S-3 considers positioning units in areas which will cause artillery delivery problems for the threat (e.g., site to crest, intervening crest, and traverse limits problems). This should force the threat to execute high angle missions, which facilitates friendly target acquisition capabilities, or to reposition. As the staff conducts this process, eliminate PAs which do not meet the above criteria. With the remaining PAs the S-3 can develop various COAs to support the commander. The staff wargames each COA against each enemy SITEMP to determine the best COA.

f. Event Templating. The event template (ET) graphically depicts the events and timing of the upcoming battle. If artillery attempts to fight the battle without an event template it risks being forced to execute more events than are possible and thus may fail to accomplish the commander's guidance for fire support. The infantry regimental S-2 will normally provide the artillery battalion with the regiment's ET which focuses on the regimental/division fight. The artillery battalion S-2 must refine this product to focus on fire support issues. The primary concern is the difference in the time increments used. The regiment generally fights

in terms of tens of minutes and hours and therefore uses timelines in these increments. The artillery battalion's fight is executed in terms of minutes and seconds and, therefore, it needs to use a timeline expressed accordingly.

(1) Regimental NAI/TAI. Copy all of the infantry regimental and battalion NAIs onto the artillery battalion ET. Artillery LNOs at the infantry battalions must ensure they relay their maneuver battalion's NAIs to the artillery S-2. The artillery battalion receives enemy location information from maneuver elements reporting on these NAIs. The artillery battalion can then incorporate these NAIs to trigger artillery battalion events.

The S-2 now draws artillery battalion NAIs which were identified while developing the situation template. These NAIs are developed to attempt to confirm or deny possible enemy courses of action and are executed as part of the artillery battalion's R&S plan. An artillery battalion's R&S plan consists of artillery battalion NAIs which firing units, survey teams, CSS elements, etc., will watch during the execution of their primary mission. The focus of these NAIs is to prevent the artillery battalion from being surprised by enemy actions such as a rear area airborne insertion, guerilla activity, or unexpected attacks along flanks or avenues of approach.

(2) Time Phase Lines (TPLs). The S-2 now develops TPLs which clearly depict the pace of the fire support battle through all phases of the fight. The artillery's success or failure is determined in terms of minutes and seconds so the S-2 must use TPLs in these terms. Time increments of minutes and seconds works best (e.g., 1:10,1:20,1:30).

- There are two types of TPLs: friendly offensive operations (use blue lines) and threat offensive operations (use red lines). Thus, if friendly units are conducting a defense the S-2 uses red TPLs to time the enemy offense. If friendly forces plan a counterattack the S-2 uses blue TPLs to time this.

- The S-2 determines the threat doctrinal movement rates using input from higher headquarter’s intelligence estimates, and from the home station data base he has built and refined. These doctrinal rates are now further refined based on METT-T.

- For friendly defensive operations draw the first TPL at the threat's assembly area or where friendly assets will first detect threat movement. Continue drawing TPLs throughout the AO using selected time increments. Place a TPL at every location at which the threat's movement rate is significantly altered (e.g., entering and exiting a minefield).

- For friendly offensive operations the S-2 develops TPLs for friendly attacking forces and enemy counterattack forces in the same manner as described above. Friendly movement rates are obtained from the OPORD, unit SOPs, and the infantry battalion FSCs/arty LNOs.

- The artillery battalion uses these TPLs to help understand the timing of the battle as it is occurring. This is particularly important when developing triggers/decision points (DPs) for unit movements, releasing reconnaissance assets, and conducting CSS operations. The TPLs will help identify lulls in the battle and times when the artillery battalion can plan on not needing all firing units available. Performed correctly, it will become very clear when the best time is to move batteries and/or conduct other operations.

- The S-2 can get a good basis for analysis from maneuver rehearsals as they discuss the execution of the battle by phase. The artillery S-2 should to talk with the maneuver S-2 and come to an agreement on the rates of march by phase so all fire supporters are basing triggers on the same TPLs. This requires the artillery battalion S-2 to attend or be represented at these rehearsals.

(3) Radar Zones. The S-2 now incorporates proposed radar zones onto the ET. The FSC and the artillery staff will both generate proposed events and areas which require coverage by specific radar zones. Based on the capability of the attached radar or the number of zones allocated, the artillery battalion staff finalizes the number, type, location, queuing assets, and/or time for all approved radar zones.

- The TPLs on the ET will assist the S-2 in determining a proactive queuing schedule to cover critical events such as friendly breaching operations or when the enemy is conducting a particular phase of their artillery fire plan. The TPLs will also assist in determining triggers to implement or cancel planned radar zones.

- Whether or not the artillery battalion has radar attached, radar zones should be shown on the ET. If the artillery battalion has a radar attached, the S-2 will complete a radar deployment order (RDO) using the zones from the ET. If the artillery battalion does not have a radar attached, the S-2 will nominate the zones on his ET to the artillery regiment for coverage.

g. Decision Support Template (DST)

(1) The DST relates the details of the event template to decision points (DPs) that are of significance to artillery. It does not dictate decisions to the S-3, but rather identifies critical events and threat activities relative to time and location that may require tactical decisions. The DST provides a structured basis for using experience and judgment to reduce battlefield uncertainties. The following should occur:

- Overlay the ET on the operations graphic to depict TPLs on the battlefield. The S-3 then lists the critical fire support tasks for the battalion. These may be battalion mass missions, special munitions missions, unit movements, reconnaissance, survey operations, etc.

- Wargame each critical fire support task, in order, with the S-2 talking timing of the battle from his TPLs, the S-3 talking critical fire support tasks, and the FDO talking honest mission execution times.

(2) One of the best uses of the DST for artillery is to ensure that the artillery can execute the infantry fire plans. To wargame the fire plans, the S-2 discusses the enemy's COA and their rate of march, while the S-3 discusses the type of target, where the artillery is to impact (front, center, or rear of formation) and the number of rounds and volleys required. The FDO then states whether or not the artillery is laid on the target, who will fire the mission, shift time required, time of flight, and total time to execute the mission. It is critical that these are honest times based on the unit's current personnel and equipment status, and level of training. With this information, back off the target area in time, using the TPLs, and place a decision point (star) on the operations graphic. This represents the point at which the artillery can achieve its greatest effects.

(3) The DPs established by artillery in the forward battle area usually do not have artillery assets to watch them. These DPs should correspond to a trigger point of an infantry battalion or regimental observer. The S-3 uses these DPs as he tracks the battle to help him make critical decisions. As the S-2 identifies threat forces at or near the DPs, the S-3/FDO is alerted and expects a call for fire for the target tied to the DP. This is how the S-3 anticipates the battle to ensure artillery is prepared to fire all required missions. In addition, if the arty LNOs at the infantry regiments and battalions have an understanding of the mission execution times the artillery battalion is capable of, and they are coordinating their fire plans between headquarters, then the artillery battalion DST will merely verify that the fire plans are executable.

(4) Another use of the artillery DST is to determine DPs for other critical fire support events such as battery movements, special munitions missions, radar queuing times, CSS operations, etc. In the same manner as described above, the S-3 and the staff wargame the battle determining where to place DPs which will trigger critical events. For example, the S-3 could establish a DP to que the radar to observe a breaching operation when the lead elements of the breach force report their location at a certain point.

(5) Once completed, graphically depict each DP on the operations overlay. This will assist in focusing the S-3 on critical events during the battle. Time permitting, the staff may develop a execution matrix which addresses tasks each unit must execute (see figure 6-9).

1
2

	H-0:30	H HOUR	H+0:30	H+0:45	H+1:00	H+1:20
ENEMY SIT	LEAD MRBS ENTER PASSES	MRBS IN COL EXIT PASSES AT OBSTACLE	MRBS IN PRE-BATTLE FORMATION	LEAD MRBS IN BATTLE FORMATION TRAIL MRB ENTERS PASSES	LEAD MRBS IN CO'S ON LINE TRAIL MRB EXITS PASSES	MRBS IN ENGAGEMENT AREAS PLTS ON LINE
NAI/DP	NAI 4/DP1	DP 2	DP 3	NAI 3	DPS 4=5	NAI 3
MNVR	BATTLE POSN SET RECON RPOL	RECON COMPLETE RPOL CAS ON STATION		TOWS ENGAGE	ENGAGE EA VIPER AND SNAKE	
A BTRY	LAID ON AB0001	FIRING AB0001	SHIFT/LAID ON AB0003	FIRING AB0003	LAID ON AB0004 OR AB0005	SHIFT TO AB0003 PREP TO MARCH ORDER
B BTRY	LAID ON AB0001	FIRING AB0001	SHIFT/LAID ON AB0003	FIRING AB0003	LAID ON AB0004 OR AB0005	SHIFT TO AB0003 PREP TO MARCH ORDER
C BTRY	LAID ON AB0001 2 GUNS CPHD AB0006	FIRING AB0001, 2 GUNS CPHD/VERIFY PRF	SHIFT /LAID ON AB0003	FIRING AB0003	LAID ON AB0004 OR AB0005	SHIFT TO AB0003 PREP TO MARCH ORDER
COC	RETRANS OPERATIONAL					JUMP COC MOVES
TRAINS	JUMP AID STATION FORWARD				CBT TRAINS MOVE TO ALT PSN	

3 Figure 6-25. Decision Support Template and Execution Matri