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Description of Selected Army Staff Functions: Targets for Planning Aids

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This research note identifies division-level coordinating staff functions, and analyzes their contribution to tactical decision making. The coordinating staff functions of intelligence (G2), operations (G3), and logistics (G4), are decomposed into tasks and subtasks. The tasks are evaluated as to importance to the decision making process, and as to amenibility to the application of advanced information processing, including the use of artificial intelligence techniques. Based upon Army experts' advice, and upon the professional judgement of the authors, functional tasks which were considered to have high priority for human performance enhancement were selected and put in order of priority. The top six priority tasks were further decomposed into subtasks to better identify opportunities for human performance enhancement. The six staff tasks for early human performance enhancement are: analyzing tactical courses of action, analyzing battlefield areas, analyzing tactical capabilities, evaluating the enemy threat, analyzing logistic capabilities, and developing tactical courses of action.

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DESCRIPTION OF SELECTED ARMY STAFF FUNCTIONS: TARGETS FOR PLANNING AIDS

EXECUTIVE SUMMARY

Requirement:

To identify critical Army battle staff functions and tasks for which enhancement would represent a valued improvement in tactical decision making performance. Enhancement areas include staff operating procedures, advanced information processing approaches for command and control systems, or artificial intelligence techniques.

Procedure:

The selection of significant staff functions and tasks involved the development of detailed function flow diagrams to decompose staff functions into tasks and describe the nature of the tasks. The division coordinating staff functions of intelligence (G2), operations (G3), and logistics (G4) were areas of concentration. The flow diagrams were provided to Army command and control doctrine experts to verify accuracy. The experts also were asked to select candidate tasks for study or enhancement. Information on functions, expert input, and author judgment were used to analyze the tasks and rank them.

Findings:

Six tasks were selected as areas of enhancement. These were analyze tactical courses of action (G2 and G3), analyze battlefield area (G2), analyze tactical capabilities (G3), evaluate enemy threat (G2), analyze logistic capabilities (G4), and develop tactical courses of action (G3). These tasks were further decomposed into flowcharts for the G2, G3, and G4 staff planning processes, indicating the links among the principal tasks of each function and relating the high priority tasks to others.

Utilization of Findings:

The flowcharts illustrate relationships among the staff functions and tasks at several levels of detail. These diagrams are useful for a wide audience, including anyone needing a description of coordinating staff functions. The flowcharts were used advantageously to examine and judge critical tasks benefitting most from potential enhancement. The six high ranked tasks are recommended as areas for further analysis, experimentation, and development.

DESCRIPTION OF SELECTED ARMY STAFF FUNCTIONS: TARGETS FOR PLANNING AIDS

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DESCRIPTION OF SELECTED ARMY STAFF FUNCTIONS: TARGETS FOR PLANNING AIDS

INTRODUCTION

This report documents one component of a larger effort to enhance human performance in Army tactical decision making. The overall effort addresses the development, integration, and evaluation of techniques to enhance the information processing and decision making performance of battlefield command groups. The techniques will be evaluated in a controlled environment, the Experimental Development, Demonstration, and Integration Center (EDDIC), at Fort Leavenworth, Kansas. The goal of the effort is to allocate, monitor, and control information processing and decision making among several humans and supporting computer systems in a manner that optimizes their respective strengths and compensates for their respective weaknesses.

Purpose

This report focuses on the selection of Army staff tasks whose enhancement, if feasible, would represent a valued improvement in the execution of battle staff functions.

Scope

The scope of this report is confined to Army division-level coordinating staff functions and tasks. The doctrinal relationships among these functions and tasks are examined in sufficient detail to judge where, within the staff functions, lie the most appropriate areas for enhancement.

Overview

An Army tactical command and control system consists of people, equipment, procedures, products, communications, and facilities for the planning, coordinating, and directing of tactical military operations. A key element of the command and control system is the people who operate the systems and perform the functions that are essential to military decision making. An analysis of the functions of the coordinating staff officers at division level can be expected to reveal opportunities for human performance enhancement to optimize decision making and, consequently, command and control of tactical military operations.

Coordinating staff officers are the commander's principal staff assistants. Each such staff officer is concerned with one of the broad fields of commander interest; namely, personnel (G1), intelligence (G2), operations (G3), logistics (G4), and civil-military operations (G5). The staff principals assist the commander by coordinating the plans, activities, and operations of the command. Collectively, they have responsibility for the commander's entire field of responsibilities, except those functional areas that a commander decides to control personally or areas that are reserved by law or regulation for specific staff officers. Coordinating staff officers at all levels of command are responsible for acquiring information, analyzing the information to determine the implication and impact upon the command and its

mission, and most importantly providing the commander with timely and accurate recommendations to assist him in making the best decision for mission performance.

The term "Army staff functions" is used to embrace the responsibilities and functions commonly performed by staff officers assigned to headquarters of Army units in the field. Within staff functional areas, corresponding coordinating staff officers at each organizational level will have similar areas of interest and responsibilities. The analyses and discussions presented in this report are focused on Army staff operations at division level, and their objective is to facilitate the recognition of those significant staff functions and tasks that offer opportunities for human performance enhancement. The significant staff functions analyzed and discussed herein are in consonance with FM 101-5, Staff Organization and Operations (Headquarters, Department of Army, 1984); USACGSC ST 100-9, The Command Estimate (US Army Command and General Staff College, 1986); and other Army doctrinal publications. The determination of which command and staff functions are significant is based upon a review of Army doctrinal literature; coordination with the U.S. Army Command and General Staff College (USACGSC) and the U.S. Army Combined Arms Combat Developments Activity (USACACDA); and the professional judgment of the authors.

The general command and staff functions associated with the planning, direction, and supervision of Army tactical operations are portrayed in Figure 1. (A glossary of abbreviations used in all figures is provided in Appendix A.) The coordinating staff areas of intelligence (G2), operations (G3), and logistics (G4) were chosen for concentration at this time because of the relative impact which their coordinating staff functions have on tactical decision making. The operations staff officer (G3) is the principal advisor to the commander in planning combat operations (including maneuver and fire support), and the results of the G3's planning feed all other coordinating staff planning efforts. The intelligence staff officer (G2) plans for and collects information, and he supplies intelligence (processed information of the enemy, terrain, and weather) to the commander and other staff members. Intelligence is a major ingredient in tactical decision making. The logistic staff officer (G4) plans for combat service support of the force and supplies resource status information which is critical to tactical decision making. Staff planning functions of the personnel staff officer (G1) and the civil-military operations staff officer (G5) are important but are considered by the authors to make relatively less impact on tactical decision making than those of the G2, G3, and G4.

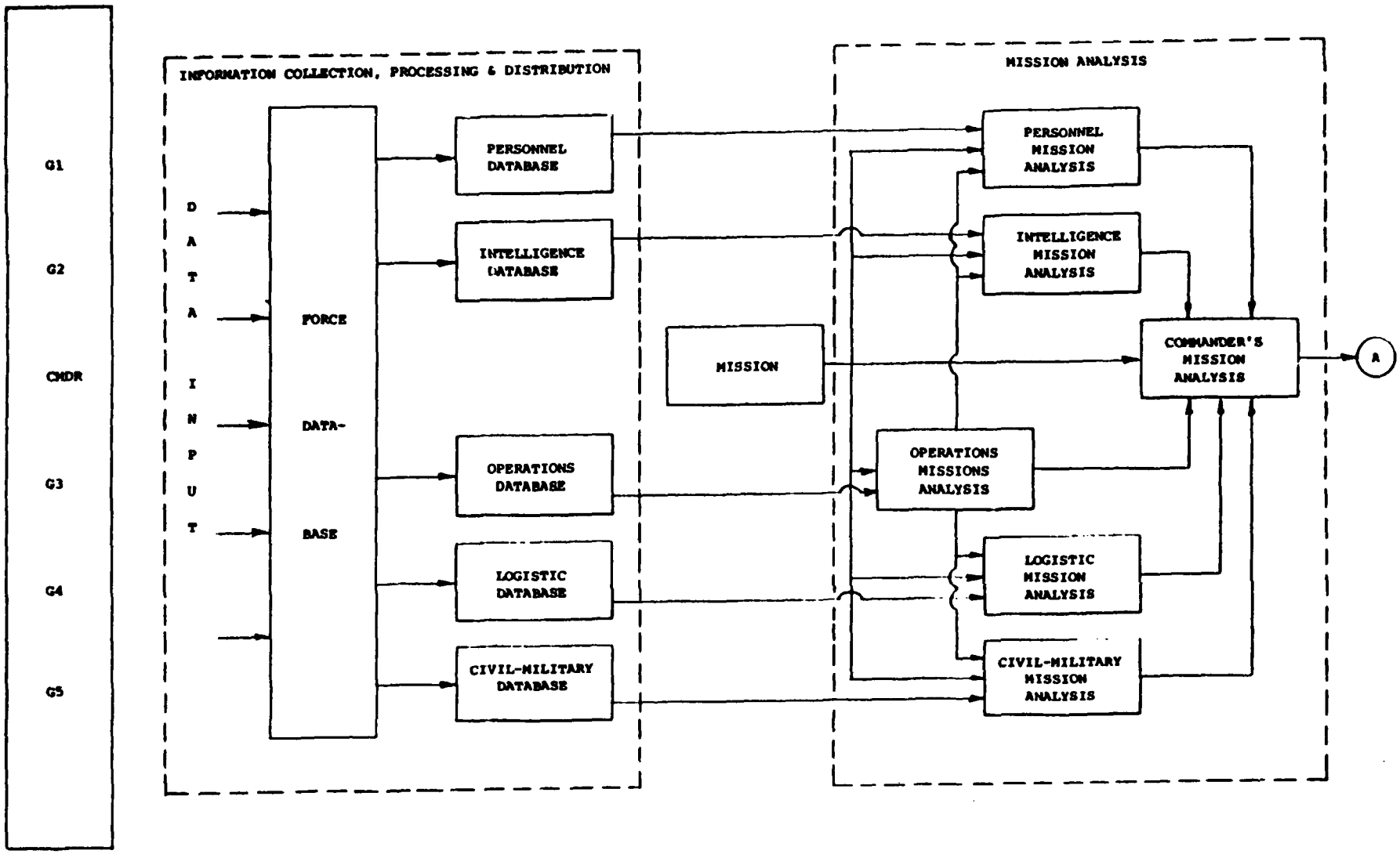

Figure 1. Significant Army Staff Functions.

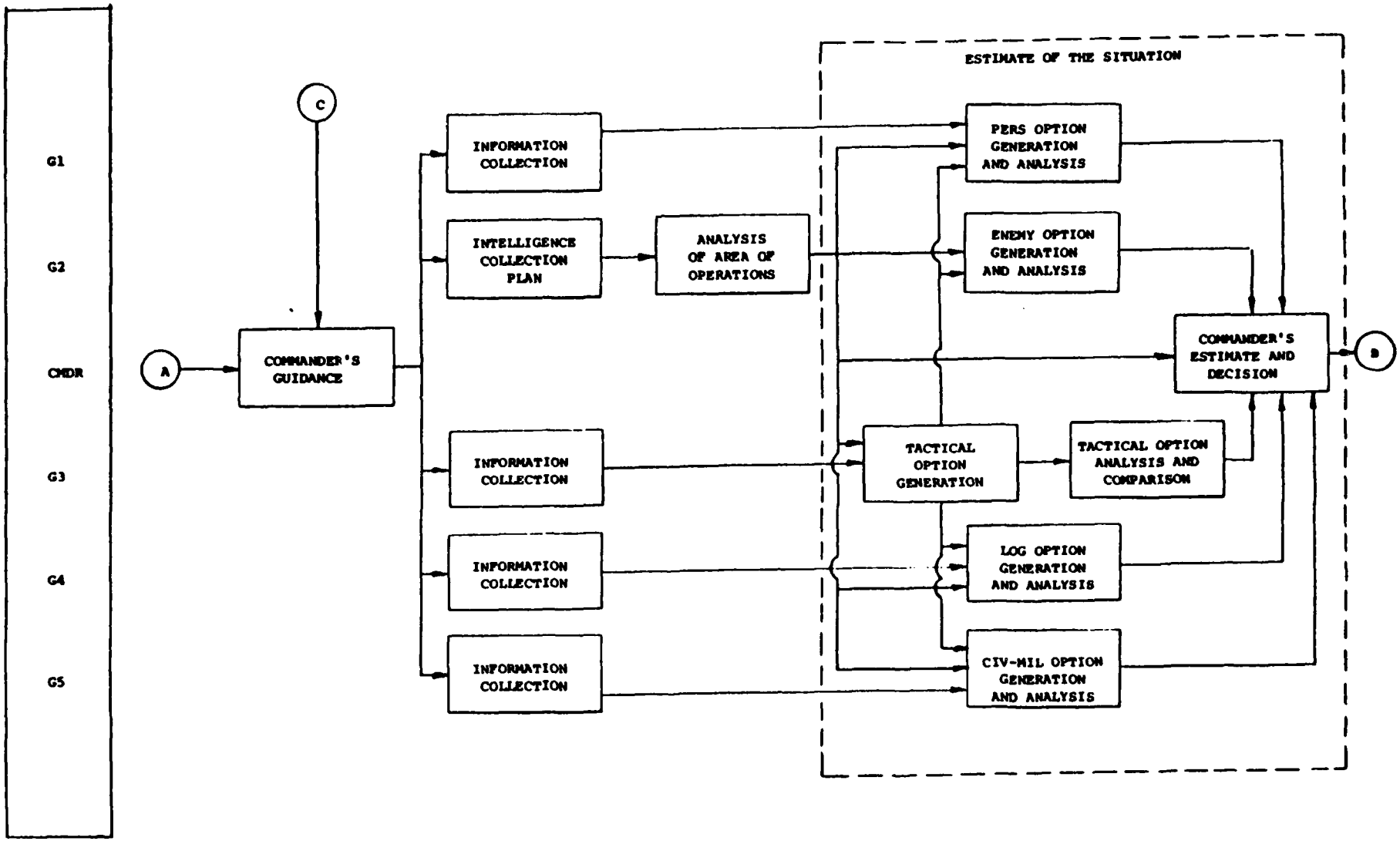

Figure 1. Significant Army Staff Functions (Continued).

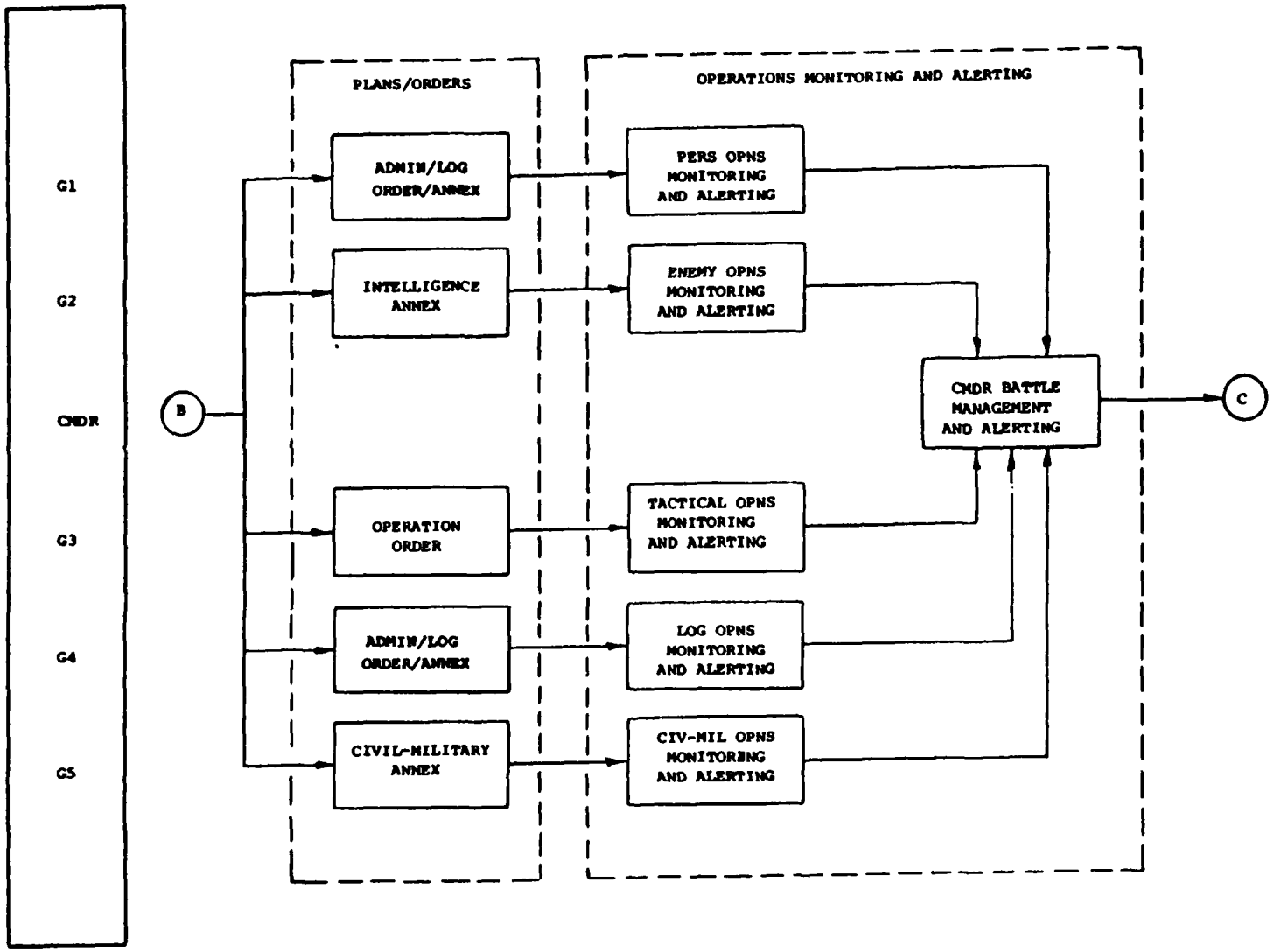

Figure 1. Significant Army Staff Functions (Concluded).

SELECTING STAFF TASKS FOR MILITARY IMPORTANCE

To be selected for enhancement, a command staff function or task should be identifiable in the hierarchy and sequence of tasks assigned to division-level G2, G3, and G4 staffs and described in official doctrine and training publications. The tasks should also be those whose importance is recognizable to command staff members and whose selection is supported by expert judgment.

Selection Process

Extracted from Army doctrine, division-level battle staff functions have been analyzed and diagrammed to show how they are connected and how they are characterized by content. Preliminary function flow diagrams, similar to Figure 1, were discussed with experts at the Center for Army Tactics (CTAC) and the Department of Sustainment and Resourcing Operations (DSRO) of the Command and General Staff College. These experts were identified to the authors through ARI-sponsored coordination with the US Army Command and General Staff College, which designates such personnel more specifically as subject matter experts. These subject matter experts, by virtue of their grade, experience, and professional capabilities are responsible for the development of Army doctrine for their assigned subject matter areas. In their roles as experts, these officers prepare and coordinate approved doctrine Army-wide and, commitantly, serve as instructors to impart approved doctrine to students at the College. With their input, the diagrams were modified as necessary and expanded to illuminate potential areas for study.

Overall function flow diagrams of intelligence, operations, and logistics staff functions are shown in Figures 2, 3, and 4 respectively. More detailed staff function flow diagrams appear in the next section of this report. Narrative texts describing the activities indicated in operations and intelligence staff diagrams are furnished in Appendices B and C. More detailed diagrams of selected functions and tasks are presented and described later in this report. Those more detailed diagrams are intended to help in the definition and design of enhancement experiments.

In addition to refining the accuracy and providing the detail, experts at the staff college were consulted on the selection of staff tasks that appear to deserve study or enhancement.

The selection method planned on was a stepwise process to consist of the following steps:

1. Describe division-level staff functions and tasks for G2, G3 and G4.

2. With tools such as function flow diagrams and functional breakdowns, understand the content, sequence, and organizational significance of the described staff tasks.

3. Submit these diagrams and descriptions to critical scrutiny of Army command staff doctrinal experts; revise if indicated.

INTELLIGENCE STAFF PLANNING PROCESS
INTELLIGENCE PREPARATION OF THE BATTLEFIELD (IPB)

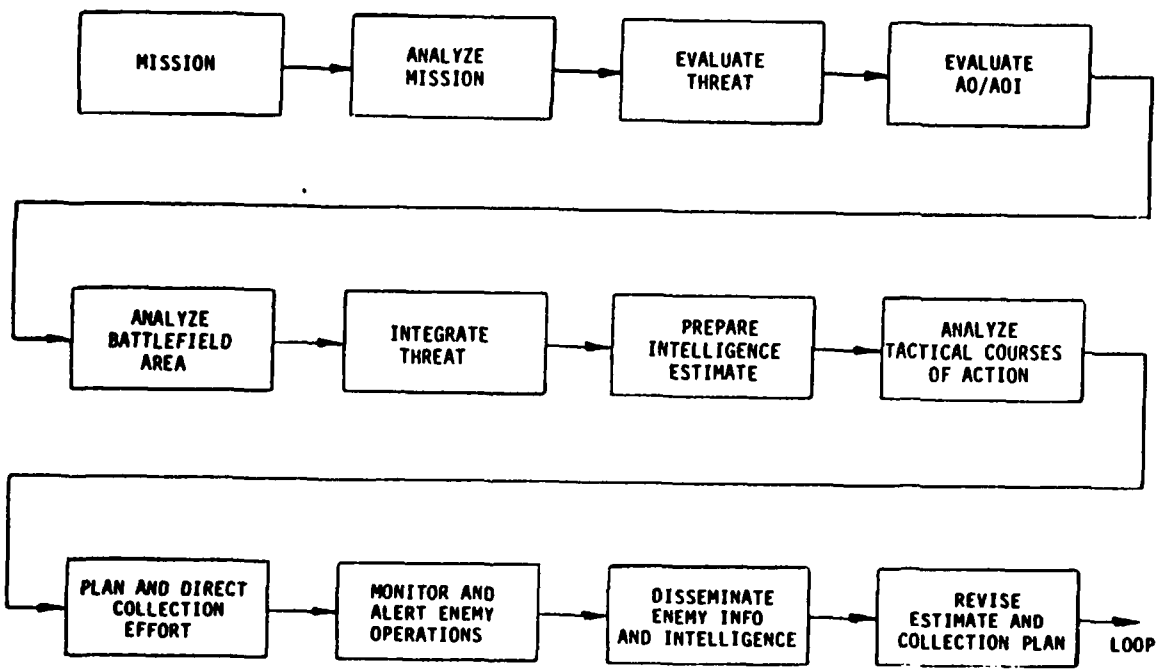

Figure 2. Intelligence Staff Planning Process (Overview).

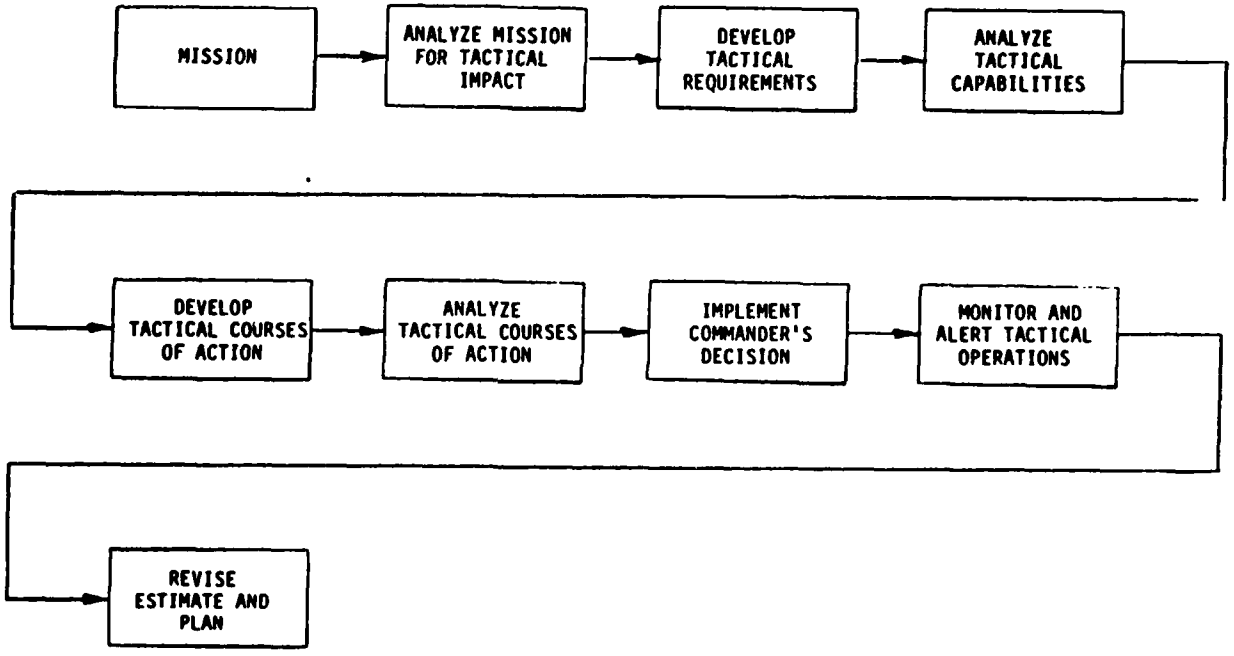

Figure 3. Operations Staff Planning Process (Overview).

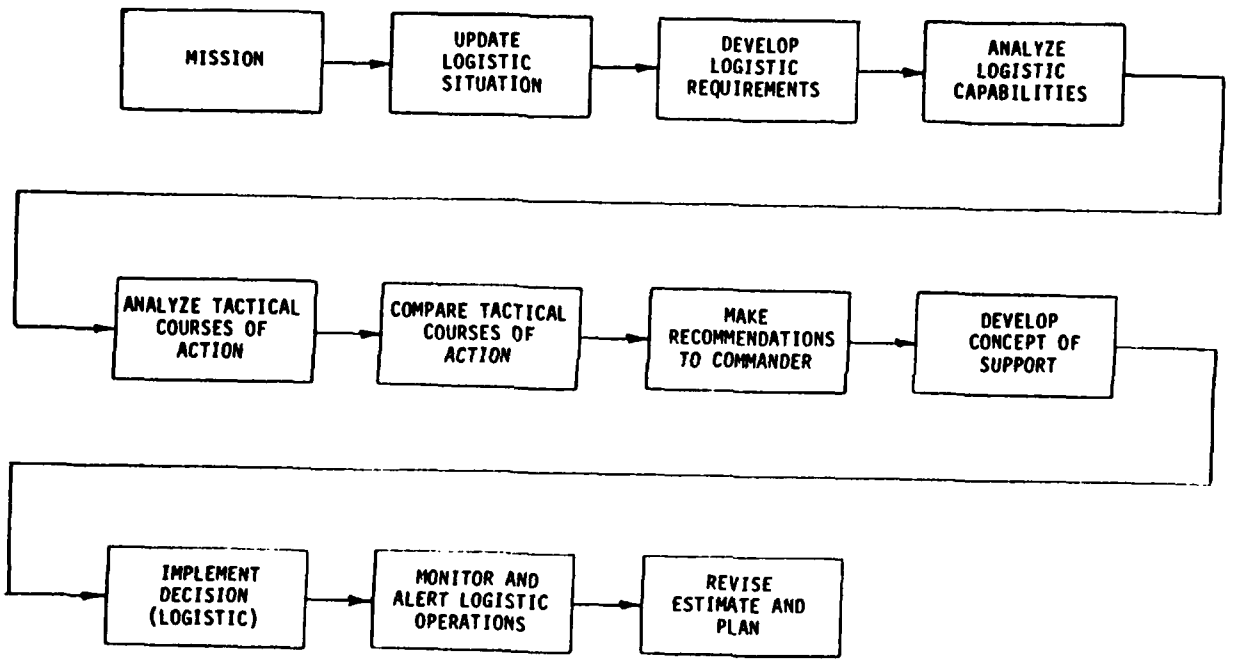

Figure 4. Logistic Staff Planning Process (Overview).

4. Provide eight (8) expert respondents representing CAC combat development and command and control doctrine experts with sample selection criteria; request them to advise on the criteria themselves as well as on the identification of candidate tasks for study or enhancement.

5. Using selection criteria, rank intelligence, operations, and logistic staff tasks with priority numbers indicating relative rank as candidate areas for study or enhancement.

6. With these expert inputs, examine the tasks, sub-tasks, and products of function areas that earned high priority ratings (low priority numbers); select from these a reasonable number for experimental study, evaluation, or enhancement and base this selection on a convincing rationale or method.

7. Examine the selected tasks and rationale in further detail; describe or characterize these tasks in a manner, and at the level of detail needed, to make it possible to plan meaningful experiments on these tasks or on the problems or opportunities associated with them.

The goal of this effort ends with the determination of where, within the division coordinating staff functions, lie the most deserving candidate staff tasks for enhancement and with the detailed description of those candidate tasks. Based on information already on hand and personal experience at this level of command, we assigned a tentative ranking to the major tasks of the staff functions of intelligence, operations, and logistics. These rankings and the tentative selections identified in this report will enable experimentation to explore battle staff enhancement.

Selection Criteria

The selection process discussed above was applied in researching, diagramming, and analyzing Army command staff functions and tasks. Having performed these earlier steps of the process, the next step (Step 5 above) was to select staff tasks as candidates for enhancement and to assign to them a relative priority for the application of enhancement resources. The assignment was a judgment process based upon doctrine and expert advice and made use of the following selection criteria:

- Importance of task to tactical decision making.
- Variability of the performance of the task, due principally to human factors or variables affecting those factors.
- Complexity of the task or its component tasks.
- Time required to perform the task.

These criteria have been used with care, since they are not all applicable to all tasks and do not all have constant relative weights. As a result, the ranking process is an educated judgment and not an objective scaling. The criteria and their applications do, however, permit rational explanation of why certain tasks are placed high or low in the list, and why certain tasks in

the list are placed close to, but above (or below) certain others.

In general, importance in tactical decision making is a universal prerequisite. Unlike the other indicators, it applies to all tasks, and no tasks were given high priority (low number) that were not judged high in importance.

Variability, on the other hand, may be a very important but is not a dominant indicator. Tasks whose performance is observed to vary in quality, and whose quality is strongly influenced by human factors, are expected to be good candidates for enhancement. Indeed, the strategy of enhancement focuses logically on this variability, aiming to narrow it and push the centrum of this variable performance toward the better end of the performance scale. If a staff task is both militarily important and highly variable in quality, there is no better combination of reasons for putting it high in the list of candidates for further study and possible enhancement.

We must allow, however, for the possibility that some important functions or key tasks may deserve enhancement because they are difficult, complex, or time-consuming. If a key task whose performance quality is not highly variable and characteristically takes a great deal of time, there is a clear strategy for improvement: shortening the time so that all dependent tasks can be completed earlier. Such a task deserves a priority ranking that ensures it will be methodically examined for possible enhancement.

Similar considerations apply to complexity. Complexity and time-consumption go hand-in-hand at times and can be sufficient reasons for enhancement if the task is also important. It is also logical to consider the load on resources that may be imposed by complex tasks that don't take much time but are distracting or undesirably burdensome. If there is a strong advantage in freeing-up resources by simplifying, replacing, automating, or aiding such a complex task, it may need no other criteria to ensure high selection rank.

Under the criteria of complexity, too, it is natural that some staff tasks may be easy, simple, and routine to perform; nevertheless, their performance is required and is often time-consuming due to frequency of performance. Aiding the performance of such tasks will obviously free staff officers for more complex and demanding staff tasks, and this rationale should also be considered in the selection of tasks for aiding and/or human performance enhancement.

Selection Results

The process of evaluating staff tasks and of assigning priorities among identified tasks was attempted using the sample worksheet displayed in Figure 5 for the operations function. Similar worksheets were prepared and used for the intelligence and logistic staff functions. These worksheets were distributed through staff points of contact to subject matter experts (SMEs) in the Center for Army Tactics (USACGSC) and the Combined Arms Combat Developments Activity. Use of the worksheets yielded objective results of evaluation factors versus staff function/task; however, the results were not sufficiently discriminating to permit establishment of the relative priority of the tasks for human performance enhancement. Concomitantly, since the worksheets were administered through agency points of contact, respondents

FACTOR PRIORITY																		
	IMPORTANCE		DESCRIPTION		ARCHITECTURE		PERFORMANCE LEVEL OF EFFORT			EXPERTISE			DATA		OTHER FACTORS			AGGRAVATING PROBLEMS AND CIRCUMSTANCES	RELATIVE PRIORITY OF FUNCTION FOR HPE
STAFF FUNCTION/TASK RATING SCHEME 1 - low, small 2 - moderately low 3 - moderate, medium 4 - moderately high 5 - high, great	IMPORTANCE TO STAFF PERFORMANCE	IMPORTANCE TO CMDR DECISIONMAKING	COMPLEXITY OF FUNCTION	EFFORT RQD TO DECOMPOSE FUNCTION	CRITICALITY OF PERFORMANCE SEQ	CRITICALITY OF TIME RQD FOR PERFORM	GREAT (>1 MAN HOUR)	MODERATE (0.5 - 1 MAN HOUR)	LOW (<0.5 MAN HOUR)	REQUIRED SPECIAL EXPERTISE	REQUIRED GENERAL EXPERTISE	ENHANCEMENT THROUGH TRAINING	DATA QUANTITY REQUIRED	DATA AVAILABILITY IN CURRENT SYSTEM					
OPERATIONS	1-5	1-5	1-5	1-5	1-5	1-5	x	x	x	1-5	1-5	1-5	1-5	1-5					
OPERATIONS ANALYZE MISSION DETERMINE TACTICAL REQUIREMENTS ANALYZE TACTICAL CAPABILITIES DEVELOP TACTICAL COURSES OF ACTION ANALYZE TACTICAL COURSES OF ACTION IMPLEMENT DECISION MONITOR AND ALERT TACTICAL OPERATIONS SUPERVISE EXECUTION																			

Figure 5. Sample Staff Task Priority Worksheet.

failed to establish priorities either for the evaluation factors or for human performance enhancement for the staff tasks identified in the worksheets. The time for this project was limited, so the author resorted to interviews with selected SMEs as a remedial action, to aid in establishing enhancement priorities.

Major functions of the intelligence, operations, and logistic staffs are decomposed into tasks in Table 1. Tasks under each major function identify activities and/or products that comprise the major function for which they are a component. Staff tasks across all coordinating staffs have been considered, and selected tasks have been assigned a number indicating their proposed priority as a candidate for enhancement experiments. (A low number indicates a high priority.)

Priority 1 is assigned to staff task Analyze Tactical Courses of Action, a key task in which both the G3 and the G2 have major roles. It should be noted that this task appears with the same priority under both the operations and intelligence staff functional breakout, giving an early clue to the importance accorded this key staff activity. Table 2 displays the relative order of importance of the staff tasks being proposed for early consideration for human performance enhancement. Ordering of tasks was limited to ten key tasks on the premise that it would be appropriate to consider a subset of tasks in follow-on efforts. Due consideration was also given to the fact that some tasks might not lend themselves to performance enhancement due to the current technological state-of-the-art.

Table 1

Function Structure and Enhancement Priorities

INTELLIGENCE STAFF TASKS

ANALYZE MISSION

(4) EVALUATE ENEMY THREAT
- Develop doctrinal OB templates
- Develop situational OB
- Identify OB anomalies/uncertainties
- Adjust doctrinal templates
- Identify enemy capabilities

EVALUATE AREA OF OPERATIONS/INTEREST
- Deep battle
- Close battle
- Rear battle

(2) ANALYZE BATTLEFIELD AREA (BA)
- Analyze weather
- Analyze terrain
- Analyze effects of BA on enemy/friendly capabilities

(7) INTEGRATE ENEMY THREAT
- Develop enemy COAs
- Analyze effects of BA on enemy COAs

PREPARE INTELLIGENCE ESTIMATE

(1) ANALYZE TACTICAL COURSES OF ACTION
- Analyze effects of BA on friendly COAs
- Analyze effects of enemy COAs on friendly COAs
- Prioritize friendly COAs vis-a-vis enemy COAs

(9) PLAN AND DIRECT INTELLIGENCE COLLECTION EFFORT
- Develop mission-specific PIR/IR
- Develop intelligence collection tasks
- Plan use of collection assets
- Distribute intelligence collection missions
- Monitor and evaluate collection activities

(8) MONITOR AND ALERT ENEMY OPERATIONS
- Intelligence reports
- Enemy force, resource, and activity status
- Enemy COA verification/deviation
- Critical events
- Decision points

DISSEMINATE ENEMY INFO AND INTELLIGENCE

Table 1

Function Structure and Enhancement Priorities (Continued)

OPERATIONS STAFF TASKS

ANALYZE MISSION

DEVELOP TACTICAL REQUIREMENTS
- Mission
- Enemy
- Terrain
- Own Troops
- Time

(3) ### ANALYZE TACTICAL CAPABILITIES
- List force components
- Assess current force status
- Select combat potential factors
- Assess combat potential of force components
- Assess combat potential of force versus standard
- Assess combat potential of MSCs
- Assess combat potential of division

(6) ### DEVELOP TACTICAL COURSES OF ACTION
- Analyze relative combat power
- Evaluate terrain and weather
- Array forces
- Develop scheme of maneuver
- Develop scheme of supporting fires
- Assign control means/measures
- Specify alternative COAs

(1) ### ANALYZE TACTICAL COURSES OF ACTION
- Wargame each friendly COA
- Assess results of each war game
- Compare courses of action

(8) ### MONITOR SITUATION AND ALERT TACTICAL OPERATIONS
- OPLAN
- Force and resource status
- Critical events
- Decision points
- Situation changes

Table 1

Function Structure and Enhancement Priorities (Continued)

LOGISTIC STAFF TASKS

UPDATE LOGISTIC SITUATION

DEVELOP LOGISTIC REQUIREMENTS

- Mission
- Enemy
- Terrain
- Own troops
- Time

(5) ANALYZE LOGISTIC CAPABILITIES

- List force components
- Assess current force status/capabilities
- Assess current resource status
- Assess terrain/weather impact on logistic capabilities
- Assess enemy impact on logistic capabilities
- Integrate logistic capability for mission support
- Develop logistic tradeoffs to optimize support

(10) ANALYZE TACTICAL COURSES OF ACTION

- Area sufficiency
- Logistic support of alternative vs tactical COAs

(10) COMPARE TACTICAL COURSES OF ACTION

- Deficiencies
- Advantages
- Disadvantages
- Logistic options
- Priorities

DEVELOP CONCEPT OF SUPPORT

- Maintenance
- Supply
- Services
- Transportation
- Labor
- Facilities

(8) MONITOR SITUATION AND ALERT LOGISTIC OPNS

- Conformance with admin/log order
- Tactical unit status
- Logistic unit status
- Resource status
- Critical logistics events
- Situation changes

Table 2

Summary of Candidate Staff Task Areas For Enhancement

PRIORITY	TASK AREA
1	Analyze Tactical Courses of Action (G2/G3) Predicting battle outcome based on friendly and enemy courses of action is a major challenge to the commander and staff. Current manual techniques do not yield rapid and consistent results. Considerable time is needed for proper performance.
2	Analyze Battlefield Area (G2) Rapid generation and interpretation of topographic and climatic factors is time consuming and a burden on resources. Quality of performance varies significantly. Options for presenting terrain factors and for predicting influence of these factors on military actions would aid in estimating the situation and making tactical decisions.
3	Analyze Tactical Capabilities (G3) Evaluating combat power of force constituents, singly or in combination, is vital to the successful application of combat capabilities. Rapid assessment of combat power is a judgmental exercise based on parameters chosen to represent combat power. Rules for combining these parameters are standardized but deserve additional investigation.
4	Evaluate Enemy Threat (G2) Assessment of enemy capabilities is a vital ingredient in decision making. Interpretation of information indicating conformance of enemy order of battle to doctrinal standard will often permit inferring enemy organization and capabilities. Non-conformance to doctrine also has predictive or interpretive value.

Table 2

Summary of Candidate Staff Task Areas For Enhancement (Continued)

PRIORITY	TASK AREA
5	Analyze Logistic Capabilities (G4) Logistic support of division and corps levels will often have a major influence on tactical decisions. Supply, transportation, maintenance, and service planning and support require continuous analysis, assessment, and adjustment to successfully support combat operations.
6	Develop Tactical Courses of Action (G3) Although identification of viable courses of action is largely a process of judgment, a number of support tasks are necessary and may be candidates for enhancement. Once identified, potential courses of action are subjected to analysis and wargaming. To provide a relative evaluation, these processes should be examined for enhancement.
7	Integrate Enemy Threat (G2) Integration of threat depends on considering enemy courses of action. These are analyzed for their potential impact on the friendly COA's being considered. Situational templates depicting enemy order of battle and deployment in the battle area are used to generate plausible enemy COA's, and wargaming facilitates assessing the potential impact. Subtasks in this difficult and involved process may be candidates for enhancements.
8	Monitor Situation and Alert Operations (G2,G3,G4) Monitoring and alerting techniques are nearly standard across all functional areas; therefore, common logic for these processes may prevail. The value of enhancement rests on advantages to be gained from timely and correct actions based on accurate monitoring of the battle's progress.

Table 2

Summary of Candidate Staff Task Areas For Enhancement (Concluded)

PRIORITY	TASK AREA
9	Plan and Direct the Intelligence Collection Effort (G2) Collection plans are based on the nature of the enemy threat, the mission of the command, and the collection assets available. Division and higher echelons have many different information collection resources; so, collection plans must consider the suitability and availability of each. The aim is to cover every intelligence target effectively without unnecessary redundance.
10	Analyze and Compare Logistic Courses of Action (G4) A variety of logistic options may support any chosen tactical COA. Such options invariably involve trade-offs between the various logistic support functions (supply, transportation, maintenance, and services). Consequently, each option must be evaluated to optimize overall combat logistic support.

DESCRIPTION OF SELECTED STAFF FUNCTION AREAS

A review of tactical decision making activities in the coordinating staff areas of intelligence, operations, and logistics was conducted, and the results were documented. The documentation, in flowchart form, appears in this section. The flowcharts of each staff planning process show the links, generally sequential, between the principal tasks of each function and serve to relate the high priority tasks to all other tasks of the staff function. Those high priority tasks, which have been selected as candidates for human performance enhancement, have been examined and are flowcharted in greater detail in the following section.

Intelligence Staff Planning Process

The intelligence staff officer (G2) is the principal staff officer for the commander on all military intelligence matters. The G2 acquires intelligence information and data; analyzes and evaluates the information and data; and presents the assessment evaluation and recommendation to the commander. This information must permit the commander to see the entire battlefield; i.e., deep threat, covering force area, main battle area, and rear area. The G2 must identify high payoff targets throughout the command area of interest. With other command and staff elements and through the efficient use of plans, orders, and standing operating procedures (SOP), the G2 directs all elements in the intelligence and counterintelligence support roles.

The G2 has primary coordinating staff responsibility in tactical decision making for the production of intelligence, which involves the collection and processing of information, conversion of information into intelligence, and dissemination of information and intelligence. The intelligence staff planning process inherent in tactical decision making is diagrammed in Figure 6. The dashed lines used in boxes around portions of the figures are used to indicate those staff tasks which comprise a higher order staff function. The higher order function is appropriately titled within the intelligence staff planning process; for example, the intelligence staff function, Evaluate Threat (Figure 2), is composed of the task's Determine Threat Order of Battle and Develop Enemy Capabilities (Figure 5). A more detailed discussion of the intelligence staff planning process is presented in Appendix C.

INTELLIGENCE PREPARATION OF THE BATTLEFIELD (IPB)

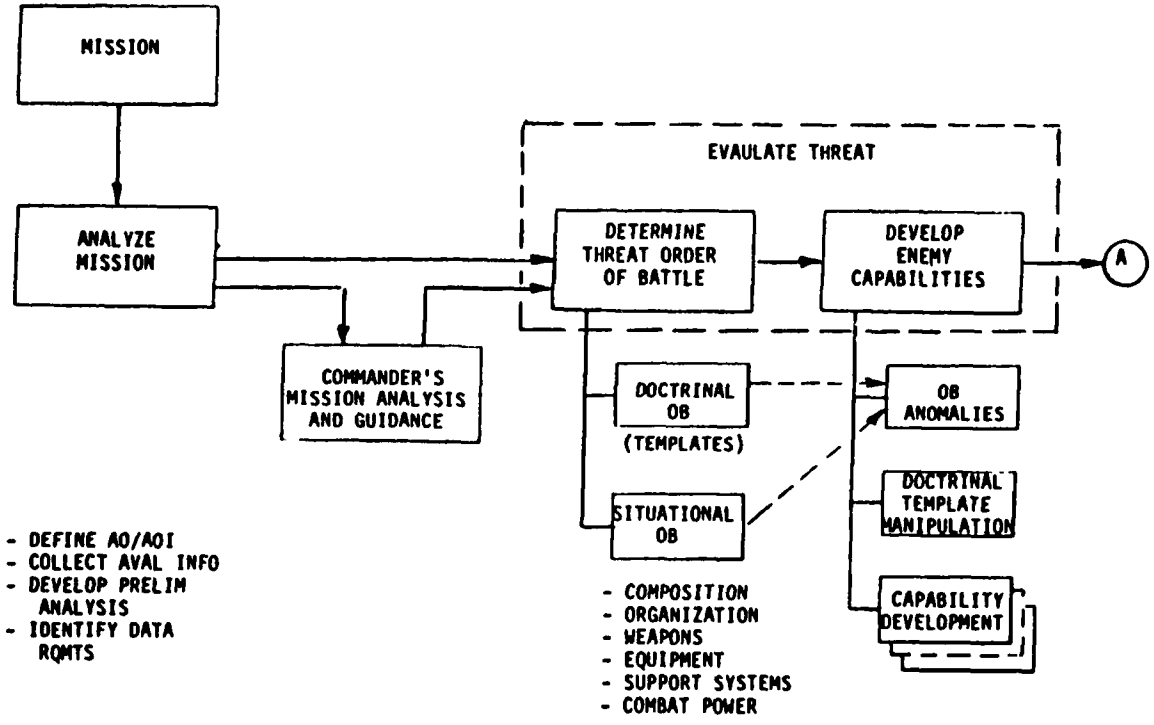

Figure 6. Intelligence Staff Planning Process (Detailed).

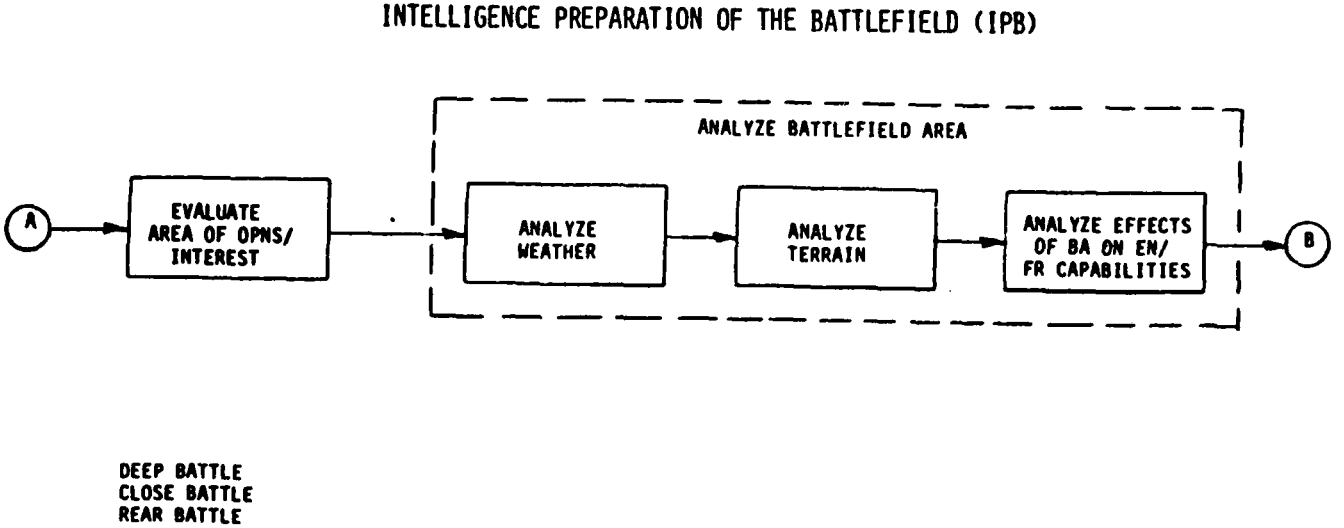

Figure 6. Intelligence Staff Planning Process (Continued).

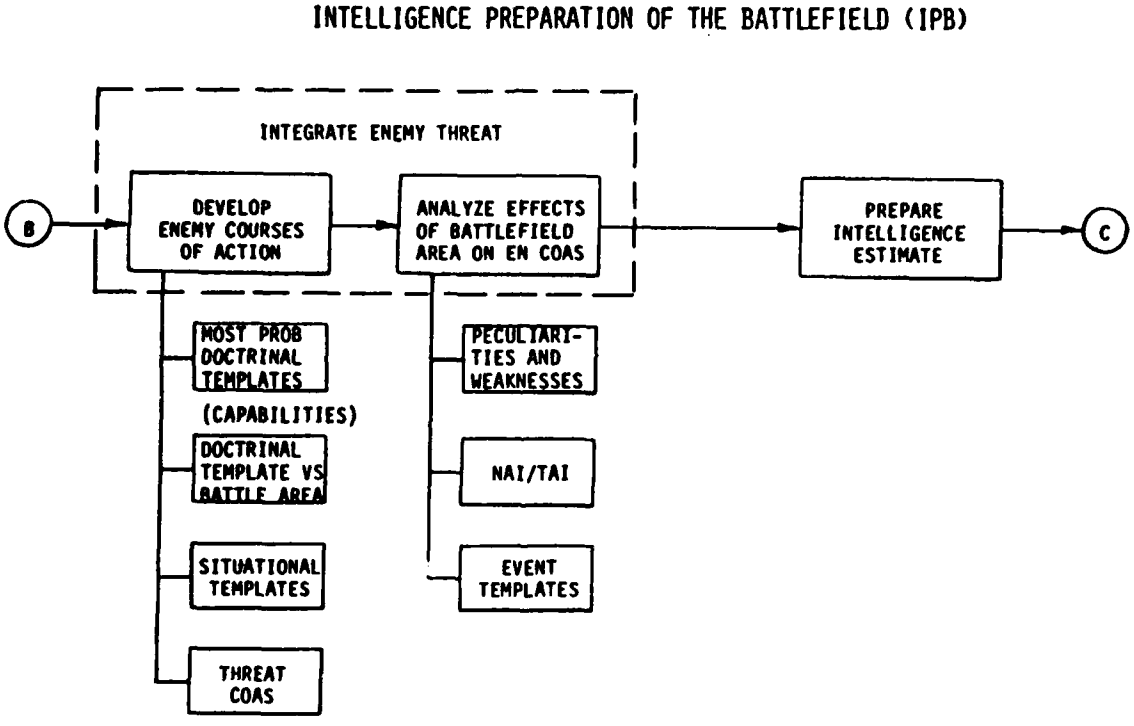

Figure 6. Intelligence Staff Planning Process (Continued).

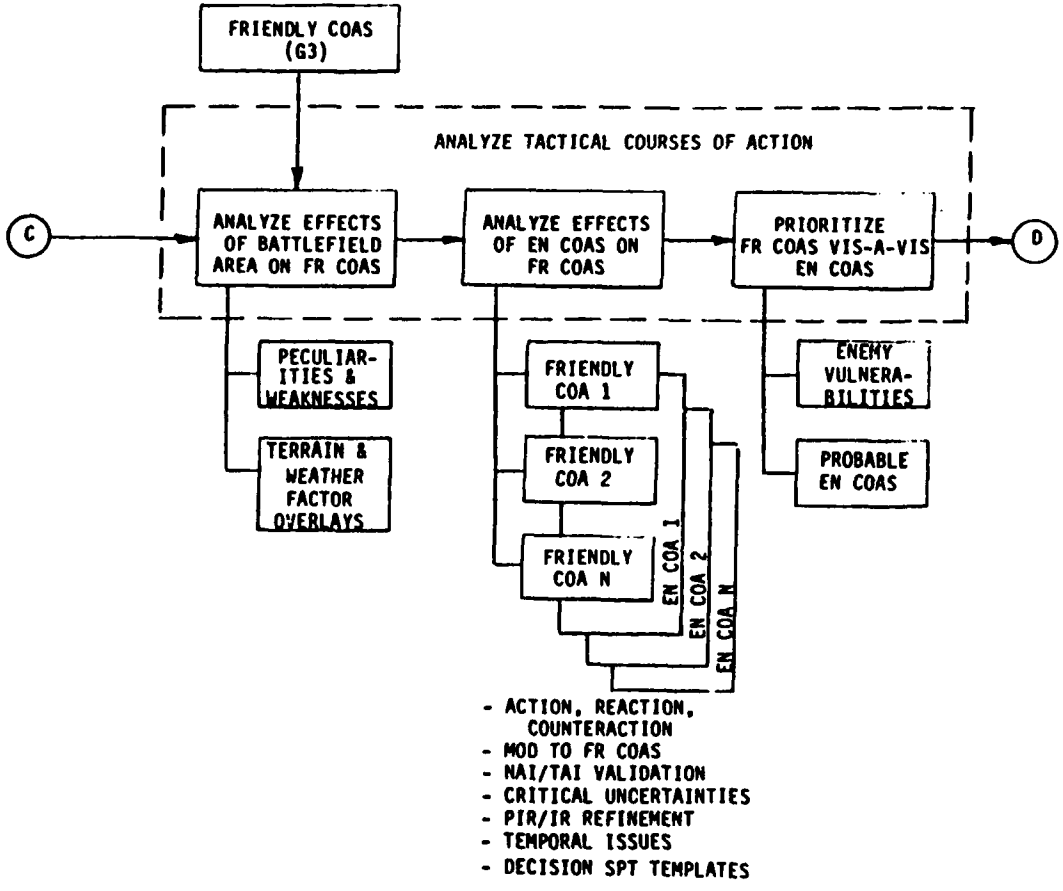

Figure 6. Intelligence Staff Planning Process (Continued).

INTELLIGENCE PREPARATION OF THE BATTLEFIELD (IPB)

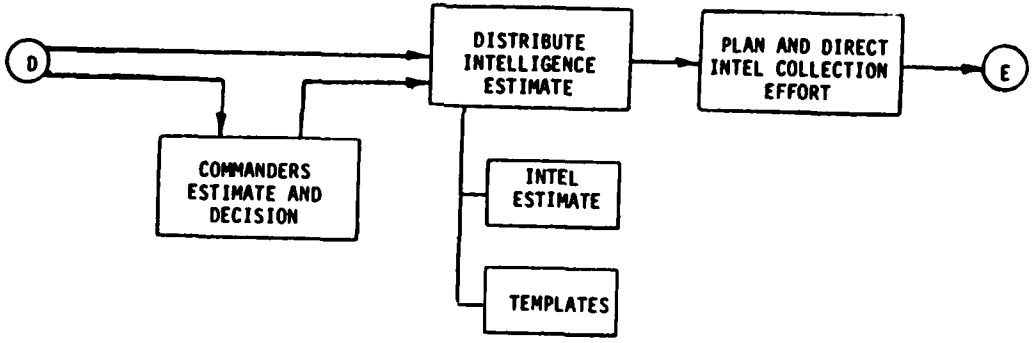

Figure 6. Intelligence Staff Planning Process (Continued).

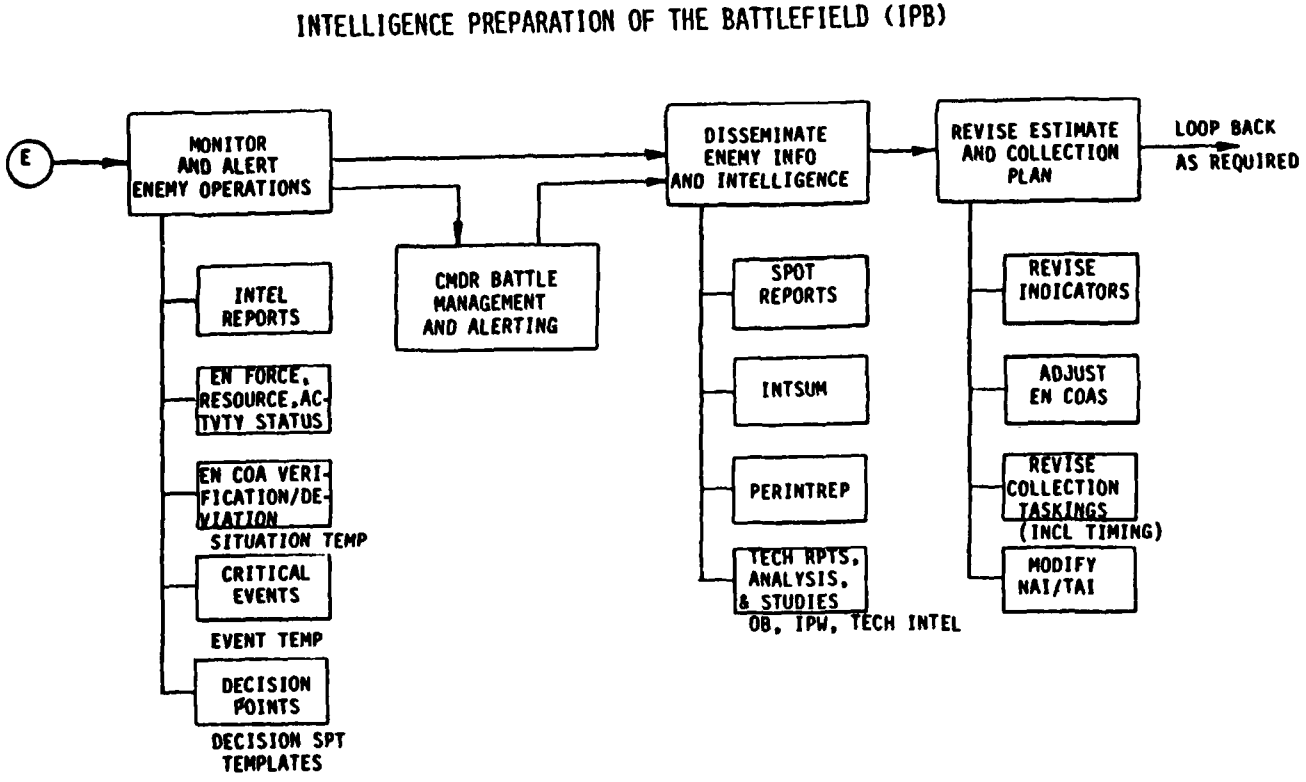

Figure 6. Intelligence Staff Planning Process (Concluded).

Operations Staff Planning Process

The operations staff officer (G3) is the principal staff officer for the commander in matters concerning operations, plans, organization, and training. The nature of the operations officer's responsibilities requires a high degree of coordination with other staff members.

The G3 has primary coordinating staff responsibility in tactical decision making for all aspects of tactical operations including such tasks as maintaining a current operation estimate of the situation, preparing and publishing the command SOPs, preparing operation plans and orders, recommending priorities for allocating critical resources of the command, recommending task organization and assigning missions to subordinate elements of the command, coordinating all aspects of maneuver with combat and combat service support, and recommending integrated schemes of maneuver and fires, including nuclear and chemical fires. The operations staff planning process inherent in tactical decision making is diagrammed in Figure 7. A more detailed discussion of the operations staff planning process is presented in Appendix B.

OPERATIONS STAFF PLANNING PROCESS

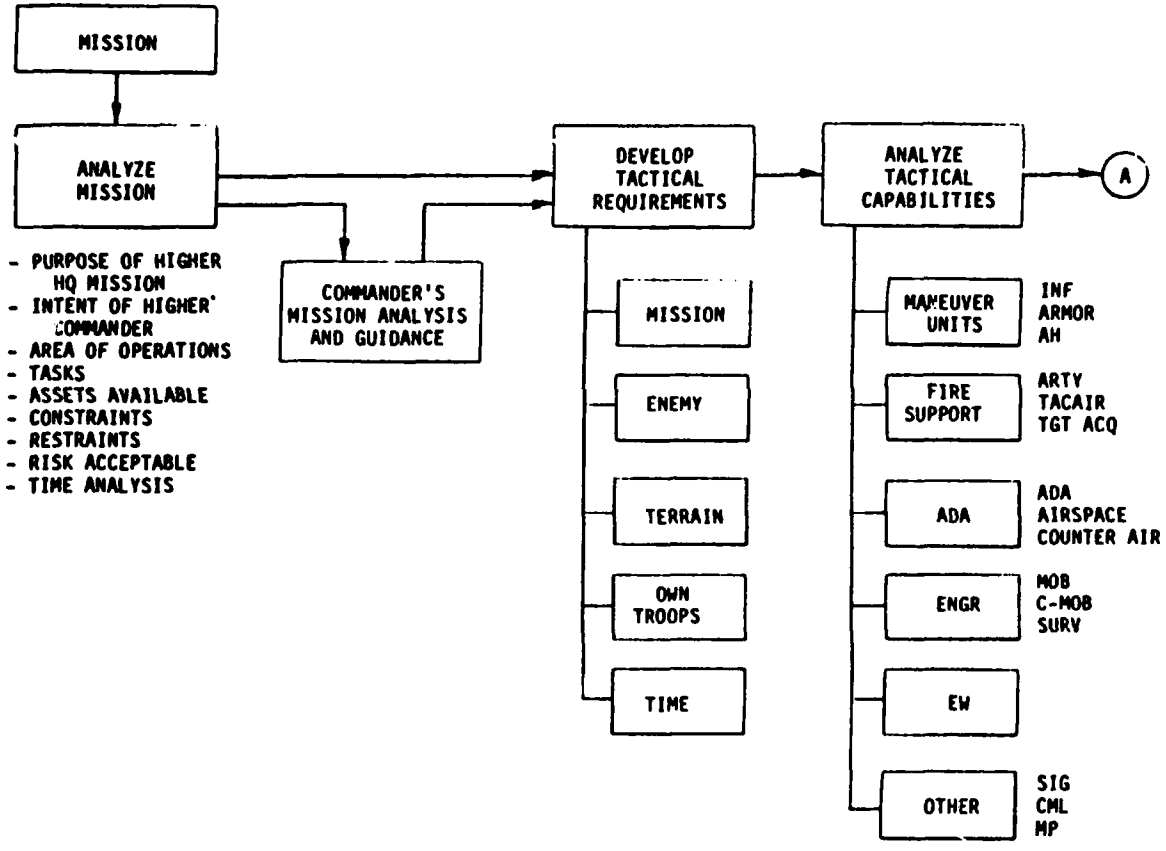

Figure 7. Operations Staff Planning Process (Detailed).

OPERATIONS STAFF PLANNING PROCESS

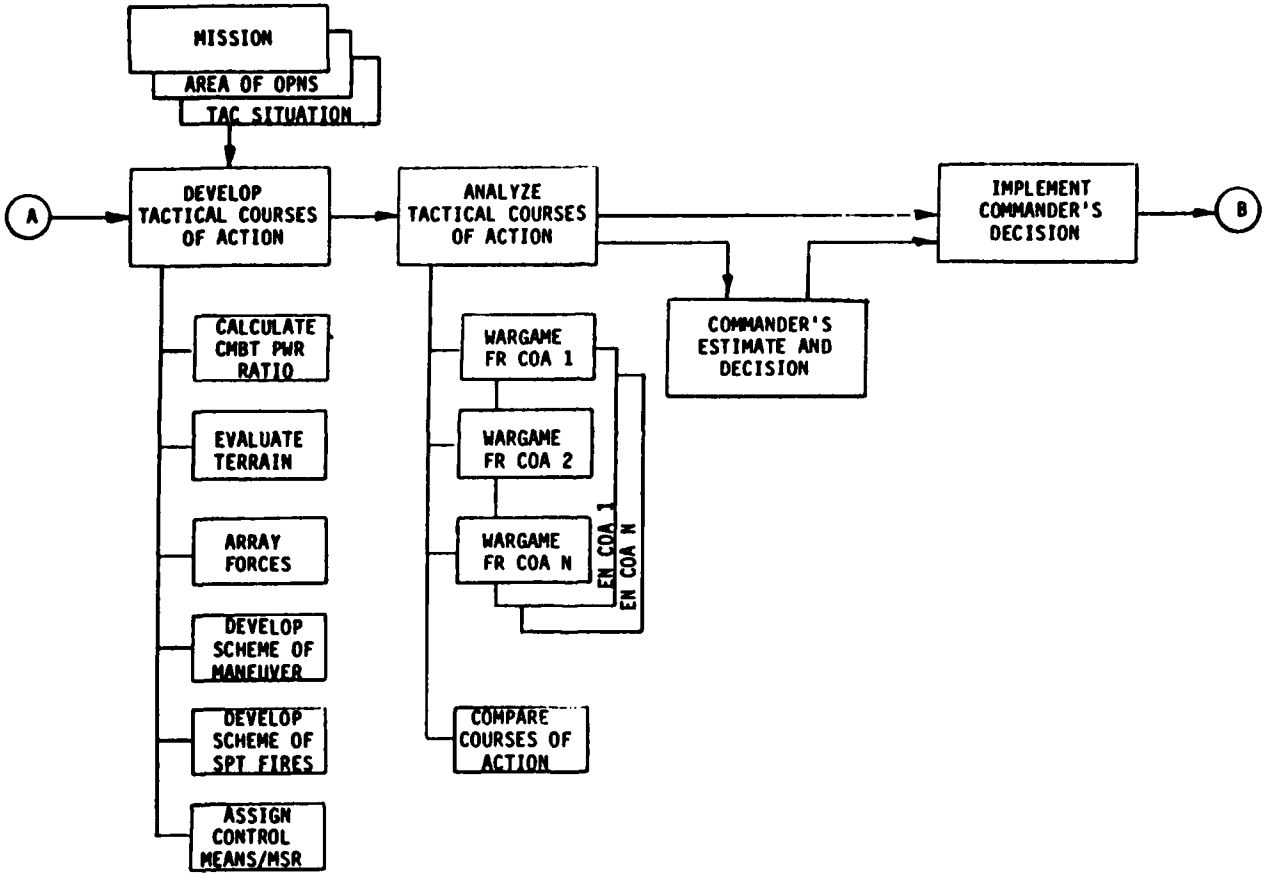

Figure 7. Operations Staff Planning Process (Continued).

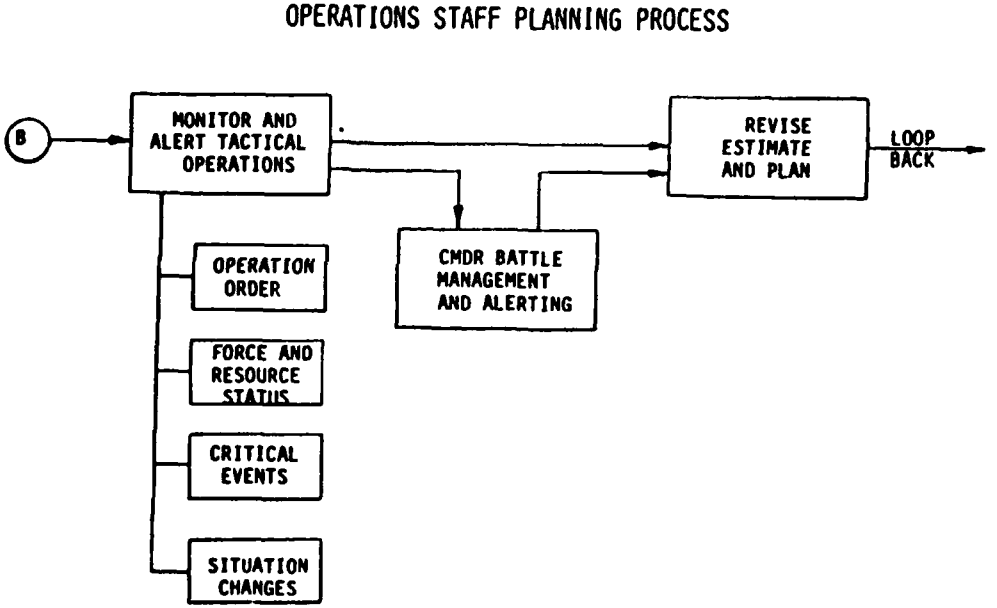

Figure 7. Operations Staff Planning Process (Concluded).

Logistic Staff Planning Process

The logistic staff officer (G4) is the principal staff officer for the commander in matters of supply, maintenance, transportation, and services. As the logistic planner, he must maintain close and continuous coordination with the support command commander, who is responsible for logistic support operations, and with the G3 for support of tactical operations.

The logistics staff officer conducts his planning to accommodate the requirements of the division during all phases of a tactical operation. The logistics concept of support and the resulting logistic plan are developed concurrently with the tactical plan, and the tactical plan is formalized only after it has been determined that the proposed tactical course of action can be supported logistically. The logistic staff planning process inherent in tactical decision making is diagrammed in Figure 8.

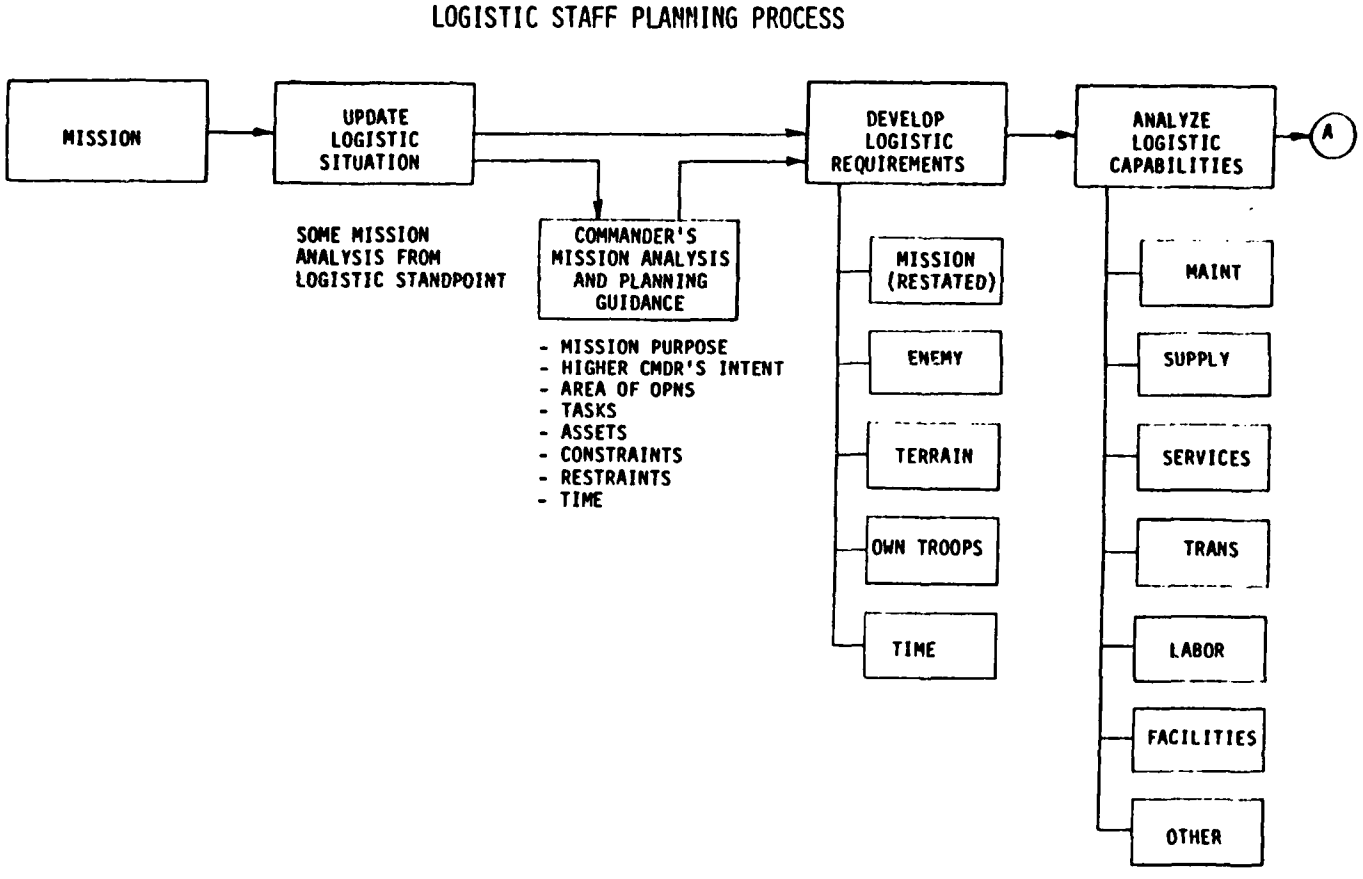

Figure 8. Logistic Staff Planning Process (Detailed).

LOGISTIC STAFF PLANNING PROCESS

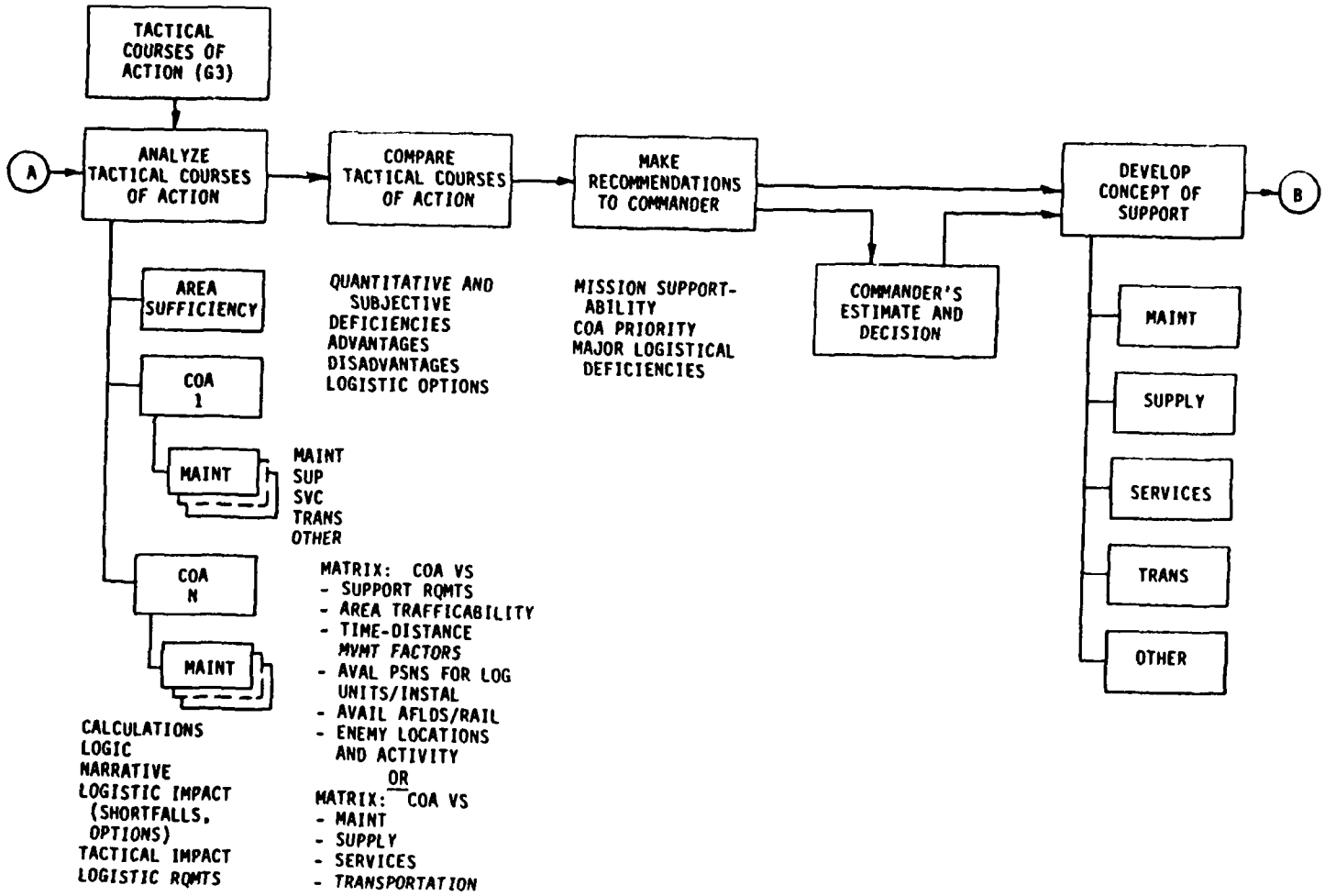

Figure 8. Logistic Staff Planning Process (Continued).

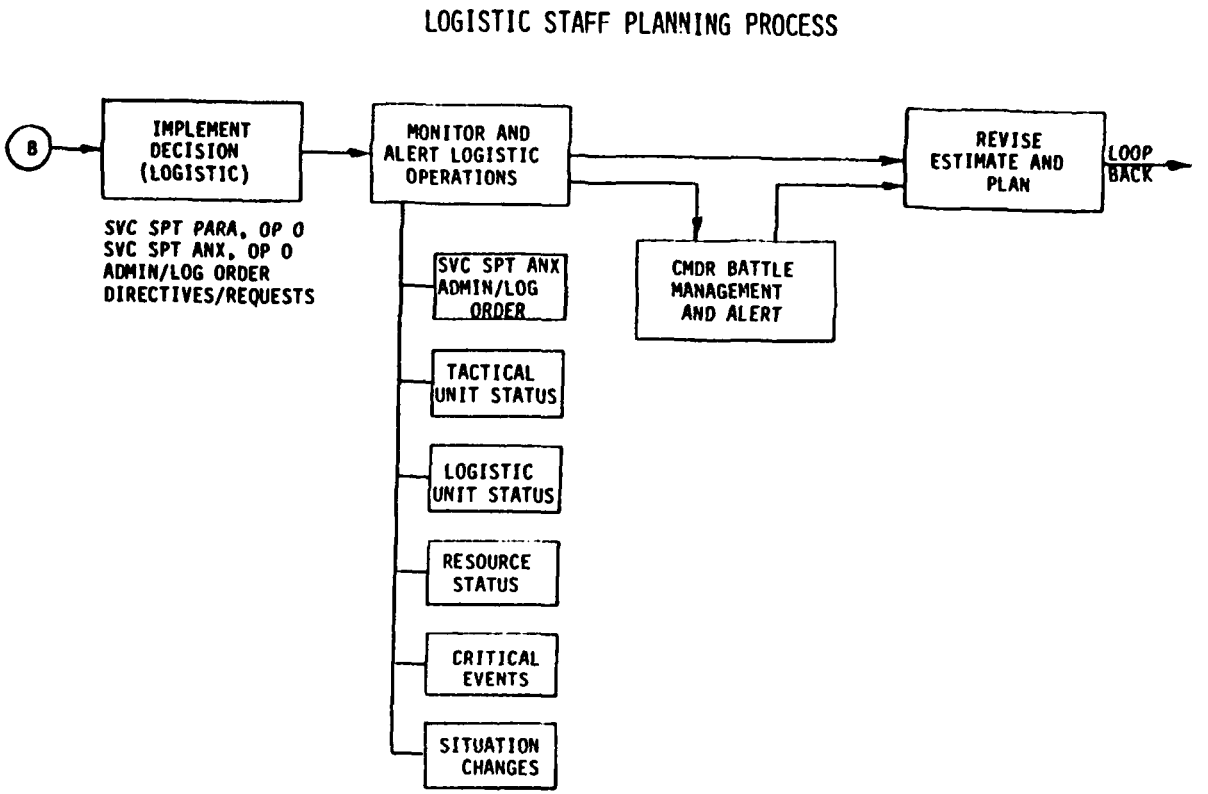

Figure 8. Logistic Staff Planning Process (Concluded).

DETAILED DESCRIPTIONS OF SELECTED STAFF TASKS

Ten staff tasks have been selected as top priority candidates for human performance enhancement (see Table 2 above). The six highest priority tasks have been selected for more detailed analysis and flowcharting, the results of which are presented in this section in priority order.

Analyze Tactical Courses of Action

After tentative courses of action have been developed by G3 and his staff colleagues, it is necessary to analyze and compare the developed options. The analysis process, based on war-gaming, is a time-consuming and burdensome exercise with great potential for leaving out critical factors. If it is practical to lighten this burden, shorten the process, or reduce uncertainty in the result, there could be much to gain from that improvement. Its clear overall need and its key position in decisions that bear directly on the outcome of a battle, earn this analysis task the top priority for enhancement attention. To identify subtasks involved in the analysis process, the box entitled "Analyze Tactical Courses of Action" in Figure 7 has been expanded in Figure 9.

Analyze Battlefield Area

The intelligence staff planning process is another exacting function that is rich in enhancement potential. It is a key function that contains many burdensome and time-consuming tasks. Indeed, the selection criteria of importance, time, burden, and variability in performance justify a priority 2 for enhancements or aiding of the task "Analyze Battlefield Area." To identify subtasks involved in the analysis process, the box entitled "Analyze Battlefield Area" in Figure 6, has been expanded in Figure 10.

Analyze Tactical Capabilities

Operational components of a tactical military force are categorized as combat maneuver forces, combat support, and combat service support (FM 101-5-1). Combat maneuver forces are primarily infantry, armor, and aviation. Combat support includes artillery, air defense artillery, engineer, military police, signal, military intelligence, and chemical. Combat service support includes administrative services, civil affairs, food services, finance, legal services, maintenance, medical services, supply, transportation, and other logistical services. Military planners find it particularly desirable to use these categories in the analysis of tactical and logistical capabilities of a force, friendly or enemy, because of the operational missions assigned to the units in each of these categories. Combat maneuver forces engage the enemy with direct fire weapon systems; combat support forces, as force multipliers, provide fire support and operational assistance to combat maneuver forces; and combat service support forces provide sustainment for all force components.

After studying the mission and its implications and carefully identifying the tactical requirements to accomplish it, a commander evaluates the tactical capabilities of the forces available in order to develop candidate tactical courses of action. Evaluating tactical capabilities involves a number of steps to assess force status and its effect on actual combat potential; thus,

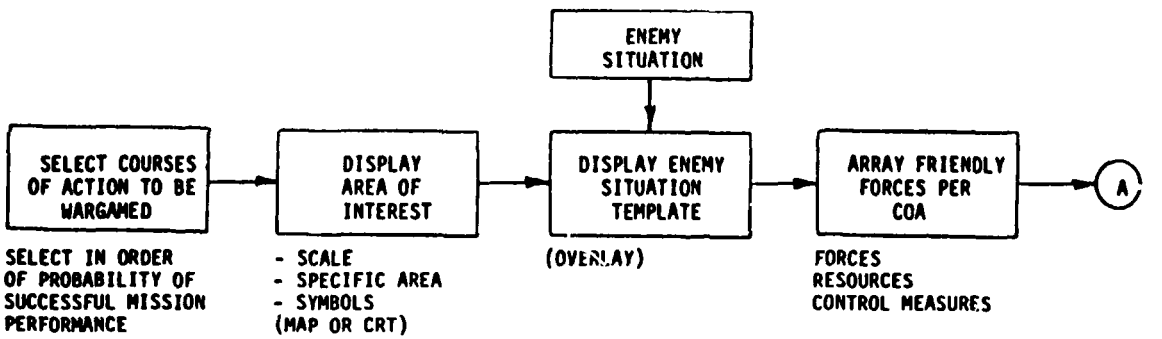

Figure 9. Analyze Tactical Courses of Action.

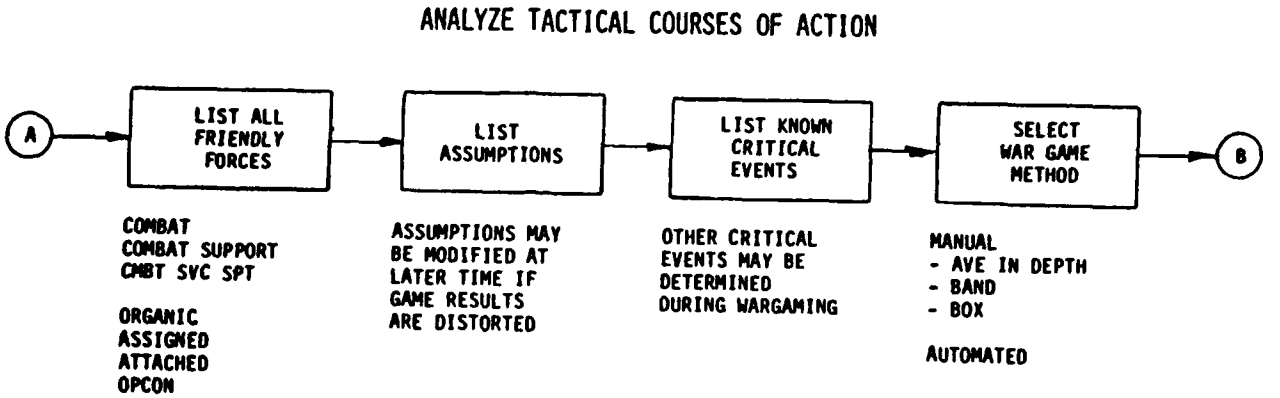

Figure 9. Analyze Tactical Courses of Action (Continued).

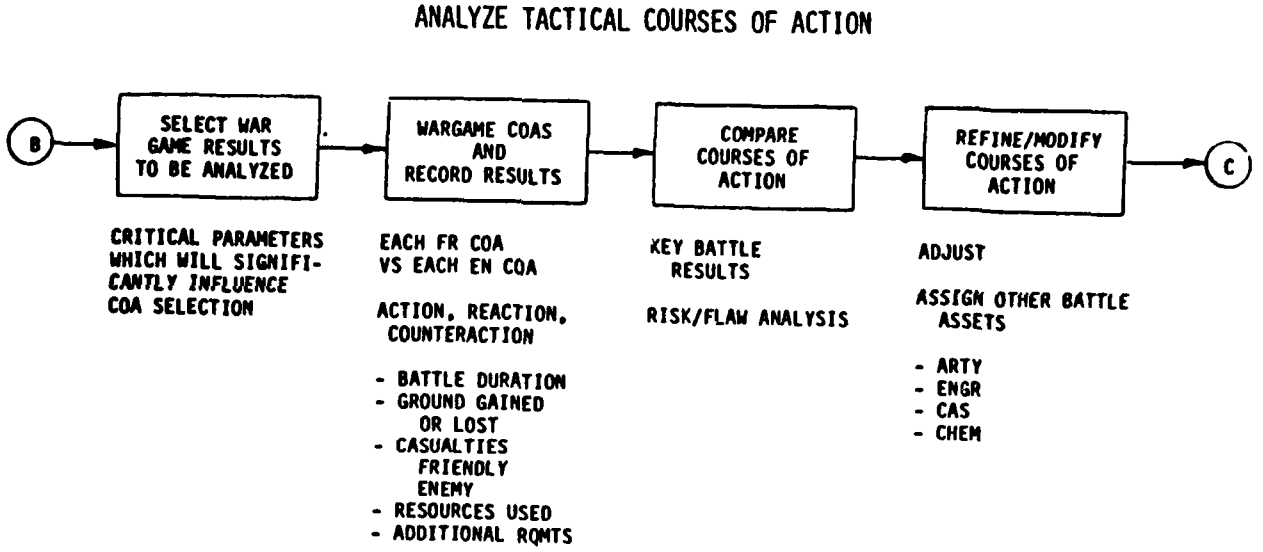

Figure 9. Analyze Tactical Courses of Action (Continued).

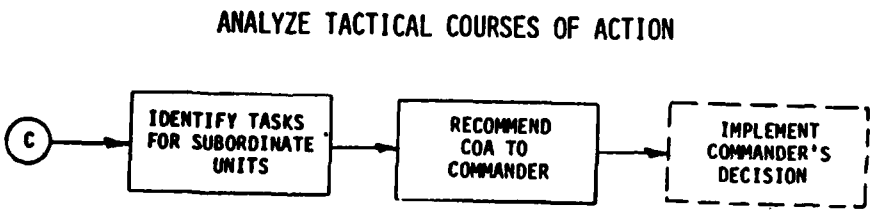

Figure 9. Analyze Tactical Courses of Action (Concluded).

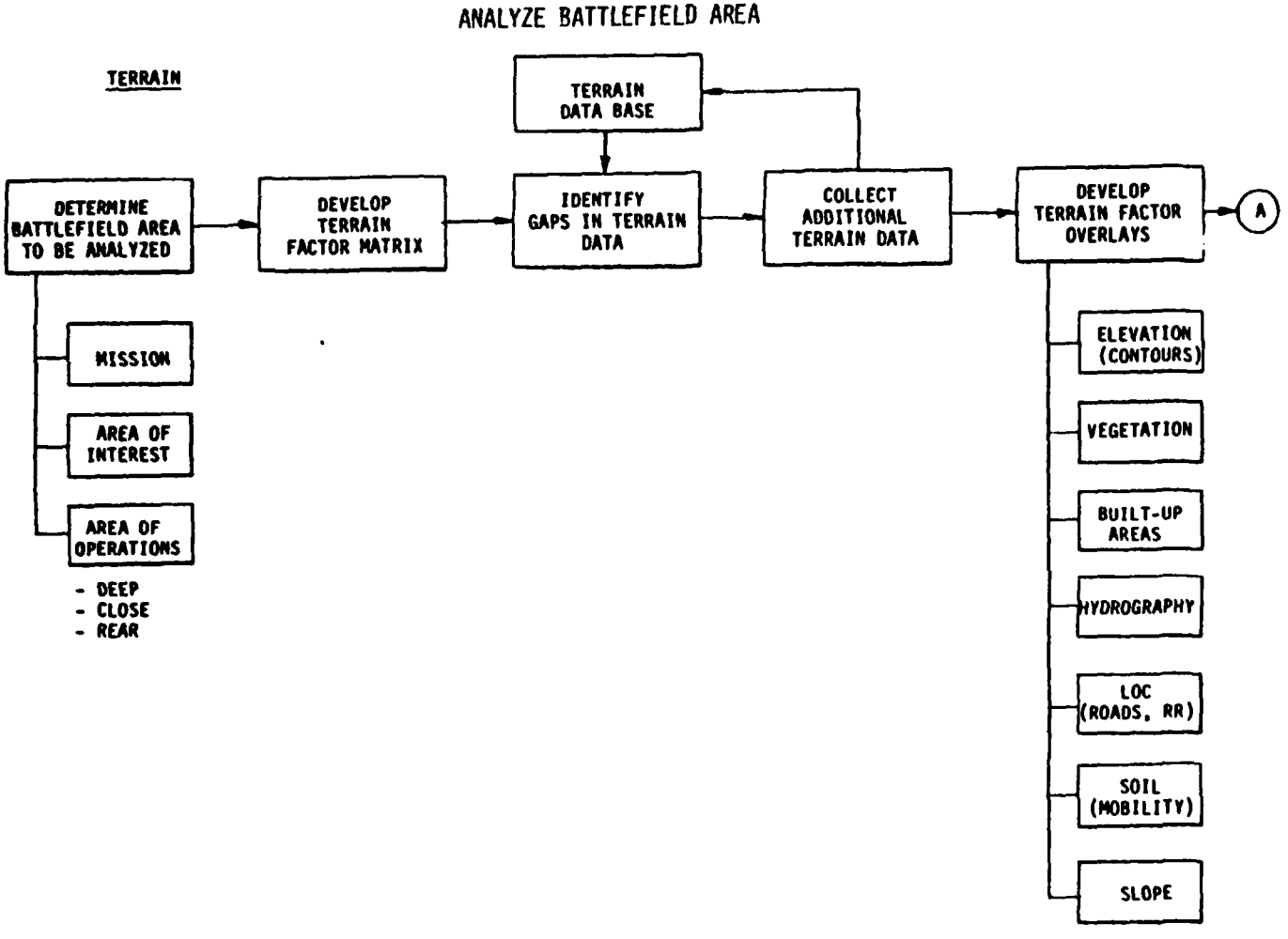

Figure 10. Analyze Battlefield Area.

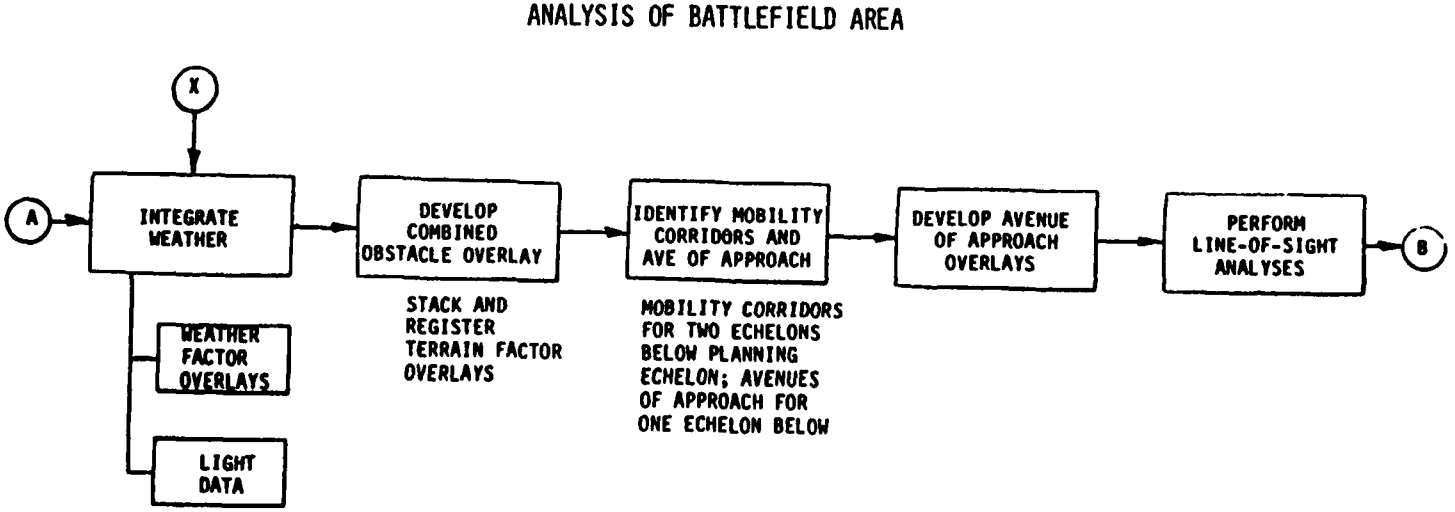

Figure 10. Analyze Battlefield Area (Continued).

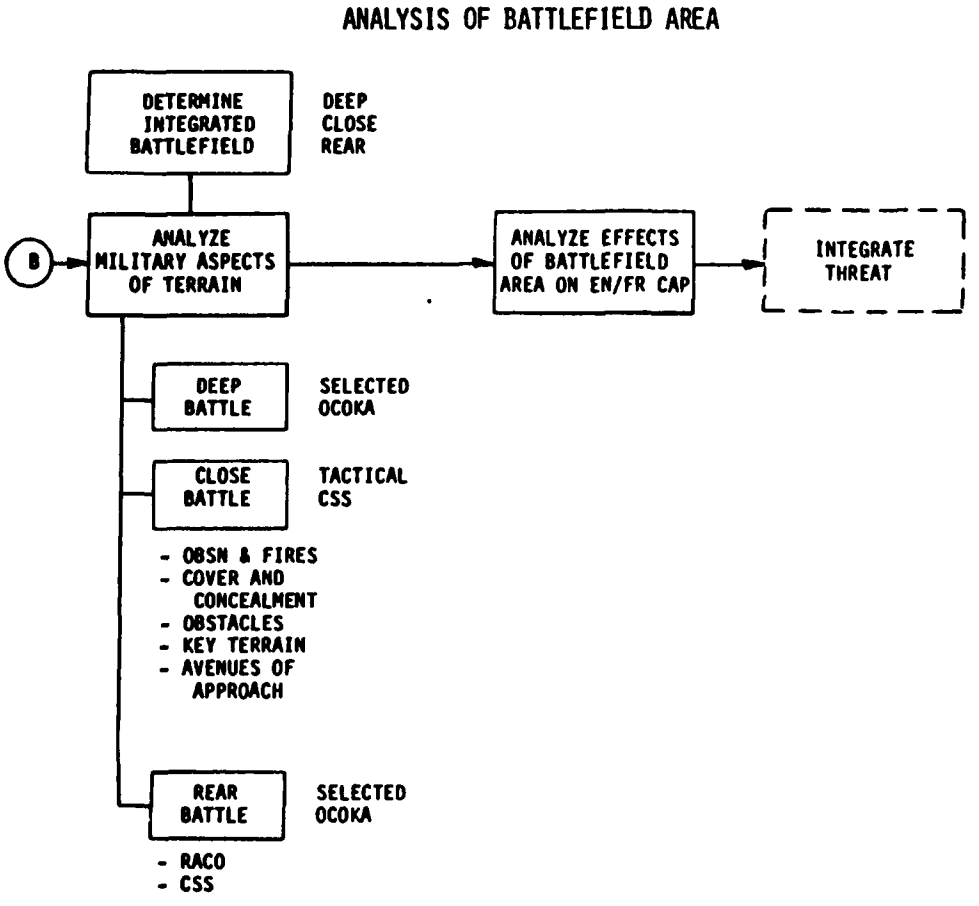

Figure 10. Analyze Battlefield Area (Continued).

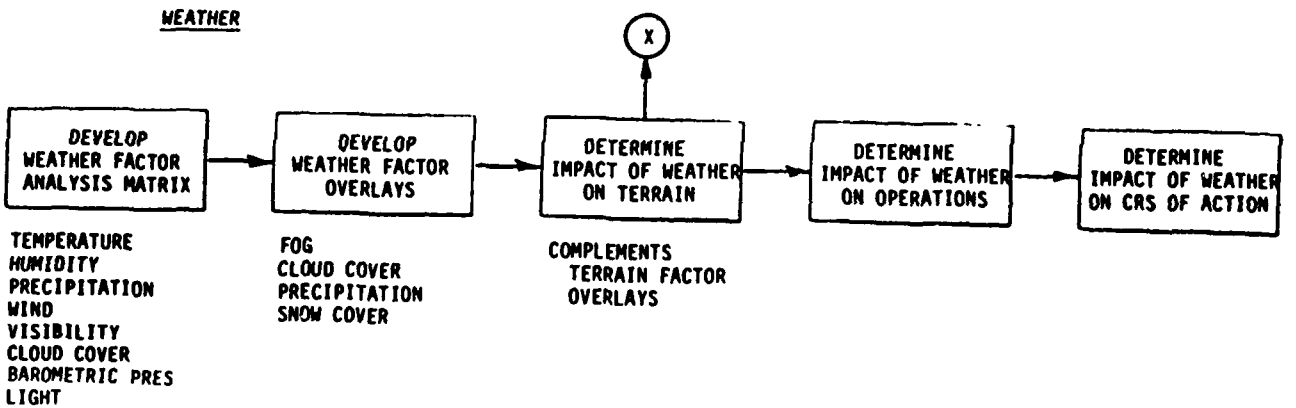

Figure 10. Analyze Battlefield Area (Concluded).

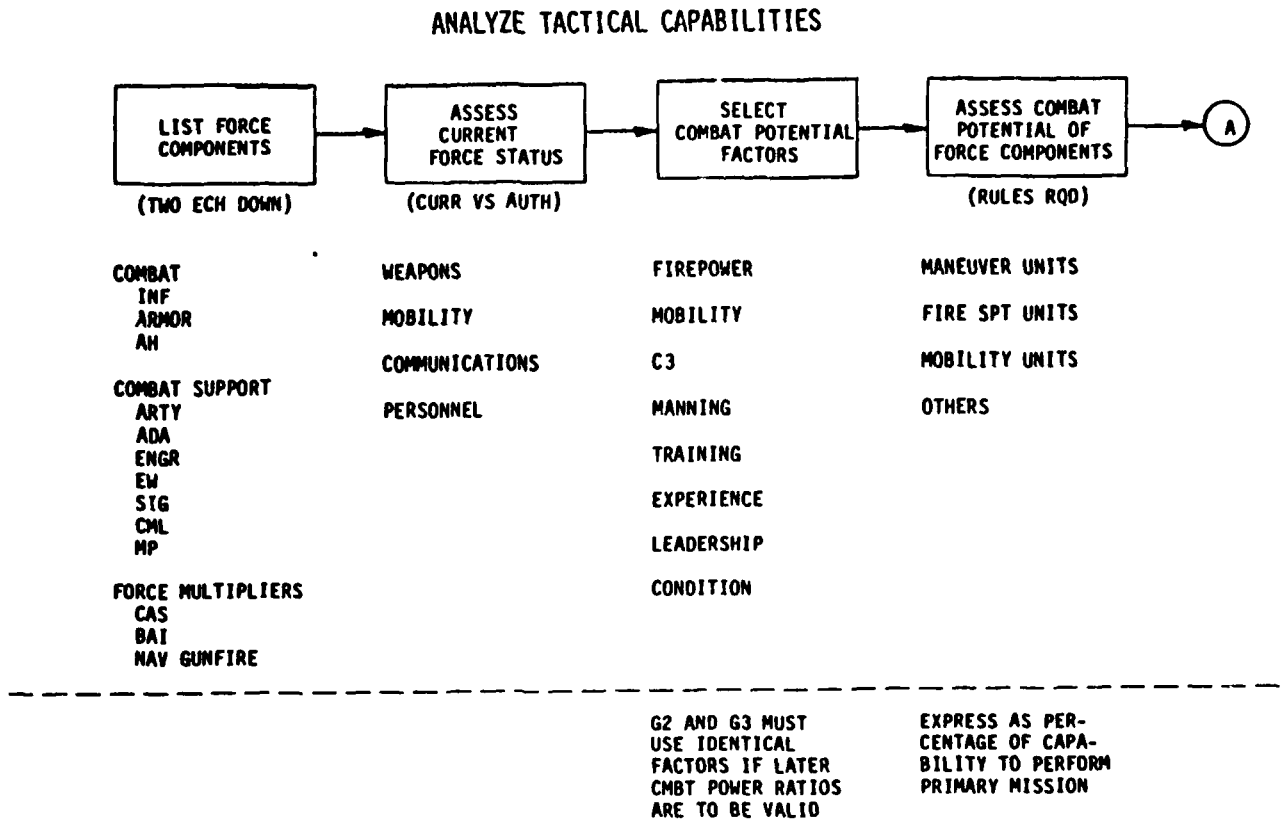

Figure 11. Analyze Tactical Capabilities.

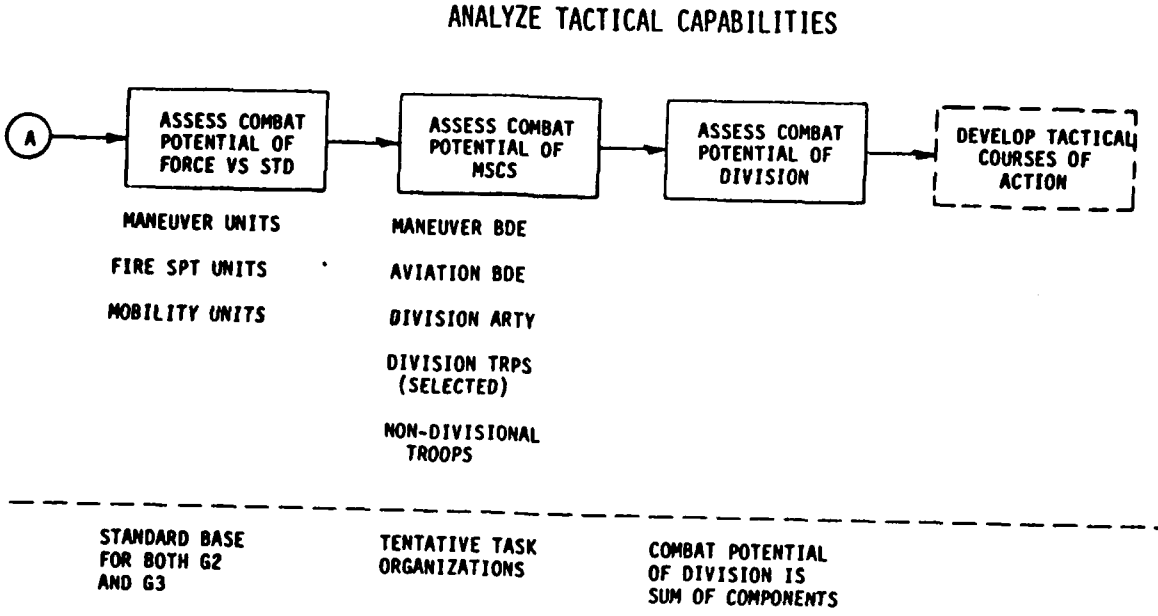

Figure 11. Analyze Tactical Capabiliteis (Concluded).

analysis of combat capabilities is a key requirement for developing specific battle plans to accomplish the mission, and it is a prerequisite to any systematic assessment of the relative combat power of friendly and enemy units that may be thrust against each other by the chosen battle plan. Figure 11 details the task labeled "Analyze Tactical Capabilities" from Figure 7. A number of subtasks in the detailed diagram -- such as "Assess Current Force Status," or "Assess Combat Potential of Force Components" -- are good candidates for aids and enhancements. This is a particularly inviting task area in which the full range of aids -- from data retrieval, to display enhancement, to expert systems -- may profitably be scanned for appropriate candidates.

Evaluate Enemy Threat

Figure 12 identifies steps of the intelligence staff task, "Evaluate Enemy Threat" (Figure 6). Performance of this task is key to the appreciation of enemy capabilities and, conversely, can help to identify his vulnerabilities, and thus support the selection and/or modification of friendly tactics and courses of action. It is given a one-step lower priority than the analysis of own force capabilities because it is a less detailed process, based on a lower level of available data. Since enemy data are less available and less rich in detail, identification of probable enemy intent and assessment of probable enemy battle plans are challenges to human insight and intelligence. Any measures that can relieve the staff of purely mechanical or methodical sub-tasks will free these officers to concentrate on other expert judgments and decisions which are their particular responsibility.

Analyze Logistic Capabilities

Analysis of logistic capabilities of a force is a continuing challenge to the G4 and the division support command commander. In order to plan effectively the logistic support of tactical operations, the G4 must have current knowledge of logistic force and resource status, must be able to quickly relate this status to tactical mission support, and must translate these capabilities into a viable concept of logistic support. Figure 13 diagrams the subtasks of this important logistic task.

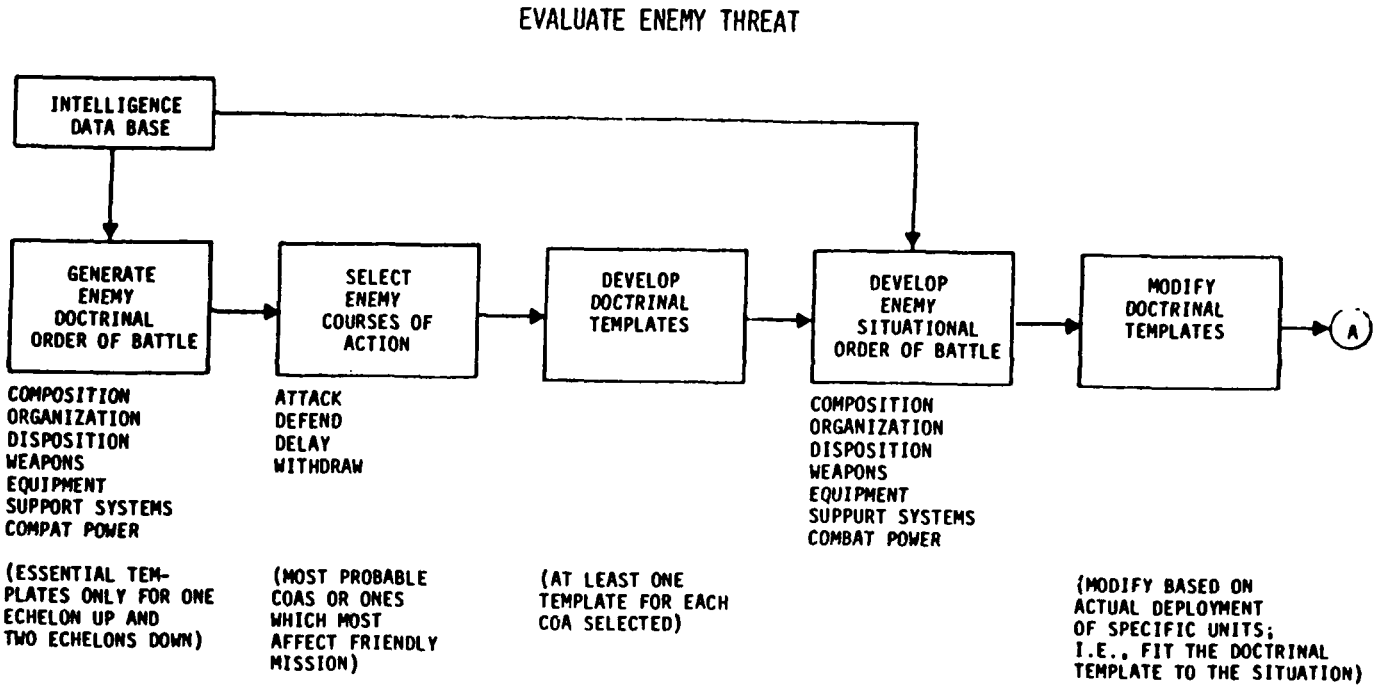

Figure 12. Evaluate Enemy Threat.

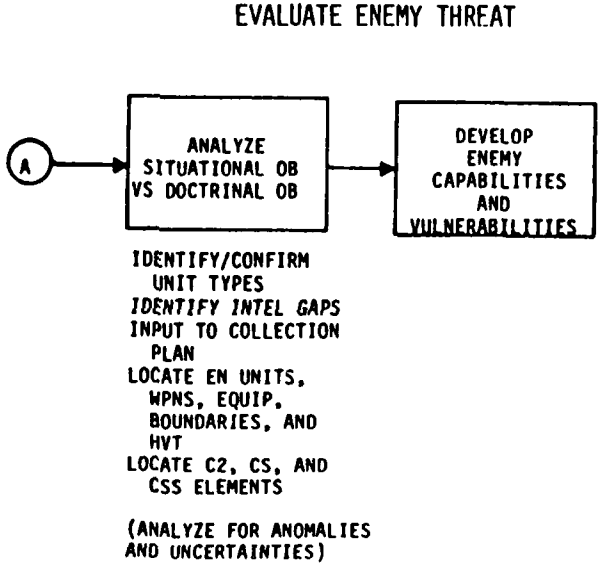

Figure 12. Evaluate Enemy Threat (Concluded).

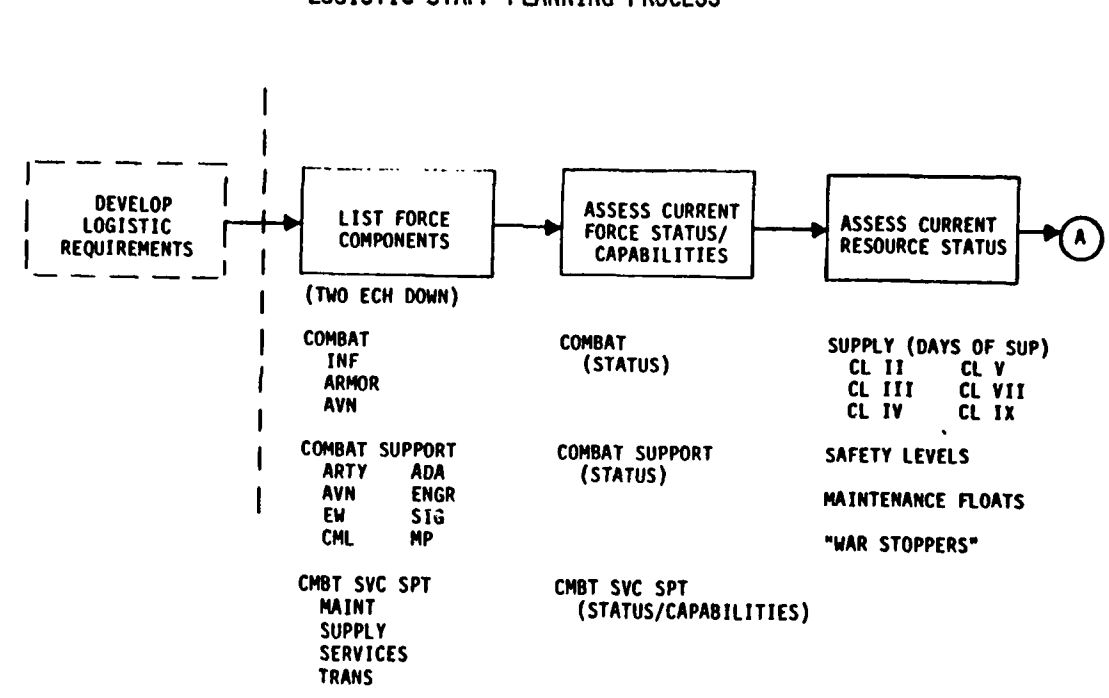

Figure 13. Analyze Logistic Capabilities.

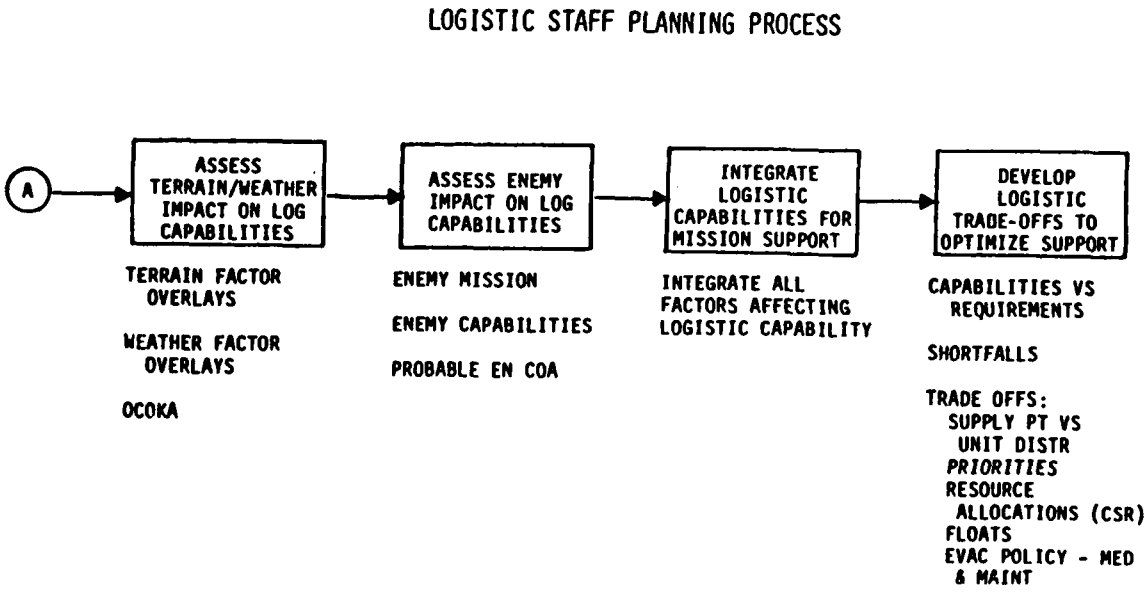

Figure 13. Analyze Logistic Capabilities (Concluded).

Develop Tactical Courses of Action

The development of tactical courses of action by G3 and his staff associates is another task whose decisions and insights are fed by a number of methodical subtasks. Figure 14 identifies the sequence of steps and indicates subtasks to consider for possible aiding or enhancement. The nature and number of these subtasks draw attention to a substantial enhancement potential. Easily automated subtasks, such as computing relative combat power, are natural candidates; however, existing aids for the more complex subtasks of terrain evaluation provide additional reasons for selecting this as an area for enhancement.

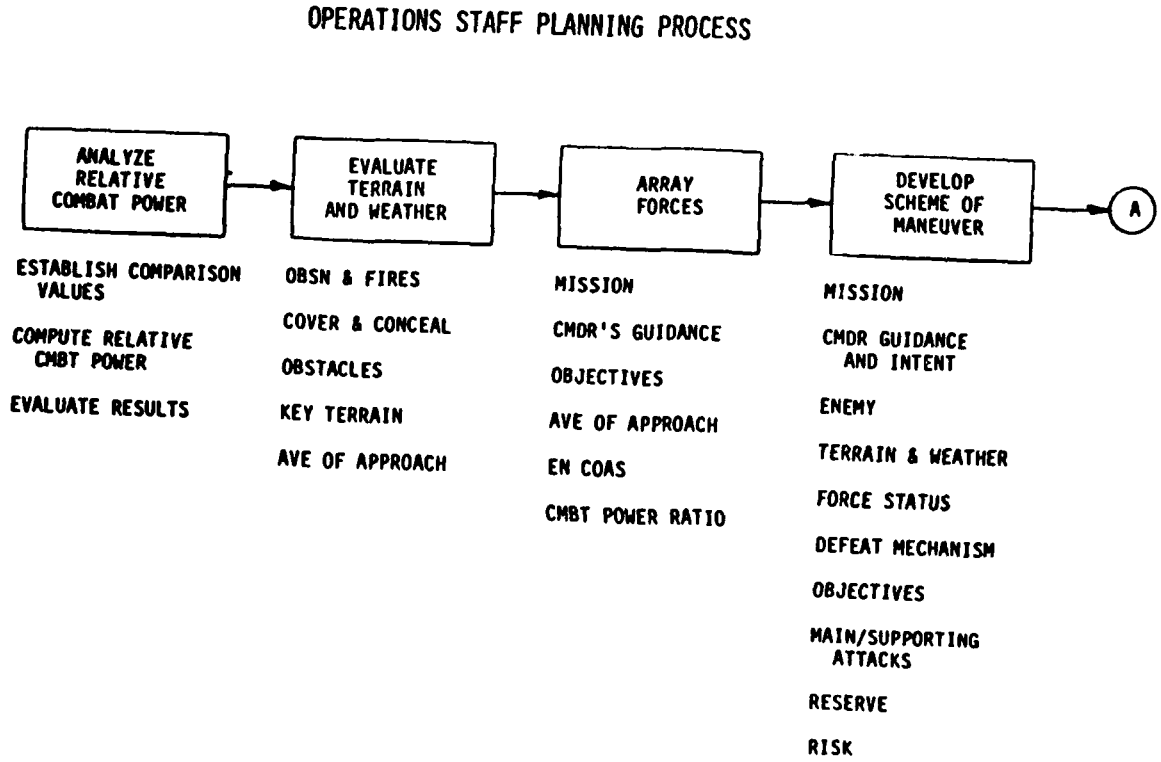

Figure 14. Develop Tactical Courses of Action.

OPERATIONS STAFF PLANNING PROCESS

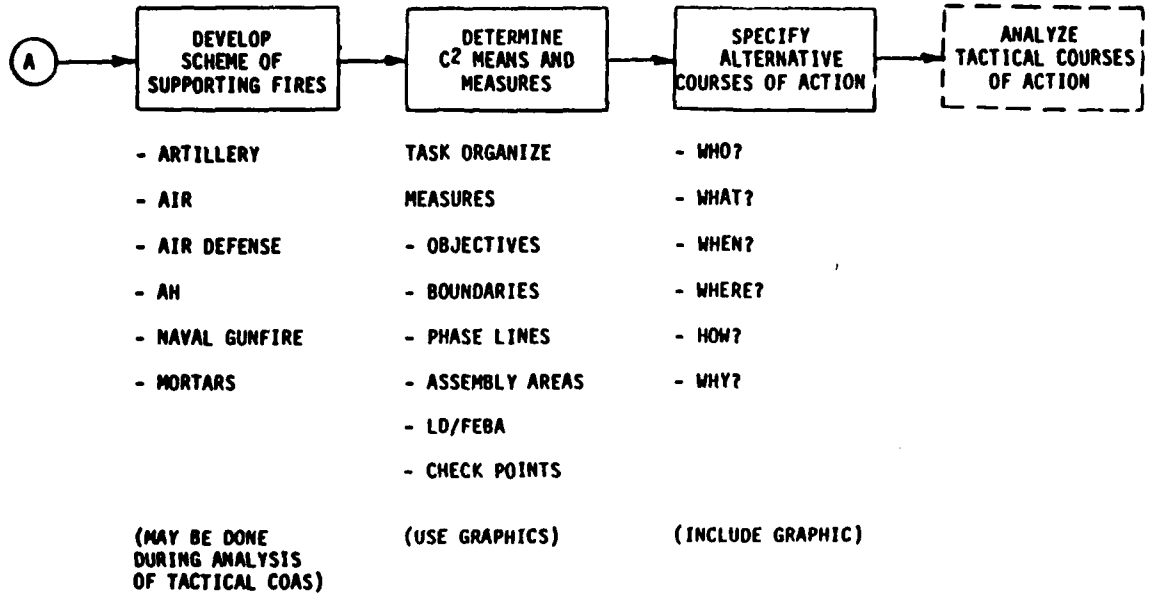

Figure 14. Develop Tactical Courses of Action (Concluded).

SUMMARY AND RECOMMENDATIONS

Tactical decision making tasks in the staff functional areas of intelligence, operations, and logistics have been described and analyzed in order to identify those staff tasks which offer the greatest opportunity for human performance enhancement. Established Army doctrine, coupled with input from Army subject matter experts in tactical command and control, provided the basis for identification and analysis of the candidate staff tasks. From the staff tasks identified and analyzed, ten tasks were selected as especially worthy of early consideration for human performance enhancement and has recommended a priority for such task enhancement. The priority ranking is based primarily on Army doctrinal publications, and the rankings may be subject to challenge by other Army experts as to the absolute order of importance. Nevertheless, it is believed that the ten staff tasks selected include the important tasks in tactical decision making and are offered as the prime candidates for enhancing human performance.

It is recommended that the six top priority staff planning tasks identified for human performance enhancement be used as initial candidate areas for research and development efforts.

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APPENDIX A

GLOSSARY OF ABBREVIATIONS

GLOSSARY OF ABBREVIATIONS

ADA	Air defense artillery
Admin	Administrative
Aflds	Air fields
AH	Attack helicopter
Ammo	Ammunition
Anx	Annex
AO	Area of operations
AOI	Area of interest
ARI	Army Research Institute
Arty	Artillery
Auth	Authorized
Aval	Available
Ave	Avenue
BA	Battlefield area
BAI	Battlefield air interdiction
Bde	Brigade
Cap	Capability
CAS	Close air support
Civ-Mil	Civil-military
CL	Class
Cmbt Pwr	Combat power
Cmdr	Commander
Cml	Chemical
C-Mob	Counter-mobility
COA(s)	Course(s) of action
CRT	Cathode ray tube

CS	Combat support
CSR	Controlled supply rate
CSS	Combat service support
Curr	Current
C^2	Command and control
C^3	Command, control, and communications
Distr	Distribution
Ech	Echelon
EDDIC	Experimental Development, Demonstration, and Integration Center
En	Enemy
Engr	Engineer
Evac	Evacuation
EW	Electronic warfare
FEBA	Forward edge of the battle area
FLOT	Forward line of own troops
FM	Field manual
Fr	Friendly
G1	Personnel coordinating staff function
G2	Intelligence coordinating staff function
G3	Operations coordinating staff function
G4	Logistics coordinating staff function
G5	Civil-military operations coordinating staff function
HPE	Human performance enhancement
Hq	Headquarters
HVT	High value target
Incl	Including
Inf	Infantry

Info	Information
Instal	Installation
Intel	Intelligence
INTSUM	Intelligence summary
IPB	Intelligence preparation of the battlefield
IPW	Interrogation of prisoners of war
IR	Information requirements
KM	Kilometer
LD	Line of departure
LOC	Line of communication
Log	Logistics
Main	Maintaining
Maint	Maintenance
Med	Medical
Mob	Mobility
Mod	Modifications
MP	Military police
MSC(s)	Major subordinate command(s)
MSR	Main supply route
Mvmt	Movement
NAI	Named area of interest
Nav	Naval
OB	Order of battle
Obsn	Observation
OCOKA	Observation, cover and concealment, obstacles, key terrain, avenues of approach
OPCON	Operational control
OPLAN	Operation plan

Opns	Operations
Op O	Operation O
Para	Paragraph
PERINTREP	Periodic intelligence report
Pers	Personnel
PIR	Priority intelligence requirement
PL	Phase line
Prob	Probable
Psns	Positions
PT	Point
RACO	Rear area combat operations
Rail	Railroad
Rpts	Reports
Rqd	Required
Rqmts	Requirements
RR	Railroad
RSR	Required supply rate
SAIC	Science Applications International Corporation
Seq	Sequence
Sig	Signal
SME	Subject matter expert
SOP	Standing operating procedure
Spt	Support, supporting
ST	Student text
Sup	Supply(ies)
Surv	Survivability
Svc	Service

TAC	Tactical
TACAIR	Tactical air
TAI	Target area of interest
Tech	Technical
Temp	Template
Tgt Acq	Target acquisition
Trans	Transportation
Wpn(s)	Weapon(s)
USACACDA	United States Army Combined Arms Combat Developments Activity
USACGSC	United States Army Command and General Staff College

APPENDIX B

DESCRIPTION OF
OPERATIONS STAFF PLANNING PROCESS

OPERATIONS STAFF PLANNING PROCESS

INTRODUCTION

The operations officer (G3) is the principal coordinating staff officer for the commander in matters relating to operations, plans, organization, and training. The nature of the operations officer's responsibilities requires a high degree of coordination with other staff members, and generally the G3 takes the lead among all of the staff members, excluding the chief of staff.

The normative courses of staff action addressed herein will cover primarily the tactical operations responsibilities and actions, the more important of which are:

- Collecting and assimilating information relating to the tactical operations of the command.
- Maintaining a current operations estimate of the situation.
- Preparing operation plans and orders.
- Recommending priorities for the allocation of critical resources of the command.
- Recommending task organization and assigning missions to subordinate elements of the command.
- Using resources to accomplish both maneuver and fire support.
- Coordinating and integrating all aspects of maneuver and fire support.
- Monitoring tactical operations and adjusting plans and actions as necessary.

STAFF FUNCTIONS

The significant operations staff functions relating to combat operations are displayed in Figure B-1 and are discussed in the following subparagraphs.

Mission Analysis

A mission for tactical operations may be received in the form of an operation order from higher headquarters or may be generated by the force commander based upon his perception of the tactical operation already in progress. In either case, the coordinating staff principals meet to receive from the commander the mission plus all other information which the commander has at the time and which has not been announced in the order. This other information may include an explanation of the higher commander's intent and guidance,

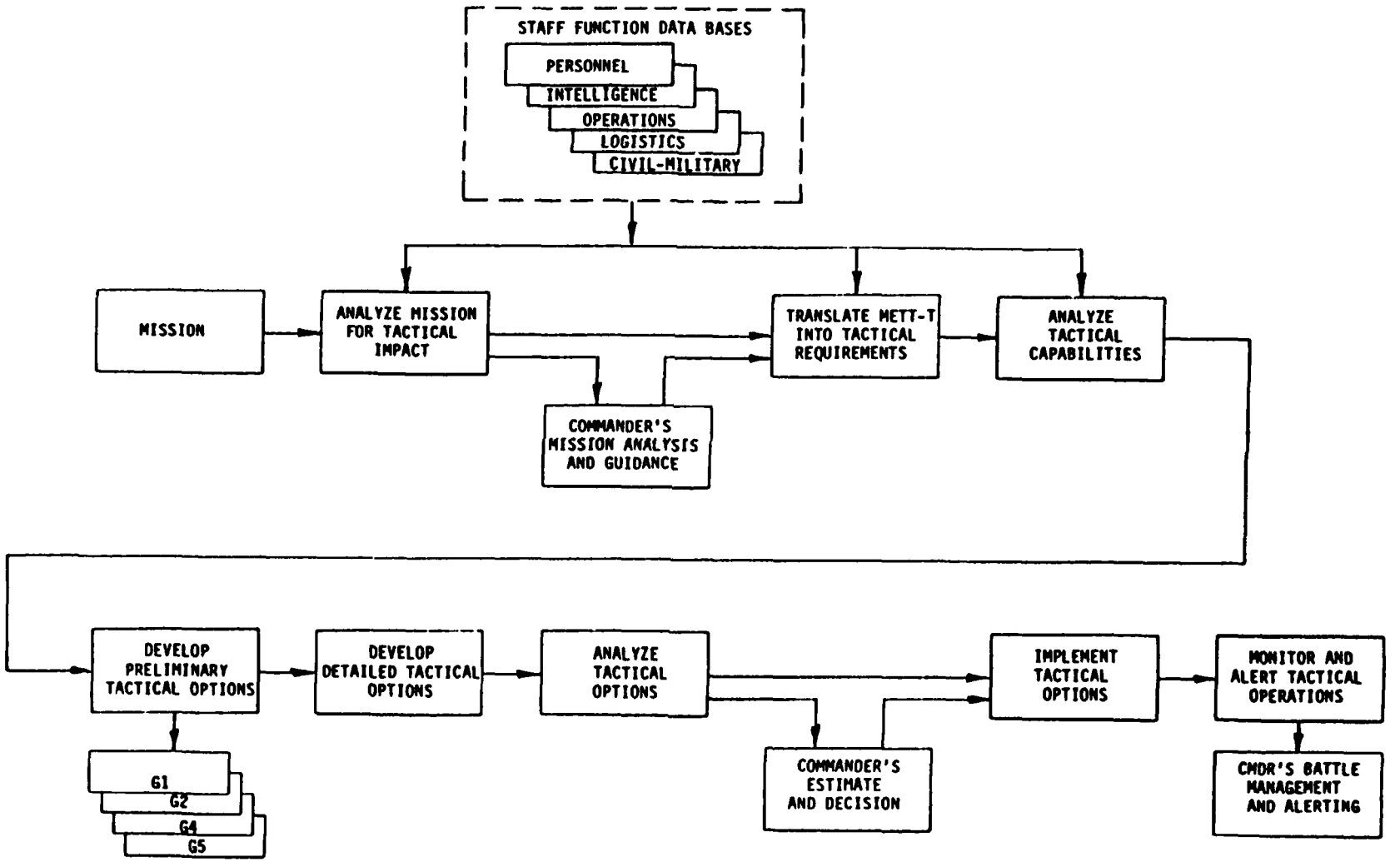

Figure B-1. Operations Staff Functions.

insights, concerns, and anticipated actions and perceived options. This information assists the staff in better grasping the tasks of the mission and the requirements that will fall upon each coordinating staff section. All staff members continue situation updates with emphasis focused on the new mission and simultaneously begin mission analysis in their respective areas of responsibility. It is imperative that each principal staff officer understand what is essential to the commander and the other principal staff officers. Once what is essential is known, the principal staff member has his staff section focus on that information and keep him apprised of changes so he can evaluate their impact and advise the commander and the rest of the staff.

Mission analysis identifies and quickly analyzes the following:

- Purpose of the higher headquarters mission.
- Intent of the higher commander and possibly the commander two levels up.
- Area of operations.
- Tasks, both specified and implied, to be performed.
- Assets available.
- Constraints.
- Restraints.
- Risk acceptable to higher headquarters.
- Time analysis.

(Note: The general mission analysis explained above is applicable to all coordinating staff sections.)

The operations officer focuses his mission analysis on the tactical performance of the assigned mission, and he generally takes the lead among the coordinating staff principals in overall mission analysis. Immediately upon receipt of the mission from the commander, the operations officer develops tentative tactical courses of action which will accomplish the mission, and he informs all other coordinating staff principals of those tentative courses of action. These tentative courses of action serve to focus and integrate the mission analysis and mission planning of all coordinating staff principals. The operations officer will refine and update the tactical courses of action as planning proceeds.

In the tactical mission analysis, the operations officer interprets the assigned mission for operational/tactical tasks, explicit and implied. He relates the mission to the area of operations and determines the area required to accomplish the mission. He then reviews the current task organization; analyzes the status of forces and resources of the command; identifies tactical constraints and restraints; assesses tactical risks inherent to mission performance; analyzes time available for planning; and recommends to the commander tactical courses of action for mission performance. The operations

officer's recommendations consider major factors provided by other coordinating staff members which may significantly impact mission performance. Recommendations evolving from the operations officer's mission analysis generally carry considerable weight in the formulation of the commander's planning guidance.

Identification of Tactical Requirements

Following the commander's mission analysis and issuance of the commander's planning guidance, the operations officer considers tactical courses of action which the commander wishes developed, which may or may not include those considered by the G3 in his mission analysis. The commander's guidance forms the latitude which the G3 has to develop courses of action. The G3 collects additional information not already available and proceeds with his estimate of the situation.

An analysis of the mission, enemy, terrain (and weather), own troops, and time available (METT-T) is performed in order to identify the requirements for mission accomplishment. The G3 translates the mission into more specific terms; considers the enemy strength, dispositions, equipment, doctrine, capabilities, and probable intentions; analyzes the terrain for observation and fires, cover and concealment, obstacles, key terrain, and avenues of approach; assesses the impact of weather and visibility conditions on the terrain and upon mission accomplishment; considers the friendly forces necessary for mission performance; and analyzes the time available for both staff planning and unit preparation as well as time for mission performance.

Analysis of Tactical Capabilities

The G3 next garners all facts about the status of friendly forces and resources available for mission performance. He considers the current task organization; current unit status, locations, capabilities, and current and recent activities; the non-organic combat support available; and information of higher, adjacent, and other supporting units. He gathers and analyzes all information which will give him a clear picture of the unit's combat power and capability to perform the assigned mission.

It is especially important that the G3 have available to him current unit status including all information which will accurately portray the real-time readiness of each constituent unit to perform its mission role. Such a requirement demands that the database of force information be the most current possible.

Development of Preliminary Tactical Options

In order to obtain the maximum synergistic effect from coordinating (general) staff planning, the entire staff must have access to preliminary tactical options being considered by the commander and the operations officer. Acting upon the commander's guidance and constraints on courses of action selection, the G3 prepares early in the planning cycle the preliminary tactical options. At corps and division level these preliminary courses of action will generally be limited to two or three so as not to dissipate unnecessarily the staff planning resources and time. If possible, the G3 may indicate which of the courses of action is most probable of adoption,

depending, of course, on the outcome of staff estimates and recommendations of all coordinating staff principals. Experience and judgment, knowledge of the commander's style in decision making, and general force status information support the G3 in this preliminary course of action identification.

Development of Detailed Tactical Options

The G3 next embarks on the preparation of his operations staff estimate which will lead to his recommendation to the commander of a tactical course of action which has the highest probability of mission accomplishment. In preparing the operations estimate, the G3 considers all elements and aspects of the situation that influence tactical operations and mission performance, and he formulates tactical options or courses of action. He carefully screens situational information to determine those facts that will influence friendly and enemy actions and will, therefore, influence the choice of a specific course of action. Situational information includes characteristics of the area of operations, the enemy situation, the situation regarding his own forces and resources, and the relative combat power between friendly and enemy forces. Situational information is derived from the force database and from other coordinating staff officers.

The G3's analysis of relative combat power is based primarily on maneuver and fire support units of the force. His analysis is expected to provide a background for formulating feasible tactical courses of action and may indicate the basic nature and characteristics of those courses of action. The G3's conclusions regarding relative combat power may also lead to the early elimination from consideration of some courses of action as being infeasible of mission accomplishment.

Relative combat power is the overall relationship of the combat power of friendly versus enemy forces including significant strengths and vulnerabilities. Analyzing relative combat power permits conclusions about friendly capabilities pertaining to the operation being planned. It indicates what types of operations may be possible from the enemy as well as the friendly points of view. It also helps to determine enemy weaknesses.

At division level, G3 avoids making a detailed study of personnel or weapons on either side. To gain an indication of the fighting capabilities of friendly and enemy units, the G3 deals in rough ratios two levels down. At division level, the analysis compares all types of combat battalions. Conclusions are based on a general impression of the capabilities of both forces. The planner, first, establishes comparison values as a means of quantifying forces. A simple comparison of the number of battalions would be inappropriate since the capabilities of different units vary; therefore, the G3 must determine the overall combat value of the type units being compared. To accomplish this, a base unit must be selected. A subjective evaluation must then be made of all other types of battalion-size units relative to the base unit. These values can be listed in a table of relative comparison values and used repeatedly. Table B-1 is an example of such a table.

Table B-1

US vs Soviet Combat Unit Comparison Values
(Base unit is BTR battalion)

US (J-Series)		Soviet	
	MANEUVER		
M113 Bn	= 1.5	BTR Bn	=1
M2 Bn	= 2	BMP Bn	= 1.5
M60 Bn	= 2.75	Tk Bn (ITR)	= 2.6
M1 Bn	= 3	Tk Bn (TR)	= 1.6
ACR Sqdn	= 2.75	AT Bn	= 1
Div Cav Sqdn (H)	= 2	ITB/TB (MRR)	= 2.0
Div Cav Sqdn	= 1.5		
Atk Hel Bn	= 4	Atk Hel Bn	= 2
	ARTILLERY		
FA Bn	= 2	FA Bn	= 2
MLRS Btry	= 2	MRL Btry	= 1

When unit comparison values have been established, the G3 then computes the relative combat power of the opposing forces and evaluates the results. At this point, the G3 can draw some reasonable conclusions about his and the enemy's capabilities and limitations in the conduct of either offensive or defensive operations in the present tactical situation.

Having established relative combat power between opposing forces, the G3 then turns his attention to possible friendly courses of action. Applying current tactical doctrine and his own personal experience, he visualizes alternative courses of action which will achieve the force objective under the existing conditions. The ability to formulate courses of action quickly and accurately is essential to sound decision making. The formulation and recognition of feasible courses of action depend significantly on the G3's ability to perceive the influence of the situational factors on mission performance, and that perception must consider the following:

- Is the course of action feasible?
- Does the force have the capability to perform the course of action?

- Will the course of action accomplish the mission without undue risk of damage to the force?

- Are the courses of action in sufficient detail to be distinguishable one from the other?

In order to verify the feasibility of tactical courses of action, the G3 may often resort to doctrinal templates, which are used in much the same manner as the G2 uses doctrinal/situational templates to identify enemy courses of action and capabilities. Beginning with combined obstacle overlays of the area of operations, the G3 will array situational templates for friendly forces on terrain representations to assist in identifying mobility corridors and avenues of approach. For offensive missions, the G3 will seek avenues of approach to force objectives, avenues which will accommodate one or more major subordinate elements of the force. For defensive missions, the G3 will be sensitive to enemy avenues of approach into friendly positions to the end of positioning friendly forces and resources to block those avenues.

The G3 will next array the friendly force for each course of action being considered as feasible for mission accomplishment. In arraying the force, the G3 will consider the mission and the commander's guidance, the avenues of approach, and the most likely and most dangerous enemy courses of action. The organizational level of the planning will most often determine the level of the units to be arrayed; for example, at division level, battalions are arrayed along brigade-size avenues of approach, while at corps level, brigades are arrayed along division-size avenues of approach.

G3's next consideration in arraying forces is to achieve force ratios between friendly and enemy forces which will reasonably ensure mission success. Mission-related planning ratios for the array of friendly forces should achieve the following minimum:

Friendly Mission	Friendly: Enemy	Notes
Delay	1:6	
Defend	1:3	Prepared or Fortified
Defend	1:2.5	Hasty
Attack	3:1	Prepared or Fortified
Attack	2.5:1	Hasty position
Counterattack	1:1	Flank

For each force array, the G3 will develop a scheme of maneuver, the means for actually achieving the force mission. The scheme of maneuver and the arrayed combat power, friendly and enemy, will be the basis for analysis of each course of action. The scheme of maneuver development will address:

- The enemy and terrain.
- The relative combat power and acceptance of risk.
- Uncommitted friendly forces and resources.
- Type of operation (mission).
- Objectives (attack or counterattack).
- Location of main effort and supporting efforts.

For each course of action, the G3 will next determine command and control means and maneuver control measures. Determining the command and control means involves the assignment of control headquarters for the arrayed forces. Determination of maneuver control measures involves the establishment of such measures as boundaries, axes of advance, objectives, phase lines, lines of departure, and assembly areas.

Having accomplished the foregoing, course of action statements are then developed for each feasible course of action and must include the following essential elements:

- The type of tactical operation (what).
- The time the operation must begin or end (when).
- The location or direction of the operation (where).
- The use of available means for the operation (how).
- The purpose of the operation (why).

Developed courses of action are now ready for analysis and the selection of that course of action which offers the best opportunity for mission success.

Analysis of Courses of Action

The G3 analyzes (war games) each course of action against the likely enemy course(s) of action starting with the most probable enemy course of action. War gaming relies heavily on tactical judgment and experience but is a logical step-by-step analytical process. It focuses the G3's attention on each phase of the operation in a logical sequence. The process is one of action-reaction-counteraction.

War gaming stimulates thought about the operation so the G3 may obtain ideas and insights that otherwise might not have occurred. Analysis highlights tasks that appear to be particularly important to the operation and provides a degree of familiarity with tactical possibilities that might otherwise be difficult to achieve. During the war game, the course of action may be changed or modified or a new one may be developed because of the identification of other critical events, tasks, requirements, or problems. As a result, the analyst or war gamer can determine whether the force allocation (including combat support and combat service support assets), dispositions, and scheme of

maneuver are adequate, or he can correct and adjust as appropriate. Shortfalls, acceptable or unacceptable risks, and possible future developments, options, and contingencies are identified for the plan or order.

Logical steps used by the G3 in analyzing (war gaming) each course of action are:

- Post the map and array the enemy force from the intelligence known.
- Array the friendly forces for the course of action under analysis.
- List all friendly forces.
- List assumptions.
- List known critical events.
- Select an analysis (war game) method.
- Select a technique to record and display results.
- Visualize the battle and assess the results.

Results of each course of action are analyzed for refinements and modifications which would improve the course of action; tasks for subordinate units; estimate of battle duration; advantages and disadvantages; deduced battle results (ground gained/lost and number of enemy defeated); requirements for additional combat support; and requirements for surprise and/or deception. Special attention in analyzing each course of action will be paid to significant risks which might be encountered in executing the course of action.

Once analyzed, the feasible courses of action are compared to identify the one which has the highest probability of success against the most likely or dangerous enemy course of action yet offers the flexibility of facilitating success against other likely enemy courses of action. The comparison will support a G3 recommendation to the commander of the best course of action for mission accomplishment.

Implementation of Tactical Options

Decisions made by the commander based upon staff recommendations and his own estimate of the situation are translated into orders and instructions to subordinate commands and are disseminated in a variety of forms. The most dominant form is the operation order prepared by the G3 and includes annexes prepared by other staff sections. From an operations standpoint, the operation order translates the selected course of action, its development, and its analysis into clearly stated instructions for mission performance by all force elements. The G3 is particularly interested in the mission performance by combat and combat support elements of the command; therefore, he ensures by personal contact and other means that the commander's intent is clear and that the instructions for mission performance are fully understood.

Monitoring and Alerting Tactical Operations

The G3 monitors the implementation of the operation order by all combat and combat support elements of the command. In so doing, he ensures that critical events in the battle performance are quickly and accurately reported to him for action and for alerting the commander. Opportunities for command decisions at critical points in the battle are immediately recognized from these alerts. Monitoring and alerting are discussed in the following subparagraphs.

Monitoring Tactical Operations. In monitoring tactical operations, the G3 ensures that mission performance is proceeding according to plan. If not, the G3 must take actions within his authority to rectify the situation or, alternatively, refer the matter to the commander for information and/or decision.

Monitoring of the tactical situation is significantly dependent upon the receipt, display, and assimilation of complete and accurate information relating to mission performance. In order to properly perform his operation monitoring function, the G3 selects critical items of information which must be presented to him with the frequency and in the format which will facilitate his accurate perception of the situation; his rapid analysis of the situation in relationship to the plan; his ready identification of alternative forces, resources, and actions to rectify an undesirable situation; and his evaluation of those alternatives. The information required by the G3 is not that associated solely with the operations staff function but will normally include other information impacting mission performance. The information may include reports of heavy casualties, significantly reduced unit strengths, and difficulties in medical evacuation from the G1; actions indicating adoption of new enemy courses of action from the G2; shortages of POL, ammunition, and key equipment items from the G4; and refugee problems from the G5, all of which may significantly impact tactical operations. Immediate identification and analysis of problem areas is essential, alternatives for their solution must be quckly analyzed, and tactical decisions must be made efficiently and effectively to deal with the problems.

In order to perform his monitoring function, the G3 must be supported by a system, manual or automated, which will accommodate his information and analysis requirements.

Alerting For Tactical Operations. In the planning for tactical operations, the G3 will identify critical events in the battle plan which serve as check points as to whether the operation is proceeding according to plan. Significant deviations from plan may require modifications to plan or actions to ensure that the plan can be executed as devised. Critical events may also signal potential problems which, if realized, may inhibit or prevent mission accomplishment. Critical events may take the form of positive action or, conversely, the lack of action.

A system for alerting the G3, operated manually or automatically, monitors inputs and updates to the force database in order to alert the G3 and the commander of tactically significant changes. Tactically significant changes may be those established by tactical standing operating procedures (e.g., crossing phaselines or seizing intermediate objectives) or may be those

established specifically for the operation at hand (e.g., when the 1st Brigade has crossed the YODER River). Absence of information concerning a critical event may indicate that the event has not taken place or that the occcurrence of the event has not yet been reported. If critical to operational performance, lack of reports of the occurrence of critical events must be verified by positive action on the part of the concerned staff section or the information collection system.

Alerts to the G3 should originate, if appropriate, from all coordinating staff principals and their staff sections. Some examples of alerts from the coordinating staff sections at division level are:

G1

- Maneuver battalion strengths drop below 75%.
- Casualties exceed 20 per hour (or 10% per day).
- Key commander casualties.

G2

- Enemy second echelon (reserve) motorized rifle regiment is moving forward.
- Enemy direct support artillery has been positioned within 2 km of the FLOT.
- Enemy has imposed radio silence.
- Enemy is jamming all radio transmissions.

G3

- 3d Bde has crossed PL Charlie.
- 2d Bde has committed its reserve.
- Armored cavalry squadron has encountered estimated enemy tank regiment.

G4

- No diesel fuel at Corps Class III Sup Pt due to enemy action; supply limited to one day supply on hand.
- 105 mm tank ammo CSR reduced to 50% of RSR.
- Float of M1 tanks has been reduced to zero.
- CSR on 155 mm howitzer ammo has been lifted.

G5

- Refugees are completely blocking MSR Blue and are uncooperative.

Replanning

The monitoring and alerting of tactical operations by the G3 will frequently result in modification to the original battle plan. The modifications may range from minor changes in order to fine-tune the original plan or may involve major changes to the plan due to such significant events as changes in the enemy courses of action, unexpected losses by friendly forces, more severe weather impact on operations than anticipated, and unusual resource (ammo or POL) expenditures and/or constraints on operations.

When replanning by the G3 becomes necessary, the G3 may re-enter the normative course of staff actions at any point in the cycle. He may simply modify (with the commander's explicit or implicit approval) an order to a subordinate unit; or he may re-estimate the entire situation, consider new courses of action, analyze them, and make a new recommendation to the commander for the continuation of the tactical operation. Replanning of tactical operations, once the battle has been joined and is in progress, is accompanied by the stress element of time. Opportunities to take advantage of the tactical situation are fleeting; therefore, in replanning, the G3 normally does only the minimum replanning necessary to take advantage of the situation and the opportunity.

OTHER CONSIDERATIONS

A number of other planning considerations are inherent to tactical decision making and to the application of the normative courses of staff action discussed above. The purpose of presenting other considerations is to indicate wherein the G3 may broaden the scope of the normative courses of staff action as well as rely upon others to perform detailed planning under staff supervision of the G3. Other considerstions are presented in the following subparagraphs.

In the application of the normative courses of staff action, the G3 focuses his attention on close operations and probably devotes a majority of his planning and monitoring activities to that operational environment. He cannot, however, overlook the requirement to also plan and monitor deep and rear operations which are inherent to tactical mission performance. Close operations bear the ultimate burden of victory or defeat; however, both deep and rear operations will have an ultimate impact on mission performance.

Close operations comprise the current activities of major committed combat elements, together with their immediate combat support and combat service support. At the operational level, close operations comprise the efforts of large tactical formations -- corps and divisions -- to win current battles. At the tactical level, close operations comprise the efforts of smaller tactical units to win current engagements. Among the activities typically comprising close operations are:

- Maneuver
- Close combat (including close air support).
- Indirect fire support (including counterfire).

- Combat support/combat service support of committed units.
- Command and control.

Deep operations comprise activities directed against enemy forces not in contact and designed to influence the conditions under which future close operations will be conducted. At the operational level, deep operations include efforts to isolate current battles and to influence where, when, and against whom future battles will be fought. At the tactical level, deep operations are designed to shape the battlefield to assure advantage in subsequent engagements. Of principal concern at the tactical level are successful efforts to isolate the tactical battlefield; to paralyze the enemy's support and command and control systems; and to prevent, delay, or discupt the closure of uncommitted enemy formations and other resources.

Rear operations comprise activities rearward of elements in contact designed to assure freedom of maneuver and continuity of operations, including continuity of sustainment and command and control. Rear operations underwrite the tempo of combat, assuring the commander the agility to take advantage of any opportunity without hesitation or delay. Four rearward activities in particular must be conducted as part of rear operations: assembly and movement of reserves, redeployment of fire support, maintenance and protection of sustainment effort, and maintenance of command and control.

Support of Staff Actions

The normative courses of staff action discussed in paragraph 2 above address the principal staff actions of the G3 in tactical decision making in a mid-intensity conventional war (see paragraph 4 below for a discussion of conflict situations). Supporting staff actions by the G3 and his section team not discussed in detail previously are presented in this paragraph and must be considered and/or performed if dictated by the mission, tactical situation, and the operations plan.

Fire Support Planning. Fire support planning starts when the commander receives or assumes a tactical mission, It is an integral part of the commander's planning and decision making process which is a continuous process until the unit's mission is accomplished. The goal of fire support planning is to help integrate fire support with the scheme of maneuver to gain the maximum combat power for the commander. Detailed fire support planning and coordination is normally performed by the unit's fire support coordinator working with the G3 and the G2.

As the G3 prepares his estimate and the battle plan for the employment of maneuver forces, he visualizes how the fire support resources will be used to support the scheme of maneuver, which subordinate echelon will be weighted with fire support, what targets to attack with what fire support means, and priorities for engaging targets and allocating fire units. The G3 ensures that the fire support plan is developed accordingly, that all available fire support is considered,and that the maneuver plan is optimally enhanced by fire support.

Air Defense Planning and Airspace Management. Commanders are responsible for the air defense of the forces assigned or attached to their commands and must always consider the effect of the enemy air threat on their plans and operations. Air defense planning comes under the purview of the G3; however, the detailed planning and execution is the prerogative of the air defense artillery commander.

Army airspace management provides for the coordinated use of division airspace by combat, combat support, and combat service support units. Airspace management ensures the most effective use of airspace for support of the division's assigned tactical mission. Airspace management comes under the coordinating staff supervision of the G3; however, actual airspace management within the division is performed by the division airspace management element (DAME).

Tactical Nuclear Employment. The normative courses of staff action presented herein have been predicated on a conventional (non-nuclear) warfare environment. Once authority to employ tactical nuclear weapons is granted, the normative courses of staff action will require significant changes to accommodate the planning for and actual employment of such weapons.

The authority to use nuclear weapons will be conveyed from the National Command Authority (NCA) through the operational chain of command. Nuclear fire planning is subject to unique considerations. Far more than conventional fire planning, nuclear fire planning will require a high level of anticipation. Typically, nuclear packages grouping a specified number of weapons having specified delivery system/yield characteristics will be preplanned for use against specified target categories.

Because of this high degree of preplanning, effective weapons employment will require continuous refinement of package targeting before and after release of weapons. Release will be predicated on a high confidence that the effects achieved will be precisely those intended. Commanders of delivery units must ensure that all supporting activities -- target acquisition, special ammunition distribution, nuclear control personnel and equipment, and operational security -- are maintained continuously in a high state of readiness to execute on relatively short notice. This must be accomplished with minimum degradation of conventional fire support and without an abrupt and detectable shift in operating pattern.

Finally, nuclear planning must, of course, reflect the constraints and directives of higher authority to include procedures for warning friendly units, restrictions on collateral damage, and responsibilities for post-strike analysis. Special care must be taken not to create obstacles to friendly maneuver through the use of nuclear fire. Divisions and corps will develop packages for possible use in their areas of operations based on the above criteria and their particular situations.

Nuclear weapon employment, as with conventional fire support planning, is under the coordinating staff supervision of the G3, who will very carefully exercise that supervision. The G3 and the fire support coordinator work closely together to effectively integrate maneuver and fire support (nuclear as well as non-nuclear) into a plan that will successfully accomplish the division mission. The fire support coordinator, however, will do the actual

integration of nuclear fires with conventional fires and will perform the detailed target analysis and targeting.

Engineer Operations. Engineer units within the division either support or serve in combined arms teams in all combat operations and in diverse environments. Normally, they support forward, committed maneuver elements, but they can be shifted to weight the tactical effort at critical times and places. Engineers provide a combat multiplier that reinforces terrain to the advantage of friendly forces or to the disadvantage of enemy forces. The principal battlefield missions for engineer elements are mobility, countermobility, and survivability.

Planning for engineer employment and support within the division is a G3 coordinating staff responsibility; however, much of the detailed planning for engineer operations falls to the division engineer (i.e., the division engineer battalion commander). The division engineer, assisted by a division engineer section located in the division command post, advises the commander on engineer matters, prepares engineer estimates and plans, and performs staff supervision of division engineer activities.

Chemical Employment. Army units must be prepared to conduct offensive chemical operations; however, only the National Command Authority (NCA) may grant authority to employ chemical munitions. When granted, such authority will also provide specific guidance governing their use. While the use of chemical weapons does not bear the enormous strategic risks associated with nuclear weapons, it can equally alter the course of operations in a theater significantly.

Commanders must be prepared to integrate chemical weapons into their fire plans on receipt of chemical release. Because the chemical expenditure rates necessary to produce a significant effect on a well-trained, well-equipped enemy are high, commanders must carefully consider how chemical weapons will affect their own operations and logistics.

Employment of chemical weapons falls under the coordinating staff supervision of the G3; however, the division chemical officer assists the G3 by performing detailed planning for the use of chemical weapons and by preparing NBC estimates, plans, and orders.

CONFLICT SITUATIONS

The normative courses of staff actions of the G3 discussed in paragraph 2 above are applicable in low intensity conflict as well as mid- and high-intensity conflict. Each level of conflict, however, calls for unique applications of the tactical decision making process in general and the G3's participation in that process specifically.

The growing incidence of war at the low end of the conflict spectrum demands Army action on the unique battlefields of low intensity conflict. This form of warfare falls below the level of high- and mid-intensity operations and will pit Army forces against irregular or unconventional forces, enemy special operations forces, and terrorists. Low intensity

conflict poses a threat to US interests at all times, not just in periods of active hostilities. Fighting in the low end of the conflict spectrum requires special force composition and task organization, rapid deployment, and restraint in the execution of military operations.

The high- and mid-intensity battlefields are likely to be chaotic, intense, and highly destructive. They will probably extend across a wider space of air, land, and sea than previously experienced. In high- or mid-intensity conflicts, Army forces must prepare to fight campaigns of considerable movement, not only to reduce vulnerability, but also to obtain positional advantage over the enemy. Rapid movement will be complemented by the use of advanced, highly lethal weapons throughout the battle area. Successfull attack will require isolation of the battle area in great depth as well as the defeat of enemy forces in deeply echeloned defensive areas. Successful defense will require early detection of attacking forces, prompt massing of fires, interdiction of follow-on forces, and the containment and defeat of large formations by fire and maneuver. Throughout the battle area, attack and defense will often take place simultaneously as each combatant attempts to mass, economize locally, and maneuver against his opponent.

APPENDIX C

DESCRIPTION OF
INTELLIGENCE STAFF PLANNING PROGRESS

INTELLIGENCE STAFF PLANNING PROCESS

INTRODUCTION

The intelligence staff officer (G2) is responsible for obtaining and analyzing information relating to his assigned staff functional area. The purpose is to provide the commander and other staff officers with relevant information (processed and synthesized) as required for staff estimates and commander's decisions. The G2 is responsible for the following types of information:

- Terrain - the analysis of the area of operations and area of interest; the effect of terrain on courses of action, to include potential enemy modifications of the terrain; and the effect of weather on terrain;
- Weather - the forecasted weather and the impact of weather on courses of action;
- Enemy situation - the disposition, composition, and strength of committed, reinforcing, and supporting forces; recent significant activities within the area of interest; and any weaknesses and peculiarities of the enemy forces;
- Enemy courses of action - the courses of action available to the enemy which he has the capability to undertake, an analysis of those courses of action, a ranking of them according to their probability of adoption, and enemy reaction to each friendly course of action;
- Friendly status - intelligence asset status and capabilities;
- Intelligence requirements - priority intelligence requirements (PIR), information requirements (IR), named areas of interest (NAI), and target areas of interest (TAI);

The G2 prepares his estimate based on the commander's restated mission and planning guidance. The estimate process is normally continuous, with staff officers exchanging information as their estimates develop. The ultimate purpose of the estimate process is to provide information and make recommendations to the commander for his use in reaching a decision as to the best course of action for accomplishing a particular mission.

Doctrinally the G2 uses a methodology called intelligence preparation of the battlefield (IPB) to perform his analysis and prepare his estimate. The IPB process is a five function cyclical process:

- Battlefield area evaluation
- Terrain analysis
- Weather analysis
- Threat evaluation

- Threat integration

IPB provides a systematic approach to analyzing the enemy, terrain, and weather in a specific geographical area. IPB integrates enemy doctrine, training, and available intelligence information with the terrain and weather information to determine enemy capabilities, vulnerabilities, and probable courses of action. IPB aids the commander and staff in predicting enemy vulnerabilities and friendly opportunities. It provides the means for comparing friendly and enemy capabilities and it assists the commander in determining when, where, and how to employ his resources to best accomplish the mission.

STAFF FUNCTIONS

Commanders base their plans and actions on estimates of enemy capabilities and the relative probability of their adoption. Enemy capabilities can be estimated objectively when they are based on a complete and thorough knowledge of the area of operations, enemy situation, enemy doctrine, time and space factors, and pattern analysis. The intelligence (G2) staff is responsible for providing this understanding to the commander and other staff members. Figure C-1 provides a schematic of the primary intelligence staff functions. Each of these functions is discussed in the following paragraphs.

Intelligence Mission Analysis

Mission analysis is the process by which the commander, assisted by his staff, determines what specified and implied tasks must be performed and what contraints or limits apply to the given mission. The intelligence mission analysis is fundamentally different from that of other staff officers in that it focuses on the enemy and the environment and is basically a preliminary intelligence estimate. The G2 uses the available information to make a general assessment of the threat and the area of interest which has been defined by the G3. The threat evaluation includes composition, strength, disposition, equipment, and doctrine. This results in an initial order of battle (OB) and statement of enemy capabilities and also identifies additional information requirements. The area of interest is examined using the available terrain and weather data to form a preliminary assessment of their impact on both friendly and enemy capabilities. This assessment also reveals areas where additional data are required.

In the terms of the IPB process the mission analysis equates to the battlefield area analysis function. Battlefield area evaluation is the function of preliminary analysis of available data and the definition of requirements for additional information. This step includes defining the area of influence and area of interest of the command (in coordination with the G3), collecting the available information (maps, demography, climatological data, etc.), the preliminary analysis of these items, and the identification of additional data required for the detailed analysis of the area.

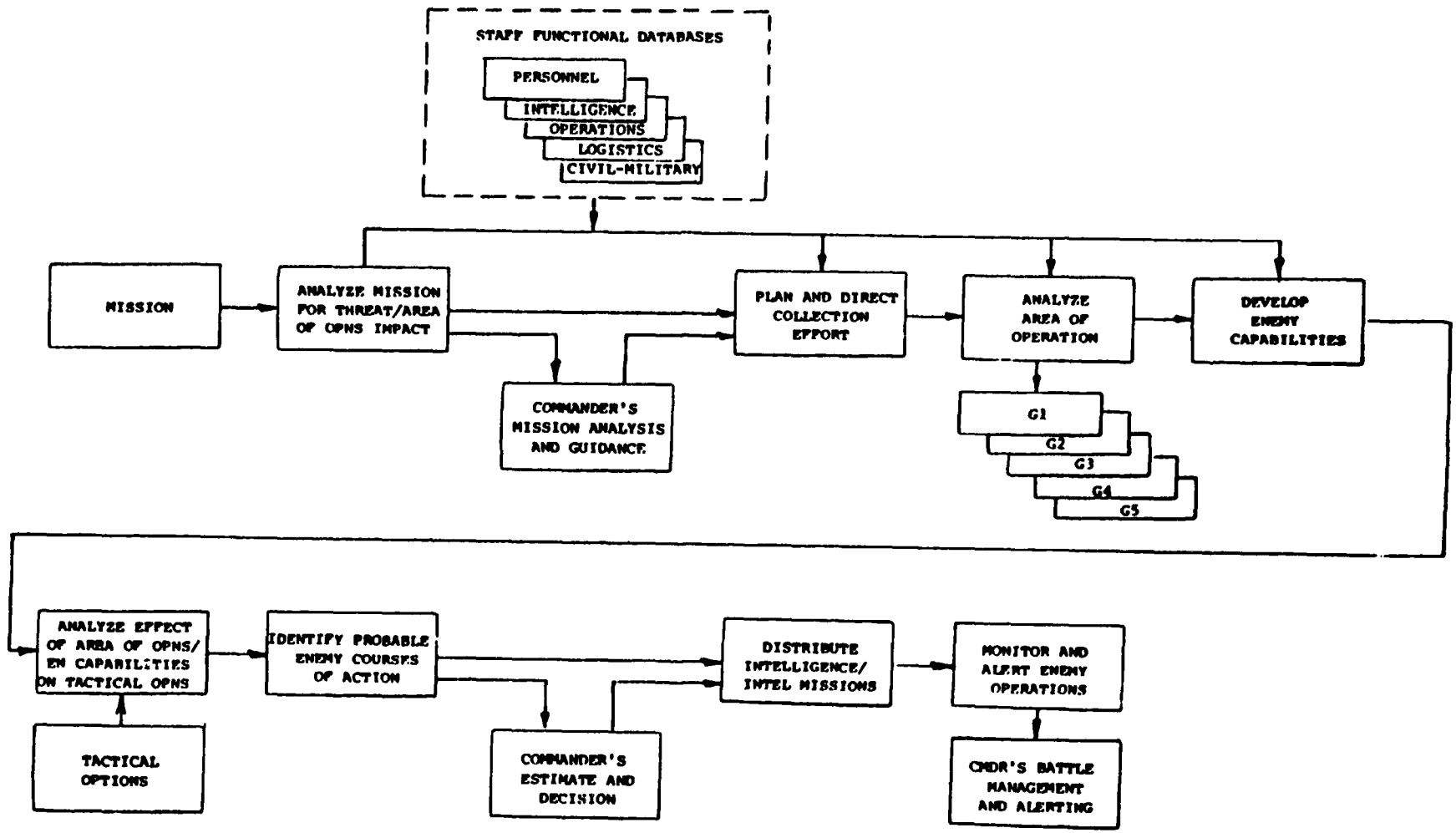

Figure C-1. Intelligence Staff Functions.

Intelligence Information Collection

Corps and division levels have many diverse intelligence collection agencies available to them. Detailed planning and tasking of these agencies is required if the maximum benefit of their capabilities is to be realized.

The intelligence collection plan is the means that the G2 uses to enumerate the collection requirements and assign collection responsibilities. The commander's intelligence requirements, announced in his planning guidance, and any other requirements identified during the mission analysis phase are analyzed to determine indicators which would assist in satisfying the requirement. The primary tool used by the G2 in this effort is the event template developed as a part of the threat integration step of the IPB process.

The event template shows where critical events and activities are expected to occur and where critical targets may appear. It is used to predict time-related events throughout the area. The event template provides the basis for collection planning, prediction of enemy intentions, and for acquiring and tracking high value targets (HVTs).

Indicators, or enemy activities which will occur if a particular course of action is chosen, are translated into specific mission requests for collection agencies. Orders and requests to collection agencies are specific as to what information is required, where it may be found, and where and when it must be reported. Time is critical to the collection effort. Information which becomes available too late to influence friendly actions is of little benefit. The collection effort requires close and continuous supervision by the intelligence staff in order to ensure success and to have a beneficial influence on the tactical operation planning and execution.

Analysis of the Area of Operations

The analysis of the area of operations has the purpose of determining the effect of the area on the courses of action that either friendly or enemy forces may adopt. This analysis allows the commander and staff to see the battlefield in depth, width, height (airspace), and time. In addition to terrain and weather this analysis includes the sociological, political, economic, religious, materiels, transportation, and science and technology aspects of the area.

Terrain analysis is concerned with the military aspects of terrain and its effect on both friendly and enemy courses of action (their capability to move, shoot, and communicate). The military aspects of terrain are: observation and fields of fire, cover and concealment, obstacles, key terrain, and avenues of approach/mobility corridors. They are generally referred by the acronym OCOKA. The G2 will normally produce a number of graphic products for use internally and by other elements of the staff in developing estimates. The terrain analysis is highly dependent on weather and must, therefore, be conducted together with the weather analysis.

The weather analysis is a look at the climate and weather in the AO and its effect on the terrain, as well as on personnel and equipment capabilities of both sides. Due to the effect that weather has on terrain, their analysis must be highly integrated. Figure C-2 provides a graphical representation of

the functions performed in terrain and weather analysis. These functions are discussed in the following subparagraphs.

Terrain Analysis. An analysis of the terrain in the area of operations/area of interest is essential to effective tactical planning. Standard topographic maps provide considerable detailed information about the terrain; however, the map data must be supplemented from other sources to be complete. Other sources include, but are not limited to, engineer terrain studies and topographic analyses, hydrographic studies, observation and reconnaissance reports, radar and imagery reports, and aerial photography and photo interpretation reports. Terrain analysis is highly mission dependent and is focused on the influence of terrain on both friendly and enemy operations. This analysis should allow the commander and staff to determine where the forces (both sides) can move, shoot, and communicate and, therefore, the best place to employ his own forces to maximize their potential and exploit enemy weaknesses.

Each of the subfunctions of terrain analysis, as depicted in Figure C-2, is discussed below.

a. Development of the terrain factor matrix. The terrain factor matrix provides a guide for the terrain analysis. The matrix is developed through an analysis process whereby terrain factors that impact on combat operations are identified and correlated with specific types of combat operations and battlefield functions. The terrain factor matrix assists the intelligence analyst in identifying the types of terrain products needed for the analysis. A typical terrain factor matrix appears in Figure C-3.

b. Development of terrain factor overlays. Analysis of the military aspects of terrain (OCOKA) is facilitated through the preparation and analysis of terrain factor overlays.

   Terrain factor overlays supplement the information provided by the standard topographic maps. The following examples are typical of such overlays.

   - Hydrography overlays which depict rivers and streams. These overlays may also include, or be supplemented by, water area overlays which depict lakes, swamps, and bogs.
   - Lines of communication (LOC) overlays which depict the primary and secondary roads and railroads in the area.
   - Slope overlays which portray predetermined terrain slopes which will hinder or impede traffic in the area.
   - Vegetation overlays which highlight forests, brush, or other types of vegetation as desired.
   - Elevation overlays which depict changes in elevation and are vital to the identification of avenues of approach/mobility corridors as well as intervisibility studies.

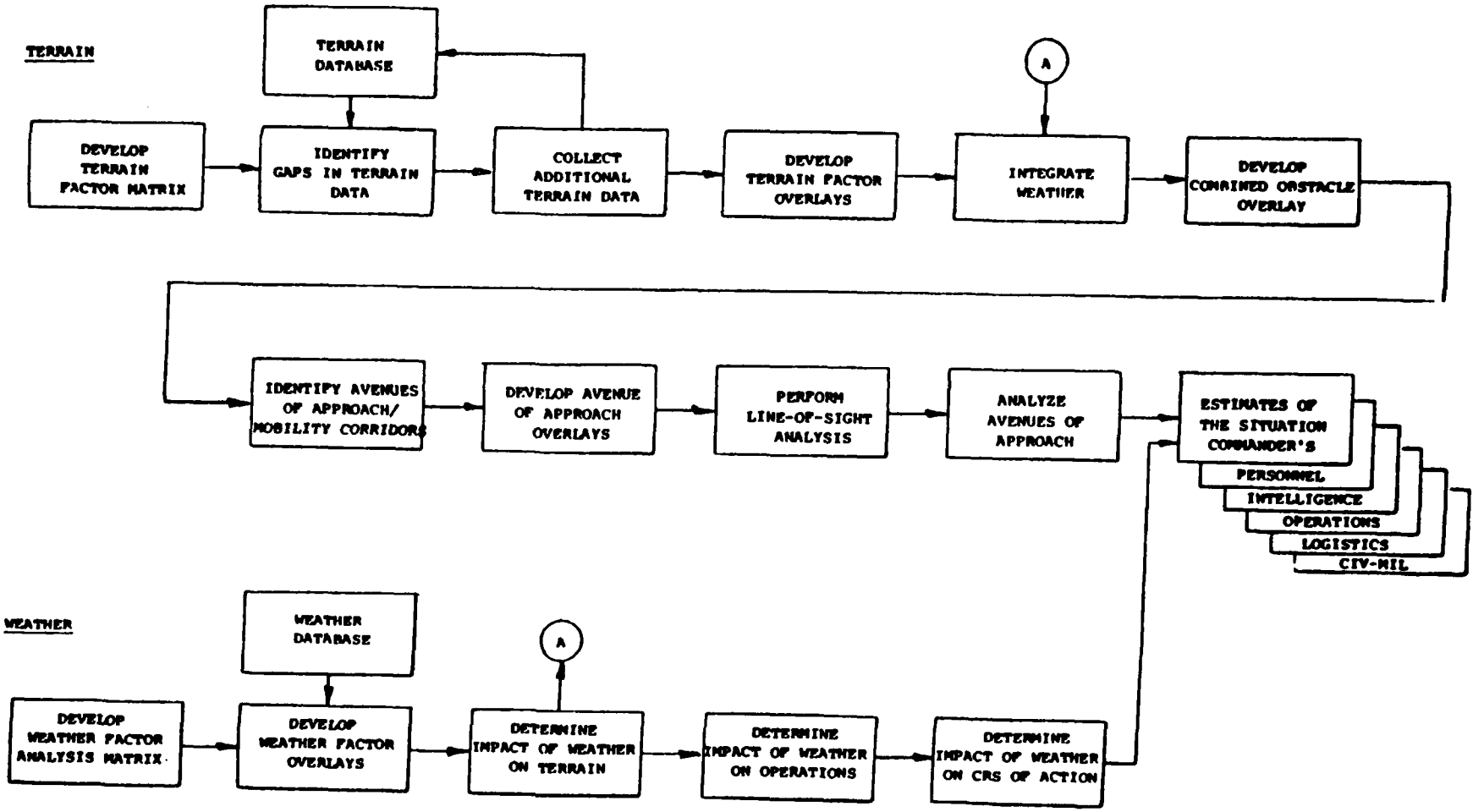

Figure C-2. Analysis of the Area of Operations.

Functions	Factors							
	Surface Configuration	Soils	Vegetation	Slope	Built-up Areas	Precipitation (1)	Roads/trails	Hydrography
Observation and Fields of Fire	X		X		X	X		X
Concealment and Cover	X		X		X			X
Obstacles	X	X	X	X	X	X		X
Key Terrain	X						X	
Ground Avenues of Approach	X	X	X	X	X	X	X	X
Air Avenues of Approach	X		X					X
Weapon Sites	X	X	X	X	X			X
DZ and LZ	X	X	X	X				X
Maneuver	X	X	X	X	X		X	X
LOC and MSR				X	X		X	X
Barriers and Fortifications	X	X	X	X	X		X	X
Line-of-Sight	X		X		X			X
Communication Sites	X		X		X			X
EW Sites	X		X		X			X

(1) Weather Input

Figure C-3. Terrain Factor Matrix.

- Mobility overlays which depict the cross-country trafficability, particularly for wheeled and/or tracked vehicles.

- Built-up area overlays which outline and code city and town perimeters.

c. Development of combined obstacles overlay. Obstacles canalize cross-country movement and must be considered carefully when planning tactical operations. The combined obstacles overlay facilitates the identification of natural obstacles and assists in the planning of man-made obstacles for maximum effect.

Selected terrain factor overlays (see paragraph b above) can be stacked and registered to create a combined obstacles overlay (as shown in Figure C-4) depicting the natural terrain obstacles of the area. These overlays contribute to the analysis of avenues of approach and mobility corridors. The effects of weather on terrain must be considered and integrated into this analysis. The inclusion of weather effects provides a picture of the average weather-induced conditions and depicts seasonal variations on mobility.

d. Identification of avenues of approach. Avenues of approach are routes by which a force may reach an objective or key terrain. The term is applicable to both friendly and enemy forces. Avenues of approach are identified and evaluated in terms of:

- Potential to suport maneuver

- Access to the objective and adjacent avenues

- Degree of canalization

- Cover and concealment

- Observation and fields of fire

- Obstacles

Avenues of approach include mobility corridors, which are areas that allow the doctrinal movement and maneuver of a specified size force (generally one level below that of the force accomodated by the avenue). Doctrinal templates, prepared as a part of the IPB process, provide the basis for integrating the enemy doctrine and training with the terrain and weather of the area. Doctrinal templates depict the doctrinal deployment (to scale) of the threat forces for various types of operations with no constraints imposed by the weather and terrain. They show formations, composition, frontages, depths, and equipment numbers and assist in identifying high value targets. They assist in determining mobility corridors by imposing them over the combined obstacles overlay to determine where sufficient maneuver space exists for a given force. Figure C-5 provides an example of the selection and designation of mobility corridors.

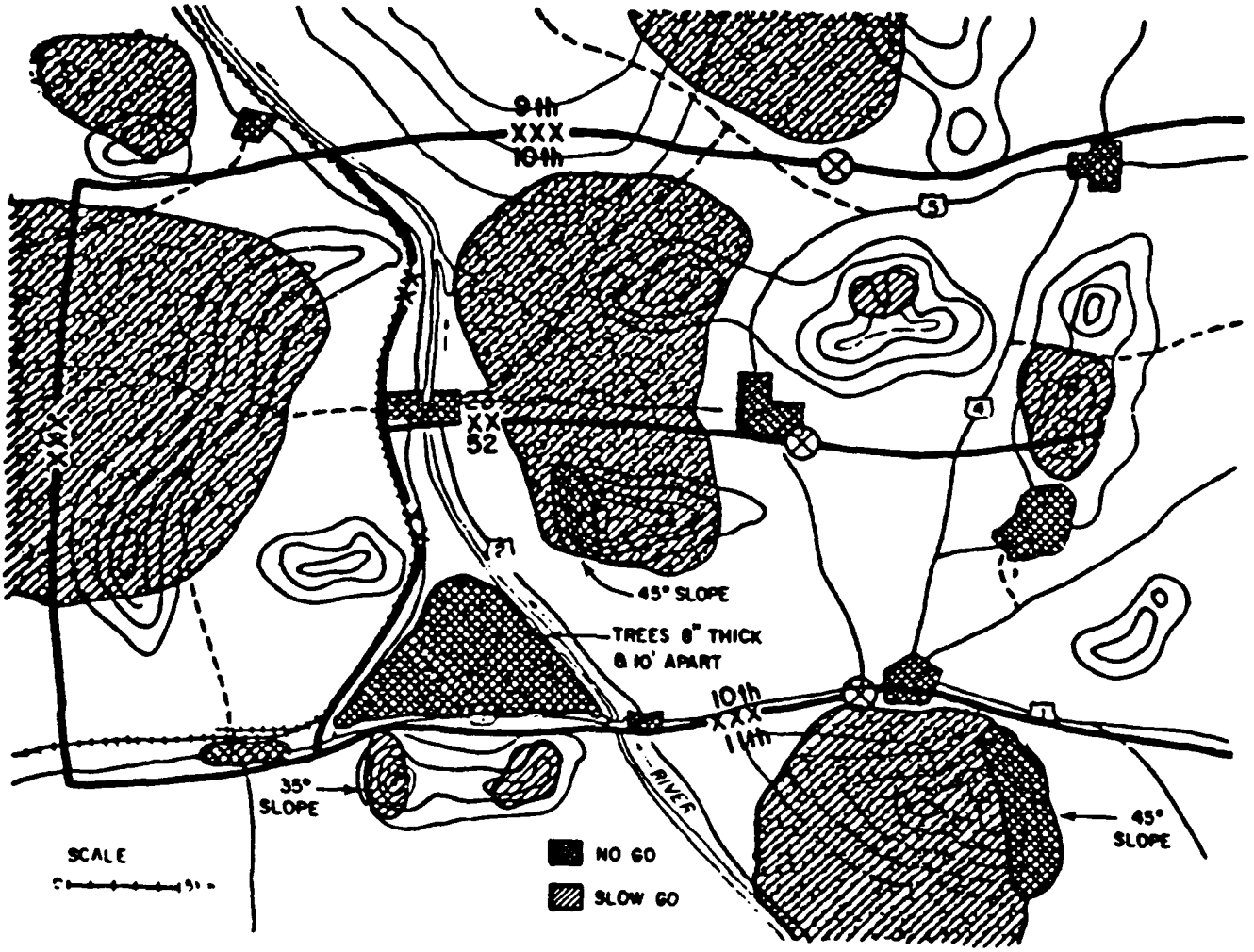

Figure C-4. Sample Combined Obstacles Overlay.

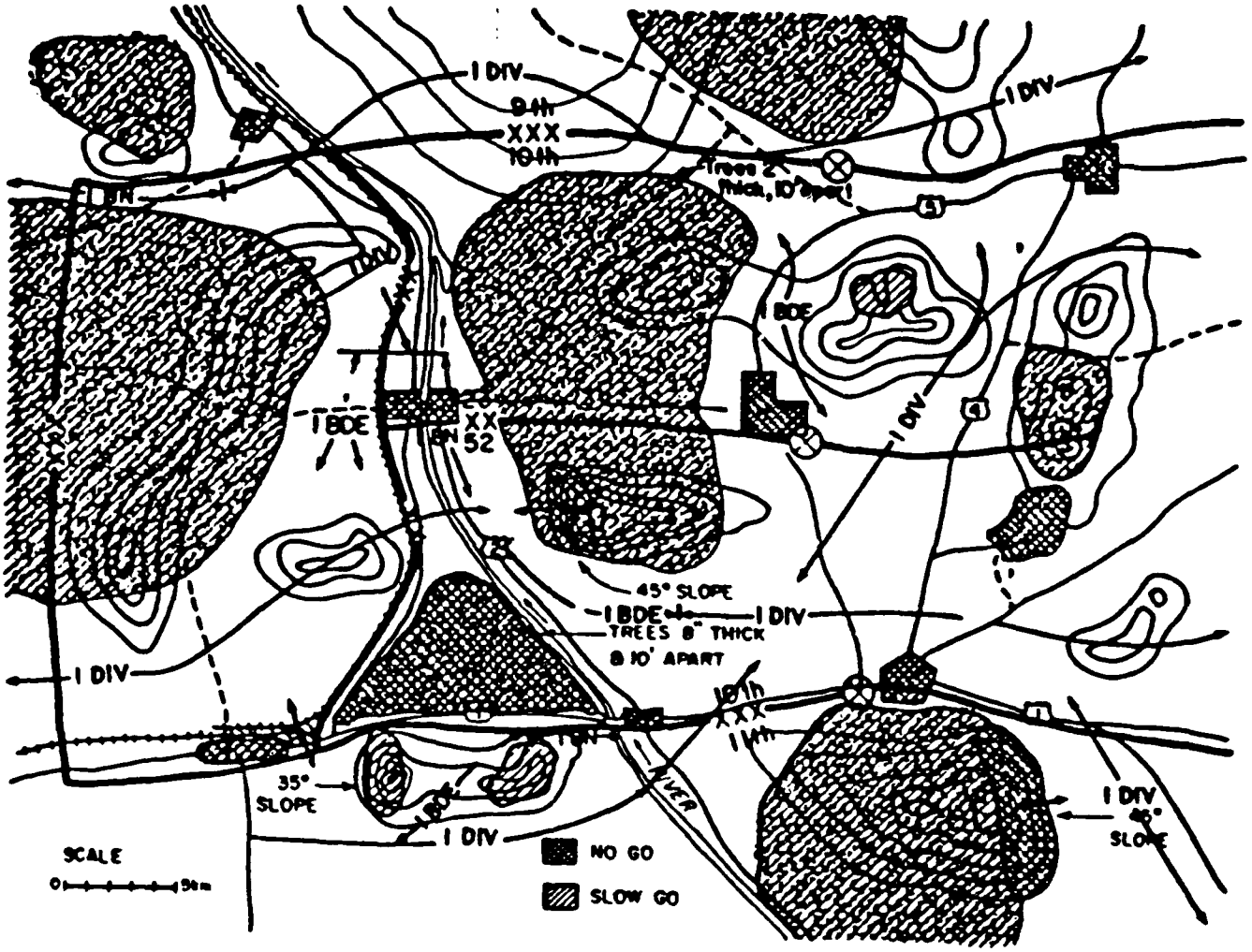

Figure C-5. Mobility Corridors

AD-A197 449 DESCRIPTION OF SELECTED ARMY STAFF FUNCTIONS: TARGETS FOR PLANNING AIDS(U) SCIENCE APPLICATIONS INTERNATIONAL CORP ALEXANDRIA VA C F CARTER ET AL. JUL 88 2/2

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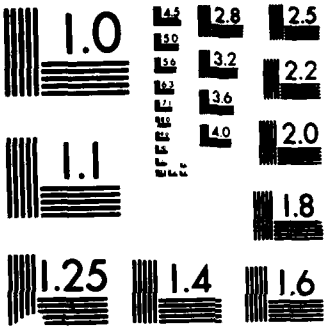

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Once the mobility corridors have been identified, then the most viable avenues of approach can be selected. A viable avenue of approach should contain at least two mobility corridors. Figure C-6 depicts the division avenues of approach corresponding to the mobility corridors shown in Figure C-5.

e. Line-of-sight analysis. Intervisibility or line-of-sight (LOS) determination for weapons, communications, target acquisition, intelligence, and reconnaissance and surveillance systems must be considered for each mobility corridor/avenue of approach. The consideration should include such factors as:

- Terrain elevations
- Tree and vegetation height
- Height of built-up areas
- Density of ground vegetation
- Effects of weather

The LOS analysis will provide another means of comparison of the advantages and disadvantages of particular avenues of approach.

f. Analysis of avenues of approach. The final step of the terrain analysis is the selection of the avenue of approach which best supports the move, shoot, and communicate requirements of the force. Each avenue is analyzed with respect to the friendly or enemy capabilities. Advantages and disadvantages are listed and weighed, and a final selection or recommendation is made. For friendly forces this will be the avenue which best accomodates course of action selection and mission accomplishment. In the case of enemy forces this will be the avenue that best supports the most probable enemy course of action.

Weather Analysis. The effects of weather on tactical operations cannot be neglected since weather has an impact on both friendly and enemy operations. Weather can have a tremendous impact on the terrain and must be integrated with the terrain analysis. The weather analysis examines in detail how weather affects friendly capabilities to move, shoot, and communicate and how it is expected to affect enemy capabilities. The military aspects of weather which must be considered in the analysis are visibility, clouds, temperature, precipitation, wind, humidity, and light conditions.

The weather analysis process is diagrammed in Figure C-2 and is discussed below.

a. Development of the weather factor analysis matrix. Weather analysis begins with the development of the weather factor analysis matrix. This matrix helps to organize the analysis task, define specific weather data requirements, and determine what weather factor overlays will be required. The matrix isolates those weather factors that are

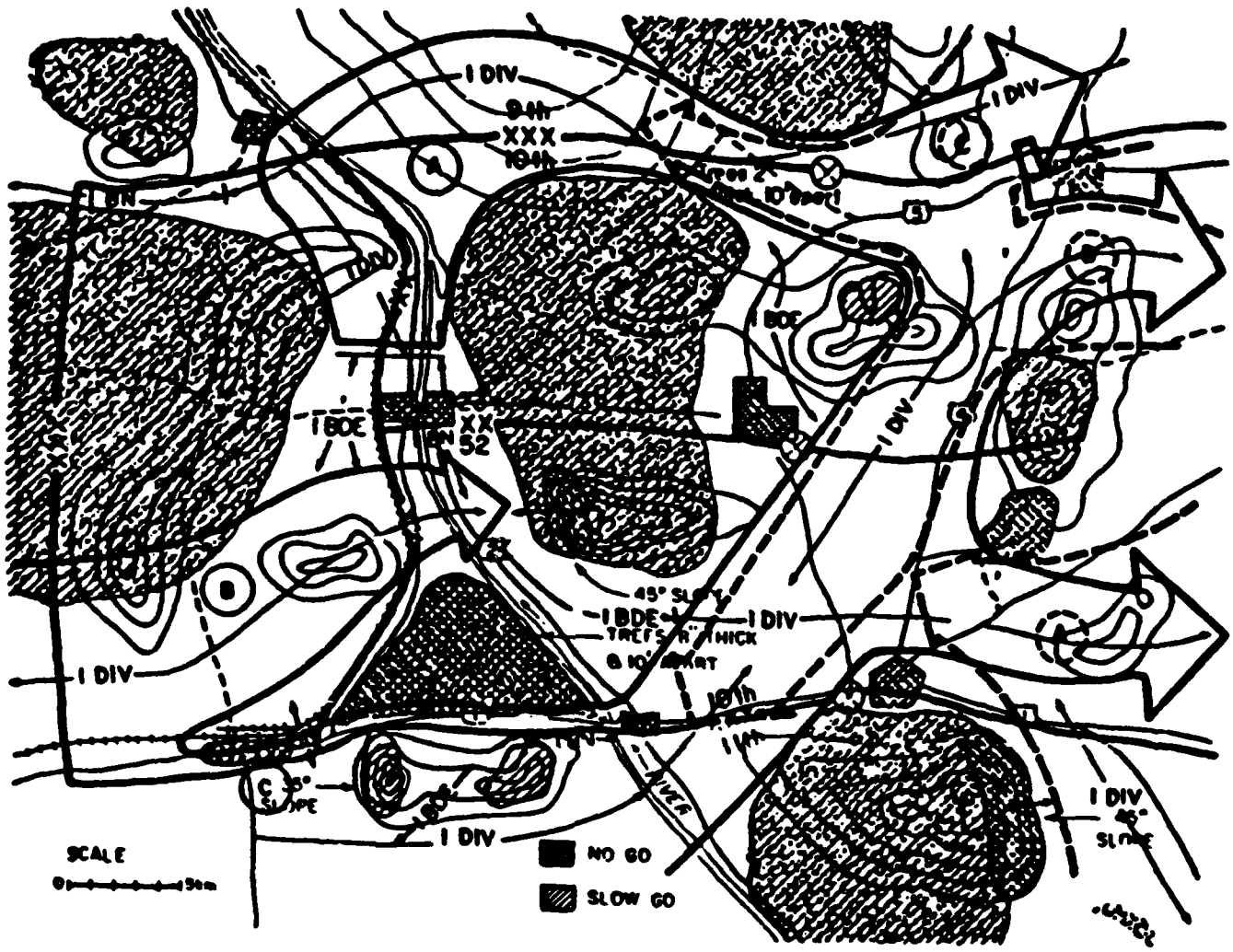


Figure C-6. Division Avenues of Approach.

militarily significant and correlates their effects with specific combat operations and supporting functions. A typical weather factor analysis matrix is shown at Figure C-7.

b. Development of weather factor overlays. As in terrain analysis, maximum use of graphic displays is made to analyze the effects of weather on combat operations. Through weather factor overlays, weather data are converted into graphic displays. Overlays are particularly convenient for integrating weather effects with the terrain analysis. Time permitting, weather factor overlays will be prepared for:

- Fog
- Cloud coverage
- Precipitation effects (rain or snow) on;
  - Hydrography and wet areas
  - LOC's
  - Built-up areas
  - Slopes

c. Impact of weather on terrain. A judgmental, experienced-based determination of the impact of weather on terrain is made by the intelligence officer and is input to the terrain analysis. Weather impact on terrain is primarily on the military aspects of terrain as follows:

- Observation and fire, primarily visibility as reduced by weather such as fog, rain, snow, etc.
- Cover and concealment, primarily the concealment offered by fog, precipitation, cloud cover, and smoke.
- Obstacles, generally those resulting from precipitation or influenced by temperature.
- Key terrain, primarily the modification of the criticality of terrain due to present weather conditions.
- Avenues of approach, primarily in terms of limitations or enhancements in the cross-country mobility, generation or enhancement of obstacles, and general impacts on force movement capabilities.

d. Impact of weather on operations. Having determined the impact of weather on terrain the intelligence officer then extends his analysis to determine the impact of weather, existing and forecasted, upon tactical operations. The impact on operations will consider both the type of operation (e.g., offense, defense, retrograde) and the various elements involved in the operation (combat, combat support, and combat service support). The impact will apply to both friendly and enemy operations and will be the precursor to determining the impact of weather on friendly and enemy courses of action.

Intelligence Uses/ Applications	Factors										
	Temperature (1)	Humidity (1)	Intervisibility	Surface winds	Precipitation	Snow/Ice cover	Winds aloft	Cloud data	Light data	Severe weather	Fog
Observation & fields of fire			X	X	X	X		X	X	X	X
Artillery emplacements	X			X	X					X	
Concealment			X	X	X	X		X	X	X	X
Camouflage	X	X	X	X	X	X		X		X	X
Ground avenues of approach	X		X		X	X				X	X
Cross-country movement	X		X	X	X	X			X	X	
Fording sites	X		X	X	X	X			X	X	X
Air drop zones	X		X	X	X	X	X	X	X	X	X
Helicopter LZ	X	X	X	X	X	X	X	X	X	X	X
LOCs and MSRs	X		X		X	X			X	X	
NBC operations	X	X			X	X	X	X		X	X
Line-of-sight radio radar				X	X					X	
REMS emplacement	X			X	X	X				X	
Infiltration routes			X		X	X			X	X	X

(1) Density altitude quality affects helicopter lift capability.

Figure C-7. Weather Factor Analysis Matrix.

The impact analysis is essentially judgmental, based on personal knowledge and experience of the staff and upon climatic and topographical studies of the area of operations.

e. Impact of weather on courses of action. The analysis of the impact of weather on terrain and operations leads ultimately to an analysis of the weather impact on courses of action open to each side. The courses of action considered should be as specific as possible and deal with specific forces, specific terrain, and specific types of operations. The courses of action analyzed must be within the force capabilities, mission related, and viable within the operational facts as known at the time. The analysis is judgmental, and a final conclusion is made as to whether weather favors, or is unfavorable to, each considered course of action, friendly or enemy.

Development of Enemy Capabilities

Enemy capabilities are courses of action which the enemy can adopt and which will influence the accomplishment of the friendly mission, either favorably or unfavorably. A complete statement of a capability will include what the enemy can do, when he can do it, where he can do it, and in what strength he can do it. The evidence considered in the analysis and discussion of enemy capabilities includes characteristics of the area of operations and positive or negative evidence of enemy presence or activities. In analyzing and discussing the enemy capabilities the intelligence officer must judge from an enemy point of view the advantages and disadvantages of adopting each capability. He must consider enemy doctrine and past practices as well as the ultimate results of adoption or rejection of a particular capability. Actions which are grossly disadvantageous to the enemy, or are unreasonable, are not included. Further, if there is no indication of the enemy's adoption of a particular capability and it does not represent a major threat to the accomplishment of a friendly capability, then it should not be considered.

The following considerations apply to the development of enemy course of action or capability statements.

What the Enemy Can Do. Four types of tactical capabilities are usually possible: attack, defend, retrograde, or reinforce. These operations are usually divisible into a variety of more specific actions. For example, an attack may be a penetration, an envelopment, a turning movement, or a pursuit. A defense may be in a single position or successive positions, static or mobile. A retrograde may be classified as a withdrawal, retirement, or delaying action. The specific actions which the enemy can physically adopt depend on the available means and the conditions under which those means can be used. Consequently, the "what" of each of the enemy's capabilities is determined by the characteristics of the area of operations, the order of battle of the opposing forces, and time and space factors. Characteristics of the area of operations, friendly situation, and the means available to the enemy will usually indicate that he is capable of some actions and incapable of others.

When the Enemy Can Do It. The time required for the enemy to employ his combat power capabilities depends on the disposition of his forces and equipment. An enemy capability involving the displacement of forces cannot be put into effect until some time after the force has begun to move. Reserves

cannot reinforce an attack or defense until they have been moved to appropriate locations such as attack positions or forward assembly areas. Consequently, time and space factors are computed in determining the "when" of a capability involving displacement of forces or equipment.

Where the Enemy Can Do It. The "where" of an enemy capability depends on the weather, terrain, and disposition of his forces. Under existing or predictable conditions of weather, the terrain may provide avenues of approach into friendly positions from the flank, front, or rear. Conversely, it may prevent the enemy's use of armored, mechanized, or airborne forces in certain areas. Cross compartments may provide the enemy with suitable defense or delaying positions. The existence of suitable objectives, drop, or landing zones indicates where airborne forces may be employed. The presence of suitable beaches suggests where enemy amphibious forces may be used. The location of adequate assembly areas and attack positions indicate where enemy missile launchers may be located. Accordingly, the intelligence officer determines the "where" of each enemy capability through analysis and integration of the characteristics of the area of operations with the situations of the opposing forces.

In What Strength Can He Do It. The strength the enemy can use in any particular capability depends primarily on the composition, disposition, and strength fo the available forces. Order of battle intelligence furnishes the necessary information. The estimate of enemy strength is usually limited to close combat units such as infantry, armor, and mechanized (including reconnaissance) units and their combat support means such as artillery, air, chemical, and nuclear weapons.

IPB. In terms of the IPB process, the development of enemy capabilities includes both the threat evaluation and threat integration steps of that process.

Threat evaluation is the detailed analysis of the enemy; his tactical doctrine, weapons and equipment, organization, composition, and support functions. Threat forces are identified, and a detailed order of battle (OB) is constructed. The objective of this step is to determine how the enemy can be expected to operate and what his capabilities are, doctrinally. The doctrinal template is the primary tool used in this step.

Threat integration is the heart of the entire IPB process. It is the integration of the enemy forces and their doctrine with the terrain and weather to determine what actual capabilities (potential courses of action) are available to the enemy in this area at this time. Threat integration is a sequential process in which the G2 develops situation, event, and decision support templates.

The situation template depicts how the enemy might deploy and operate within the constraints imposed by the current weather and terrain and force status. This template is used to identify critical enemy activities and locations. It provides the basis for high value target (HVT) analysis and target development.

The event template shows where critical events and activities are expected to occur and where critical targets may appear. It is used to predict time-

related events throughout the area. The event template provides the basis for collection planning, prediction of enemy intentions, and for acquiring and tracking HVTs.

The decision support template relates the significant events depicted by the event template to identified target areas by depicting the relative point in time that a tactical decision is required to take advantage of or exploit the situation. The decision support template is a major product of the G2 IPB process and is a graphic representation of the intelligence estimate.

Effect of Area of Operations and Enemy Capabilities on Mission Accomplishment

Friendly courses of action are developed by the G3 and furnished to other coordinating staff members to facilitate their planning efforts. The intelligence officer, using all the information and analyses from the previously discussed intelligence functions, must draw conclusions as to the effect that the area and the enemy will have on each considered friendly course of action.

Using the analysis of the area of operations, the intelligence officer states the total effects of weather and terrain on mission accomplishment. He identifies the obstacles and key terrain and presents the avenues of approach to the G3 and commander. From the identification and analysis of the enemy capabilities the intelligence officer evaluates the effect that each enemy capability is expected to have on each friendly course of action. He specifically identifies each enemy capability that, if adopted, would have an adverse effect on friendly mission accomplishment.

Probable Enemy Courses of Action

Relative probability of adoption of each feasible enemy capability or course of action is determined based on the enemy doctrine, terrain and weather, relative combat power, and recent enemy activities. The intelligence officer makes this determination by evaluating each capability from the enemy's perspective and judging the advantages gained for the enemy by each. His conclusions are presented to the commander and the G3 for their consideration in choosing the friendly course of action.

Monitoring and Alerting Enemy Operations

The intelligence officer must continuously monitor enemy operations and activities and update his estimate throughout any tactical operation. He must be especially alert to both anticipated and unanticipated enemy actions to insure that deviations from the expected course of action are detected early. The IPB event template provides the G2 an invaluable aid in this process.

The event template depicts named areas of interest (NAI) along each mobility corridor and the relationship of events along mobility corridors. NAI are points or areas where enemy activity or lack of activity will confirm or deny the adoption of a particular course of action by the enemy. An example of the event template is shown in Figure C-8. The event template is used to predict time-related events throughout the area. By knowing what the enemy is capable of doing and comparing this to what he is actually doing,

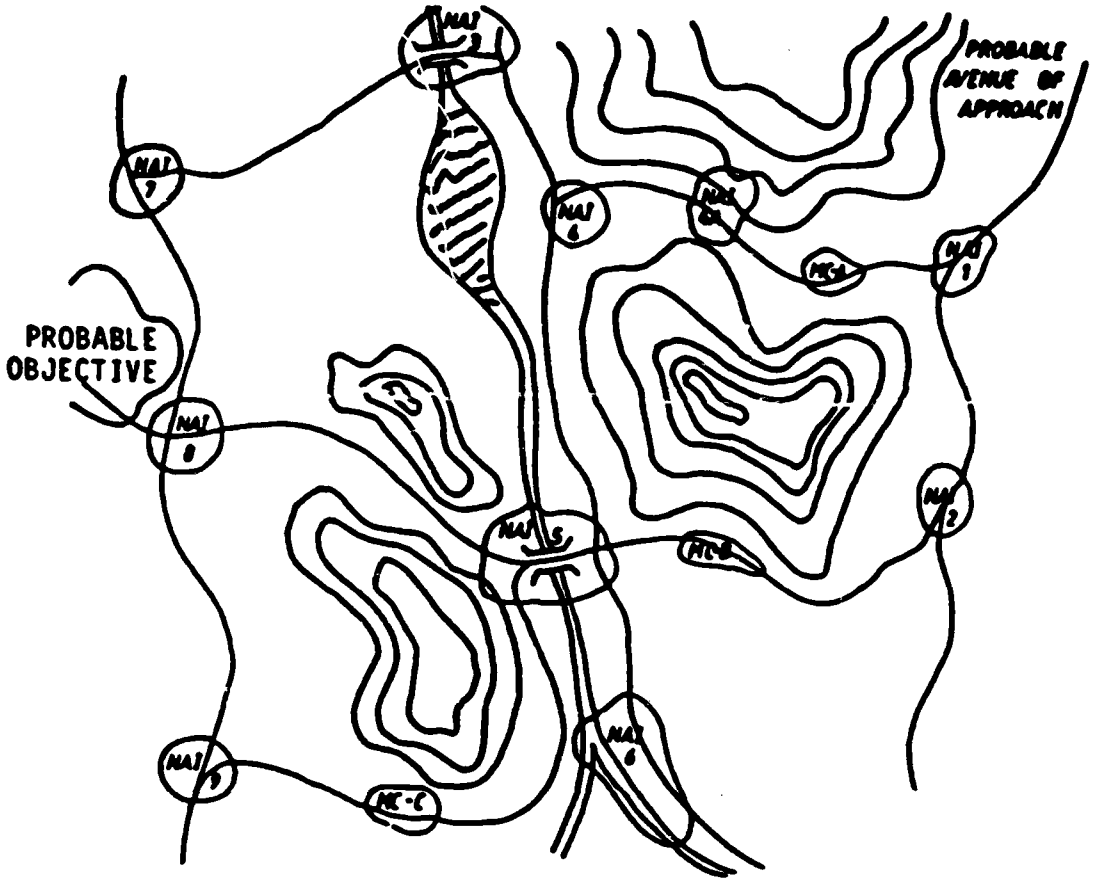


Figure C-8. Sample Event Template.

future enemy activities can be reasonably projected. The event template is useful for:

- Collection planning, by providing high priority focal points for collection assets and providing a basis by which the intelligence officer may assign information threshholds which provide alerts that a particular action is confirmed or not within a time limit or by specified activities;

- Prediction of enemy intentions, by providing for the comparison of activities within and between mobility corridors with those that must occur for particular courses of action;

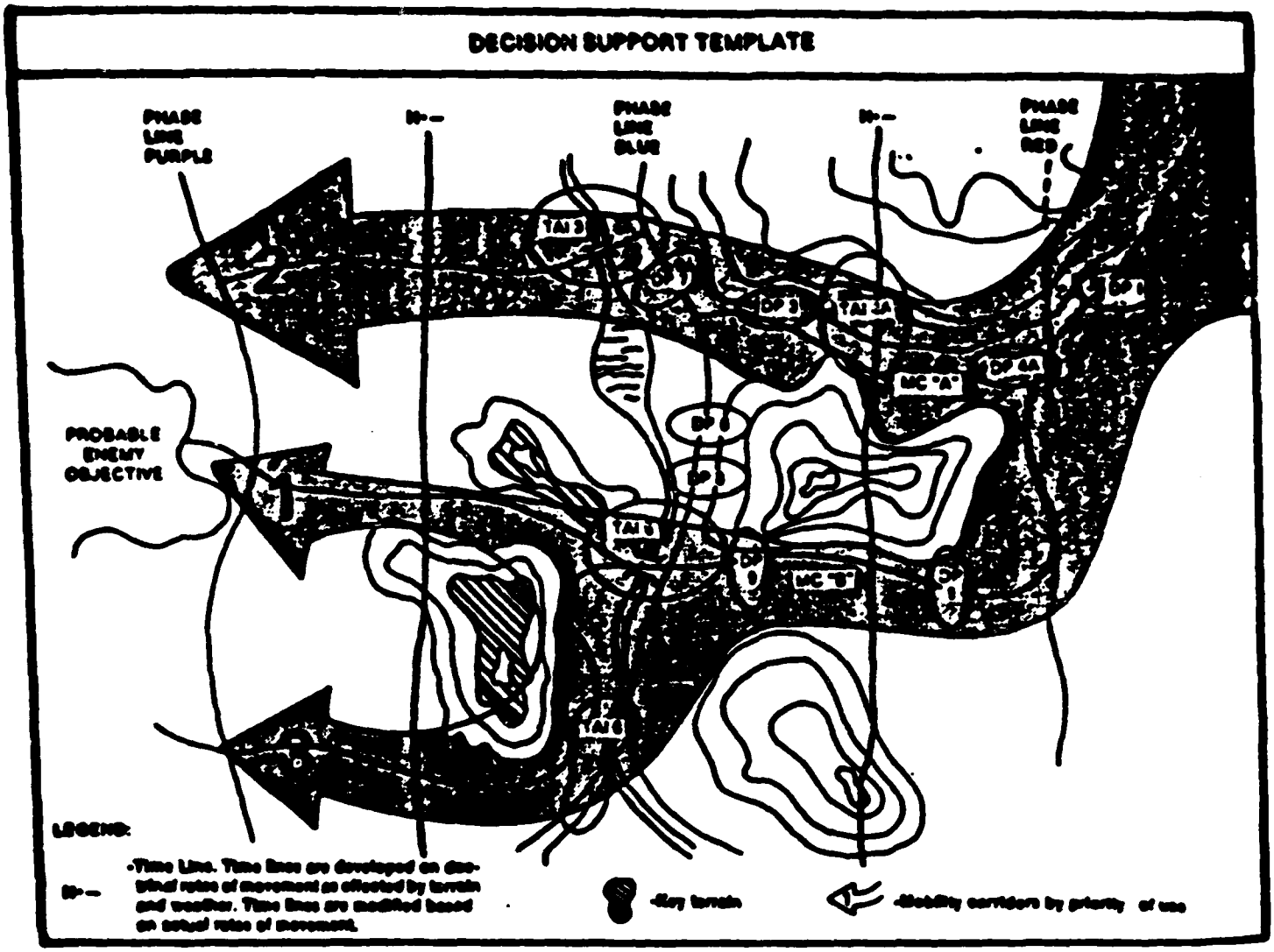
- Acquiring and tracking high value targets (HVTs), by detailing where and when to look for these targets.

The event template also provides a basis for the decision support template (see example at Figure C-9.) The decision support template relates the details of the event template to points in space and time where tactical decisions may be required to effect battlefield events. The decision support template does not dictate decisions to the commander but rather identifies critical tactical events and threat activities relative to time and location which may require tactical decisions by the commander. The decision support template provides a structured basis for using judgment and experience to reduce battlefield uncertainties.

Replanning

The monitoring and alerting of enemy operations will frequently detect variations from the expected activities. These variations may be the result of minor or extreme deviations from the expected enemy course of action. The intelligence staff officer must evaluate each of these occurrences and modify his estimate of the situation accordingly.

When replanning becomes necessary, the G2 may re-enter the normative course of staff actions at any point. Replanning, particularly during the heat of battle, is extremely time critical. The intelligence officer must make very rapid evaluations of new information and incorporate his judgment of that information into his estimate of the situation. The replanning may require only minor adjustments to the situation or may require that an entirely new estimate of enemy capabilities and courses of action be completed. Modifications, either large or small, must be communicated to all affected staff members and are of particular importance to the G3 and commander.



TAI - target area of interest
NAI - named area of interest
DP - decision point
MC - mobility corridor

Figure C-9. Sample Decision Support Template.