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CONTENDING CONCEPTS TACTICS & OPERATIONAL ART

VOLUME I

(10) BY

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EXECUTIVE SUMMARY

I. BACKGROUND

1. Purpose. Prompted by the "Corps Battle" tape of General Donn A. Starry, a gloomy U.S. Army Training and Doctrine Command (TRADOC) assessment of the condition of U.S. "Front line" combat units some 48 to 72 hours into a Warsaw Pact attack on Western Europe, the study attempts to assist in the development of an operational concept for use by the Army's "heavy" division (an Armored or Mechanized Infantry Division) of 1986; the key ground element of a successful deterrence or defeat of such an attack.

2. Study Description. As a means of achieving this goal, the study, after extensive reading and research, developed an alternative tactical doctrine. This "alternative" was compared to a base case, the current U.S. Army tactical doctrine presented in Field Manual (FM) 100-5, Operations and the "How to Fight" series of field manuals, to determine if there is potential for improvement of battlefield performance and effectiveness through improvement of tactical doctrine. Comparison of the tactical doctrines was accomplished using surveys and a war game. Senior commanders and senior staff officers - U.S. Army corps commanders, commanders of "heavy" divisions, center commanders, and selected HQ Department of the Army and TRADOC staff officers served as one sampling population for the surveys. Army "combat arms" officers,

students at the Naval War College (NWC), served as war game players and as a second survey population.

II. SYSTEMS APPROACH - METHODOLOGY

1. Type of Problem. The study is structured to approximate a "problem of choice." The capabilities of the two tactical doctrines to meet specific battlefield objectives are highlighted. The study does not attempt to measure the resource implications for the doctrines. A schematic illustrating the study's methodology is on p. 29.

2. Description of the Systems. The tactical doctrines are examined by studying two alternative systems operating in the same environment (see Table I-1, p. 30). Each system comprises a U.S. Army "heavy" division and a tactical doctrine. In order to isolate the tactical doctrines, each system is identical except for the doctrine. The environment is the 1986 European battlefield.

3. Measurement Tools. The primary sources of data for the evaluation phase of the study are the surveys. The surveys were used to measure the performance of the "heavy" division using each tactical doctrine. These surveys were tied to specific Measures of Performance (MOP) which will be discussed later. The study used the war game for two purposes: first, as a vehicle for measuring the battlefield effectiveness of the divisions and second, as a vehicle for giving the NWC Student Survey population a closer look at the tactical doctrines and the "heavy" division's critical battlefield tasks.

a. War Game. The use of a war game as a measurement tool is a recognition of the fact that ultimately armies are made up of people and led by people. Computer simulations or analytical models poorly account for human behavior and its impact upon the outcome of combat. Human decisionmaking is better accounted for in war games, wherein a number of different players provide a spectrum of behavior.

(1) The war game used in the study is a modified version of a prototype of NATO Division Commander (NDC), developed by Simulation Publications Incorporated (SPI) for the commercial market. NDC was selected because of its low cost, its availability, its ability to simulate many of the division's critical tasks, its ease of control, and relatively short training and playing time. Other commerical or Army war games did not exercise the appropriate level of command or were too complex for the control and player resources available to the study.

(2) NDC was modified significantly by the study group to suit the purposes and assumptions of the study and to match the resources available. Changes in rules, procedures, and, most importantly, game variables were made based upon an analysis of the 1986 battlefield environment and 1986 U.S. and Soviet weapons, tactics, and organizations. A complete description of the war game is provided in Appendix B.

b. Surveys. Three surveys were made, two of the Army officer students at the NWC and one of the senior

commanders and staff officers. The following table provides a brief description of the sample populations.

TABLE 1

STUDY SURVEYS

SURVEY	DESCRIPTION OF SAMPLE POPULATION	SIZE OF SAMPLE POPULATION
NWC Student Preliminary Survey	Base Case Group	6
	Alternative Group	6
NWC Student Final Survey	Base Case Group	6
	Alternative Group	6
	Combined Group	12
Senior Commander Survey	Primary Group	12*
	TRADOC Group	3*
	"Special Interest" Group	1*

* The 16 Senior Commander Survey responses represent about 50% of the surveys actually sent out.

- Tables D-1 and D-10, Appendix D, describe the survey population in detail. Appendix D provides samples of the survey.

(1) Senior Commander Survey. The Senior Commander Survey asked the respondents to do three things. First, the respondents weighted the division's critical tasks according to their judgment of each task's importance. Second, the respondents compared the two systems (each system is a division paired with a tactical doctrine), estimating

their capability to perform each critical task. Third, the respondents provided their judgment of whether the study had in fact provided two distinct tactical doctrine alternatives. Additional comments on all other aspects of the study were solicited. Annexes D-6 through D-8 of Appendix D provide an anthology of their comments.

(2) NWC Student Surveys. The NWC students, who also played the role of a "heavy" division commander in the war game, served as a second sampling population for two surveys: a pre-war game survey and a post-war game survey. The earlier survey, designed primarily to focus the respondent's attention on the particular system he would play in the war game (6 students played a base case "heavy division; 6 played an alternative "heavy" division) and on the division's critical tasks, asked for a critical task weighting and a judgment of how well the respondent's system would perform each critical task. The later survey was taken after the respondent had played the war game with his sytem and had studied the system that he did not play. The later survey is nearly identical to the Senior Commander Survey. Again, the survey asked for critical task weightings, a judgment of how well each system would perform each critical task, and a response indicating whether the study had developed two distinct doctrines. Additional comments were again solicited. Annexes D-3 and D-4 to Appendix D anthologize these comments.

4. Measures of Performance and Effectiveness (MOP/MOE)

a. Measures of Performance (MOP). MOP are used in this study to indicate the extent to which the systems accomplish their critical tasks and to indicate the extent to which each of the tactical doctrines contribute to this goal. Division 86, an "on-going" TRADOC evaluation and development process which is designed to focus Army-wide force modernization efforts, provides a framework for analyzing a division's battlefield performance. It is this framework which provides the basis for the study's MOP.

(1) Division 86 divides the air-land battle into two basic forms of activity: those associated with anticipating the battle (Force Generation) and those performed during the battle (Central Battle). Each form of activity is considered to have five tasks that are critical to its successful accomplishment. Table 2 shows these critical tasks.

(2) Given the intimate relationship between Division 86 and the base case tactical doctrine, these critical tasks were analyzed for the purpose of removing any biases or restrictions that would prevent them from serving as an unbiased and comprehensive basis for the study's MOP. In effect, the study provided for the alternative tactical doctrine by expanding the definitions of the critical tasks. Appendix A, pages A-6 through A-12, elaborate this process

TABLE 2

DIVISION CRITICAL TASKS

CENTRAL BATTLE

Target Servicing - neutralizing or destroying enemy firepower systems

Counterfire - attack of enemy indirect fire systems

Air Defense - nullify or reduce the effects of enemy air attack

Logistical Support - provision of critical supplies and service to units engaged

C^3/EW - effective command, control, and communications for the Central Battle

FORCE GENERATION

Surveillance/Fusion - intelligence processing for C^3 and Interdiction purposes

Interdiction - attack of second echelon forces not involved in Central Battle

Force Mobility - the ability to move on the battlefield

Reconstitution - required combat service support to regenerate the force

C^3 - effective command, control, and communication for Force Generation.

More comprehensive definitions are provided in Appendix A.

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and the resulting critical tasks. The MOP follow immediately in that each expresses the extent to which the system is expected to accomplish the critical task. The MOP provide the performance criteria for the study.

b. Measures of Effectiveness (MOE). MOE are used in this study to indicate the extent to which the systems accomplish their objectives and to indicate the extent to which each of the tactical doctrines contribute to this goal. Appropriately, they are measures of the degree to which the systems accomplish their battlefield missions.

(1) Division 86 specifies that the most critical mission for the Army's "heavy" division of 1986 will be to carry out its offensive and defensive tasks as part of a corps committed to CENTAG or NORTHAG within NATO. After a mission analysis for the division and for the Soviet forces that the division could encounter, the study formulated MOE which were used in conjunction with the war game to provide a tentative appraisal of system effectiveness. Too few iterations of the war game could be played to gain any true statistical basis for conclusions of effectiveness (recall that the primary purpose of the war game was to give its players, a survey population, a look at the tactical doctrines and the critical tasks).

(2) The study's MOE are:

(a) Offensive MOE - Expected extent of the loss of effectiveness suffered, due to the "heavy" division's attack, by the enemy security and main defensive belt forces in the division's assigned sector; and the expected duration of the loss of effectiveness.

(b) Defensive MOE - Expected extent to which the enemy first echelon army's 150-200 kilometer objectives are not achieved at D+4, and the extent to which ultimate attainment of the objective has been delayed.

c. Criterion of Choice. A Criterion of Choice is used to determine whether the performance capabilities of one of the systems, and thus its tactical doctrine, is preferred over the performance capabilities and doctrine of the other. The criterion is a result of a weighting scheme developed from the surveys. The study does not identify a preferred tactical doctrine per se but does attempt to rank order the alternatives using the Criterion of Choice and certain other factors.

(1) Each alternative is described in terms of the study's MOP and MOE; dominance by one alternative within groups of tasks and significant differences in the performance of specific tasks are identified.

(2) Any lack of feasibility of an alternative or failure at a specific task is identified.

(3) Any inability to distinguish a difference between the alternatives in accomplishing a task or in meeting mission objectives is identified.

(4) If no readily apparent differences between the alternatives can be identified, the alternative which is less successful at performing the more important tasks or missions or which, relative to the other alternative, has risks without compensation, is identified.

III. MAJOR ASSUMPTIONS AND CONSTRAINTS

1. Assumptions. An analysis was conducted during the formulation phase of the study to define and bound the problem at issue. Assumptions made to establish the political, military, technological, economic, and personnel conditions which bear upon this problem were part of the results of this analysis. The following sub-paragraphs will simply enumerate these assumptions. (A detailed listing of the assumptions is provided in Chapter I; the uncertainties which have the most significant impact upon the study are analyzed in Chapter V.) Some of the assumptions are peculiar to the war game, while others obtain for the whole study.

a. The study assumes that nuclear weapons are not used.

b. The study does not address problems associated with chemical or biological weapons, assuming that they would be equally effective against both systems.

c. The study assumes that the U.S. commitment to NATO will remain in effect at its present level.

d. The study assumes that defeating or neutralizing the Warsaw Pact threat to Central Europe will remain the most difficult mission for U.S. general purpose forces.

e. The study assumes that potential enemies other than the Warsaw Pact are likely to use Soviet equipment and operational methods, thus conclusions from this study should be applicable to any theater where mechanized operations can be undertaken. (The remainder of the assumptions are generally applicable to the war game.)

f. The study assumes a "partial mobilization scenario." In this scenario, the Soviets would use 48 to 96 hours to begin the deployment of their forces in the German Democratic Republic, to begin moving second echelon armies, to reinforce tactical air forces, and to make final combat support and combat service support arrangements. NATO forces would have enough time to occupy their initial defensive positions and to begin initial reinforcement of tactical air forces.

g. Per its "Strategic Scenario" (Annex B-4 to Appendix B), the study assumes that three divisions of a Soviet Tank Army are directed into the defensive sector of a U.S. "heavy" division.

h. The study assumes that its understanding of Soviet operational methods is accurate. Appendix G presents a comprehensive description of the Threat doctrine used by Red forces in the war game.

i. The study assumes that combat will be conducted 24 hours a day; operations are only slightly affected by darkness and weather conditions (the Soviets expect their units to be capable of four to five days of continuous combat). Chapter II details key environmental conditions which will affect the 1986 battlefield.

j. The study assumes that both U.S. and Soviet organizations for 1986 will be identical to current organizations, modified only to accept the new equipment anticipated by 1986.

k. The study assumes that either side could achieve a local air superiority for brief periods of time. Neither side will gain absolute superiority during the early phases of a war.

l. The study assumes that extensive use will be made of Electronic Warfare (EW). Both sides can, at times, attain a complete disruption of enemy communications and data nets. All forces will operate with partially degraded communications capabilities at all times.

m. The study assumes current TRADOC projections of "urban sprawl" and "reforestation" affects upon the terrain of West Germany.

n. The study assumes that both sides can integrate new technology into their organizations and that both sides can successfully train commanders and units to use the technology.

o. The study assumes that U.S. commanders and units can be trained to execute either tactical doctrine with absolute efficiency. At the same time, the study assumes that a doctrine must have an underlying philosophy and set of principles which can be understood and applied by leaders at all levels of command and that these leaders must be confident that all other leaders are applying the same principles.

2. Constraints. The analysis which resulted in assumptions also identified constraints, factors which serve to limit the set of alternatives considered as potential solutions to the problem at issue. The following sub-paragraphs enumerate these constraints.

a. The NATO allies will continue to concede the strategic initiative to the Warsaw Pact.

b. The defense must be conducted well forward.

c. There will be no early release of nuclear weapons for use by NATO forces.

d. The division probably cannot allow a penetration of its defensive surface by regimental or larger size forces; thus a "porous defense" alternative, which would allow for a maximum economy of force for large counterstrokes is infeasible.

e. A defensive concept that relies completely upon the forward deployment of advanced technology weapons is not feasible in the foreseeable future.

f. A linear defense is not feasible.

g. The inviolability of the Warsaw Pact's national borders limits the extent of local offensive operations undertaken in the early stages of combat to support a strategic defense.

h. Time constraints placed upon the conduct of the study disallow the testing of a host of tactical alternatives. The study developed one alternative doctrine, which represents many of the best features of all the doctrines researched.

SPECIAL NOTE: "Offensive Exclusion."

In terms of tactics for offensive operations, it is questionable whether the alternative is significantly different from the base case. More importantly, even if there is a difference, measurement of this difference with the analytical tools that have been selected may not be possible. The war game focuses upon defensive operations. The "offensive" MOE is provided for use in further study.

IV. RESULTS OF ANALYSIS

1. Effectiveness. The effectiveness of a "heavy" division using the tactical doctrines at issue in this study is measured by means of the "defensive" MOE. The data for the MOE are the combat results of the war game.

a. Four iterations (Games) were conducted. Each Game matched either the base case doctrine or the alternative doctrine with one of two Soviet OM: Breakthrough (B) or Multiple Penetration (MP).

TABLE 3

GAME COMBINATIONS

U.S. TACTICAL DOCTRINE

SOVIET OM	BASE CASE	ALTERNATIVE
B	Game 4	Game 1
MP	Game 3	Game 2

b. In each Game, a U.S. "heavy" division, the 8th Mechanized Infantry Division (8 MID), was required to defend against an attack by three divisions of the Soviet First Guards Tank Army (1 GTA). Time constraints in each Game allowed only 40 hours of simulated time for Games 1, 2, and 4; Game 3 simulated 48 hours of combat. Subjective judgment of the final tactical situation allowed the MOE to be used. As the MOE and war game results were intended to provide only very tentative insights, this problem was not considered to be critical. The war games did allow the players to see their doctrine work so that they could better judge performance. (Detailed game histories and results constitute Appendix C to the study; this includes "eight hour" snap-shots of the game drawn on maps. The final map of each series includes an overlay detailing the remaining relative combat power of U.S. and Soviet forces.)

c. Key results for each Game are the exchange ratios, Soviet losses compared to U.S. losses; remaining combat power ratios compared to combat power ratios at the beginning of the games; and the tactical results--reported in Chapter IV and illustrated in Appendix D.

TABLE 4

EXCHANGE RATIOS (SOVIET/US)

(The higher the number, the more favorable the result for the US)

	U.S. TACTICAL DOCTRINES			
	BASE CASE		ALTERNATIVE	
	GAME 4	GAME 3	GAME 1	GAME 2
SOVIET OM TYPE OF LOSS	B	MP[1]	B	MP
BATTALIONS	3.75	1.875	2.17	7.50
COMBAT STRENGTH(CS)	4.80	2.54	2.35	5.57
COMBAT/COMBAT SUPPORT STRENGTH (C/CSS)	4.22	2.45	2.16	5.84

[1] Simulated 48 hours of combat; all others simulated 40 hours.

TABLE 5

REMAINING COMBAT POWER RATIOS
(Soviet/US)

(The lower the number, the more favorable the result for US)

	U.S. TACTICAL DOCTRINES				
	BASE CASE		ALTERNATIVE		RATIO AT GAME START
	GAME 4	GAME 3	GAME 1	GAME 2	
SOVIET OM	B	MP[1]	B	MP	
TYPE OF POWER					
BATTALIONS	3.33	6.00	4.57	2.73	3.46
CS	2.80	5.00	4.51	2.52	3.46
C/CSS	2.41	3.19	3.35	2.07	2.95
FATIGUE	1.41	1.89	0.81	2.18	1.00

[1] 48 hours of combat; other games simulated 40 hours.

d. The following table and sub-paragraphs compare the effectiveness of a "heavy" division paired with a tactical doctrine--one system against the other, using the study's MOE.

TABLE 6

HEAVY DIVISION EFFECTIVENESS

	U.S. TACTICAL DOCTRINE	
SOVIET OM	BASE CASE	ALTERNATIVE
B	Partially Successful	Partially Successful
MP	Successful	Successful

(1) The divisions were successful, using either tactical doctrine, in preventing the 1 GTA from achieving either its intermediate or final objectives when the Soviets were using their Multiple Penetration OM. The 1 GTA was stopped in place, or worse, and would have had to use additional forces to overcome the defense.

(2) The divisions were partially successful, using either tactical doctrine, in preventing the 1 GTA from achieving its objectives when using the Breakthrough OM. While in both cases the 1 GTA had achieved, or was likely to achieve, its intermediate objectives on time; losses, fatigue, and a tenuous tactical situation would likely prevent the achievement of its final objective.

2. The following tables rank the tactical doctrines in terms of the exchange ratios achieved and remaining strength ratios.

TABLE 7

EXCHANGE RATIO COMPARISON

RANK ORDER	TACTICAL DOCTRINE	SOVIET OM
1[1]	ALTERNATIVE	MP
2[2]	BASE CASE	B
3[3]	BASE CASE	MP
4[4]	ALTERNATIVE	B

[1] Regardless of type of losses.

[2] Regardless of type of losses.

[3] For CS loss and C/CSS loss; 4th for Battalion losses.

[4] For CS loss and C/CSS loss; 3d for battalion losses.

TABLE 8

STRENGTH RATIO COMPARISON

RANK ORDER	TACTICAL DOCTRINE	SOVIET OM
1[1]	ALTERNATIVE	MP
2[2]	BASE CASE	B
3[3]	BASE CASE	MP
4[4]	ALTERNATIVE	B

[1] Regardless of type of combat power (Battalions, CS, C/CSS) or fatigue level.

[2] For combat power ratios; 3d for fatigue level.

[3] For C/CSS ratio; 2d for fatigue level; and last for Battalion and CS ratios (see para (c))

[4] For C/CSS Ratio and fatigue level; 3d for Battalion and CS ratios (see para (b)).

3. Performance. The performance of the systems is measured by means of the MOP and a Criterion of Choice. The data for the MOP and the Criterion of Choice are the results of the surveys' respondents' judgment of the systems' performance of critical tasks and importance of the critical tasks.

a. The surveys resulted in data which were used to compute the study's MOP, to identify new concepts and issues or refine old ones, and to define a weighting scheme for use in computing the study's Criterion of Choice.

b. Summary of Survey Results.

(1) Criterion of Choice. Table 9 compares the potential performance capabilities of a "heavy" division using the U.S. tactical doctrine alternatives in terms of the study's Criterion of Choice. A significant difference was not identified by either the Army officer students at the NWC or by the senior commanders, suggesting no preference for either doctrine/division over the other doctrine/division. The alternative was evaluated slightly higher than the base case.

(2) The majority of the Army officer students at the NWC stated that two clear alternatives had been presented (but this is not reflected in their group's evaluation). The majority of the senior commanders disagreed, stating that two clear alternatives had not been presented (this

TABLE 9

"HEAVY" DIVISION PERFORMANCE

SURVEY GROUP	U.S. TACTICAL DOCTRINE	
	BASE CASE	ALTERNATIVE
NWC STUDENTS	6.47	6.84
SENIOR COMMANDERS	6.03	6.04

qualitative statement is accurately reflected in their quantitative evaluations).

(3) Neither the NWC students nor the senior commanders identified a significant difference in the capability of a "heavy" division to perform any of the critical tasks using one tactical doctrine or the other.

(4) The senior commanders did estimate that the "heavy" division may perform the C^3/EW critical task in an inferior manner using the alternative tactical doctrine, although their rating for the base case was not significantly higher.

(5) The NWC students estimated that a "heavy" division would perform the more important critical tasks ("their" more important tasks, i.e., Force Mobility, C^3/EW, Target Servicing, and Logistical Support) better when using the alternative tactical doctrine rather than the base case, but not significantly better. The senior commanders provided

a similar rating for their more important tasks, i.e., Target Servicing, Force Mobility, and C^3/EW, but rated the base case higher for two of the three tasks.

(6) Both groups estimated that a "heavy" division using the base case tactical doctrine would perform TRADOC's "Central Battle" tasks better when compared to a division using the alternative and reversed this judgment for TRADOC's "Force Generation" tasks. In neither instance was the difference in the performance capability estimate significant.

V. CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations that follow are the results of the comparison and other analyses conducted during the study.

1. Conclusions

a. "Heavy" Division Performance and Effectiveness. There is potential for improvement of the battlefield performance and effectiveness of the 1986 "heavy" division through improvement of its tactical doctrine. Adding the tactical concepts of the alternative to current doctrine would contribute to this improvement. Both doctrines were found to be advantageous to the battlefield effectiveness of the division in the war game. Both doctrines were found to be advantageous to battlefield performance as measured by the opinion surveys. Neither of the tactical doctrines

tested emerged as a "preferred" alternative. The Criterion of Choice could not provide a clear distinction; both entail risk; and neither, if used exclusively, promises much against the follow-on echelons of a Warsaw Pact attack.

b. Current Doctrine - Foundation. The current U.S. Army tactical doctrine may not provide a philosophic basis and set of principals that can be understood and applied by leaders at all levels of command, confident that other commanders are doing the same thing. The study's surveys found that Army officers at all levels had difficulty distinguishing the concepts of the base case and those of the alternative. Perhaps more importantly, the survey evidenced that there is not a consensus among these officers as to what comprises the philosophy and concepts of the current doctrine.

c. Current Doctrine - Universality. The current tactical doctrine does not provide the universality required of an ideal tactical doctrine; the alternative is better in this regard. Although the "How to Fight" series of FMs will, when published, address the complete spectrum of potential Army battlefields, its "capstone" manual, FM 100-5, Operations, which contains the base case's philosophical basis and its basic principles, is focused mainly on the defense and on the European battlefield. The alternative is not oriented to any particular mission or theater.

d. Current Tactical Doctrine - Realism. The current tactical doctrine may be a more realistic solution to the problem presented by the European battlefield, the limited depth of which may preclude a more offensive oriented or maneuver oriented solution.

e. Attack Windows. There may be "attack windows," points in space and time, into which and during which NATO forces can counterattack between the echelons of a Warsaw Pact force. Depending upon the targets of the attack, the counterattack(s) may result in benefits disproportionate to the size of force and costs involved. The attacks must be prepared for in advance, and Surveillance/Fusion and C^3 activities must be designed to look for and quickly recognize and act upon the indicators of these windows (see Chapter VII, para 5).

f. The 1986 Battlefield. The 1986 battlefield will be characterized by its extreme lethality, but other factors will impose severe demands upon the "heavy" division's units and personnel. Fatigue, Electronic Warfare, and a non-integral FEBA will place extraordinary pressures upon unit cohesion. In fact, small-unit cohesion or lack of it may well win or lose the battle for NATO forces.

g. Doctrine Development. Doctrine development cannot occur in isolation from training development, materiel development, and personnel actions. Division 86, as a management tool, is a clear recognition of this fact.

Battlefield performance and effectiveness will not be improved simply by incorporation of Operational Methods from the alternative or expanding the scope of current defensive doctrine.

2. Recommendations

a. Doctrine development for 1986 should be begun by writing a manual which details an explicit statement of the U.S. Army's philosophy of war. This manual should clearly and unequivocally articulate the philosophy and its basic concepts in terms universally applicable; the manual should not be directed toward any single theater or type of operation. The "Battle Book" developed as the alternative for this study could be one prototype. The base case, reduced to its essential elements, might be another prototype.[1] In any case there must be a clear understanding of the defeat mechanism implicit to the philosophy and of the operational art which employs this defeat mechanism against an enemy (these terms are employed throughout the study; the most concise treatment of them is in Chapter I, para 4B). These basic principles, once articulated, should be instilled in all members of the Army.

b. A second manual should be developed which explicitly and clearly delineates a set of Operational Methods (OM) derived from the principles in the first manual and used to meet the demands of a particular tactical situation.

c. The "How to Fight" series of FMs should be derived from this foundation, providing OMs to be used by specific

organizations to meet the demands of a particular tactical situation.

c. Division 86 and the Battlefield Development Plan (BDP). These TRADOC management and development tools should be adjusted to keep pace with and reflect the change in focus and scope of the evolving doctrine. Priorities within the Army processes guided by these documents should serve as the mechanism by which the guidance of U.S. national policy makers is met. The U.S. Army's tactical doctrine should not be so constrained.

d. Recommendations for Further Study

(1) The base case should be reduced to its essence and subjected to further analysis. This analysis could serve as a more comprehensive and rigorous basis for comparing it to the alternative.

(2) Subject the OM from the base case and the alternative to additional analysis to discover when both are most useful and how they complement each other. Key environments for this analysis should include:

(a) offensive operations

(b) meeting engagements

(c) the presence of and or the intervention of additional forces (both sides) on the battlefield.

(3) A comprehensive study should be directed at gaining an understanding of the "attack window" issue raised in this study. Key to this analysis are:

(a) accurate "templating" of Soviet echelonment,

(b) intelligence indicators,

(c) time and space boundaries of the window,

(d) Surveillance/Fusion targeting and capabilities, and

(e) C^3 requirements.

(4) The Army should investigate further uses of the war game developed by this study from the SPI prototype of NATO Division Commander. Modified with computer assistance and a better projection of game variables based upon classified performance data, this game could be used in testing and training.[2]

(5) A number of "organizational issues" were raised throughout the conduct of the study (Chapter VI). These deserve further study. Among the most important are:

(a) Roles and capabilities of rotary-wing aircraft, with special attention paid to the potential use of armed helicopters (AAH) as bona fide maneuver units.

(b) Capabilities of smaller units, battalions and brigades, to operate autonomously, because of non-integral FEBA, C^3 problems (EW), etc.

(c) Factors involved in unit cohesiveness and how to develop this commodity.

(d) Unit replacement system versus the individual replacement system.

(e) Logistical support of armored and mechanized units maneuvering on a fluid battlefield, geared to the development of organizations and equipment.

VI. UNCERTAINTY

This study, conducted with meager resources, is fraught with uncertainties. Many of these are addressed with assumptions or became constraints upon alternative development. The implications of these uncertainties are examined in Chapter V. An informal use of the conclusions and recommendations of this study cannot be made without examining these issues and unanswered questions.

ACKNOWLEDGEMENT

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TABLE OF CONTENTS

CHAPTER		PAGE
	EXECUTIVE SUMMARY	i
	ACKNOWLEDGEMENT	xxviv
	LIST OF TABLES	xxxiii
	LIST OF FIGURES	xxxiv
I	OVERVIEW	1
	Background.	1
	Study Purpose	3
	Methodology	3
	Definitions, Assumptions and Constraints.	12
II	ALTERNATIVE DEVELOPMENT AND DEFINITION.	31
	Introduction	31
	Development of the Base Case Tactical *Doctrine* - Background.	31
	Development of the Alternative - Background	34
III	ENVIRONMENT AND THREAT 1986+	38
	The Environment	38
	Threat Forces	60
IV	ANALYSIS OF PERFORMANCE AND EFFECTIVENESS	70
	Introduction.	70
	War Game Description.	70
	Game Results.	74
	Summary	81
	Part II Performance	
	Introduction.	84
	NWC Student Survey Results.	89
	Senior Commander Survey Results	94
	Summary	100
V	UNCERTAINTIES	103
	Introduction.	103
	Conceptual Uncertainties.	104
	Strategic Uncertainties	106
	Operational Uncertainties	110
	Environmental Uncertainties	112
	War Game Uncertainties	116

CHAPTER		PAGE
VI	ORGANIZATIONAL ISSUES	118
	Introduction	118
	Command and Control Issues	119
	Task Organization Issues	121
	Combat Support and Combat Service Support	123
	Reconstitution Issues	124
	Helicopter Employment	125
	New Systems Issues	125
	Conclusion	126
VII	CONCLUSIONS AND RECOMMENDATIONS	128
	Purpose	128
	Scope	128
	Part I - Conclusions	
	"Heavy" Division Performance and Effectiveness	128
	Current Doctrine - Foundation	129
	Current Doctrine - Universality	134
	Current Tactical Doctrine - Realism	134
	Attack Windows	135
	The 1986 Battlefield	137
	Doctrine Development	138
	Part II - Recommendations	
	U.S. Army Tactical Doctrine - 1986	138
	Division 86 and the Battlefield Development Plan (BDP)	139
	Further Research	140
NOTES		143
BIBLIOGRAPHY		148
APPENDIX A - Measures of Effectiveness (MOE) and Measures of Performance (MOP)		V-II
APPENDIX B - War Game		V-II
Annex B-1	War Game Structure	V-II
Annex B-2	Game Variables	"
Annex B-3	Controller Checklist	"
Annex B-4	Strategic Scenario	"
Annex B-5	U.S. Intelligence Estimate	"
Annex B-6	Soviet Intelligence Estimate	"
Annex B-7	U.S. Base Case OP ORD	"
Annex B-8	U.S. Alternative OP ORD	"
Annex B-9	Soviet Breakthrough OM OP ORD	"
Annex B-10	Soviet Multiple Penetration OM OP ORD	"
Annex B-11	Player Groups	"
Annex B-12	War Game Players	"
Annex B-13	Memo to Potential War Game Participants	"

APPENDIX C - War Game Results . . . . . V-II

Annex C-1 Game 1. . . . . V-II
Annex C-2 Game 2. . . . . "
Annex C-3 Game 3. . . . . "
Annex C-4 Game 4. . . . . "

APPENDIX D - NWC Student/Senior Commander Surveys . . . . "

Annex D-1 Preliminary NWC Student Survey. . . . . "
Annex D-2 Final NWC Student Survey. . . . . "
Annex D-3 NWC Student Pregame Comments . . . . . "
Annex D-4 NWC Student Post Game Comments. . . . . "
Annex D-5 Senior Commander Survey . . . . . "
Annex D-6 Senior Commander Comments Primary Group . "
Annex D-7 Senior Commander Comments TRADOC Group. . "
Annex D-8 Senior Commander Comments "Special Interest" Group . . . . . "

APPENDIX E - Base Case Tactical Doctrine. . . . . "

APPENDIX F - Alternative Tactical Doctrine. . . . . "

Annex F-1 Mobile Operations Concept Paper . . . . . "
Annex F-2 Division Mobile Operations Battle Book. . "

APPENDIX G - Soviet/Warsaw Pact Operational Methods . . . "

Volume II has been issued separately

LIST OF TABLES

TABLE		PAGE
1	Study Surveys.	iv
2	Division Critical Tasks	vii
3	Game Combinations	xv
4	Exchange Ratios(Soviet/US)	xvi
5	Remaining Combat Power Ratios	xvii
6	Heavy Division Effectiveness	xviii
7	Exchange Ratio Comparison	xix
8	Strength Ratio Comparison	xix
9	"Heavy" Division Performance	xxi
I-1	Alternative Systems.	30
IV-1	Game Combinations	71
IV-2	Exchange Ratios (Soviet/US).	76
IV-3	Remaining Combat Power Ratios	76
IV-4	Heavy Division Effectiveness	82
IV-5	Exchange Ratio Comparison	83
IV-6	Strength Ratio Comparison	84
IV-7	Study Surveys.	86
IV-8	Division Potential Performance - Criterion of Choice - NWC Students.	92
IV-9	Division Potential Performance - Criterion of Choice - Senior Commanders Primary Group	95
IV-10	Division Potential Performance - Criterion of Choice - Senior Commanders TRADOC Group	98
IV-11	"Heavy" Division Performance	100

LIST OF ILLUSTRATIONS

FIGURE		PAGE
1	Study Schematic	29
2	Built-Up Area Development in West Germany . .	45
3	U.S. Male Population, Age 17-21, 1970-2000. .	53
4	Profile of U.S. Enlisted Soldier	54
5	Division 86 (Base Case)	55
6	Division 86 (Base Case)	56
7	Division 86 (Base Case)	57
8	Regimental Cavalry Squadron	58
9	Division 86 (Base Case)	59
10	Threat Motorized Rifle Division	64
11	Threat Tank Division	65
12	How Threat Artillery is Organized for Combat.	67

CHAPTER I

OVERVIEW

1. Background

a. National Security Policy

National security policy decisions during the past several years have reestablished the pre-eminance of the U.S. ground force mission, as part of the NATO Alliance, of countering an attack by the ground forces of the Warsaw Pact. The Department of Defense's report for fiscal year 1980 portrays this mission as the primary mission for the U.S. ground forces and as the task for which ground force capabilities are primarily designed.

b. Mission Area Analysis

(1) Projected changes in Warsaw Pact capabilities and doctrine, perceptions gained about the nature of the modern battlefield from the 1973 Middle East War, and the planned introduction of both modernized and totally new weapon and support systems into U.S. inventories in the first half of the next decade have prompted the U.S. Army to reexamine itself completely. This examination comprised a thorough analysis of mission needs, an analysis of current and projected capabilities for meeting these mission needs, and an analysis to discover opportunities for improving efficiency.

(2) The Army's principle examination tool, developed under the auspices of its Training and Doctrine Command (TRADOC), is the "operational concept" for the Army's "heavy" division which would fight on the 1986 battlefield. This "operational concept," (called DIVISION 86,) has become the paradigm for evaluation, force development, and force modernization.

(3) TRADOC continues to pursue efforts that are complementary to and that were, in some cases, precursors of Division 86. Most important among these efforts are:

(a) the publication of Field Manual (FM) 100-5, Operations, and the "How to Fight" series of field manuals which, when completed, will constitute a thorough revision of the Army's tactical doctrine; and

(b) the preparation of the Battlefield Development Plan (BDP), which is intended to focus TRADOC's materiel and training development efforts, force structuring, and doctrine development and to provide "user" views of major issues to the Department of the Army and other agencies.

(4) Division 86 and BDP, which are in part Army Mission Area Analyses, served to direct the structure of this study and to provide an analytical method for the study. An analysis of the Army's NATO mission per se was not conducted.

2. Study Purpose

The purpose of this study is to assist the evolution of an "operational concept" for use by the Army against the Warsaw Pact threat. This study, unlike Division 86 or the BDP, concentrates upon tactical doctrine rather than organizational issues, materiel development, or personnel and training issues. Division 86, the BDP, and most other current studies concerned with the modern battlefield and the performance of the U.S. Army upon it consider tactical doctrine to be established in the "How to Fight" series of manuals. The hypothesis of this study is that there is potential for improvement of battlefield performance and effectiveness through improvement of the Army's tactical doctrine. This study develops and analyzes a set of alternative tactical doctrines to test this hypothesis.

3. Methodology (See Figure 1, p. 29 (a fold-out)).

a. The study is organized as follows:

Chapter I - Overview

Section 1 - Background

Section 2 - Purpose

Section 3 - Methodology

Section 4 - Assumptions and Constraints

Chapter II - Environment and Threat 1986+

Chapter III - Development and Definition of Alternatives

Chapter IV - Analysis of Performance and Effectiveness

Chapter V - Uncertainties

Chapter VI - Force Structuring Issues

Chapter VII - Conclusions and Recommendations.

b. Systems Approach

(1) The structure of this study is similar to the structure of a "problem of choice." The capabilities of two alternative tactical doctrines to meet specific battlefield objectives are highlighted. The "base case" doctrine is contained in the "How to Fight" series of manuals, most particularly in FM 100-5, Operations and 71-100, Armored and Mechanized Division Operations. Chapter III of this study develops and defines an alternative tactical doctrine which is the result of examining the tactical doctrines of the Federal Republic of Germany, Israel, the Soviet Union, and the historical antecedents of these doctrines. The factors which limited the set of doctrines considered are identified in Section 4, which follows.

(2) The tactical doctrines are examined by studying alternative systems (see Table I-1, p. 30 (fold-out)); specifically, the study evaluates two possible "heavy" divisions, different only in terms of their tactical doctrines, which could be present in the Army force structure of 1986. The "heavy" division and the 1986 timeframe were selected for several reasons:

(a) to provide correspondence to the BDP and to Division 86, both of which examine the "heavy" division for 1986;

(b) in recognition of the fact that the division is the battlefield level of command at which tactics and operational art strike a balance and at which immediate and anticipatory tasks for the battlefield are balanced (systems below the division are principally involved with tasks performed in and during a battle and not preparation for it or the next battle; systems above the division stress the latter type of activity); and

(c) in recognition of the fact that 1986 is the target date for which the majority of the many new and improved weapon and support systems (nearly 70 major end items) will be present on the battlefield.

(3) The study does not attempt to determine comparative resource implications for the two alternatives.

(4) When used in accordance with its "operational concept," each "heavy" division should have the capability to achieve some level of performance in accomplishing battlefield tasks. Levels of performance can then be compared.

(a) For the purposes of this study, an "operational concept" is defined as the full set of notions regarding the ways in which people and things are arranged and employed. It is the aspect of employment, in essence tactical

doctrine, which is the function at issue in this study. All other functions, including the ways in which people and things are arranged, that would affect the "heavy" division's battlefield performance, are treated as common to the two "heavy" divisions. This is in contrast to the BDP and to Division 86, both of which consider tactical doctrine as established. As such this study will complement Division 86. It is likely that organizational changes made in response to advantageous changes of tactical doctrine identified herein would provide additional benefits.

(b) The analytical framework used to examine the alternative tactical doctrines was originally suggested by the BDP. The BDP divides firepower, maneuver, command and control, and support tasks into two basic categories of battlefield activity: "Force Generation" tasks, those critical tasks associated with preparation for a battle; and "Central Battle" tasks, those critical tasks performed in and during a battle. These tasks are considered to be complementary. The alternative divisions' capabilities to perform these tasks in both offensive and defensive operations allow a measurement of relative effectiveness.

(5) Measures of Effectiveness (MOE) are derived from the missions specified for the heavy division in Division 86 (provided at Appendix A). These MOE are used to measure the extent to which the "heavy" division's

objectives are attainable and are used to indicate the extent to which the alternative tactical doctrines contribute to this goal. The basis for this measurement is the combat data provided by the war game played as part of the study.

(6) Measures of Performance (MOP) are derived from the critical tasks suggested by Division 86 (provided at Appendix A). The MOP are used to measure the performance capabilities of the "heavy" division variants and the contribution of the alternative tactical doctrines to these capabilities. The basis for this measurement is provided by:

(a) an opinion survey of senior U.S. ground force officers, both active and retired, and selected civilians; the questions posed by the survey elicit answers in terms of the modified critical tasks from Division 86;

(b) opinion surveys of the players participating in the war game--Army combat arms officers attending the Naval War College (NWC); these surveys also elicit answers in terms of the modified Division 86 critical tasks.

(7) A criterion of choice is used to determine whether the performance capabilities of one of the "heavy" divisions, and thus its tactical doctrine, is preferred over the performance capabilities and doctrine of the other. The criterion is a result of the application of a weighting scheme developed from the surveys.

c. Analyses

A description of the analytical elements of the study follows:

(1) Assumptions and Constraints

An investigation, which served as the basis for all other analyses, was conducted during the formulation phase of this study to define and to bound the problem. The results of this investigation, elaborated in Section 4 which follows, are in two parts:

(a) Assumptions - inferences of fact concerning political, military, time, technological, economic, and personnel realities and uncertainties.

(b) Constraints - specific factors which limit the set of admissable tactical doctrines.

(2) Threat

An analysis of the Warsaw Pact armed forces was conducted to identify a set of conditions most likely to exist in 1986. This analysis determined the threat elements that the alternative tactical doctrines (and, thus, the "heavy" division variants,) would confront. The results of this study are elaborated in Chapter II of this study.

(3) Environment

An analysis of the natural environment, including terrain, weather, and the projected division's

organization and equipment for 1986 was conducted to determine the conditions within which the alternative tactical doctrines might be used. The results of this analysis are in Chapter II of this study.

(4) Battlefield Objectives

An analysis of the "heavy" division's missions and the critical battlefield tasks specified in Division 86 was conducted to arrive at a set of goals and standards against which the effectiveness and level of performance of the "heavy" division variants and alternative tactical doctrines could be measured. The results of this analysis are in Appendix A.

(5) Tactical Alternatives

FM 100-5 and the "How to Fight" series of manuals provide a base case tactical doctrine. Specifically FM 71-100 of this series provides the doctrine for Division 86. Potential alternatives exist in the form of the tactical doctrines of the Federal Republic of Germany, Israel, and the Soviet Union. These doctrines and their historical antecedents were examined, and their best features were synthesized into an alternative tactical doctrine. This alternative was modified throughout the conduct of the study until testing began. The analytical process and its result, a definition of the two contending doctrines, are provided in Chapter III.

(6) Performance and Effectiveness

(a) Performance

The study measured the performance capabilities of the "heavy" division variants and the contribution of the alternative tactical doctrines by means of:

1 An opinion survey of senior U.S. military officers. The survey asked for an evaluation of the relative acceptability of the alternative tactical doctrines and an estimation of the relative performance capabilities of the "heavy" divisions in terms of the study's MOP.

2 Similar surveys of war game players prior to and subsequent to the war game itself.

(b) Effectiveness

The study measured the relative effectiveness of the "heavy" division variants and evaluated the contribution of the alternative tactical doctrines to this effectiveness by a comparison of the combat results of the war game to the study's MOE.

(c) The results of this analysis are provided in Chapter IV. The results of the surveys and the war game are provided at Appendices C and D..

(7) Uncertainties

An additional analysis concerned itself with identifying the major areas of and the extent of uncertainty

in the study. The results of this analysis, reported as Chapter V, address the impact of the study's main assumptions; the uncertainty associated with the factors of threat, environment, organizations, war gaming, and subjective data gathering methods and highlight the uncertainties which most affect the study. There was no attempt to refine the understanding of this impact through sensitivity analysis.

(8) Organizational Issues

Organizational issues identified throughout the conduct of the study are enumerated in Chapter VI of the study as potential sources for increased effectiveness and improved performance of the "heavy" division.

(9) Preferred Alternative

The study does not provide a preferred tactical doctrine but does attempt to rank order the alternatives using the criterion of choice and certain other factors.

(a) Each alternative is described in terms of the study's MOP and MOE; dominance by one alternative within groups of tasks and significant differences in the performance of specific tasks are identified.

(b) Any lack of feasibility of an alternative or failure at a specific task is identified.

(c) Any inability to distinguish a difference between the alternatives in accomplishing a task or in meeting mission objectives is identified.

(d) If no readily apparent difference between the alternatives can be identified, the alternative which is less successful at performing the more important tasks or missions or which, relative to the other alternative, has risks without compensation, is identified.

4. Definitions, Assumptions and Constraints

a. General. An analysis was conducted in the initial phase of this study to define and bound the problem at issue. As a result of this analysis:

(1) Assumptions are made to establish the political, military, technological, economic, and personnel conditions which bear upon the problem;

(2) Constraints are identified and serve to limit the set of alternatives to be considered as solutions; and

(3) Definitions are developed to provide a common understanding of key terms.

b. Definitions

(1) Strategy is the planning for and execution of activities which lead to the realization of national goals. Strategy makes use of many kinds of leverage, including the application of military power, to secure the national interest. Strategy, as an application of military power, concerns itself with achieving the national goals with military force; it seeks efficient ways to attain this end and allocates military and economic resources appropriately.

(2) Operational Art is the body of general military principles that establish the predominant defeat mechanisms, such as attrition or dislocation, to be employed against an enemy force and a general philosophy for the conduct of battle. It is applied in the form of Operational Methods (OM).

(3) Tactics is the body of military concepts that represent the application of Operational Art to a specific battlefield situation; including specific mission, terrain, threat, and friendly force considerations. It is applied in the form of Tactical Techniques (TT).

(4) Tactical Doctrine. The synergistic combination of operational art and tactics is constantly evolving, providing at any particular time the best understanding of modern warfare.

(5) Duels, Engagements, and Battles

> Combat is conducted at different levels which must be differentiated not only because the variables that determine success at each level will be different but because both one's own and an opponent's vulnerabilities change, depending upon whether the level of combat is between two weapon systems or two armies.[1]

(a) Duels - combat between elements and units of combat forces, from individual weapon versus individual weapon through company and battalion level. Duels are won through the efficient use of firepower and the

effective use of terrain. Favorable attrition through combat actions is the principal means of success.

(b) Engagements - the management of duels in time, space, and proper sequence to establish conditions for further favorable action. Engagements are associated with battalions and brigades; terrain and maneuver are the principle considerations for the commander. Engagements are a means toward a higher end.

(c) Battles - the management of engagements in time, space, and proper sequence to implement the selected defeat mechanism against the enemy. Battles are associated with divisions and corps; maneuver is the principal concern of the commander at this level.

c. Assumptions

(1) Nuclear Forces and Conventional Deterrence

(a) Background. Strategic nuclear parity between the United States and the Soviet Union has increased the range of Soviet military options and capabilities for which the United States must possess a credible deterrent. Under earlier conditions of outright nuclear superiority, the U.S. could counter any Soviet menace to its interests with a hint of direct confrontation. Today, and for the foreseeable future, the United States' "nuclear umbrella," while essential for strategic deterrence, is not an absolute guarantee against other kinds of confrontation. Consequently, a regional or theater balance of

forces must be maintained in critical areas. This task remains especially critical in Europe, as the NATO allies are threatened by the massive concentration of theater nuclear and conventional forces of the Warsaw Pact. The NATO allies must provide an "unquestionable capability to thwart a Pact armored thrust without recourse to a strategic nuclear exchange."[2]

(b) "Flexible Response." Guided by the strategy of "flexible response," the NATO allies have agreed to meet a particular type of attack with a corresponding counter. Initially, NATO will attempt to defeat any conventional aggression with a conventional response, although the NATO allies have not renounced the option of "first use" of theater and tactical nuclear weapons when it becomes clear that a conventional defense has failed. The conditions for which the theater nuclear option may exercised have been left unspecified. "Flexible response" links conventional deterrence and defense with the threat of escalation to theater nuclear attack and finally strategic nuclear attack.

(c) Tactical and Theater Nuclear Forces. This study assumes that nuclear weapons will not be used. In any real confrontation it seems unlikely that these weapons would be used at the onset of hostilities. To include a nuclear escalation, either theater or strategic, would, for the purposes of the study, override the impact

of tactical doctrine; the "signals" of tactical operations would be lost in the "noise" of nuclear exchange. Furthermore, tactical doctrine must apply equally, albeit with modification, to the nuclear or conventional battlefield. As a recent study of the evolution of U.S. tactical doctrine points out, "a war might begin with a conventional battle, move in to a combined nuclear-conventional phase of uncertain length, and finally return to a conventional battle."[3] Thus, the study's focus is confined to conventional operations in support of national policy.

(2) Chemical and Biological Warfare. The study does not address problems posed by the use of chemical or biological weapons. The study assumes that the weapons would be equally effective against either of the study's tactical alternatives. NATO is engaged in improving its defense capabilities against these weapons; by 1986 these capabilities will be significantly upgraded. Historically, "CB" weapons have not been effective beyond the initial shock of their first appearance.

(3) United States Commitment to NATO. This study assumes that the U.S. commitment to NATO will remain in effect at the present level. Implicit in this assumption is the notion that the U.S. must be prepared for more than a short, intense war but is not likely to have time to mobilize and train forces to sustain the effort.

(4) Threat

(a) Defeating or neutralizing the Warsaw Pact threat to Central Europe will be the most difficult mission for NATO's general purpose forces. Consequently, this study examines a Central European scenario including the projected threat and friendly forces, mobilization times, and reinforcement times for this mission.

(b) Given that most potential adversaries of the United States outside the NATO theater will be organized along Soviet lines and will use tactics that parallel Soviet practices, any conclusions from the study should be applicable to other theaters where mechanized operations can be undertaken. These conclusions may not be adaptable to another type of battlefield. Additionally, it is clear from the 1973 War in the Middle East that the U.S. could encounter modern weapons in vast numbers in other than Warsaw Pact forces.

(c) Details concerning the specific threat for the study's scenario and for the Soviet operational art in general are included in Chapter Two.

(5) Assumptions Related to the War Game Scenario

(a) Soviet Strategic Options

1 Mobilization and Warning Times.

Soviet mobilization and NATO warning times are related but not necessarily in a one-to-one correspondence since deception,

secrecy, and "noise" will degrade strategic intelligence collection and analysis. As mobilization continues, the probability of detection, of warning, and, hence, of an intelligent response will increase. Three general scenarios represent the spectrum of possibilities:

a Short-Warning Mobilization and Attack. This scenario supposes that the Soviets are most concerned with exploiting strategic, operational, and tactical surprise. Soviet planners could assume that NATO forces would not have time to deploy to their defensive positions. An attack of this nature would probably occur in a relaxed political climate when NATO nations are less vigilant or in the face of a major NATO provocation. Only Soviet forces "in-place" would be available for the initial attack; front second echelon forces would have to move from Poland and the Western Military Districts of the Soviet Union.

b Partial Soviet Mobilization and Attack. In this scenario, the Soviets would use 48 to 96 hours to begin the deployment of their forces in East Germany, to begin moving the second echelon armies, to reinforce tactical air forces, and to make final combat support and combat service support arrangements. NATO forces would have sufficient time to occupy their initial defensive positions, to begin the reinforcement of tactical air forces, to mobilize combat support and combat service

support units, and to begin the mobilization of reserve forces.

c Complete Soviet Mobilization and Attack. This scenario poses a condition in which the Soviets would take sufficient time (14 to 28 days) to mobilize and deploy major forces from the Soviet Union. There would be time for the Soviet planners to marshal major logistical support as well as to alert and disperse their strategic nuclear forces. In this scenario NATO could deploy major reinforcements from Great Britain and the U.S. (REFORGER only) to bolster the Central Front. NATO would have time to deploy its navies to protect the Atlantic SLOC in preparation to convoy reserve units from the U.S.

2 This study assumes the "partial mobilization" scenario for several reasons. First, the scenario allows for an examination of currently deployed forces. Second, while it disallows strategic surprise, it does still allow the application of operational and tactical surprise. Using this scenario allows the study to avoid becoming embroiled in issues like reinforcement rates in order to better isolate the impact of tactical doctrine upon combat performance. (See the "Strategic Scenario," written for the conduct of war game, in Chapter II.)

(b) Forces Available. This study assumes that a part of a Soviet Tank Army is directed into the defensive sector of a U.S. "heavy" division. The Soviet

forces consist of one motorized rifle division, two tank divisions, and army-level support assets controlled by a headquarters. The U.S. division, the 8th Mechanized Infantry Division, consists of a reinforced armored cavalry squadron from V Corps,[5] one divisional armored cavalry squadron, five tank battalions, six mechanized infantry battalions, and organic divisional support units. There is no augmentation of DIVARTY by Corps; some tactical air support is represented in the combat support points. Again the intent is to isolate the division so as to focus on the impact of tactical doctrine on combat performance.

(c) Soviet OM (See Chapter II, Threat, and Appendix F , Mobile Operations Concept Paper). The study examines two Soviet OM: the "Breakthrough," or deliberate attack, and the "Multiple Penetration."

1 Breakthrough - Using this OM, the Soviets would select a point of main effort. For this main attack, divisional frontages are reduced to 10 to 16 kilometers in width; secondary or holding attacks will be conducted adjacent to the main effort. Second echelon divisions are maneuvered to reinforce the main attack. First echelon regiments will attempt to destroy the integrity of the main defensive area, creating gaps. Second echelon regiments and divisions will attempt to penetrate through these gaps.

2 Multiple Penetrations - This OM is designed to place maximum pressure along the entire line of

contact, with first echelon battalions and regiments seeking gaps or weaknesses in the main battle area. As gaps are discovered or created by combat, second echelon regiments and divisions are maneuvered through them. This OM is similar to German WWII OM. The war game plays both "heavy" division variants against each Soviet OM.

(d) Duration of Combat Operations. As discussed in the assumption regarding mobilization and warning time, the focus of this study is on the actions of a Soviet first echelon army. Soviet expectations of this unit would include the capability for 4-5 days of continuous combat, thus this study only examines this very early period of a hypothetical war. Uncertainties that might arise from this assumption are examined in Chapter V.

(e) Soviet Use of Theater Nuclear Weapons and Chemical/Biological Weapons. As stated in the assumption concerning the use of these weapons, the war game will not play weapons of mass destruction. Such a restriction is necessary to examine the impact of tactical doctrine. Yet Soviet doctrine and literature emphasize the use of these weapons, and Soviet training is designed to effect this doctrine. The implications of this latter issue are examined in Chapter V.

(f) Meeting Engagements. Soviet doctrine and literature emphasize the "meeting engagement." The

Soviets plan and train frequently for its eventuality. But the "meeting engagement" is not an OM, rather it is a type of combat action; it is an event. The Soviet commander develops certain OM for use in a "meeting engagement." The war game scenario does not play the "meeting engagement" per se. The hypothesis is that the 8th MID has set up a hasty defense. (For a discussion of the "meeting engagement," see Chapter II, Threat and Environment.)

(6) Organizations. Though organizational changes are constantly under study, and some are actually being made in NATO and Warsaw Pact formations,the study assumes that the current organizations of both antagonists will be used in 1986. The "heavy" division variants are organized in consonance with the H-series TOE, updated with equipment projected for 1986 and adjustments to the H-series structure to accommodate organizations added because of the equipment changes. The study assumes that both variants will function efficiently under a corps command.

(7) Technology. Weapon and support systems assumed to be available in the BDP and Division 86 are assumed to be incorporated into existing NATO and Warsaw Pact combat organizations. In general terms, those systems which should be deployed by 1986 will be incorporated into all combat, combat support, and combat service support formations.

(8) Air Superiority. The study assumes that both NATO and the Warsaw Pact air forces can, through concentration, gain local superiority for brief periods of time. Neither side will operate with absolute air superiority.

(9) Electronic Warfare. This study assumes that both NATO and Warsaw Pact forces will make extensive use of electronic warfare. Both sides will be capable, at times, of achieving a complete disruption of opposing communications and data nets. All forces will operate with some degraded communications capabilities at all times.

(10) Continuous Combat. This study assumes that combat will continue for 24 hours each day. The tempo of combat will not be affected to a significant degree by the necessity for night operations. Additionally, the study assumes that the weather and visibility patterns detailed in Chapter II will not alter materially by 1986; these factors, to the extent feasible, are used in the study.

(11) Urbanization. The study assumes that urbanization and "reforestation" will have a significant impact upon the battlefield of 1986. The study considers, the projected impact of these phenomena upon operational art and tactics.

(12) This study assumes that successful training is achievable by NATO forces to implement either tactical doctrine

tested in this study. Both alternatives require skilled units and leaders; both will require the absolute confidence engendered by repetitious battle drill and tactical training.

(13) The study assumes, para. 4.b(9), that communications may be significantly degraded, thus units using either tactical doctrine must be prepared to operate autonomously. This will require an absolute understanding of the "concept of the operation" by commanders at each tactical echelon and their willingness to use their own initiative to establish ad hoc communications and resupply procedures.

(14) While no foolproof determination can be made concerning the skill of soldiers and commanders of friendly and enemy units, two generalizations seem appropriate:

(a) Soviet leadership at the unit and subunit level is probably much more flexible than traditionally given credit for; and

(b) NATO officers and NCOs will retain an "edge" in combat because of the concerted effort to develop initiative and decisiveness in the absence of higher headquarter's direction.

(15) Because of the lethality of modern warfare, casualty and equipment loss rates may be paralyzing, both physically and psychologically. Success in avoiding this

paralysis will be dependent upon maintaining group cohesiveness in small units. This factor will affect both NATO and Warsaw Pact forces. The study assumes that both alternatives are likely to be affected equally. The issue will demand increasing attention, as it will be a significant factor in the conduct of future battles.

(16) This study assumes that NATO forces cannot allow any significant penetration of their defensive surfaces. This factor is more fully delineated under Constraints.

(17) The study assumes that a tactical doctrine must have an underlying philosophical basis and set of principles that can be understood and applied by leaders at all echelons of command and that these leaders must feel reasonably confident that adjacent, subordinate, and superior commanders are applying the same principles.

(18) War Game.

(a) In order to analyze the behavioral aspects of the issue in Para (17), a war game, rather than a computer simulation or analytical model, is used as a key analytical tool of the study. Behavioral decision processes are poorly understood and have not been reduced to a quantifiable basis for use in simulations or analytical models. The war game, in using many different players, provides a variety of such processes.[4]

(b) The war game used in the study was selected because of its low cost, availability, ability to

simulate many of the critical tasks, ease of control, and relatively short training and playing time. Some obvious artificialities in the game and the fact that only a few iterations are played are limitations of the game results.

(c) Offensive Exclusion. In developing tactics for offensive operations, it is questionable whether the alternative is significantly different from the base case. More importantly, even if there is a difference, measurement of this difference with the analytical tools that have been selected is not possible. For these reasons the issue of the offense per se is ignored. The war game focuses upon defensive operations.

d. Constraints

(1) Current strategic and political constraints facing NATO will remain in force through 1986. The NATO allies will continue to concede the strategic initiative to the Warsaw Pact. While this condition remains a political "fact-of-life," it does not follow that NATO forces must also concede the tactical initiative and remain in a strictly defensive posture.

(2) In accordance with NATO strategy, the defense must be conducted well forward. While the tactics of the "forward defense" are subject to discussion--they are the subject of this study--the fact that an initial "forward

defense" is necessary as a major constraint with which all tactical alternatives must contend.[6]

(3) There will be no early release of nuclear weapons for either side.

(4) In light of (3) above, a significant constraint upon the development of tactical alternatives is that NATO forces cannot accept any significant penetration of their defensive surface. In this regard, it seems unlikely that a NATO division could allow the penetration through its assigned sector of the MBA by a regiment or larger forces. Consequently, a "porous defense" alternative, which would allow for a maximum economy of force for the preparation for large counterstrokes against Warsaw Pact C^3 and support organizations, is infeasible.

(5) A defensive concept that relies completely upon the forward deployment of extremely sophisticated weapons is infeasible. In spite of the technological virtuosity of the arms developers, weapons alone will not dominate a battlefield in the foreseeable future.

(6) A "linear defense" is not a feasible alternative. Aside from its vulnerability to strikes by weapons of mass destruction, NATO forces do not possess sufficient conventional combat potential, even with "technological force multipliers," to establish any depth to a linear defense or to redress the imbalance in

combat power caused by the concession of strategic initiative and early tactical initiatives to the Warsaw Pact.

(7) The inviolability of the Warsaw Pact's national borders limits the extent of local offensive operations undertaken in the early stages of combat to support a strategic defense.

(8) Time constraints placed upon the conduct of the study disallow the testing of a host of alternative tactical solutions. Ideally, the study should test all codified operational methods (OM): the Israeli, the German, the Soviet, the U.S., the U.K., the French, and their historical antecedents. Because of this constraint, the study developed an OM which represents many of the best features of all the OM researched.

FIGURE 1

STUDY SCHEMATIC

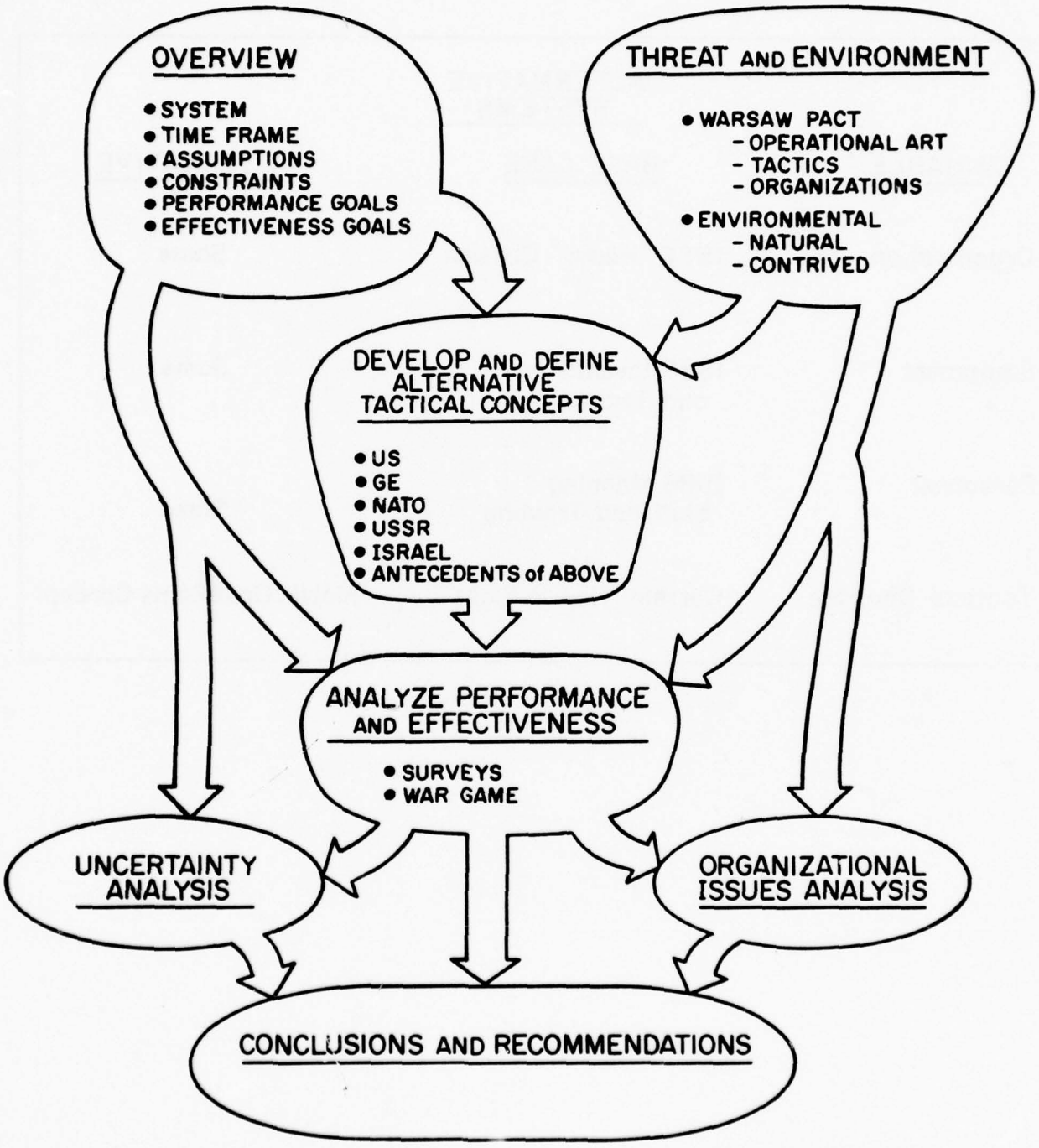


TABLE I-1

VARIABLE	ALTERNATIVE SYSTEMS: BASE CASE	ALTERNATIVE
Organization	1986 "Heavy" Division	Same
Equipment	1986 Inventories and Technology	Same
Personnel	1986 Manning Skill, and Training	Same
Tactical Doctrine	Current "How to Fight"	Mobile Operations Concept

CHAPTER II

ALTERNATIVE DEVELOPMENT AND DEFINITION

1. Introduction

The purpose of this chapter is to describe the development of the contending tactical doctrines, the base case and the alternative, and highlight some of the significant differences between them. The base case comprises Field Manual (FM) 100-5, Operations, and the "How to Fight" series of field manuals listed at Appendix E. For the purposes of this study, the essence of the doctrine was considered to consist of FM 100-5 and FM 71-100, Armored and Mechanized Division Operations. The alternative, in the form of the "Mobile Operations Concept Paper" and the "Division Mobile Operations Battle Book," is at Appendix F.

2. Development of the Base Case Tactical Doctrine - Background[1]

> Because of the cost of and preoccupation with the Vietnam War, the Army lost a generation of modernization.[2]
>
> GEN William E. Depuy

a. In the early 1970s, a variety of factors convinced senior U.S. Army officers that a major reassessment of the Army, followed by an appropriate redirection, had to occur. The requirements and problems of NATO had not lessened during the decade of U.S. preoccupation with Southeast Asia; on the contrary, the Warsaw Pact had begun a massive

modernization of its force, including organization and doctrinal changes, and weapon and support system improvements. The 1973 War in the Middle East heightened the sense of urgency within the Army community. It quickly was perceived as a paradigm for modern combat, armored and mechanized operations of extraordinary lethality, with unprecedented expenditure of materiel yet of short duration--a "come-as-you-are war." General Creighton Abrams, then Army Chief of Staff, directed the newly created TRADOC, under the command of General Depuy, to teach the Army how to fight on the new battlefield and to determine what weapon and support systems would be needed.

b. Given a hint of what a war in Europe would be like--a note here is that the 1973 War clearly showed that the U.S. could expect to face modern, mechanized armies in theaters other than Europe--it immediately followed that if the U.S. Army lost the "first battle," the potential for recovery was slim at best. The U.S. Army could not be, as it always had been, unprepared for this first battle. Clearly the U.S. Army and, by extension, NATO, was in a disadvantageous position. The threat was massive; the political realities of NATO and the terrain within the 7th Army sector demanded a "forward defense," thus limiting maneuver depth; time to mobilize would likely not exist; and any Soviet thrust into Western Europe would have to be stopped quickly.

Additionally, the state of readiness, a reflection of training, confidence, and cohesion, of U.S. and NATO forces was questionable at best. TRADOC was literally starting from scratch.

c. What was needed, given these circumstances, was a clear, coherent, and rigorous doctrine that could provide for maximum combat efficiency through the effective use of every available asset. Each weapon system would have to be employed to provide the best possible effect. Every advantage would have to be taken from combat power multipliers, especially technology. Because of this necessary preoccupation with the defense, the traditional "firepower" orientation of American doctrine, pushed perhaps to a logical limit in Vietnam, continued to influence Army thinking. Even a cursory glance at the military journals of the 1970s bears this out and leads one commentator to assert that:

> Although the evolution of doctrine since World War II has been affected by a variety of influences, the emphasis on firepower, the defense, and attrition has slowly and progressively increased until they have become the primary characteristics of U.S. Army tactical doctrine.

d. As TRADOC began to do the "Abrams job," the various Branch Centers and the Combined Arms Center at Fort Leavenworth were working on Training Circulars (TC). The Combined Arms Center also began work on a new FM 100-5. Late 1974 saw the beginning of the "Central Battle Concept" and the decision to write FMs rather than TCs. By the spring of

1975, General Depuy had consolidated the writing effort at TRADOC Headquarters. After some brief field testing experience at Fort Hood, Texas, a first draft of FM 100-5 was written, beginning in November of 1975. Editorial reworking completed, FM 100-5, Operations was published in July of 1976. Other field manuals in the "How to Fight" series were published routinely thereafter, with FM 71-100, Armored and Mechanized Division Operations appearing in December of 1978. At present, an FM on Corps Operations is being written.

3. Development of the Alternative - Background

a. Beginning with TRADOC's own fairly gloomy assessment of the condition of the U.S. corps or division some 48 to 72 hours into the "Central Battle," the study group began a systematic search for an alternative to the Base Case. The U.S. could probably handle the Warsaw Pact first echelon divisions, but then what? The only real article of faith that had existed from the beginning of the study was the notion that somehow we had to discover a way to exploit the opponent's weaknesses rather than grapple with his strength. Our perception was that the base case doctrine played directly into Warsaw Pact strength. Even though the base case appeared to try to take advantage of Pact echelonment, there was an uneasy feeling that the U.S. might just lose a "street fight," as one CGSC faculty member characterized the "Central Battle Concept."

b. After formalizing a set of concepts into what eventually became the "Mobile Operations Concept Paper" (Appendix F), the study team traveled to the Army War College, Carlisle Barrcks, to hear LTG Sidney Berry, the CG, U.S. V Corps discuss the current situation in the field. During this trip, initial contacts were made with the TRADOC community. Soon thereafter, the study group traveled to Fort Monroe for briefings on the "How to Fight" manuals, the BDP, and the Division 86 studies. The purpose of these trips was to insure that we had a correct understanding of the base case, to discover where TRADOC doctrine, system, and training development efforts were being directed, and to seek both aid and advice in constructing testing devices and measurement tools for the study.

c. Returning to the Naval War College (NWC), the study group refined its plan for the study, designed a methodology, and began searching for measurement tools. At the same time, an extensive and methodical research of available materials to discover armored and mechanized OM that might constitute a series of testable tactical doctrines was begun. Current German doctrine, HdV 100/100, and joint U.S. and German concepts as they appeared in various Allied Tactical Publications (ATP) were studied. The study group examined in detail accounts of Israeli armored and mechanized operations, with particular emphasis on the 1967 and 1973 Wars. Special attention was paid to German World War

II operations on all fronts, but most especially the German OM for dealing with Soviet offensives on the Eastern Front beginning in late 1942.

d. By this time the "Mobile Operations Concept Paper" had been refined and a better idea of what was needed was clear. It also became clear that the study group would not have the time or the mechanisms for testing a host of tactical variants. The decision was made to try to synthesize the best features of the various OM investigated into one operational concept, the final "Mobile Operations Concept Paper," and to begin work on a "Battle Book." The "Battle Book" would attempt to take the mobile operations concept and provide an elementary "how to" book, with the clear realization that with severe time constraints the book would never be able to duplicate the detail and refinements of current Army FMs.

e. Additionally, and about the same time, it became clear that the developing alternative was probably not significantly different from the base case in its concept of offensive operations. There were some fine differences, but the study group felt that the distinctions could not be tested. As a consequence of this realization, we formulated an "offensive exclusion" (*see* Chapter I, p. 26) and began concentrating upon defensive operations. The study group finalized the "Mobile Operations Concept Paper" and began refining what was shaping up to be the "Division Mobile Operations Battle Book" (Appendix F).

f. Concurrently, while continuing our coordination with TRADOC, the study group learned of a study being organized at the Combination Arms Center. This study was to investigate the "fixed brigade," an organization which would have permanently assigned maneuver battalions and support units. It was hypothesized that the "fixed brigade" might not be a suitable organization for use in conjunction with the base case doctrine (which appeared to require a flexible task organization capability between brigades). The study group at CAC expressed an interest in our "battle book" and operational concept. We traveled to Fort Leavenworth to meet with the CAC study group and subsequently provided the CAC study group with our final alternative. At the same time we conducted an informal seminar with a group of students and faculty of the CGSC (see note 4, Chapter VI) to obtain their reactions to both tactical doctrines. Upon our return to the Naval War College, we completed work on the "Division Mobile Operations Battle Book" and began final preparations for testing and analysis.

CHAPTER III

ENVIRONMENT AND THREAT 1986+

1. The Environment. Many factors constitute the environment for the 1986 "heavy" division. In addition to the obvious factors such as terrain and weather, technology and new weapons systems, the training and personnel requirements for this technology and weapons array, and new organizations in the force structure all contribute to the natural environment affecting the division and its tactics and doctrine. Other factors such as cost, bureaucratic elements in the acquisition cycle, and politics affect the environment, yet the impact of these factors cannot be reliably predicted for the purposes of the study. Identified throughout the remainder of Part I, Chapter II, are the environmental factors which are included in the design of the study and its measurement tools.

a. Theater of Operations - General. As stated in Chapter I, the "heavy" division and its doctrine are principally designed for combat with NATO forces in Europe. Because of this and because most U.S. forces committed to NATO are currently employed in Central Europe, and specifically in the CENTAG sector, the study confines itself to military operations in West Germany (see Scenario, Annex B-4 to Appendix B).

b. Climate and Weather

(1) General. With a summer mean of 62° and a winter mean of 32°, temperature does not adversely affect military operations in West Germany. The climate is generally damp and rainy. Late winter and early spring thaws exaggerate this wet condition, ans cross-country wheeled vehicle traffic is thus impaired. For half the year in West Germany there is a ceiling (more than 50% cloud cover) at 2000' or above. Ceilings lower than 2000' vary from 16% of the time during summer, to 43% in winter. This will hamper close air support. During fall and winter, an average of one third of the mornings are foggy for five to six hours, limiting visibility to less than one kilometer. This prohibits "Nap of the Earth" (NOE) flight and severely degrades the capability of long-range ATGM and CLGP. These elements combine to form a bleak picture if an attack should come in the winter. One note is that the prevailing westerly winds would carry chemical or biological agents and nuclear fallout back toward the Warsaw Pact.

SUMMER:	20 June--20 September
FALL:	21 September--20 December
WINTER:	21 December--19 March
SPRING:	20 March--19 June

(2) Mean Temperature

SUMMER _____ +62

FALL +48 "mean" temperature for the four seasons in Germany.

WINTER +32 While the winter mean is not severe, there are extended

SPRING +46 periods of cold and snow.

0 10 20 30 40 50 60 70 (degrees F.) FM100-5

(3) Rainfall

SUMMER +11.6 particularly significant in late winter or early spring when snow melts, ground thaw, and spring rain begins--tracks are slowed, wheeled traffic movement is impaired.

FALL +7.1

WINTER +5.7

SPRING +6.9

0 2 4 6 8 10 12 14 (days of rainfall) FM-100-5

(4) Fog. Fall, winter and early spring are featured by frequent fog which often does not lift until midday. Approximately one out of three mornings during this period, U.S. forces will have less than one kilometer visibility causing a significant reduction in the frequency of long range engagements.

SUMMER +4

FALL +30

WINTER +33

SPRING +11

0 5 10 15 20 25 30 35
frequency of fog: days/season

SUMMER +3.2

FALL +5

WINTER +6

SPRING +3.6

0 2 4 6 8 10
duration of fog: hours
FM 100-5

Due to the incidents of ceilings that are 1000' AGL or less, commanders can expect a one-third degradation in close air support during DEC--FEB.

(5) Ceiling. The cloud layer over Western Europe is typically low and scudding on westerly winds. The average ceilings (more than 50% cloud cover) expressed as a percentage for three month periods in West Germany are:

	MAR--MAY	JUNE--AUG	SEP--NOV	DEC--FEB
No Ceiling	29.7	33.9	25.1	15.7
2000'+	49.2	50.2	42.3	41.2
1500-2000	3.9	2.4	4.0	5.6
1000-1500	5.4	3.9	6.2	9.8
500--1000	6.5	5.0	8.0	14.1
0-----500 *	5.3	4.6	14.4	13.6
less than * 500' with fog	6.2	6.7	18.5	17.1

FM 100-5

-* Degraded close air support

c. Topography. The topography of Germany is fine-grained compared to the areas of the United States where most of our troops are trained. Germany is more like the Piedmont of Virginia or the countryside of New England. There are many hills, streams, small forests, and villages, limiting long range fields of fire for tanks and ATGMs.

(1) Area of Operations

(a) NORTHAG's front extends about 250 miles from the Elbe River to Gottingen. This area includes the North German Plain, a major avenue of approach consisting of open, rolling, and lightly forested terrain. Except for the Harz Mountains in the sector's southern area, there are few natural obstacles to invasion. Every six miles at least one water obstacle, either natural or a part of Germany's extensive canal system is encountered. With an excellent north-south road net, and a good east-west one, the North German Plain offers the best high speed approach for Warsaw Pact forces with objectives on the channel coast or in the industrial area of the Ruhr.

(b) CENTAG's area of responsibility covers about 375 miles from the Harz mountains to the Alps along the East German and Czech borders. Should the Warsaw Pact choose to go through a neutral Austria--a tempting proposition along the obstacle-free Donau Basin--another 60 miles will be added to the NATO defense frontage. Terrain in the CENTAG zone generally favors the defense, with hilly and heavily wooded features predominating. As in the north, many water courses cross the area of operations. However, canals in the CENTAG zone, offer little obstruction, since their gently sloped concrete sides do not inhibit Warsaw Pact fording operations. Army sized approaches

into the CENTAG zone are the Fulda Gap, between the Harz Mountains and Thuringer Wald; the Hof Gap, with its subsidiary approaches, extending through the Thuringer Wald to the Bohemer Wald; and the Donau Basin, between the Bohemer Wald and Alps. These approaches, in conjunction with the excellent east-west road net in the CENTAG zone, provides axes of advance to Frankfurt and the Rhine, Nuremberg, and Munich respectively. Additionally, the Fulda Gap provides access to the U.S. equipment storage depots near Kaiserslautern. The considerable vegetation in the CENTAG area afford the defender much better concealment than in NORTHAG and provides for the use of tree blowdown techniques in nuclear war. Throughout West Germany, both sides will face fighting in built-up areas. Although these areas generally favor the defense, they hamper target acquisition for long-range weapons and they degrade communications.

(2) Urban Areas

(a) Urban Sprawl. Western Europe has experienced a massive growth in built-up areas and manmade changes to the natural landscape. These changes significantly affect potential future battlefields. Avoidance of built-up areas is no longer possible. Rather, military operations in built-up areas are an integral part of combat operations and present special

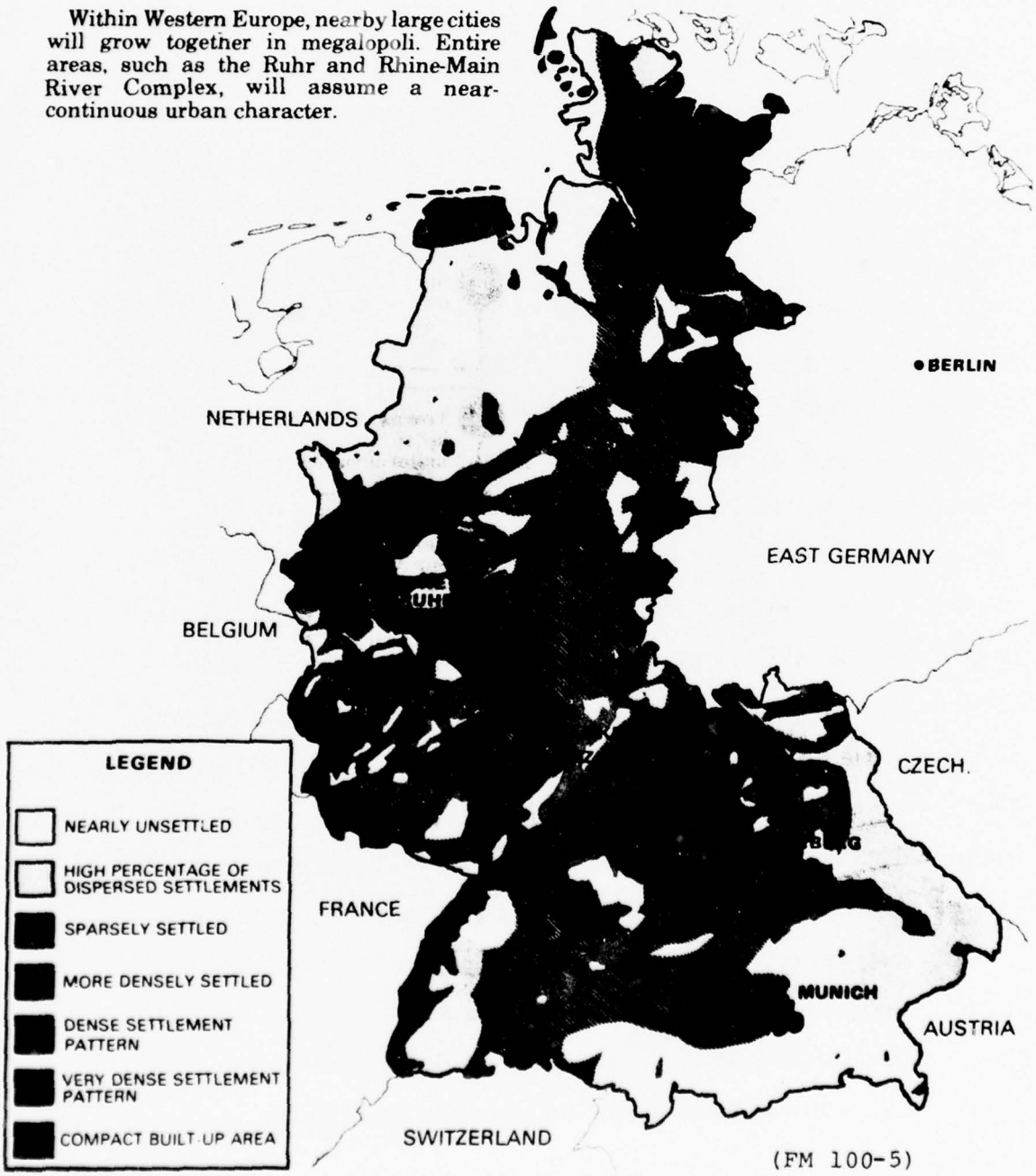
opportunities and challenges to commanders at all levels (see Figure 2).

(b) Environmental Effects of Sprawl. Built-up areas and manmade changes to the terrain take a variety of forms. New highway systems have opened up areas previously considered unsuitable for fast mobile operations. While these roads are generally restrictive, the areas they cross require a greater degree of attention than in the past. Major cities have lost their well-defined nature and have spread out over the nearby countryside. Highways, canals, and railroads have been built to connect population centers and have themselves attracted industries and directed urban growth into strip cities. More agricultural land is being converted to urban use, reducing terrain suitable for fast-moving armor operations. Rural areas, while losing some of their population, have retained their previous character. Small farming communities are scattered every few kilometers throughout the more open areas. These villages are generally located along streams and have an extensive network of secondary roads. Each of these manmade topographical changes affect military operations. Future trends indicate an increasing density of large cities and their resultant urban sprawl. These trends are not just confined to Europe, where growth appears more dramatic because of reduced distances, but include many other advanced and developing regions of the world.

FIGURE 2

BUILT-UP AREA DEVELOPMENT IN WEST GERMNY

Within Western Europe, nearby large cities will grow together in megalopoli. Entire areas, such as the Ruhr and Rhine-Main River Complex, will assume a near-continuous urban character.



(FM 100-5)

d. Characteristics of the Modern Battlefield. During the past several decades, the nature of battle has significantly changed. As a result, the modern battlefield presents challenges greater than commanders have ever faced before. Some characteristics of the modern battlefield environment are:

(1) Proliferation - the major powers and client states have developed and fielded an unprecedented array of sophisticated weapon systems.

(2) Intensity - recent wars have demonstrated heretofore unknown intensity in terms of materiel and weapon systems losses over short periods of time.

(3) Complexity - the number of sophisticated systems that must be brought together to achieve the full measure of battlefield effectiveness and combat power has tremendously increased the complexity of the battle.

(4) Distance - new sophisticated weapons have greater range and lethality than those of previous wars. As a result, the engagement will begin at distances far greater than has been the case in the past.

(5) Mobility - with the increase of armored and mechanized forces and the advent of the helicopter, mobility has greatly increased, facilitating the rapid concentration of forces.

(6) Tempo - the shorter duration of combat and the resultant decrease in time to engage large numbers

of highly mobile targets in enemy formations places a premium on well-trained, highly proficient crews and units.

e. New Technology. The U.S. Army will be introducing the following modernized and totally new systems in the first half of the 1980s.

AAH	Advanced Attack Helicopter (YAH-64)
ADAM	Artillery Delivered Mines
AGETLIS	Automatic Location/Identification System (AN/TSQ-109)
AHAWS	Advanced Heavy Antitank Weapon System
AN/MSQ-103	Ground Based ELINT System
AN/PPS-15	Radar Set
AN/TLQ-17A	Ground Based Communication Jammer
AN/TTC-39	Circuit Switch
AN/TYC-39	Message Switch
ASAS	All Source Analysis System
ASH	Advanced Scout Helicopter
BCS	Battery Computer System
BDWS	Biological Detection Warning System
BLACKHAWK	Utility Helicopter (UH-60A)
BSTAR	Battlefield Surveillance Target Acquisition Radar
CFV	Cavalry Fighting Vehicle (XM3)
CH47MOD	Modernization for Medium Lift Cargo Helicopter CH47

COPPERHEAD	Cannon Launched Guided Projectile (XM712)
DIVAD GUN	Division Air Defense Gun
FAMAS	Field Artillery Meteorological Acquisition System
FAMECE	Family of Military Engineer Construction Equipment
FOV	Forward Observer Vehicle
GEMSS	Ground Emplaced Mine System
GLLD	Ground Laser Locator Designator
GSRS	General Support Rocket System
GUARDRAIL V	Airborne and Ground Based Remote Control Correction, Processing, and Reporting System
HELLFIRE	Heliborne Fire and Forget Missile
IFV	*Infantry* Fighting Vehicle (XM2)
ITV	Improved TOW Vehicle
I-81	Improved 81mm Mortar
MOPMS	Modular Pack Mine System
MRTT	Modular Record Traffic Terminal
MULTEWS	Multiple Target Electronic Warfare System
M60A3	Product Improved M60A1
NAVSTAR-GPS	Navy Satellite Navigation System - Global Positioning System
NBDS	Nuclear Burst Detection System
PADS	Positioning and Azimuth Determining System
PATRIOT	Tactical Air Defense System
PERSHING II	All Weather, Long Range Artillery Missile

PEWS	Platoon Early Warning System
PLRS	Position Locating and Reporting System
QUICK FIX	Heliborne Intercept and Electronic Counter Measure System
QUICK LOOK II	Airborne ELINT System
RAAMS	Remote Antiarmor Mine System
REMBASS	Remotely Monitored Battlefield Sensor System
ROLAND	Short Range All-Weather Air Defense System
RPV	Remotely Piloted Vehicle
RSCAA	Remote Sensing Chemical Agent Alarm
SAW	Squad Automatic Weapon
SINGCARS	Single Channel Ground and Airborne Radio System
SLUFAE	Surface Launched Unit, Fuel-Air Explosive
SOTAS	Standoff Target Acquisition System
SRWBR	Short Range Wide Band Radio
STINGER	Manportable Air Defense System (FlM92A)
TACELIS	Tactical Communications Emitter Location and Identification System (AN/TSQ-12)
TACFIRE	Tactical Fire Detection System
TACJAM	Tactical Communications Jamming System (AN/MLQ-34)
TACSATCOM	Tactical Satellite Communications System
TOS	Tactical Operations Systems
TPQ-36	Mortar Locating Radar
TPQ-37	Artillery Locating Radar
TRAILBLAZER	Detection Set Special Purpose (AN/TSQ-114)

TSQ-73	Air Defense Command and Control System
TSS	Topographic Support System
UET	Universal Engineer Tractor
VIPER	Light Antitank Weapon
VMDA	Vehicle Mounted Decontamination Apparatus
XM1	Main Battle Tank

f. New Technology and Training. Advanced technology will increasingly characterize the army in the next decade. Technology will enhance combat potential in the following areas:

-- micro-miniaturization
-- "near-real-time" intelligence acquisition
-- "real-time" data distribution
-- special armor protection
-- satellite communications
-- use of computers- S/B computer assisted decision-making
-- command and control synthesis
-- thermal imagery capabilities
-- micro-computerization.

Weapons of greater range and lethality will be provided during this period, requiring training to the full potential of each system. This training must include both single system/crew and unit requirements. Meeting the challenges posed by the integration of new weapons capabilities will be one of the key factors in achieving the potential offered

by new technology. Leaders and staffs must be trained to integrate sophisticated systems with the increasing complexity of the modern battlefield. The study assumes that this training can be accomplished effectively, though our ability to do this must remain questionable.

g. New Technology and Personnel

(1) General. Advanced technology will test the ability and will of our soldiers. The new complex systems must be manned, fought, and maintained by soldiers attracted into the volunteer army. Statistics show that many (nearly 50%) of these soldiers require high quality training, discipline, and supervision to accomplish complex tasks. Certain factors threaten the quality of soldiers enlisted in the army; these will, in turn, adversely affect force modernization and readiness:

-- Projections of a gradual reduction in the male population available to the military.

-- Social perceptions of military service and the army in particular.

-- Use of the army as a national vehicle for remedial development and training.

This impact can be lessened to the degree that the army can build a comprehensive personnel management program; one that efficiently procures and retains larger numbers of soldiers, organized in effective teams motivated to learn and fight. The army's ability to successfully solve the problem of integrating its personnel with its increasingly sophisticated technology will decide whether our combat potential will be advanced or degraded by the introduction of this new technology.

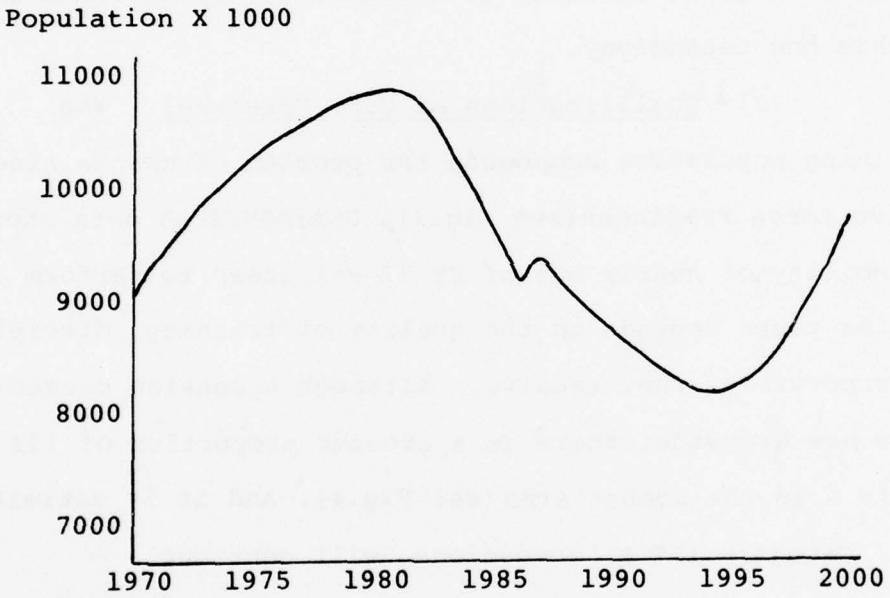
(2) Qualifications of U.S. Personnel. The declining population compounds the problem of maintaining U.S. active force readiness(see Fig.3). USA ADMINCEN data shows that the ability of nearly 50% of FY 77 enlistees to perform complex tasks depends on the quality of training, discipline, and supervision they receive. Although accession percentages are Armywide, there is a greater proportion of III B and IV A in the combat arms(see Fig.4). And it is estimated that Category III B accessions will continue to increase, requiring one or more of the following actions:

- -- increase training effort and resources
- -- Increase minimum qualifications for future accessions
- -- increase incentive for more highly qualified personnel
- -- expand enlistment options
- -- increase effort to make new equipment easier to understand and operate.

-- increase effort to make tactics simpler to understand and use.

FIGURE 3

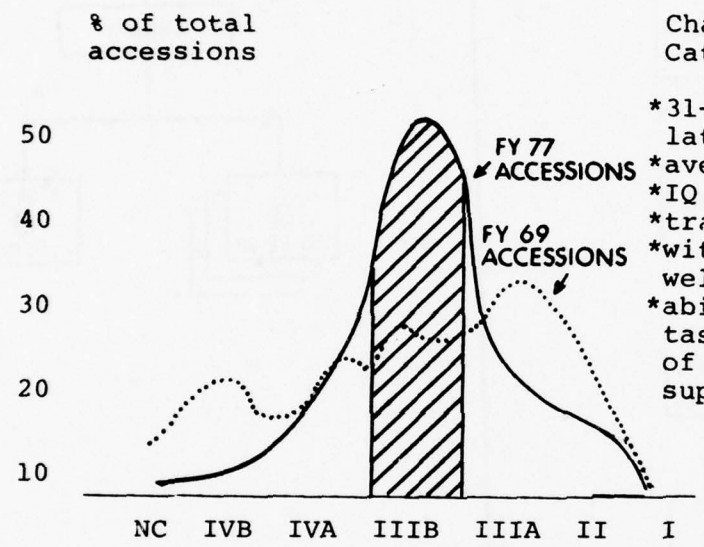
U.S. MALE POPULATION, AGE 17-21, 1970-2000



U.S. Bureau of Census, Current Population Reports

FIGURE 4

PROFILE OF U.S. ENLISTED SOLDIER



Characteristics Mental Category IIIB

*31-49 percentile of population in mentalability
*average GT 92
*IQ 85-95
*trainable
*with training can perform well on routine tasks
*ability to perform complex tasks dependent upon quality of training, discipline, & supervision.

ADMINCEN projects trend toward increase percentage of Category IIIB

h. Division Organization. The following figures depict the organizations which use the two alternative tactical doctrines:

FIGURE 5

DIVISION 86 (u)
(base case)

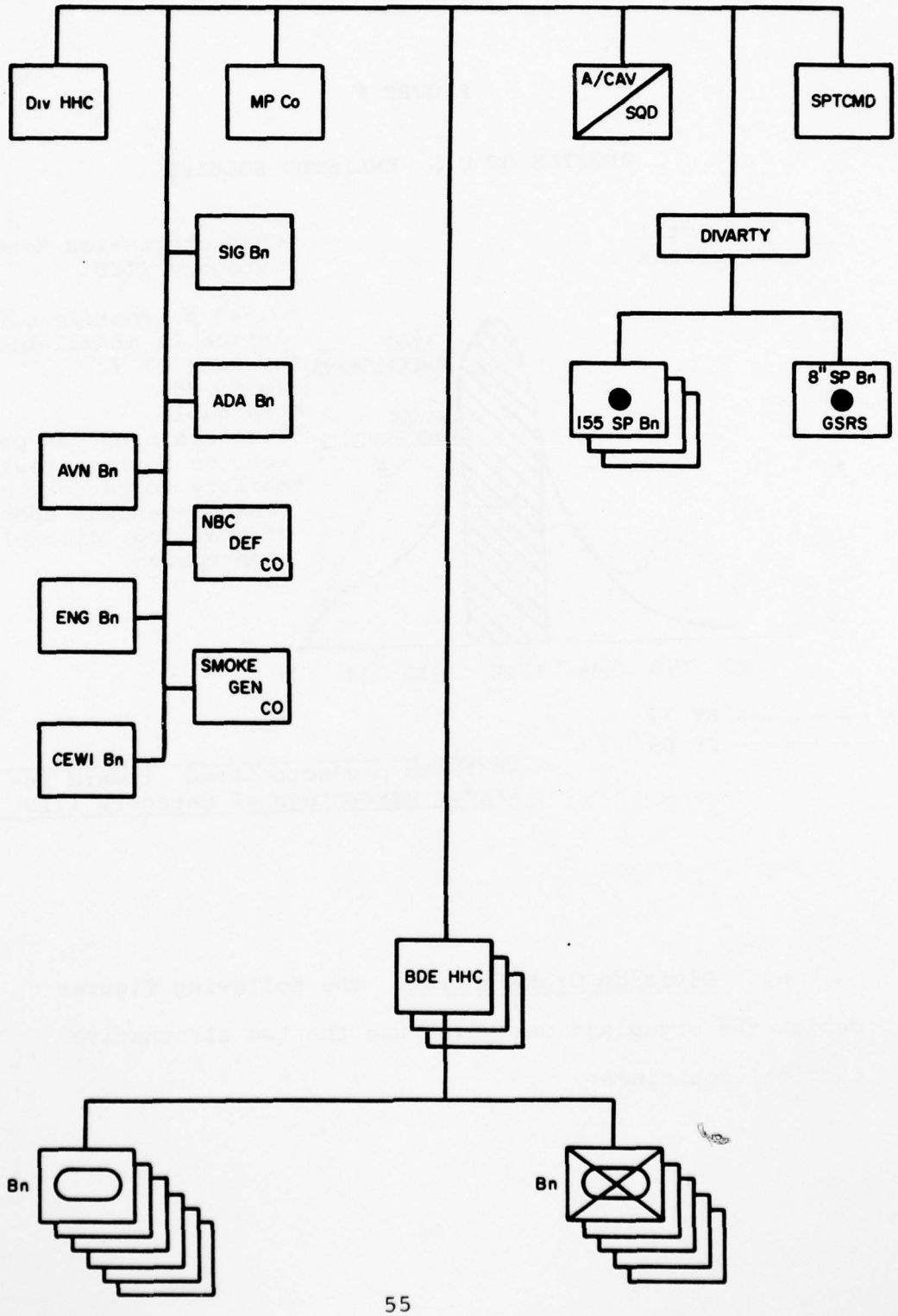
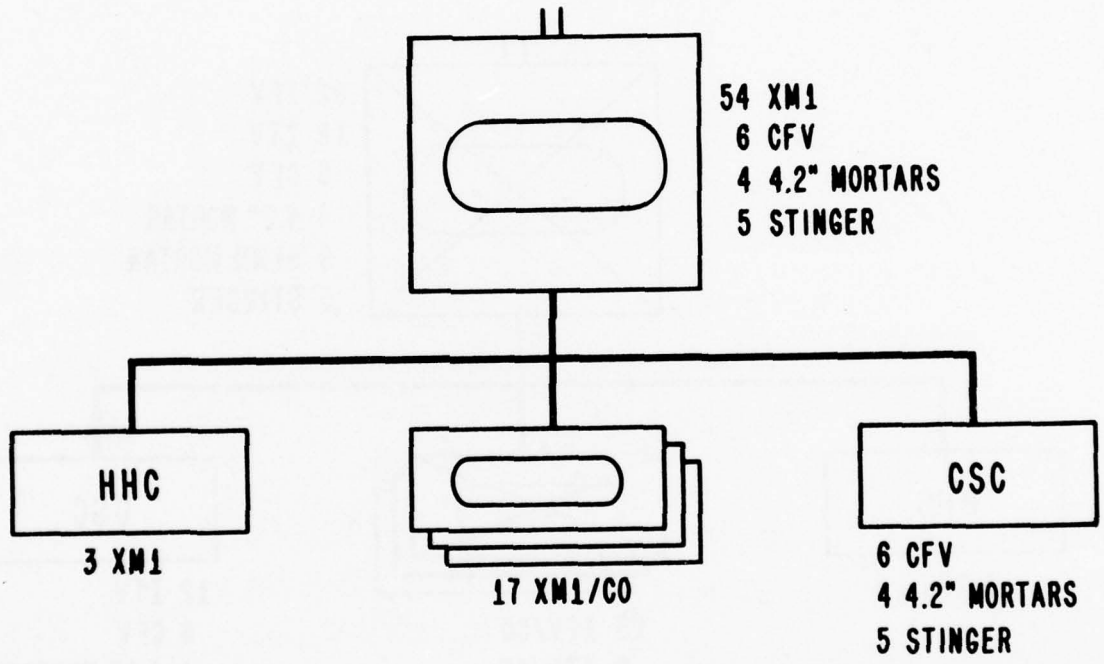
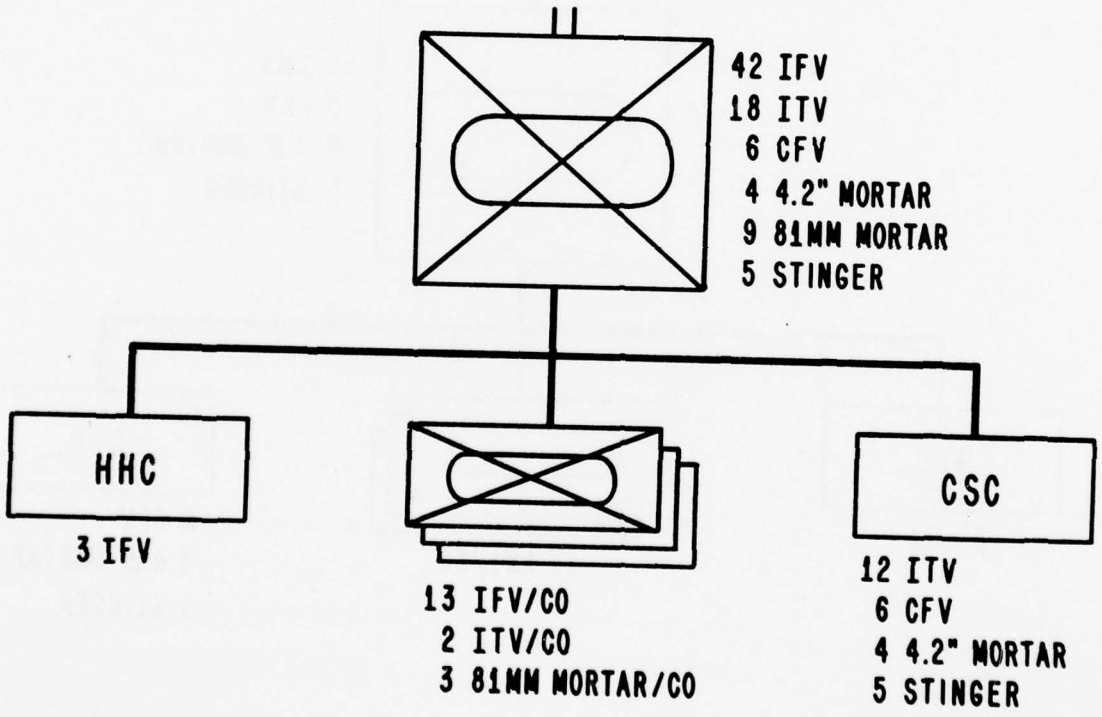


FIGURE 6



DIVISION 86 (BASE CASE) (U)

FIGURE 7



DIVISION 86 (BASE CASE) (U)

FIGURE 8

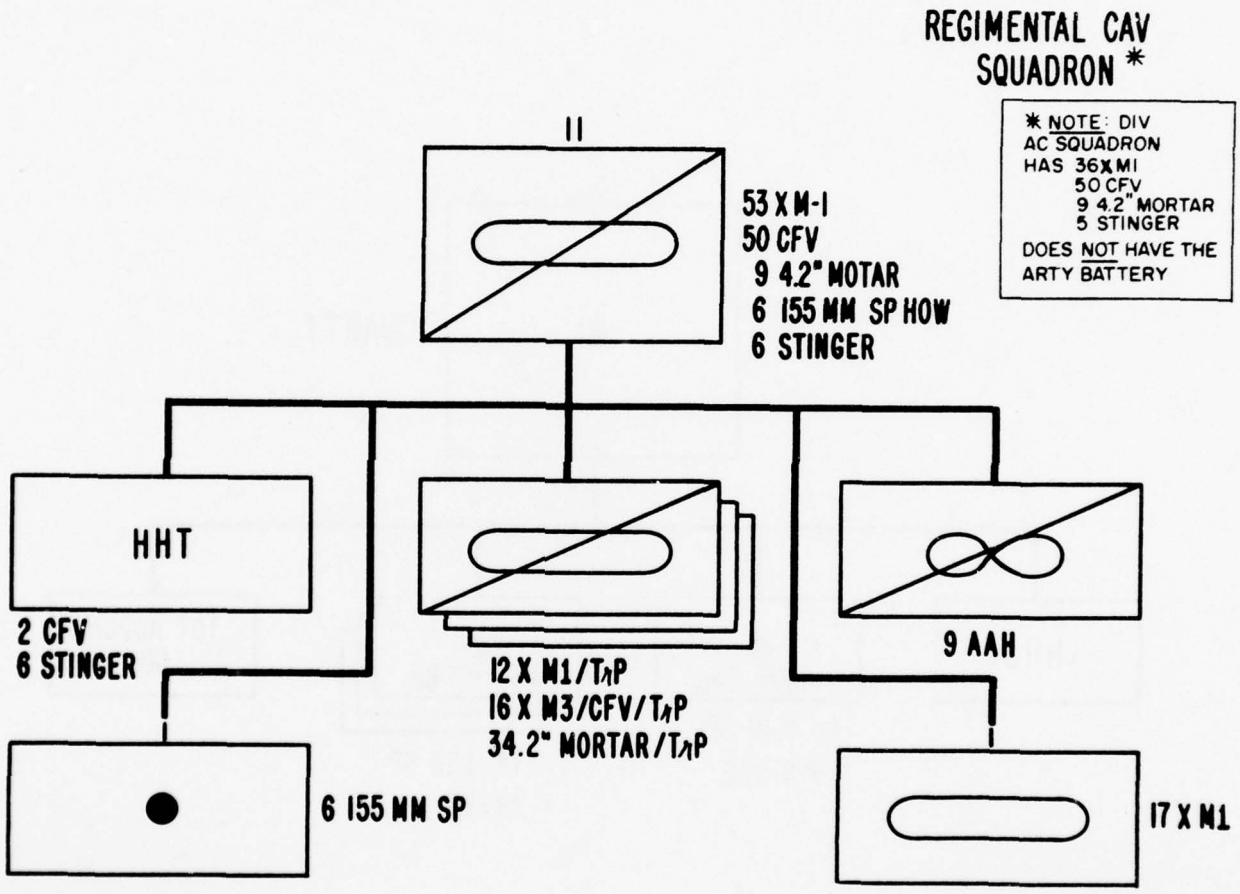
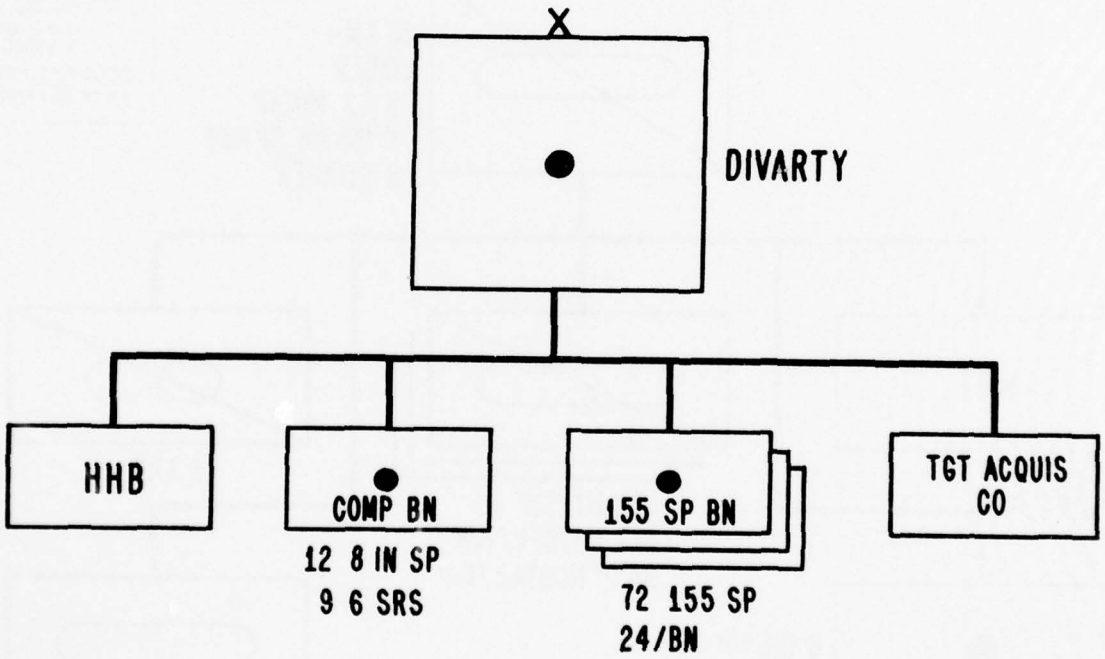

REGIMENTAL CAV SQUADRON *
* NOTE: DIV AC SQUADRON HAS 36 X M1 50 CFV 9 4.2" MORTAR 5 STINGER DOES NOT HAVE THE ARTY BATTERY
11
53 X M-1
50 CFV
9 4.2" MOTAR
6 155 MM SP HOW
6 STINGER
HHT
2 CFV
6 STINGER
12 X M1/TAP
16 X M3/CFV/TAP
34.2" MORTAR/TAP
9 AAH
6 155 MM SP
17 X M1

FIGURE 9



DIVISION 86 (BASE CASE) (U)

2. Threat Forces[1]

a. Salient Features of Threat Tactics

(1) In the offensive, following closely the concepts of mass, momentum, and continuous operations, threat tactics focus clearly on the concentration of superior forces and firepower for a combination of frontal attacks, enveloping maneuvers, holding attacks, and deep thrusts into the enemy rear by armor-heavy combined arms forces.

(2) The momentum of the attack is sustained by echelonment of forces in depth so that succeeding echelons can pass through or around the first echelon, join the fight with fresh forces, and press on to achieve and maintain continuous operations. Echelonment of forces is an important Threat concept during both offensive and defensive operations.

(3) The defense is seen as a temporary condition. Threat forces defend while seeking an opportunity to attack, or as an economy of force measure to support an attack elsewhere.

(4) Motorized rifle troops and tanks consistently operate together; ground operations are always supported by extensively planned artillery fires.

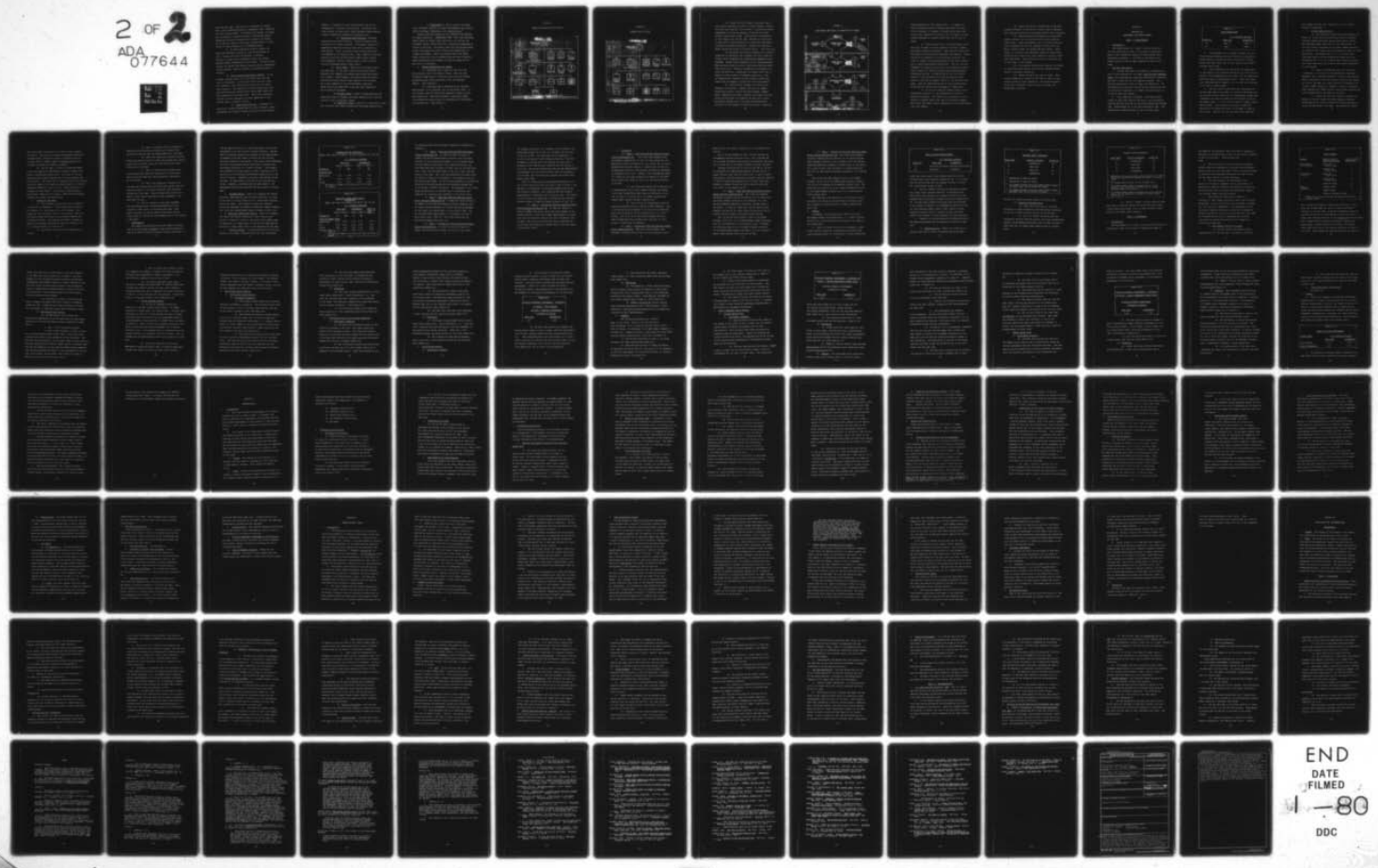
(5) Threat forces that possess nuclear and chemical weapons plan for employment in both offense and defense of these weapons as the basis for all fire planning. Nuclear and chemical fire, as well as biological fires, may be combined and coordinated with non-NBC fires and air attacks, and exploited rapidly by ground and air assault forces.

(6) In the attack the enemy attempts to overwhelm the defense with the weight and speed of his advance,

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both day and night. The attack is conducted on a broad front, with formations moving on independent axes, accepting the risk of open flanks. To minimize this danger, the enemy may use nuclear or chemical weapons to neutralize ground dominating his axis of advance and to protect his flanks. Units also are likely to have small reserve forces in march column in close proximity to a threatened flank.

(7) To avoid presenting nuclear targets, the enemy may concentrate forces for only short periods of time. He may close with the defender to destroy him and to insure that the defender cannot use nuclear weapons without endangering his own forces. Primary nuclear targets are nuclear and chemical delivery means, command and control systems, logistics systems, and concentrations of reserves.

(8) River Crossing Operations, General. On the average in Europe there is a 10-20 meter wide river for every 10 kilometers, a 50-100 meter wide river for every 50 kilometers, and a 100-200 meter wide river for every 200 kilometers. Any army moving through Europe must cross many water barriers; Threat forces facing NATO forces are well prepared for such operations. They train constantly, and most of their equipment is either amphibious or can snorkel under 5.5 meters of water.

(a) Hasty River Crossing: conducted on a wide front, without slowing down the rate of advance, using amphibious and snorkeling capabilities and minimal engineer

support. A forward unit will cross quickly and set up a bridgehead at a suitable crossing site. Following units cross quickly as they arrive, while engineers simultaneously construct additional bridges for following units.

(b) Deliberate River Crossing: detailed planning and extensive build-up. Usually conducted after the failure of a hasty crossing. A deliberate crossing is supported by massive artillery fires and is conducted in three phases. First, an assault force crosses and seizes a bridgehead on the opposite bank. Next, engineers construct crossing facilities and additional combat forces enlarge the bridgehead. Finally, Threat forces launch an attack from the bridgehead against enemy forces.

(9) Use of Smoke. Smoke can blind enemy gunners and observers. It can slow a moving force since vehicle operators and commander can become disoriented when operating in smoke. Smoke degrades the effectiveness of optical and electro-optical devices that operate in the infrared and visual segments of the electro-magnetic spectrum. Threat forces use smoke both in day and night operations for a variety of purposes:

(a) Blinding Smoke is used on enemy positions and observation posts to degrade the enemy capabilities to deliver accurate fires on attacking troops.

(b) Camouflage Smoke is used over a large area to conceal equipment and troops dispositions from enemy observations.

(c) Decoy Smoke is used to deceive the enemy as to the exact location of troops and equipment viz. placing smoke on several alternative river crossing sites.

Threat forces are especially well prepared and equipped for smoke operations. OPERATIONAL NOTE: When enemy defenders employ smoke to conceal their positions or to confuse the attackers, Threat forces will rely on maintaining momentum as a means of survival. The Threat feels that battlefield smoke favors the attacker and their forces train extensively in a smoke environment. When an attacking enemy uses smoke, Threat forces will try to withdraw from the area of heaviest smoke concentration and attempt to flank the enemy and engage him in a crossfire.

b. Threat Organization for Combat

(1) Motorized rifle troops are the basic and most versatile arm of the Threat forces. They are used to destroy enemy forces. Motorized rifle units are seldom employed without strong artillery, tank, and engineer support. (See Figure 10).

(2) Tank units may be employed at all echelons. Exploitation is the principle role of the Threat tanks. In the offense, tanks are most often employed in mass to seize deep objectives. Tank units attempt to seize such objectives before the enemy is able to reorganize for the defense or counterattack. (See Figure 11).

FIGURE 10

THREAT MOTORIZED RIFLE DIVISION

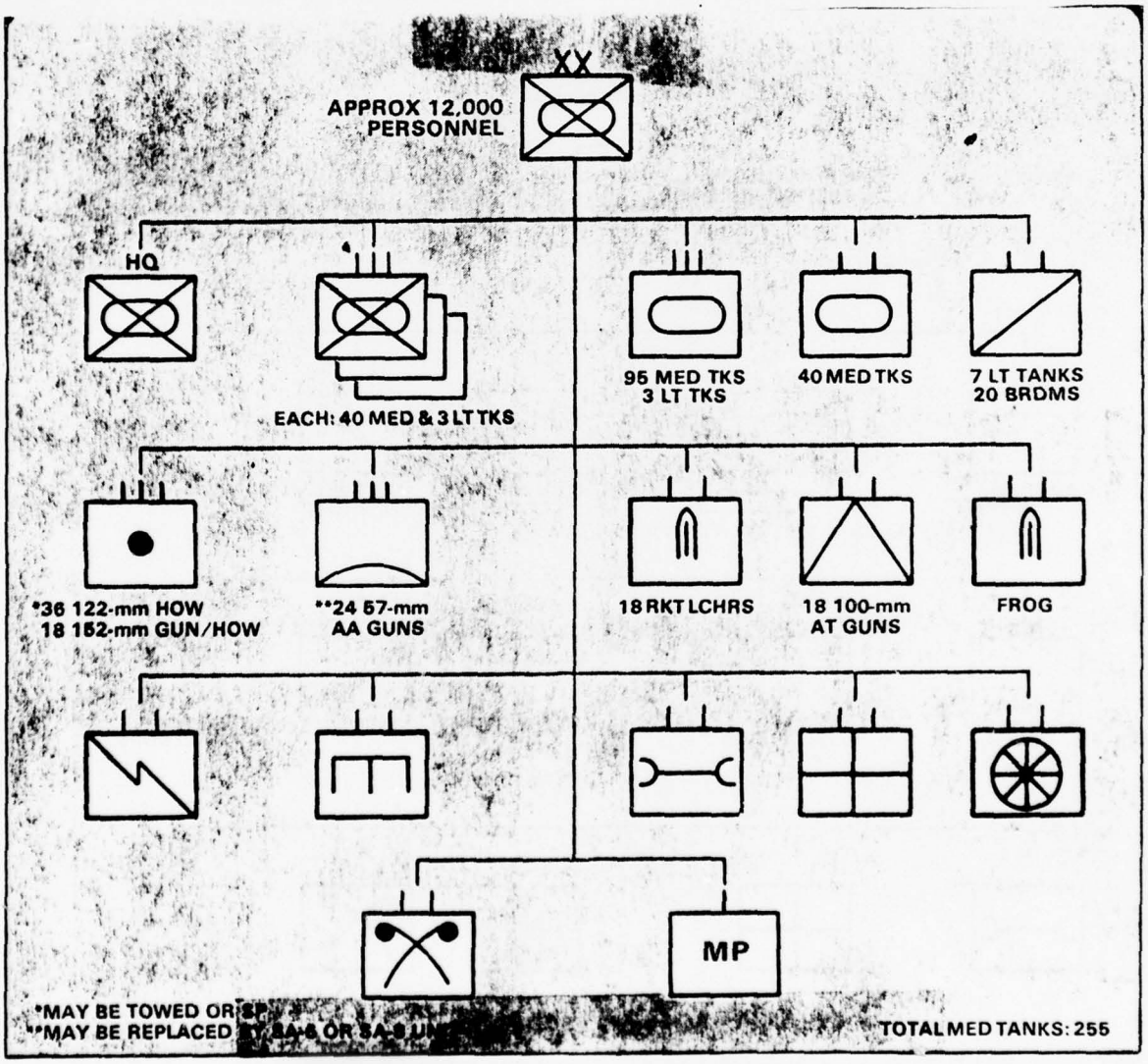
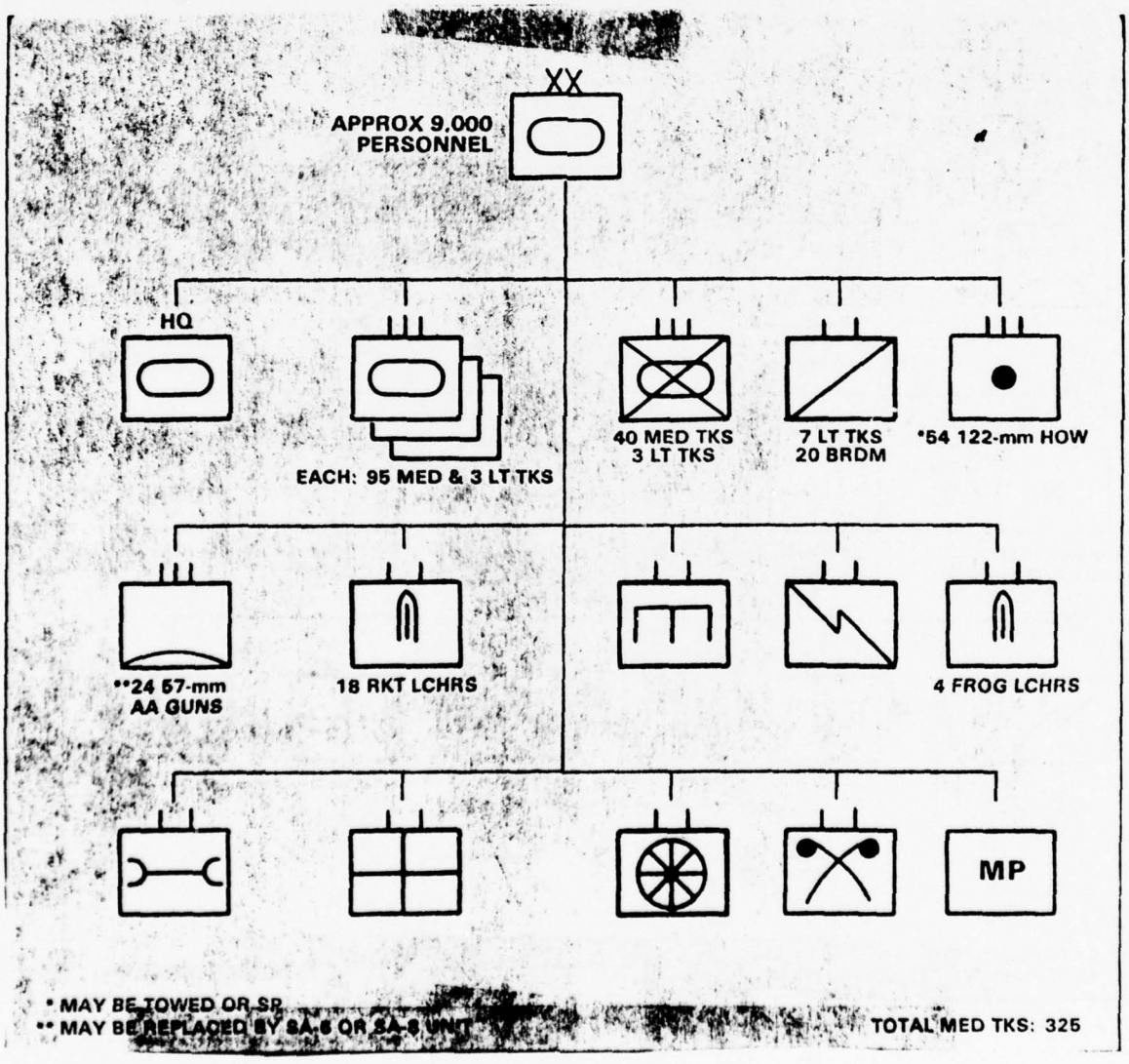


FIGURE 11

THREAT TANK DIVISION



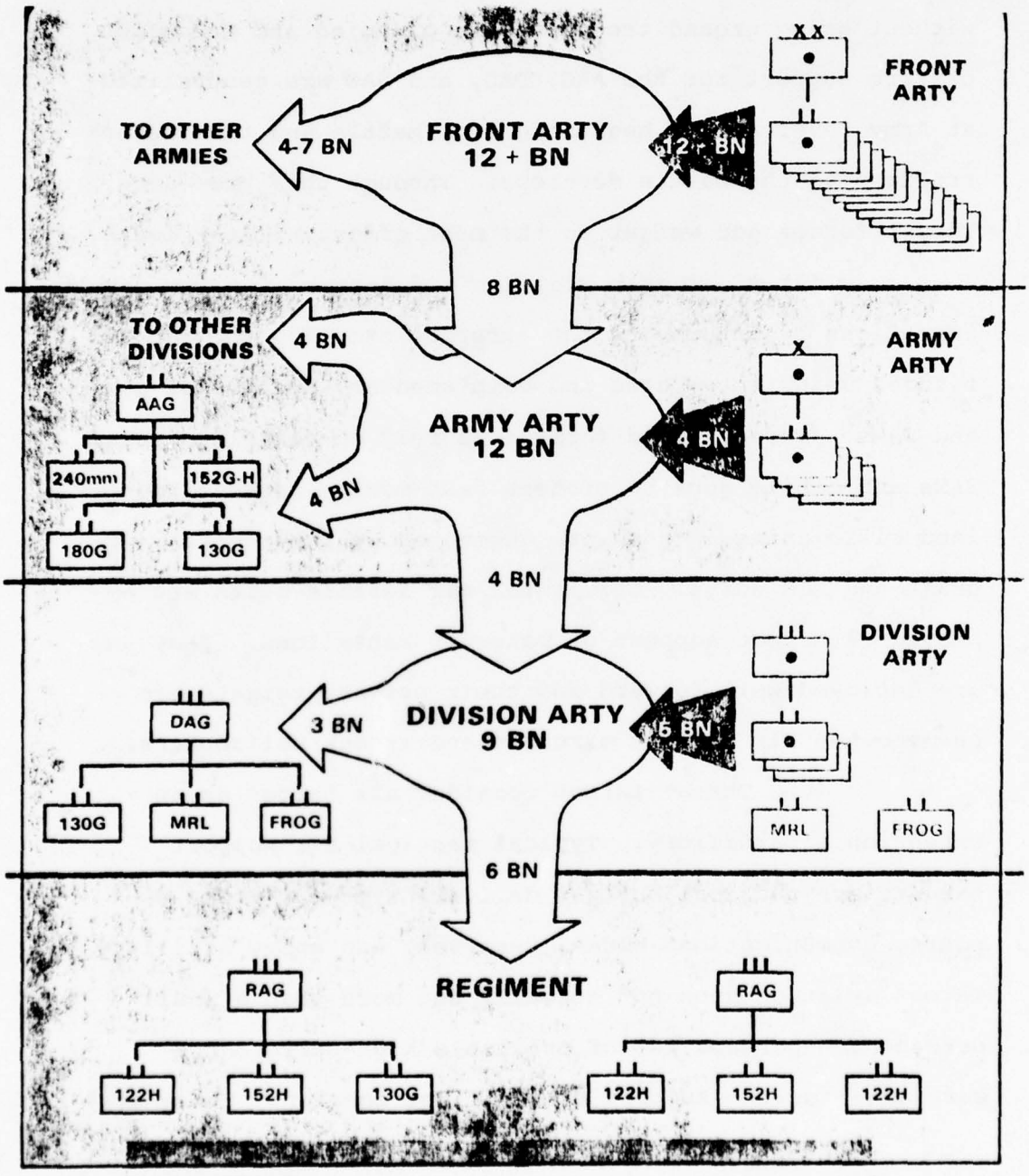
(3) Threat artillery support saturates areas with massive barrages to cover all likely targets. Threat artillery also uses the "fire strike," a severe and intense bombardment by artillery weapons, to destroy the enemy without using ground troops. Fire planning and execution of fire support for the AAG, DAG, and RAG are centralized at Army level at the beginning of a battle and then decentralized as the battle develops. Through this procedure, Threat forces add weight to the main effort. (See Figure 12.)

(4) The Threat provides air defense for its mobile formations by saturating the airspace from low to high altitude, using integrated and complementary systems of guns and SAMs. Threat field formations rely on vehicle mounted SAMs and mobile guns to protect fast-moving tank and motorized rifle units. These are augmented by interceptor aircraft and ECM units. Regimental air defense units are employed in direct support of maneuver battalions. They are deployed well forward and their primary targets are enemy close air support aircraft and attack helicopters.

(5) Threat forces consider air forces as an extension of artillery. Typical tactical air support targets are tactical nuclear delivery systems, command posts, communications nodes, reserves, and enemy artillery. Threat aviation does not normally use more than a small percentage--perhaps 20% of available high-performance aircraft--for the support of the first echelon. There are

FIGURE 12

HOW THREAT ARTILLERY IS ORGANIZED FOR COMBAT



three exceptions to this general rule: (1) support of special operations such as mountain operations or hasty river crossings; (2) support of ground forces which have outrun their supporting artillery; and (3) support to help restore momentum to a ground attack that has run out of steam.

(6) Threat forces have a large helicopter fleet. The fleet includes increasing numbers of attack, assault, and assault support helicopters. There are also heavy-lift helicopters for moving heavy equipment and supplies. Threat forces can be expected to use helicopters primarily for close air support of ground operations of the first echelon and in armed reconnaissance operations. The U.S. division commander can expect his division to be attacked by considerable numbers of armed helicopters and high-performance fixed-wing aircraft. Airmobile forces will be directed against C^3 and logistics activities and against choke points in the flow of support traffic in the division rear areas. They are used extensively in river crossing operations and for blocking the withdrawal of enemy units.

(7) It will be normal for Threat forces to systematically analyze U.S. Army communication and radio-electronic emitters. The Threat can be expected to try to destroy or degrade better than 50% of divisional command and control and weapon system communications with suppressive fires and jamming.

(8) Threat forces have fielded some of the best bridging equipment in the world to enable them to implement their tactical doctrine of high-speed assault river crossings.

(9) Mobile obstacle detachments are formed from organic engineer units to provide flank security against armor attack. These detachments vary in strength from platoon to company size and are composed of motor-rifle elements, antitank teams, and mechanized mine layers. Their mission is to protect the advancing column by laying hasty minefields and constructing other expedient obstacles along armor approaches. Threat doctrine calls for extensive use of mines even in the offense.

(10) Even during counterattacks against the flanks of advancing Threat forces, the division commander should expect to encounter minefields.

(11) Threat forces do not stop at night. They consider darkness an advantage that must be used, so they become skilled at night operations. This applies equally to periods of degraded visibility due to weather and battlefield confusion.

CHAPTER IV

ANALYSIS OF
PERFORMANCE AND EFFECTIVENESS

PART I - EFFECTIVENESS

1. Introduction

The effectiveness of a "heavy" division using the tactical doctrines at issue in this study is measured by means of the "defensive" Measure of Effectiveness (MOE) described at Appendix A. The data for the MOE are the combat results of the war game conducted as part of the study.

2. War Game Description

a. The war game used in the study is a modified version of the prototype of a war game, NATO Division Commander (NDC), being developed by Simulation Publications Incorporated (SPI) of New York for the commercial market. For a detailed description of the war game, see Appendix B. The paragraphs below describe its most salient features and how the iterations (referred to as "Games" from this point on) of the war game were played.

b. Four Games were conducted. Each Game matched either the base case tactical doctrine or the alternative tactical doctrine with one of two Soviet Operational Methods (OM): Breakthrough (B) or Multiple Penetration (MP). The combinations played are shown in the following table.

TABLE IV-1

GAME COMBINATIONS

	U.S. TACTICAL DOCTRINE	
SOVIET OM	BASE CASE	ALTERNATIVE
B	Game 4	Game 1
MP	Game 3	Game 2

c. In each Game, a U.S. "heavy" division, the U.S. 8th Mechanized Infantry Division (8 MID), was required to defend against an attack by three divisions of a Soviet Guards Tank Army (GTA), the 1st GTA, entering the 8 MID's assigned battle area.

d. Time constraints did not permit the examination of the conduct of an offensive mission by the 8 MID (as discussed in the assumptions of this study, such an examination would have been of questionable value). Hence the "offensive" MOE described at Appendix A is not used but furnished to be used in further study.

e. The real time to simulated time requirements of the war game used in the study (2-3 hours of simulated time for one hour of real time) and time constraints allowed only a maximum of 48 hours of combat to be simulated in any of the Games (Games 1, 2, and 4 were 40 hours of combat; Game 3 was 48 hours). This limitation required a subjective analysis of the results of three of the Games in order to use the MOE. Ideally, the war game would have simulated

more combat time than that expected for the 1st GTA to attain its objectives.

f. Key War Game Features

(1) The study's war game allows two players, one using U.S. forces and one using Soviet forces to conduct simulated combat operations against each other's forces. The simulated combat takes place in the "Fog of War" in that the player's knowledge of the actual combat situation is limited to that which would be available to them on a real battlefield. Each player uses a 3' x 2' terrain color coded game board on which he moves and fights his units represented by 1/2" x 1/2" counters and on which he locates only those enemy units for which he has combat information or intelligence.

(2) Combat is conducted under the control of a referee(s), one or more of the researchers, (minimum-1; maximum-3) who: provides strategic, tactical, and environmental information to the two players; monitors and records the flow of the game (on a game board which represents the "actual" combat situation); computes, records, and reports (when appropriate) combat results; and provides instructions; rule interpretations; and game play guidance.

(3) During the game each player is required to manage his forces' combat and combat support resources constrained by his initial resource allocation provided to him at the beginning of the game. The referee(s) insures

that each player stays within the limits of his resource allocation. The resource allocation/management problem of the game player focuses the player's attention upon the critical tasks of TRADOC's BDP and Division 86 while he attempts to execute his tactical concepts.

(4) The war game is played in successive game-turns, each game-turn representing 8 hours of combat, composed of alternating player-turns. The rules of the war game provide proximate simultaneity of action despite this artificiality. The real time to simulated time ratio realized during the Games of the study was approximately 2-3 hours of simulated combat for 1 hour of play. Each player-turn is composed of seven phases: Intelligence, Asset Transfer, Mode Change, Offensive Fire Support, Defensive Fire Support, Movement and Combat, and Housekeeping.

g. Conduct of the Games

(1) The strategic scenario for all the Games is at Annex B-4 to Appendix B. This scenario was briefed to all players, U.S. and Soviet, prior to the games. Each player was also provided a copy of the scenario. Each U.S. and Soviet player was given an Intelligence Estimate and an Operations Order. Each Operations Order's "Concept of Operation" paragraph reflected the tactical concepts of a U.S. tactical doctrine or a Soviet OM.

(2) The player pairings for the Games were as follows:

(a) Game 1-3 players from the Alternative Tactical Doctrine Group were paired with 1 player from the Soviet group who used the Breakthrough OM in the Game.

(b) Game 2-the remaining 3 players from the Alternative Tactical Doctrine Group were paired with another player from the Soviet group who used the Multiple Penetration OM in the Game.

(c) Game 3-3 players from the Base Case Tactical Doctrine Group were paired with a third player from the Soviet Group who used the Multiple Penetration OM in the Game.

(d) Game 4-the remaining 3 players from the Base Case Tactical Doctrine Group were paired with the remaining player in the Soviet Group who used the Breakthrough OM in the game. These pairings were derived randomly; as were Group assignments, Game assignments, and Game order of play.

(3) The U.S. players in each Game commanded the 8 MID sequentially (randomly determined) but were allowed to confer prior to and during the Game. Each player received a situation update either from the previous player or from one of the referees prior to his portion of the Game.

3. Game Results

The combat data generated by the war game are considered to provide only an example of the possible effectiveness of a "heavy" division using the tactical doctrines, in

the war game as well as on a real battlefield, and are not considered to be statistically reliable evidence. The war game's principal purpose is to provide for the game players an example of how the "heavy" division and the tactical doctrines "worked on the ground." The players were respondents for two of the surveys used by the study to estimate the performance potential of a "heavy" division. This example was provided to aid the players in their formulation of an opinion as to the potential performance capabilities of the "heavy" division. Appendix B provides a description of the war game, the game players, and how the war game was conducted. Appendix C provides detailed game results. The paragraphs which follow highlight the key results of the war game:

a. Exchange Ratios. Table IV-2 compares the "heavy" divisions, described by their tactical doctrines, in terms of the ratio of Soviet losses to U.S. losses which occurred during the Games. Three types of losses are reported: battalions destroyed or rendered ineffective; Combat Strength (CS) lost; and Combat/Combat Support Strength (C/CSS) lost.

b. Remaining Combat Power Ratios. Table IV-3 compares the "heavy" divisions, described by their tactical doctrines, in terms of a ratio of remaining Soviet combat power to remaining U.S. combat power at the end of a Game and the Soviet/U.S. combat power ratio at the beginning of that Game.

c. Tactical Results. The descriptions of the tactical results of the Games, reported below, are also illustrated

TABLE IV-2

EXCHANGE RATIOS (SOVIET/US)

(NOTE: The higher the number, the more favorable for the US)

	U.S. TACTICAL DOCTRINES			
	BASE CASE		ALTERNATIVE	
	(Game 4)	(Game 3)	(Game 1)	(Game 2)
SOVIET OM	B	MP[1]	B	MP
TYPE OF LOSS				
Battalions	3.75	1.875	2.17	7.50
CS	4.80	2.54	2.35	5.57
C/CSS	4.22	2.45	2.16	5.84

[1] 48 hours of combat; all others are for 40 hours of combat.

TABLE IV-3

REMAINING COMBAT POWER RATIOS (SOVIET/US)

(NOTE: The lower the number, the better for the US)

	U.S. TACTICAL DOCTRINES				
	BASE CASE		ALTERNATIVE		RATIO AT START OF GAME
	(Game 4)	(Game 3)	(Game 1)	(Game 2)	
SOVIET OM	B	MP[1]	B	MP	
TYPE OF COMBAT POWER					
Battalions	3.33	6.00	4.57	2.73	3.46
CS	2.80	5.00	4.51	2.52	3.46
C/CSS	2.41	3.19	3.35	2.07	2.95
Fatigue (Note 1 Chap.IV)	1.41	1.89	0.81	2.18	1.00

[1] 48 hours of combat; all others are four 40 hours of combat.

by situations maps and the Combat Differential Comparison in Appendix C.

(1) Game 4 - Base Case Tactical Doctrine Versus Soviet Breakthrough OM. At Game end (after 40 hours of combat) the Soviet second echelon division, the 11th Tank Division (11 TD), minus one regiment (+), has passed around the left flank of the Soviet first echelon divisions, the 27th Motorized Rifle Division (27 MRD), and the 7th Tank Division (7 TD), and the right flank of the U.S. 8 MID, into the latter's rear area. The 11 TD had penetrated the 8 MID's battle area to a depth of 36 kilometers, 18 kilometers into its Main Battle Area (MBA). The 8 MID was attempting to restore the situation by re-positioning one tank battalion between the 11 TD and the 1st GTA's objectives. The remainder of the 8 MID, except possibly one, at the most two (+) battalions, was committed to containing the remainder of the Soviet force.

(2) Game 3 - Base Case Tactical Doctrine Versus Soviet Multiple Penetration OM. At Game end (after 48 hours of combat) the 1st GTA was conducting frontal assaults with its three divisions against the 8 MID's battalions deployed on line along the forward edge of the division's MBA. The 1st GTA had pushed approximately 17 kilometers into the 8 MID's battle area. Both U.S. and Soviet forces are all decisively engaged along this line.

(3) Game 1 - Alternative Tactical Doctrine Versus Soviet Breakthrough OM. At Game end (after 40 hours of combat) the Soviet second echelon division (11 TD), minus

the Command and Control (C^2) elements of one regiment, had penetrated between two of the U.S. brigades into the rear of the U.S. 8 MID. The equivalent of two regiments (+) of one of the Soviet's first echelon divisions (7 TD) had succeeded in forcing their way through the right flank brigade of the 8 MID and had linked up with the forces of the 11 TD. The Soviet penetrations had carried approximately 56 kilometers into the 8 MID's battle area, 40 kilometers into its MBA, and its forces were astride the 8 MID's Main Supply Route (MSR).

Four U.S. battalions had counterattacked, parallel to the 11 TD's thrust, into the rear area of the 11 TD and 7 TD; and were in the process of decimating Command and Control and logistics elements. This counterattack had advanced approximately 5 kilometers into the Soviet rear. The remaining U.S. forces were committed to containing the remaining Soviet division (27 MRD) and combat elements of the 7 TD.

(4) Game 2 - Alternative Tactical Doctrine Versus Soviet Multiple Penetration OM. At Game end (after 40 hours of combat) the Soviet attack had been stopped in the forward portion of the 8 MID's MBA; approximately 23 kilometers into the division's battle area and 5 kilometers into its MBA. The 8 MID had launched two major counterattacks one of which was beginning to break loose in the rear areas of the Soviet forces.

d. Evaluation

(1) Game 4 - Base Case Tactical Doctrine Versus Soviet Breakthrough OM. The 8 MID would probably have succeeded in denying the 1st GTA its final objective, the MAINZ Rhine River crossing sites, until after D+4. It would probably have failed, however, in denying the 1st GTA its intermediate objective, the Autobahn intersection southeast of Giessen, by D+2 or D+3. However, this intermediate objective would not have been achieved by elements of the GTA's first echelon but rather by the 11 TD, the second echelon of the GTA.

(a) The 8 MID had reduced the 27 MRD and 7 TD to approximately 47% of their Combat Strength and induced a very high fatigue[1] level upon these two divisions at the cost of only 27.5% and 22.9% of its Combat Strength and Combat/Combat Support Strength respectively.[2]

(b) The 11 TD has an advantageous tactical situation, possibly forcing a general 8 MID withdrawal. The 11 TD has gained the autobahn in the rear of the 8 MID and would only be faced by one or possibly two (+) U.S. battalions. The 11 TD is at 95% Combat Strength and has a lower average battalion fatigue level than the U.S. battalions it would have to overcome.

(2) Game 1 - Alternative Tactical Doctrine Versus Soviet Breakthrough OM. The 8 MID would probably have succeeded in denying the 1st GTA its final objective until

after D+4 but has failed in denying it its intermediate objective.

The 11 TD and elements of the 7 TD have secured the intermediate objective by H+40 (D+1). The 11 TD has 96% of its Combat Strength remaining and only moderate "fatigue"; the 7 TD has 56% of its Combat Strength and high "fatigue".

Although the 8 MID was at only 53% and 58% of its Combat Strength and Combat/Combat Support Strength and at a higher fatigue level than the Soviet GTA, it had a brigade intact, which, although moderately fatigued, could be expected to inflict significant damage to the 1st GTA's rear area elements, probably forcing the GTA to stop to deal with this threat to its support and C^3.

(3) Game 3 - Base Case Tactical Doctrine Versus Soviet Multiple Penetration OM. The 8 MID has probably succeeded in denying the Soviet GTA both of its objectives and would probably continue to be successful until the Soviets committed additional resources, another Army, to the effort. It was D+2, Game time, and the battle would probably continue to be fought along the existing line of contact without further significant Soviet advance.

The 1st GTA has been reduced to 60% of its Combat Strength and 65.5% of its Combat/Combat Support Strength with all its elements at a high fatigue level. Although the 8 MID has only 45% of its Combat Strength and 58.5% of its Combat/Combat Support Strength, it is at a significantly lower fatigue level than the 1st GTA.

(4) Game 2 - Alternative Tactical Doctrine Versus Soviet Multiple Penetration OM. The 8 MID would probably succeed in denying the 1st GTA both of its objectives and would probably continue to be successful until the Soviets committed additional resources, another Army, to the effort. D+2 is only 8 hours away and there is a good possibility that the 1st GTA would be rendered ineffective as a fighting force.

The 1st GTA has been reduced to 63% of its Combat Strength and 65.5% of its Combat/Combat Support Strength with all of its elements at a moderate fatigue level. The 8 MID has lost only 23.1% of its Combat Strength and 17.4% of its Combat Support Strength and is at a significantly lower fatigue level.

The 8 MID has a two battalion (+) size force loose in the Soviet rear which can either destroy the Soviet rear area elements or attack the Soviet combat elements from their rear.

4. Summary

In summary, the following table (Table IV-4) and paragraphs compare the effectiveness of a "heavy" division using the U.S. tactical doctrine alternatives in terms of the study's MOE.

a. The U.S. "heavy" division was successful, using either tactical doctrine, in preventing the Soviet Army from achieving either its intermediate or final objectives

TABLE IV-4

HEAVY DIVISION EFFECTIVENESS

	U.S. TACTICAL DOCTRINE	
SOVIET OM	BASE CASE	ALTERNATIVE
B	Partially Successful	Partially Successful
MP	Successful	Successful

within the Soviet Army's time schedule when the Soviets attacked using their Multiple Penetration OM. It is likely that the Soviet Army would be stopped in place, or worse, for a significant period of time.

b. The U.S. "heavy" division was partially successful, using either tactical doctrine, in preventing the Soviet Army from achieving its objectives within its time schedule when the Soviets attacked using their Breakthrough OM. In both cases although the Soviet Army had achieved, or was likely to achieve, its intermediate objective within its time schedule, combat losses, combat support losses, excessive fatigue, and/or a tenuous tactical situation would likely prevent it from achieving its final objective.

c. Implicit to the above MOE are the Exchange Ratios and Remaining Strength Ratios reported in Tables IV-2 and IV-3.

(1) Exchange Ratios. Table IV-5 ranks the U.S. tactical doctrines in terms of Exchange Ratios achieved

TABLE IV-5

EXCHANGE RATIO COMPARISON

RANK ORDER	TACTICAL DOCTRINE	SOVIET OM
1[1]	ALTERNATIVE	MP
2[2]	BASE CASE	B
3[3]	BASE CASE	MP
4[4]	ALTERNATIVE	B

[1] Regardless of type of losses

[2] Regardless of type of losses

[3] For Combat Strength loss and Combat/Combat Support Strength loss; 4th for Battalion losses

[4] For Combat Strength loss and Combat/Combat Support Strength loss; 3d for battalion losses.

by the U.S. "heavy" division against the Soviet Army.

(2) Remaining Strength Ratio

(a) Table IV-6 ranks the U.S. tactical doctrines in terms of Remaining Strength Ratios maintained by the U.S. "heavy" division against the Soviet Army.

(b) The U.S. "heavy" division, using the alternative tactical doctrine against the Soviet Breakthrough OM, had a worse Remaining Strength ratio at Game end than at Game start for all combat power measures and for fatigue level.

TABLE IV-6

STRENGTH RATIO COMPARISON

RANK ORDER	TACTICAL DOCTRINE	SOVIET OM
1[1]	ALTERNATIVE	MP
2[2]	BASE CASE	B
3[3]	BASE CASE	MP
4[4]	ALTERNATIVE	B

[1] Regardless of type of combat power (Battalions, Combat Strength, Combat/Combat Support Strength) or fatigue level

[2] For combat power ratios; 3d for fatigue level

[3] For Combat/Combat Support Strength Ratio; 2d for fatigue level; and last for Battalion and Combat Strength ratios (see para (c)

[4] For Combat/Combat Support Strength Ratio and fatigue level; 3d for Battalion and Combat Strength ratios (see para (b)

(c) The U.S. "heavy" division using the base case tactical doctrine against the Soviet Multiple OM had a worse Remaining Strength ratio at Game end than at Game start for all combat power measures.

PART II - PERFORMANCE

1. Introduction

The performance of a "heavy" division using the tactical doctrines at issue in this study is measured by means of

the Measures of Performance (MOP) described at Appendix A. The basis of the MOP are the results of the surveys conducted as part of the study. Three surveys were used:

a. The first survey, the NWC Student Preliminary Survey, asked its respondents to estimate the performance capabilities of one of the study's "heavy" division variants in isolation from knowledge concerning the other variant and the other variant's tactical doctrine.

b. The other surveys, the NWC Student Final Survey and the Senior Commander Survey, asked their respondents to judge the relative acceptability of both tactical doctrines and to estimate the performance capabilities of both "heavy" division variants.

c. The surveys are described in Table IV-7 according to their sample populations and in the following paragraphs. Copies of the surveys are provided as Annexes D-1, D-2, and D-5 of Appendix D. The population size of the Senior Commander Survey was limited by the number of surveys received in time to be incorporated into the study. Of 29 surveys mailed only 17 responses were received [including one survey which provided only comments on the tactical doctrines].

(1) NWC Student Preliminary Survey

(a) The NWC Student Preliminary Survey, conducted prior to the war game, consisted of two parts:

TABLE IV-7

STUDY SURVEYS

SURVEY	DESCRIPTION OF SAMPLE POPULATION	SIZE OF SAMPLE POPULATION
NWC Student - Preliminary	Base Case Player Group	6
	Alternative Player Group	6
NWC Student - Final	Base Case Player Group	6
	Alternative Player Group	6
	Combined Group	12
Senior Commander	Primary Group	12
	TRADOC Group	3
	"Special Interest" Group	1

Tables D-1 and D-10 describe the survey populations in more detail.

Part I asked Army students [combat arms officers] at the Naval War College (NWC) who were to "play" the "heavy" divisions in the war game to specify preference values for the tasks which must be performed by a "heavy" division in combat (the modified versions of the Division 86 critical tasks). Part II asked them to estimate the extent to which they would expect a "heavy" division, on average, to perform these tasks using one of the tactical doctrines at issue in the study. Each student had been provided with and asked to

study, two weeks prior, either Annex E, the core elements of the base case tactical doctrine, on Annex F, the core elements of the alternative tactical doctrine exclusively. Subsequently each student "played" a "heavy" division in the war game, either the Base Case variant or the Alternative variant, categorized and differentiable in terms of the tactical doctrines. Each student played the division whose tactical doctrine he had studied.

(b) The survey resulted in data which was used to compute the study's MOP and to define a weighting scheme for use in computing the study's Criterion of Choice for two groups: a Base Case Group and an Alternative Group.

(2) NWC Student Final Survey

(a) The NWC Student Final Survey, conducted after completion of the war game using the same sample population as the NWC Preliminary Survey, consisted of three parts:

1 Part I of the Preliminary Survey;

2 Part II was identical, in form, to Part II of the Preliminary Survey except that in the Final Survey students were asked to make judgments for two divisions: the division they had played in the war game (whose tactical doctrine they had studied prior to the war game) and for a division which they had not played in the war game but whose tactical doctrine they had been provided and asked to study subsequent to the war game. Each student was provided either Annex E or Annex F, whichever they had not previously studied.

3 Part III asked each student to state his judgment with respect to whether two clear alternative doctrines were represented in Annex E and Annex F, and solicited any comments he would care to make.

(b) The survey resulted in data which was used to compute the study's MOP, to identify additional concepts and issues or refine old ones, and to define a weighting scheme for use in computing the study's Criterion of Choice, in this instance, for three groups: a Base Case Group, an Alternative Group, and a Combined Group.

(3) Senior Commander Survey

(a) The Senior Commander Survey was identical to the NWC Student Final Survey. Its sample population is broken down into three groups: a Primary Group consisting of senior U.S. Army officers serving in command positions within the active Army (one respondent serves in a HQ, Department of Army position); a TRADOC Group consisting of senior U.S. Army officers now or formerly serving in command or staff positions within HQ TRADOC; and a "Special Interest" Group - one respondent who is a respected civilian analyst serving as a consultant for the U.S. Army. Each respondent was provided Annexes E and F and requested to study both.

(b) The survey resulted in data which were used to compute the study's MOP, to identify additional concepts and issues or refine old ones, and to define a

weighting scheme for use in computing the study's Criterion of Choice, in this instance for three groups: the Primary, TRADOC, and "Special Interest" groups. In the case of the single respondent from the "Special Interest" Group, only his written comments are reported as data for this study.

2. NWC Student Survey Results

a. Preliminary Survey Results

(1) Performance Judgments

(a) Both player groups rated their division's potential performance as superior. The alternative was rated slightly higher (6.03) by its group than the base case was by its group of players (5.85) [See Table D-4].

(b) The alternative received a higher rating on 8 of the 9 critical tasks, but for only one task (Air Defense) was the difference significant, i.e., greater than or equal to 2 whole numbers on the rating scale per the survey's instructions. The base case received a higher rating for the Force Mobility critical task [Table D-3].

(c) The alternative's player group rated their division's potential performance superior for all critical tasks. The base case group rated their division's potential performance superior for all critical tasks but two, Air Defense and Interdiction, for which the division's potential performance was rated inferior [Table D-3].

(d) The base case player group exhibited less variability in their ratings, as indicated by the variance of their ratings of the division's potential performance for each critical task, than did the alternative player group [Table D-9].

(2) Weightings

(a) The player groups weighted three critical tasks nearly identically. Minor differences, i.e., less than .04, resulted from their weighting of the remainder of the tasks. The Logistical Support task weightings exhibited the largest difference, .0358 [Table D-2].

(b) The alternative player group exhibited less variability in their weightings than did the base case group [Table D-9].

b. Preliminary Survey-Final Survey Comparison

(1) Performance Judgments

(a) The potential performance rating of both divisions increased in the Final (post game) Survey compared to their pre-game ratings. The alternative group's rating of its division was again higher than the rating given to the base case division by its player group and the margin between the divisions increased [Table D-4].

(b) The alternative division was rated higher on one less critical task (7 of the 9 rather than 8 of 9) compared to the pre-game results. Again the alternative was

rated significantly higher for only one task (however in this instance Interdiction rather than Air Defense). Neither of the critical task ratings, for which the base case did receive a higher score (Target Serving and Logistical Support), were significantly higher than those of the alternative [Table D-3].

(c) The alternative's player group again rated their division's potential performance superior for all critical tasks. The base case group continued to rate its division's potential performance inferior for the Air Defense task, but in this instance they rated it as superior for the Interdiction task [Table D-3].

(d) The base case group were less consistent in their ratings than the alternative group [Table D-9].

(2) Weightings

(a) The player groups weighted four critical tasks nearly identically. Minor differences, i.e., less than .0417, resulted from their weighting of all the remainder of the tasks but one, Target Servicing. There was a .0617 difference between the group ratings for this task [Table D-2].

(b) The alternative group again displayed less variability in their weightings than did the base case group [Table D-9].

c. Final Survey Results

(1) Performance Judgments

(a) The alternative division was judged, combining player groups, to have a higher, but not significantly higher, potential performance than the base case division. Both were rated as potentially providing superior performance. Table IV-8, below, displays the study's Criterion of Choice, the weighted sum of the ratings by the NWC students of the potential performance of the divisions.

TABLE IV-8

DIVISION POTENTIAL PERFORMANCE - CRITERION OF CHOICE - NWC STUDENTS

DIVISION POTENTIAL PERFORMANCE CRITERION OF CHOICE	
BASE CASE	ALTERNATIVE
6.47	6.84

(b) The base case division was judged, combining player groups, to have a higher potential performance on 5 of the 9 critical tasks [but none significantly higher]. The alternative, which was rated higher on 4 of the 9 tasks, also did not received any significantly higher ratings. The largest difference (1.67) was for the Force Mobility task [Table D-6], and in favor of the alternative.

(c) The alternative was rated, combining player groups, in a more consistent manner than was the base case [Table D-9].

(2) Weightings

(a) Force Mobility, C^3/EW, Target Servicing, and to a lesser extent Logistical Support [in that order] received more than a proportionate share of the weightings provided by the player groups. Force Mobility exceeded the next higher weighted task, C^3/EW, by .0509 [Table D-5].

(b) TRADOC's Division 86 "Central Battle" tasks received approximately 55% of the weighting; "Force Generation" tasks received approximately 45% [incorporating a halving of the C^3/EW weighting].

d. Comments

The following paragraphs are comments made by the player groups in the surveys which were considered to be a consensus opinion and/or significant in nature. An anthology of all NWC student comments is at Annex D-3. Comments similar to those below but which specifically address Organizational Issues are in Chapter VI.

(1) The tactical doctrines at issue in the study represent two clear alternatives [Table D-8].

(2) Each tactical doctrine is viable and should be available for use by the U.S. Army as part of its repetoire to meet the requirements of future battlefields, to include a European war against the Warsaw Pact.

(3) The 1986 "heavy" division will not have all the capabilities it will require, especially in terms of the Air Defense and C^3/EW critical tasks.

(4) Doctrine and system capability improvement are necessary but not sufficient to insure success. The 1986 "heavy" division will also require well trained personnel and units and excellent battle procedures and techniques, integrating all combat and combat support assets.

(5) The "heavy" division variants are not easily distinguishable in terms of the critical tasks. A judgment with regard to their potential performance depends more on organization and equipment differences.

3. *Senior Commander Survey Results*

a. Primary Survey Group

(1) Performance Judgments

(a) The alternative division was judged by the primary survey group to have a higher, but not significantly higher, potential performance than the base case division. Both divisions were rated as potentially providing superior performance. Table IV-9 displays the study's criterion of choice, the weighted sum of the ratings by the primary survey respondents of the potential performance of the divisions.

(b) The base case division was, however, judged to have a higher, but not significantly higher, potential performance on 5 of the 9 critical tasks. The alternative

TABLE IV-9

DIVISION POTENTIAL PERFORMANCE - CRITERION OF CHOICE - SENIOR COMMANDERS PRIMARY GROUP

DIVISION POTENTIAL PERFORMANCE CRITERION OF CHOICE	
BASE CASE	ALTERNATIVE
6.03	6.04

which was rated higher on 4 of the 9 tasks also did not receive any significantly higher ratings. The largest difference (1.18) was for the Force Mobility Task [Table D-12], and in favor of the alternative.

(c) The alternative was rated in a more consistent manner than was the base case. [Table D-15].

(2) Weightings

(a) Target Servicing, Force Mobility, and C^3/EW, in that order, received more than a proportionate share of the weightings provided by the survey respondents. Target Servicing exceeded the next higher weighted task, Force Mobility, by .0609 [Table D-11].

(b) TRADOC's "Central Battle" tasks received approximately 63% of the weighting; Force Generation tasks received approximately 37%.

(3) Comments. The paragraphs which follow are comments made by the primary group in the survey which

were considered by the study group to represent a consensus opinion or to be significant in nature. An anthology of all primary survey respondent comments is at Annex D-6. Comments similar to those below but specifically addressing Organizational Issues are in Chapter VI.

(a) The tactical doctrines at issue in the study do not represent two clear alternatives [Table D-14].

1 The alternative tactical doctrine is only a refinement of the base case.

2 They are not mutually exclusive and contain the same concepts; perhaps you have misinterpreted the base case.

3 The differences are cosmetic; in the packaging. The base case would benefit from the concise treatment given the alternative; reducing it to its basic elements for analysis. That would reduce the apparent differences between the two alternatives.

(b) A minority, 4 of 12 respondents, suggested that the two tactical doctrines were clear alternatives. They tended to contrast the firepower orientation of the base case with the maneuver oriented disruption scheme of the alternative. The alternative is similar to the German doctrine contained in HdV 100/100 which also is very different from the base case.

(c) The base case is better than the alternative because it tells the division commander how to fight

the battle in addition to what he must do to be successful.

(d) The base case is too closely tied to the European environment and is less suitable than the alternative for any other possible conflict.

(e) Both doctrines and the current U.S. Army approach to the European battle undervalue the importance of built-up urban areas and reforestation.

(f) The current doctrine does not, and the 1986 "heavy" division may not, have all the capabilities they will require, especially in terms of the Air Defense, C^3/EW, Logistical Support, and Reconstitution critical tasks.

(g) The critical tasks of the study (and Division 86) are not satisfactorily defined. Some tasks are subtasks of others; the subtasks of a few of the tasks are exactly the same; some tasks are redundant to others; and the accomplishment of some tasks may hinder the accomplishment of other tasks.

b. TRADOC Survey Group

(1) Performance Judgments

(a) The base case division was judged by the TRADOC survey group to have a significantly higher potential performance than the alternative division. The base case was rated as potentially providing superior performance while the potential performance of the alternative was

rated as inferior. The table below (Table IV-10) displays the study's criterion of choice, the weighted sum of the ratings by the TRADOC survey respondents of the potential performance of the divisions.

TABLE IV-10

DIVISION POTENTIAL PERFORMANCE - CRITERION OF CHOICE - SENIOR COMMANDERS TRADOC GROUP

DIVISION POTENTIAL PERFORMANCE CRITERION OF CHOICE	
BASE CASE	ALTERNATIVE
6.80	4.28

(b) The base case division was judged to have a significantly higher potential performance on 8 of the 9 critical tasks. It was judged to have a lower, but not significantly lower, potential performance for one task, Force Mobility [Table D-12].

(c) The alternative was rated in a more consistent manner than the base case [Table D-15].

(2) Weightings

(a) Target Servicing, Surveillance/Fusion, and Interdiction, in that order, received more than a

proportionate share of the weightings provided by the survey respondents. Target Servicing exceeded the next higher weighted task, Surveillance/Fusion by 1.67 [Table D-11].

(b) TRADOC's "Central Battle" tasks received approximately 63% of the weighting; "Force Generation" tasks received approximately 37%.

(3) Comments. The paragraphs which follow are of comments made by the TRADOC group in the survey which were considered by the study group to represent a consensus opinion or to be significant in nature. An anthology of all TRADOC survey respondent comments is at Annex D-7. Comments similar to those below specifically addressing Organizational Issues are in Chapter VI.

(a) The tactical doctrines at issue in the study represent two clear alternatives [Table D-14].

(b) The alternative is the better tactical doctrine; however, it is not realistic for Europe. The alternative would be what the U.S. Army should use in any other theater and in any other situation. In Europe, because of the political, geographic and military constraints (NATO/US lack of sufficient combat strength for offensive action and questionable resources even for the defense) the base case, a conservative response, is more appropriate.

(c) It is questionable if you have fully considered the impact that technology will have on the 1986 battlefield.

(d) The current doctrine does not, and the 1986 "heavy" division probably will not, have all the capabilities it will require especially in terms of the C^3/EW critical task.

c. "Interested Party" Survey Group

See Annex D-8.

4. Summary

a. Table IV-11 compares the potential performance capabilities of a "heavy" division using the U.S. tactical doctrine alternatives in terms of the study's Criterion of Choice. A significant difference was not identified by either the Army officer students at the NWC or by the senior commanders, suggesting no preference for either doctrine/division over the other doctrine/division. The alternative was evaluated slightly higher than the base case.

TABLE IV- 11

"HEAVY" DIVISION PERFORMANCE

SURVEY GROUP	U.S. TACTICAL DOCTRINE	
	BASE CASE	ALTERNATIVE
NWC STUDENTS	6.47	6.84
SENIOR COMMANDERS	6.03	6.04

b. The majority of the Army officer students at the NWC stated that two clear alternatives had been presented

(but this is not reflected in their group's evaluation). The majority of the senior commanders disagreed, stating that two clear alternatives had not been presented (this qualitative statement is accurately reflected in their quantitative evaluations).

c. Neither the NWC students nor the senior commanders identified a significant difference in the capability of a "heavy" division to perform any of the critical tasks using one tactical doctrine or the other.

d. The senior commanders did estimate that the "heavy" division may perform the C^3/EW critical task in an inferior manner using the alternative tactical doctrine although their rating for the base case was not significantly higher.

e. The NWC students estimated that a "heavy" division would perform the more important critical tasks ("their" more important tasks, i.e., Force Mobility, C^3/EW, Target Servicing, and Logistical Support) better when using the alternative tactical doctrine rather than the base case, but not significantly better. The senior commanders provided a similar combined rating for their more important tasks, i.e., Target Servicing, Force Mobility, and C^3/EW, but rated the base case higher for two of the three tasks.

f. Both groups estimated that a "heavy" division using the base case tactical doctrine would perform TRADOC's "Central Battle" tasks better compared to a division using

the alternative and reversed this judgment for TRADOC's "Force Generation" tasks. In neither instance was the difference in the performance capability estimate significant.

CHAPTER V

UNCERTAINTIES

1. Introduction

a. This study focuses on development of a tactical doctrine for the U.S. Army of 1986. It suggests that there is potential for improvement of battlefield performance through improvement of the current U.S. Army tactical doctrine. Such a study is inherently replete with uncertainty.

b. As a result of an investigation conducted during the formulation phase of the study, most of these uncertainties, as well as what were perceived as realities, were identified by the assumptions and constraints made for the study; but their potential impact was not addressed. Other uncertainties were identified as a result of the research, the war game, and the surveys conducted as part of the study.

c. Purpose. The purpose of this chapter is to identify the main areas of uncertainty of the study and in some cases to estimate their extent and implications.

d. Scope. Sensitivity analyses have not been conducted to identify the precise impact of the uncertainties. This chapter merely highlights what are perceived to be

those uncertainties which most affect the study and the subjective views of the researchers. The chapter is organized as follows:

(1) Conceptual Uncertainties

(2) Strategic Uncertainties

(3) Operational Uncertainties

(4) Environmental Uncertainties

(5) War Game.

2. Conceptual Uncertainties

a. Alternative Development

(1) Time constraints disallowed the testing of a host of alternative tactical solutions. It was a basic assumption of this study that a document incorporating what were perceived to be the best features of all the tactical doctrines investigated could be developed. Moreover, the document would be perceived by the survey respondents and others as a set of concepts distinct from those of the base case.

(2) The mixed and confusing set of responses received as answers, to the study's survey question addressing this issue, raises doubt concerning the correctness of the earlier view.

(3) Not only did the responses suggest that the respondents had difficulty differentiating between the base case doctrine's concepts and those of the alternative (which were deliberately stated in stark contrast to those of the base case), but the responses also raise the issue of whether there was a consensus opinion as to what constitutes the basic concepts of the base case.

b. Underlying Philosophy

In view of the above, concern must be expressed with regard to the "health" of the current U.S. Army tactical doctrine and for the successful development of a tactical doctrine for 1986. The most fundamental assumption of the study is that a tactical doctrine must have an underlying philosophical basis and a set of principles that can be understood and applied by leaders at all echelons of command. Additionally, these leaders must feel reasonably confident that adjacent, subordinate, and superior commanders are applying the same principles.

c. Applicability to Other Theaters

This study assumed that any conclusions from the study should be applicable to any other theater where mechanized operations can be undertaken. The severe constraints imposed upon this study by the political and military realities of the European Theater recommend that caution be used

in applying the study's findings. As Doughty suggests, the American system of policy making has always molded U.S. Army tactical doctrine in nearly a case by case (or war by war) manner focused on one particular theater. It seems unlikely that a set of U.S. tactical principles "tailorable" to any combat situation, and any war, can be produced unless this fundamental fact is faced and a solution for U.S. policy makers is developed.[1]

3. Strategic Uncertainties

These uncertainties pertain to the strategic conduct of a European war in 1986 between the forces of NATO and those of the Warsaw Pact, including the political and military constraints and limits of its battlefields.

a. Tactical and Theater Nuclear Forces (NATO and Warsaw Pact)

(1) This study was conducted under the assumption that nuclear weapons would not be used by either side. For this reason nuclear weapons play was omitted from the study's war game. Undoubtedly the use of tactical nuclear weapons would have a major impact on combat. Chapter I suggests that a tactical doctrine must apply equally, albeit with modification, to either the nuclear or conventional battlefield -- a fundamental concept in the change from the "Pentomic" to "Road" organization by the U.S. Army.

(2) Both tactical doctrines in this study require massing of forces in their operations, presenting potential nuclear targets: the base case to block the Soviet thrust, the alternative to force a penetration. The alternative may have an advantage because the duration of this concentration of force would probably be for a shorter period of time and because it probably would present its massed forces as a moving target, complicating the Soviet targeting problem.

b. Depth of the Battle Area. A respondent to the senior commander survey suggested an uncertainty previously considered only at the operational level in the study. The respondent asked that the researchers consider what would be the impact of opening up the battle, as suggested by the alternative doctrine, in view of the limited depth of the European battlefield and the close proximity of the industrial heartland of West Germany to the border areas. The impact of this issue at the division level is discussed in paragraph 4 as an operational uncertainty.

c. Forces/Resources Available

(1) A "partial Soviet mobilization" scenario was assumed in this study, and played in the war game, allowing sufficient time for NATO forces to occupy their initial defensive positions, to begin the reinforcement of tactical air forces, to mobilize combat support and combat service support units, and to begin mobilization of reserve forces.

(2) This assumption and the assumed strategic plan for the Warsaw Pact attack had several important effects upon the war game.

(a) The 8th MID had arrived in its defensive positions, with sufficient time to prepare for the battle, and did not have to fight a meeting engagement while moving to its positions.

(b) The 8th MID did not face a "full" Warsaw Pact army but rather one of only three divisions.[2]

(c) Neither side received reinforcements during the battle, nor were any likely for several days.

(3) These effects severely limit the usefulness of the study's war game results in addressing the question of how to deal with a Warsaw Pact attack at the strategic level. Chapter IV compares the battlefield effectiveness of the "heavy" division using the study's tactical doctrines at the operational Level(see paragraph 5 for additional war game limitations).
Obviously the presence of or the intervention by additional forces on either side may have altered the ability of the 8 MID to successfully conduct either type of tactical solution.

(4) The war game did, however, detect the presence of "attack windows" within the echeloned formation of the Warsaw Pact force which if properly used may

produce returns disproportionate to the costs. In all Games the Pact first echelon force was severely fatigued, had suffered moderate losses, and was moderately disorganized after its fight with the 8 MID's covering force units and initial contact with the 8 MID's Main Battle Area (MBA) units. The Games suggest, best illustrated in Game 2, that U.S. tactical planners should consider major counterattacks to completely destroy the cohesiveness of a Pact first echelon Army at this point in the battle. Even in Game 1, against the Soviet Breakthrough OM, despite its own tenuous situation, an 8 MID counterattack into the flank of the Soviet penetration, was producing significant results in terms of destroying the potential of the Soviet 1 GTA to continue its attack. Unfortunately, again, the impact of the presence of additional divisions within the Pact first echelon army is unknown. This issue should be the subject of further study.

(5) Related to the above is the clear failure of many survey respondents to catch the expanded sense of the study's definition of "Interdiction." Most saw it, as it is defined in Division 86, in the traditional air power or indirect fire sense. The study intended that this critical task's definition be broadened in scope to include attacks against enemy C^3 and support elements by ground maneuver units. The study's weighting schemes, MOP, and Criterion of Choice should be considered with this in mind.

d. Chemical and Biological Warfare. This study did not address the use of chemical or biological weapons, assuming that their use by the Warsaw Pact would be equally effective against a "heavy" division using either of the study tactical doctrines. As with nuclear weapons the alternative may have an advantage because of its implied mobility. This factor would make Pact targeting problems greater, and U.S. forces would spend less time in contaminated areas.

4. Operational Uncertainties

These uncertainties apply to the conduct of combat upon a NATO-Warsaw Pact battlefield. They are concerned with the application of combat power against a Warsaw Pact threat.

a. Offensive Operations/The Meeting Engagement

(1) Analysis during the formulation phase of the study suggested that there was little conceptual difference between the base case and the alternative tactical doctrines for the "heavy" division in terms of the offense. For this reason the study's war game played only a U.S. defensive scenario. As previously stated the scenario also provided sufficient time for the U.S. "heavy" division to deploy into its initial defensive position, thus an unexpected encounter (a "meeting engagement") by the division with Warsaw Pact forces was not played. This bias must be considered in reviewing the NWC Student Survey responses.

Note: The NWC Student Surveys did instruct their respondents to consider all possible tactical situations. However, the respondents, as game players, played only defense.

(2) The Senior Commander Survey did instruct its respondents to consider all possible tactical situations. Thus offensive operations and meeting engagements by the "heavy" division must be considered, unequivocally, implicit to their responses.

b. Penetration of the "Heavy" Division's Defense.

(1) The study assumed that a NATO division could not allow the penetration of its defense by a Warsaw Pact force of regimental or larger size. As a consequense a "porous defense" concept, which would allow a maximum economy of force for the preparation of large counterstrokes against Warsaw Pact C^3 and support elements was excluded from the alternative tactical doctrine. This assumption was made in consideration of a perception that such a penetration would constitute a grave risk for the continued cohesion of the defense. An additional consideration was suggested by a Senior Commander Survey respondent which confirmed the soundness of this view especially at the strategic level. The potential capture of NATO cities, regions, or key terrain by Pact forces precludes a "porous" defense or any other defense which trades significant space for tactical advantage.

(2) Game 1, however, suggests that the study's assumption may have been too restrictive. In this Game, the 8 MID's defense was penetrated by a threat force of greater than division size which had the potential

to attack and temporarily, at least, seize any one of several major objectives. At the same time, however, the threat C^3 and support elements needed to continue operations were being disrupted and destroyed by a counterattack force of the 8 MID. The issue, then, at the operational level may be one of the size of the force that can be allowed to penetrate while maintaining one's own ability of accomplishing the mission.

5. Environmental Uncertainties

These uncertainties pertain to the factors that constitute the environment of the 1986 "heavy" division, including terrain, weather, technology, and new weapon systems, training and personnel requirements and limits, organizations, and the threat.

a. Terrain and Weather

(1) The study's assumptions with regard to the factors of terrain and weather are in two forms. First, due to the instructions in the surveys, they were implicitly considered by the surveys' respondents. Second, the war game was played under conditions approximating those suggested by the latest TRADOC studies and tests. Most significant of these was an assumed combat differential advantage for the defender gained because of 1986 thermal technology and the need for and conduct of continuous combat operations made possible by the same technology.

(2) At the "micro-level" of the war game, neither German reforestation efforts or urban sprawl had

a noticeable effect whereas control of road nets was critical.

(3) On the other hand, one of the respondents of the Senior Commander Survey expressed concern for what he perceived to be the lack of consideration for these factors in U.S. Army weapon and support system and doctrinal development.

b. Technology and New Weapon Systems

(1) The study assumed that those weapon and support systems which are forecast for 1986 would in fact be incorporated into the combat, combat support, and combat service support formations of existing U.S. organizations. The war game "played" these systems. A like level of technology was assumed for the Warsaw Pact. The survey respondents were instructed to consider these new systems in their judgments. These assumptions produce a wide range of possible errors, highlighted by the pessimism of several survey respondents who questioned the capability of the U.S. Army's acquisition cycle to produce what has been promised.

(2) In this regard the study assumed, as a constraint in its development of an alternative tactical doctrine, that a defensive concept that relies completely upon the deployment of extremely sophisticated weapon systems is not feasible.

c. Skill, Training and Leadership. The study made several assumptions with regard to the skill, training, and leadership of the soldiers of both sides. These factors were perceived to be compounded by the increasingly severe nature of the modern battlefield. Average commanders for both sides were played in the war game by selection of "average leader"game variables.

(1) It was assumed that combat (fighting, moving, or refitting/resupplying) will continue 24 hours a day,relatively unaffected by the conditions imposed by night or bad weather. As previously noted, the latest environmental estimates were assumed and used. The war game highlighted the fact that individual and unit fatigue may be more of a limiting factor than commonly perceived.

(2) The war game also highlighted the need for units to be prepared to operate autonomously because of tactical results or loss of C^3 due to EW.

(3) The study's research, the war game, and survey responses all suggest that success in avoiding individual and unit "paralysis", possible because of the physical and psychological impacts of likely high casualty and loss rates,will depend upon excellent individual and unit training and leadership; these factors together maintain the cohesiveness of small units.

d. Organizations. The study assumed that the current organizations of U.S. and Soviet units will be used in 1986. Organizational changes made to better implement a tactical doctrine would produce additional performance and effectiveness benefits. Soviet organizational improvements may reduce the battlefield performance and effectiveness of U.S. units; perhaps to different degrees depending on the tactical doctrine.

e. The Threat

(1) Air Superiority. The study assumed that neither NATO or Warsaw Pact ground forces will operate with absolute air superiority. This fact may be critical to both tactical doctrines, both of whom depend on information concerning threat forces and actions far behind the threat forward elements. The war game played a surveillance capability of the 1986 "heavy" division approximating that set by TRADOC as the Surveillance capability ideal for the 1986 "heavy" division. This assumption had a significant but non-differentiating impact on the effectiveness of a "heavy" division using either doctrine.

(2) C^3/EW. The study assumed that both sides will be capable of achieving, at times, a complete disruption of the opponent's communication and data nets, and that all forces will operate with some degraded communication

capabilities at all times. This assumption had a significant but non-differentiating impact upon "heavy" division effectiveness.

6. War Game Uncertainties

These uncertainties relate to the analytical and testing tools used in the study to measure the effectiveness of the "heavy" division. These uncertainties are listed below and serve as cautions against the unrestricted and careless use of the study's war game results.

a. War Game Scenario. See paragraph 3c.

b. Validity of the War Game Variables. The war game variables were those provided by SPI, modified in almost all cases by the researchers to fit their perceptions of the relative strengths and weaknesses of the U.S. and Soviet forces. Classified estimates of actual performance capabilities were not used to effect this modification.

c. Number of Iterations. Only 4 Games were played; one for each combination of U.S. tactical doctrine and Soviet OM.

d. Game Playing Skill. The war game players received what was judged by the researchers to be the minimum amount of training necessary to play the war game. Skill levels, displayed during the game, varied within player groups (within U.S. groups; within the Soviet players; and U.S. vis-a-vis Soviet players). Each Soviet player played against 3 different U.S. players thus having the opportunity

to develop additional game skill. Extreme cases of poor game play were rectified by the game referees, who sometimes inadvertantly provided tactical guidance.

e. Tactical Skill. The inherent background differences of the game players, were compounded by varying levels of understanding of the tactical doctrines.

f. Division Commander's Knowledge of the Situation. The game, unrealistically, provides the division commander with instant, perfect information concerning his units' locations and status.

g. Lack of Command Influence. Except for the division commander, the impact of unit leaders upon the effectiveness and performance of their units was not played.

CHAPTER VI

ORGANIZATIONAL ISSUES

1. Introduction

a. The organization and equipment of an army generally corresponds to an underlying philosophy of how that army envisages fighting its adversaries. Doughty points out that, "Doctrine...assists in the development of organization and weapon systems, for it establishes the potential functions of the various systems and the parameters under which units are organized."[1] TRADOC's Division 86 is a perfect example of this relationship. The Division 86 terms "Central Battle" and "Force Generation" not only serve as functional area descriptive designations but also serve to delimit the battlefield in terms of the U.S. Army's doctrine.

b. The present study focuses on tactical doctrine by fixing all other combat performance and effectiveness variables such as quality of personnel, training, materiel development, and organizational issues. The study acknowledges that its ability to separate tactical doctrine from these other variables is questionable.

c. The study assumes that the current organization of the U.S. Army's "heavy" division will be used in 1986. The division variants used are organized following the current H-series Tables of Organization and Equipment (TO&E), modified to reflect new or improved systems available to the

Army in 1986 and organizational adjustments where units have been added to the division to incorporate these systems.

d. Organizational issues have been identified throughout the conduct of the study. Suggested by research, the war game, and the survey responses, these issues are reported as potential sources for increasing the effectiveness of the "heavy" division. Raising these issues might lead to organizational changes which could provide benefits over and above any improved battlefield performance for the 1986 division resulting from improved tactical doctrine.

e. The remainder of this chapter comprises the organizational issues identified during the study, in some instances providing tentative conclusions or recommendations regarding the impact of the issue or the value of possible actions taken in response. The issues are categorized according to whether or not they are independent of the tactical doctrines examined by the study and are collected under six general topics: Command and Control; Task Organization; Combat Support and Combat Service Support; Reconstitution; Helicopter Employment; and New System Employment.

2. Command and Control Issues

Several issues identified in the study relate to coordination between divisional units and headquarters, corps and higher headquarters, and other service staffs and resources.

a. Implicit in the alternative tactical doctrine is the principle of a "unified concept of operation" for all levels of command, "decentralized for execution." Without such a philosophy, operations using the alternative tactical doctrine would be difficult to control.

b. Efficient "Combat Information and Intelligence" processing and dissemination are essential for both alternatives. The base case needs less refined information than the alternative, but it must have the data in a more timely manner, earlier during a battle.

c. The use of Army assets, for example attack helicopters, in an interdiction role will require close coordination with USAF elements during a battle. This latter employment, because it might be seen as a violation of a traditional USAF role, could lead to dysfunctional interservice competition for Research and Development (R&D) resources.

d. Similarly the proposed use of attack helicopters in an anti-helicopter air-defense role (see Para. 6) would require close coordination with both the USAF and Army air-defense units. The potential blurring of service roles and missions could again, in this instance, cause dysfunctional competition. Additionally, this concept is but one example of the many potential competitors for airspace, vastly increasing the battlefield airspace control problem to be faced by joint control elements in 1986.

3. Task Organization Issues

For the purpose of improving battlefield performance, "good organizational structure" may be more important than tactical doctrine; flexible organizations might allow the commander to use whatever tactics he likes. An obvious counter argument suggests that the approach to war implicit in a tactical doctrine has an important impact upon what a "good" organization is, and that an effective organization can only be developed after the doctrine has been chosen.

a. In this context General Herman Balck, who commanded Panzer units from regimental to army size during World War II, stated in a recent interview: "I have always been a strong advocate of small divisions in order to gain maneuverability and mobility;"[2] implicitly arguing the WWII doctrine of Blitzkrieg, the elements of which are easily recognizable in the alternative tactical doctrine.

b. Another argument suggests that the organizational structure should be flexible enough to allow any tactical doctrine to be used depending upon the needs of the commander. This argument would rule out an organization such as that currently under study at the Combined Arms Center, Ft. Leavenworth. The Leavenworth study examines the feasibility of a "fixed brigade," that is a brigade to which battalions are permanently assigned.[3] While our study has found no conclusive evidence for or against such a unit, the war game provided ample illustration of the advantages

of being able to change battalion assignments from one brigade to another while playing either doctrine.

c. The war game suggested that there might be advantages to eliminating formal brigade assignments and using brigade headquarters elements as strictly temporary command and control (C^2) teams, flexible enough to coordinate any set of battalions within the division. Such a system could provide a solution to two current organizational problems: first, a lack of clear cut identification of a controlling headquarters for the covering force; and second, the number of command echelons through which information must be passed. On the other hand, brigade headquarters, as they are currently structured and trained, probably could not be sufficiently flexible. Additionally, in fluid battles with discontinuous battle lines, the transfer of battalions from one headquarters to another will be more difficult if not impossible. Aside from considerations of requirements for control of advanced technology weapons and C^2 in general, the difficulty in transferring battalions and combat support and combat service support assets from one brigade to another is one of the considerations for developing the fixed brigade (see Note 3).

d. Another issue related to task organization is brought out by further comments by General Balck with regard to the size of the division:

> The most important reason for keeping divisions small is to make it possible for average officers to lead them swiftly and flexibly.... Actually Guderian was a strong advocate of the big division, surprisingly enough. He liked divisions like the Gross Deutschland Division. That division was so big and fat that you could split it in two, and you would have two divisions, each of which would be fat enough by itself. Now a man like Guderian could lead such a large division. But the average commander...has to be able to command the organization--that's the real problem.[4]

4. Combat Support and Combat Service Support

One of the key roles played by the division commander is the timely and adequate provision of combat support and combat service support to the maneuver battalions. In this regard it is questionable whether the intelligence, C^3/EW, close air support, indirect fire, air-defense, maintenance, and supply systems now in being or in development for the 1986 division will be capable of adequately supporting a division using the tactical doctrine for which the division is designed, let alone one operating under a different tactical doctrine--the alternative.

It has been suggested throughout the responses to our surveys that the U.S. Army's air-defense, C^3/EW, and logistics support are and will continue to be inadequate for the more conservative base case tactical doctrine. The alternative, which would impose more demanding support requirements because of its deep maneuver orientation, is, at the

same time, more dependent upon these assets. Historical examples of the critical nature of this support are evident in German WWII operations.[5] A more modern example of the critical nature of this support is the Egyptian experience in the Sinai in 1973; when their offensive moved out from under its air-defense missile umbrella, the results were disastrous.

A key issue is whether and for how long the 1986 division can provide for and support itself, especially using the alternative tactical doctrine. Aerial resupply using STOL and Rotary Wing aircraft for the resupply of POL and Ammunition for both alternatives, and the use of prepositioned caches for the base case, will help. An additional factor militating against the feasibility of the alternative tactical doctrine is the questionable ability to forecast logistical requirements. The base case has this problem too, as Chapter II points out, but to a lesser degree.

5. Reconstitution Issues

Two issues are related to activities associated with the division's ability to continuously regenerate its combat force and provide the material required for its operation, independent of the tactical doctrine.

a. The division commander will be faced continually with difficult decisions with regard to the resources available. Should he keep them for the immediate provisioning of forces in contact or hold these resources for

future operational necessity? Guidelines or formulas to aid this decisionmaking do not exist.

b. Current U.S. Army policy calls for individual replacements rather than unit replacement. Under either alternative the replacement of units seems called for in order to meet 1986 battlefield requirements and constraints. A replacement policy using battalions might greatly facilitate the POMCUS concept of immediate reinforcement in the event of a "no-warning" attack.

6. Helicopter Employment

a. Neither the roles and usefulness of Army Aviation, especially attack helicopters, nor the types of helicopters required for 1986 have been established with any real confidence.

b. Responses to the survey suggest that they can serve several purposes: as a fourth "brigade-sized" maneuver unit (6 ACCB) of the division, engaging either first or second echelon units of the threat force; as an additional asset for divisional air-defense against threat Attack helicopters; as highly mobile command and control vehicles; and as responsive, long-legged supply and transportation vehicles.

7. New Systems Issues

1986 is the target date for which the majority of the many new or improved weapons and support systems for the

U.S. Army are to be available for units. Most of these systems reflect the continuing trend towards increasing firepower, especially long-range precision firepower, and decreasing combat manpower.

a. It now seems questionable whether the U.S. Army's development, testing, training, and fielding process can successfully and fully integrate all the new systems between now and 1986.

b. Recent trends in U.S. Army small unit organizations, trends which are more pronounced in other NATO armies, which include size reductions, removal of support elements, and a tendency toward specialization of weapon type within the small unit in an effort to increase "target-servicing rates" focuses too narrowly on the defense as presented in the base case. None of the trends appear to reflect any organizational capabilities for offensive action, even within an overall concept of strategic defense. For example, although much progress is being made in the development of countermobility systems and techniques, almost no attention has been paid to breaching obstacles when attacking.

8. Conclusion

Obviously the study has raised no "new" issues. This chapter exists solely to reiterate the need for directed study and perhaps to emphasize some of

the very visible problems in these areas. They are not likely to go away soon no matter what our tactical doctrine; there is ample evidence for this in the responses to our surveys.

CHAPTER VII

CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

1. Purpose. The purpose of this chapter is to present the conclusions and recommendations of this study.

2. Scope. The intent of the study is to assist the evolution of an operational concept for use by the U.S. Army against the Warsaw Pact threat. Toward achieving this goal, the study developed an alternative tactical doctrine and compared it to the current tactical doctrine (the base case) to determine if there is potential for improvement of battlefield performance and effectiveness through improvement of tactical doctrine. The study uses the 1986 "heavy" division as its paradigm. The conclusions and recommendations that follow are the results of the comparison and other analyses conducted during the study.

PART I - CONCLUSIONS

1. "Heavy" Division Performance and Effectiveness. There is potential for improvement of the battlefield performance and effectiveness of the 1986 "heavy" division through improvement of its tactical doctrine.

a. The study has developed a set of tactical concepts (the alternative tactical doctrine) which when added to

those of the base case would improve the battlefield performance and effectiveness of the "heavy" division.

(1) Both doctrines were found to be advantageous to the "heavy" division's battlefield effectiveness, depending on which Soviet OM was played, during the limited war gaming conducted as part of the study.

(2) Both doctrines were found to be advantageous to the "heavy" division's battlefield performance as measured by the opinion surveys of U.S. Army officers conducted as part of the study.

b. Neither of the tactical doctrines evaluated in the study is a "preferred" alternative.

(1) The study failed to differentiate between the two doctrines by means of the study's Criterion of Choice.

(2) Both doctrines entail risk but not without compensation.

(3) Neither doctrine, if used exclusively, promises much in the way of enabling the "heavy" division to deal with the "follow-on" echelons of a Warsaw Pact attack, after defeating its first echelon, without significant reconstitution.

2. Current Doctrine - Foundation

a. The current U.S. Army tactical doctrine may not presently provide an underlying philosophical basis and set of principles that can be understood and applied by leaders

at all levels of command with confidence that adjacent, subordinate, and superior commanders are applying the same principles.

a. Not only did the study's surveys suggest that U.S. Army officers at the battalion, brigade, division, and corps level had difficulty differentiating between the base case doctrine's concepts and those of the alternative, but also that there was not a consensus among these officers as to what comprised the basic concepts of the current doctrine.

b. Although it is possible that the alternative as written does not articulate its concepts sufficiently well, key survey responses, i.e., the TRADOC Group's response, and the understanding of the basic conceptual difference between the doctrines apparent in the responses of members of the Primary Group and Naval War College (NWC) Student Groups, indicate that the opposite is true.

(1) As previously noted in the study's "offensive exclusion," the alternative as written is not significantly different from the base case in terms of offensive operations. On the other hand, the study group had deliberately stated the alternative's defensive concepts in terms that would draw a sharp contrast with the defensive concepts of the base case.

(2) The following paragraphs highlight what were perceived by the study group and many of the survey respondents

to be the most significant, gross difference between the defensive concepts of the alternative and the defensive concepts of the base case doctrine.

(a) Maneuver, Surveillance, and the "Defeat Mechanism"

1 The base case requires the maneuver of the majority of one's forces to positions in depth blocking the enemy's main effort(s). The base case requires the collection of data (combat information and intelligence) of sufficient resolution only to identify the enemy's likely axis (axes) of advance early enough in the battle to complete this movement. Once blocked the enemy force is to be annihilated by firepower, in a piecemeal manner, taking advantage of its echeloned formation.

2 In contrast when using the alternative tactical doctrine one initially moves only sufficient forces to contain the enemy's main effort(s). Like the base case, the alternative needs data concerning the enemy's likely axis (axes) of advance, but this information is of a different nature and for a different purpose than that required and collected by the base case.

a More detailed (higher resolution) information is required in order to locate the creases and seams in the enemy formations and its C^3, combat support, and combat service support elements; but not as early in the battle. It looks for weaknesses rather than strengths.

b When using the alternative one seeks to avoid the mass of the enemy's combat power to conserve one's own combat power which is used in counter-attacks aimed at the enemy's C^3 and support elements.

3 When using the alternative one attempts to offer the enemy force an "apparently easy" axis, playing to the enemy's doctrine; an axis which is actually more advantageous to the purposes of the defense. Once the enemy has been channelled the counterattack(s) is launched into his flank or rear where destruction of the C^3 and support elements disrupts his attack and renders his force ineffective.[1]

4 The alternative doctrine seeks to take advantage of two apparent Warsaw Pact weaknesses: centralized control of operations, reflecting rigidly centralized decisionmaking, which requires adherence to preconceived, time critical plans; and the presence of numerous "soft" targets between combat echelons without which the preconceived plans become even more inflexible and more time constrained.

(b) Tactical Initiative. The base case, because of its reactive nature, appears to cede the tactical initiative, while the alternative seeks to shape and control the battlefield.

(c) Aggressiveness. The base case limits the scope of its counterattacks; they are limited in duration

and distance and are to be considered only when key terrain must be taken to maintain the defense or when an opportunity to destroy enemy combat forces, out of all proportion to potential losses, exists. For the alternative the defense exists primarily to mount disruptive counterattacks. In certain sectors units may be using what appears to be the base case concept; the overall OM is, however, offensive in nature.

(d) Risk. Units using the base case risk the loss of their combat power in battles of attrition, without a reserve if they fail. The alternative which requires, and thus allows, a deeper enemy penetration into the battle area risks a "piercing of the bottom of the bag," freeing major enemy forces to secure political or strategic objectives. Both require significant economy of force measures

c. It was suggested by several survey respondents that the base case, provided as it is in a series of FMs, delineates not only general tactical concepts but also specific methods and techniques; whereas the alternative, at this stage of its development, provides only the former.

(1) This perception may be an additional explanation for the study's survey results. The wealth of information provided in the "How to Fight" series of FMs may obscure the philosophic basis and basic concepts of the current tactical doctrine.

(2) It also provides guidance for U.S. Army doctrinal development. If no other action results from this study the base case doctrine should be reduced to its basic elements and analyzed. The basic elements of the doctrine should then be published as a separate document.

3. Current Doctrine - Universality. The current tactical doctrine does not provide the universality required of an ideal tactical doctrine; the alternative is better in this regard.

a. Although the "How to Fight" series of field manuals (FMs) will, when published, address the complete spectrum of potential U.S. Army battlefields, its capstone manual, FM 100-5, Operations, which contains the base case doctrine's philosophical basis and its basic principles, is focused mainly on the defense and on the European battlefield. The alternative was not written oriented towards any particular mission.

b. Doughty suggests that the current tactical doctrine is not an aberration but rather the latest example of U.S. Army tactical doctrine, whose development has historically been constrained and focused by strategic and political goals to one specific theater.[2]

4. Current Tactical Doctrine - Realism. The current tactical doctrine may be a more realistic solution to the European battlefield whose limited depth may preclude a more aggressive solution.

a. The higher the level of command that would execute the OMs suggested by the alternative tactical doctrine, the greater the potential success that may be achievable. The risk of losing strategically or politically important cities, regions, or terrain, however, may preclude such a solution.

b. Even at the division level, as indicated by the study's war game, use of the alternative tactical doctrine may result in penetrations by large size threat units.

5. Attack Windows. There may be "attack windows," i.e., opportunities and points in time available when a defending force can successfully counterattack, within the echeloned formation of a Warsaw Pact attack force.

a. Execution of such a counterattack may result in benefits disproportionate to the costs involved, possibly resulting in the complete disruption of the Warsaw Pact force's attack.

b. These "attack windows" must be planned for and may be difficult to recognize. Execution of the counterattack(s) must be prompt and decisive. The implications for the "heavy" division's Surveillance/Fusion and C^3 capabilities are significant.

(1) Indicators of the "attack windows" must be identified and acted upon as a result of the division's data collection, data processing, and decision activities.

(2) Potential indicators suggested by the study's limited war gaming include:

(a) Hasty defense postures by a large number of the enemy's first echelon regiments' first echelon battalions.

(b) The presence of a large number of the enemy's first echelon regiments' second echelon battalions mixed with first echelon battalions.

(c) Unusual or congested positioning of the enemy's first echelon regiments' headquarters and support elements.

(d) The presence of the enemy's second echelon regiments' battalions immediately behind or mixed with the first echelon regiments.

(e) Unusual or congested positioning of the enemy's second echelon regiments' and or divisional headquarters and support elements.

(3) Key data which must be collected and processed quickly include: enemy unit types; enemy unit designations; enemy losses; headquarters and support element locations and status; and the "tempo" (aggressiveness and effectiveness) of enemy attacks.

c. The "attack windows" occurred in the study's war game after the Warsaw Pact first echelon army had fought its way through the defender's covering force and had begun to engage Main Battle Area (MBA) units. By this time in

the battle the majority of the Warsaw Pact force (its first echelon division) was fatigued, disorganized, and had suffered moderate losses. Most of the defending force was unfatigued, had not suffered any significant losses (except for the elements of the covering force), and were fully prepared for combat.

d. Unfortunately the Warsaw Pact force played in the war game did not have what would be considered its normal complement of second echelon divisions.

6. The 1986 Battlefield. The 1986 battlefield will not only be characterized by its extreme lethality but also by the severe physical, intellectual, and psychological demands it will impose upon units and individuals.

a. Fatigue, mental and physical, of individuals and units is a factor which must receive increased attention by the U.S. Army.

b. The mixing of units, friendly and enemy, and the impact of EW, requires forces which are prepared to fight autonomously; what size unit is not clear. These requirements have leadership, training, organizational, communication, logistical support, and acquisition process implications for the U.S. Army's operational concept for the 1986 "heavy" division as well as other types of U.S. ground forces. A key to success on the 1986 battlefield may be in the ability of small units to maintain their cohesiveness.

7. Doctrine Development. U.S. tactical doctrine cannot be improved, either by incorporating the alternative of this study or by merely expanding the scope of the current doctrine's counterattack guidelines to take advantage of the suggested "attack windows," in isolation from U.S. Army training, development, and personnel actions.

a. The interrelationship is evident, e.g., Division 86.

b. It has historically been a factor in U.S. Army doctrinal development.

c. The philosophical basis of the tactical doctrine must be reflected in all other facets of the Army's efforts.

d. The basic concepts of the tactical doctrine must be matched by the proper tools, skills, and soldiers.

PART II - RECOMMENDATIONS

1. U.S. Army Tactical Doctrine - 1986. The U.S. Army's tactical doctrine for the battlefields of 1986 and beyond should be developed by modifying the current tactical doctrine along the following lines.

a. A field manual should be developed which explicitly and clearly delineates the philosophical basis and basic concepts of the doctrine. These core elements should be universal in nature, not tied to any particular theater or type of operation, and not obscured by any other information.

(1) The alternative developed by the study group and evaluated in this study is suggested as a prototype of this field manual. The base case, reduced to its basic elements, is another.[3]

(2) These basic principles should be instilled into the thinking of all members of the U.S. Army.

b. A field manual should be developed which explicitly and clearly delineates a set of Operational Methods (OM) derived from these principles, available and used to meet the demands of a particular tactical situation.

(1) The defensive tactical concepts (the "active defense") of the base case should be retained but as an integral part of the subsuming defensive OM suggested by the alternative.

(2) All U.S. Army members should be trained in the execution of these OM and to recognize the tactical situation for which a particular OM is best suited.

c. All other field manuals of the U.S. Army should be modified to include the essence of the doctrine's philosophical basis and basic principles.

2. Division 86 and the Battlefield Development Plan (BDP)

a. TRADOC's Division 86 and Battlfield Development Plan (BDP), as the mechanisms which guide and control U.S. Army training, development, and personnel processes, should be modified to reflect the above change in focus and scope of U.S. tactical doctrine along the lines suggested by this study. (See paragraphs below and Appendix A.)

(1) The critical tasks of Division 86 and the BDP, and the concept of categorization into "Central Battle" and "Force Generation" groups of tasks, are too closely related to the defensive concepts of the base case and its approach to the battlefield.

(2) A critical task should be added, and all others modified, addressing the requirement of preparing the battlefield as the first step in gaining the tactical initiative.

b. If necessary the use of priorities within these processes should serve as the mechanism by which the guidance of U.S. national policy makers is met. The U.S. Army's tactical doctrine should not be so constrained.

3. Further Research. The following issues and questions should be the subject of additional research.

a. The base case doctrine should be reduced to its basic elements and analyzed by an unbiased study group and compared to the alternative doctrine. This study would lead naturally to a first draft of the field manual recommended in paragraph 1a.

b. The OMs suggested by the base case and the alternative should be subjected to additional analysis and testing to determine the battlefield situations to which each best apply and how they can best complement each other. Key issues include:

(1) Offensive operations.

(2) Meeting Engagements.

(3) The presence of additional forces (both sides) on the battlefield.

(4) The impact of the "follow-on" echelons of a Warsaw Pact attack.

This study would lead naturally to a first draft of the field manual recommended in paragraph 1b.

c. The "attack window" findings of this study should be addressed by further study. Key questions relate to:

(1) The impact of fighting a complete Warsaw Pact 1st echelon army.

(2) The battlefield indicators which suggest that a "window" has in fact opened.

(3) The duration of the "window;" both how quickly a force must react and how long it has before "follow-on" echelons intervene.

(4) The Surveillance/Fusion and C^3 capabilities (data gathering, data processing, and decisionmaking requirements) required to implement the concept.

d. The war game used in this study would be an excellent tool for use in any of the above studies. Improvements to the war game (or the way it was used in this study) include:

(1) Computer assistance to perform the housekeeping, bookkeeping, and computational chores. Computer

assistance would significantly improve the relatively poor game time to real time ratio experienced in this study.

(2) The use of classified performance data, rather than subjective estimates, to estimate the game variables would increase the validity of its results.

(3) More iterations of longer duration.

(4) The incorporation of additional game modules, feasible with computer assistance, e.g., SMOKE or Air Defense, which would increase the realism of the war game.

e. The weapon system, leadership, training, organizational, communications, personnel, logistical support, and acquisition cycle implication of the 1986 battlefield suggested in the study would each be the subject of profitable research.[4] Key issues include:

(1) The role and capabilities of the helicopter.

(2) Unit versus individual replacement.

(3) The absence of new weapon systems now in development.

(4) The ability of small units to operate autonomously; and at what level they should be provided the capability to do so.

f. The principles, concepts, and OM which result from the above should be translated into more realistic testing, e.g., tactical field experiments.

NOTES

Executive Summary

1. This study was not able to determine with any confidence which alternative doctrine has the best philosophy, or even if the study group's perception of these doctrines as "fire-power based, force destruction" (base case) or "maneuver-based, force disruption" (alternative) is accurate.

2. The study group would like to specially acknowledge Mr. James Dunnigan, President of Simulations Publications Incorporated and the designer of NATO Division Commander. His assistance was invaluable in conducting this study.

Chapter I

1. Phillip A. Karber, from unpublished manuscript material for TRADOC's update of the BDP, p. 25.

2. Cecil M. Minich, "The Ultimate Deterrent," Military Review, LIX, 1, January 1979, p. 65-66.

3. Robert A. Doughty, from unpublished final draft of work in progress, "The Evolution of U.S. Army Tactical Doctrine, 1946-1976," Ft. Leavenworth KS: Combat Studies Institute, CGSC, 1979, p. 83.

4. Felix C. Banis, Modeling of the "Non-Integral" FEBA, Monterey, CA: Naval Post Graduate School, 1977, p. 39-40.

5. This reinforced squadron is not a part of the division; rather it is part of the Corps screening force which happens to be in the division sector. The U.S. division commander, the war game player, was given specific limits to his operational control of this squadron. The 8th Division is on its own in this scenario.

6. The requirement for a "forward defense" results from an interaction of the American political and military system, political realities within the NATO Alliance, and persuasive tactical considerations. For an excellent discussion of this problem see General William E. Depuy, USA Ret., "Technology and Tactics in Defense of Europe," ARMY, April 1979, p. 14-23.

Chapter II

1. For an excellent account of the history of U.S. Army doctrine, see Doughty, "The Evolution of U.S. Army Tactical Doctrine, 1946--1976." See Note 3, Chap. I.

2. General William E. Depuy, "Are We Ready for the Future?" Army, Vol. 28, No. 9, September 1987, p. 24.

3. Doughty, p. 98.

Chapter III

1. Much of the "Threat" information used in this study comes directly from FM 71-100 and other TRADOC unclassified sources. That this is so is a tribute to TRADOC's efforts to educate the Army concerning the Threat. FM 71-100's Threat Chapter is a superbly concise rendering of our potential enemy.

Chapter IV

1. The use of the term fatigue or fatigue level throughout the study refers to a variable of the war game, used to simulate a degree of physical or mental weariness that a unit experiences as a result of battlefield activity. The variable has four levels (Fatigue Level 0 through Fatigue Level 3) simulating a fresh unit or headquarters to an exhausted unit or headquarters. A unit's fatigue level in the game, as on the real battlefield, is a factor which impacts upon its ability to perform an activity during combat (fighting, support, C^2, organizing, etc.).

2. "T/O" is the game variable used to simulate the personnel and equipment strength of maneuver, support, and headquarters units. At the beginning of a game, all units have a T/O of 6; all headquarters and support units have a T/O of 0. A unit's T/O is reduced as the result of combat or excessive fatigue. A unit which falls below a T/O of 0 is considered to have been eliminated.

Chapter V

1. Doughty, p. 93.

2. A Soviet army comprises three to five divisions and the administrative and support troops for non-combat functions. While most armies have four divisions, the 1st Guard Tank Army has five. See Wiener, p. 60-62.

Chapter VI

1. Doughty, p. 2.

2. General Hermann Balck. In a translation of a taped interview, 12 Jan 1979, p. 37. Prepared by Battelle Columbus Laboratories, Columbus Ohio.

3. The idea for a "fixed-brigade" is not a new idea. A "mini-division" would parallel developments in other NATO armies, would fall in line with increasing recognition of C^3 problems on the battlefield, and would increase the capability of units actually doing the fighting to provide limited support to its units even cut off from its parent (divisional) headquarters. A "fixed-brigade" could allow the developopment of greater unit cohesion. A "fixed-brigade" might make current REFORGER and POMCUS reinforcement plans more effective and less difficult in the first few days of combat. A "fixed-brigade", already task organized with combined arms task forces rather than pure battalions, could greatly increase the capability of smaller unit staffs and commanders to employ combined arms in combat.

4. Balck. pp. 37, 42-3. As an added note, the same reasoning could be applied to a tactical doctrine. The doctrine must be understandable and usable by average commanders and staffs; it should not require genius to implement. Similarly, it should provide for simple, direct operations which can be controlled. An informal seminar held at Ft. Leavenworth during the conduct of our study, the subject of which was the two contending tactical alternatives, saw some pertinent comments made. A CGSC faculty member suggested that the "active defense" taught at the CGSC was different from what is in the FMs, that the "active defense" is flexible enough to embrace a broad range of possible allocations of forces and their use. He suggested, and several students echoed the notion, that very few officers "really understand" FM 100-5 or the "active defense," nor would very many be able to implement its concepts.

5. In DuPuy's A Genius for War, Prentice-Hall, 1977, p. 267, there is a reasonably concise description of the use of support in mobile operations:

> The German doctrine...emphasized the principle of mass by means of tanks in armored divisions, and the massing of armored divisions into corps and groups. Infantry and artillery closely supported the tanks, with the artillery often right behind the line of contact, firing over open sights. Light armored ground forces and air observation units were integrated into reconnaissance teams to support each

army group. Engineers were readily available for mining and stream crossings. Anti-aircraft [sic] was well forward and successfully protected river crossing sites and chokepoints from Allied air attacks. [The classic example occurred at Sedan in 1940 during Guderian's attack across the Meuse.] The availability of 88mm anti-aircraft guns was frequently useful against the most heavily armored Allied tanks [or against bunkers, as Guderian used them crossing the Meuse].

In Lucas' Panzer Army Africa, Presidio, 1978, p. 28, there is a discussion of the use of SIGINT and conventional reconnaissance:

> In North Africa reconnaissance was of the pattern common on European battlefields, and in the early months Panzer II vehicles were used to screen the front and flanks of a battle formation. These lightly armored and undergunned, obsolete vehicles were pushed forward of the main body about eight miles, that is up to the extreme range of their wireless sets. Up with the forward reconnaissance detachments was a small but highly specialized group whose task was to listen to wireless messages which passed between the British armor and its commanders, and to lay this intelligence before the divisional commander so that the direction and size of British thrusts could be countered.

Liddell Hart's The German Generals Talk, Morrow, 1948, p.95-96, quotes Von Thoma's assertions concerning the main reasons for early successes with armored formations:

> ...the fact that the armored division itself carried enough petrol for 150-200 kilometers--supplemented, if necessary, with the supply of petrol dropped in containers by parachute...carrying rations for 3 days in the tanks, for 3 more days in the regimental supply columns, and 3 more days in the divisional supply column.

Returning to DuPuy, p. 257, with respect to the German WWII methods:

> A well prepared, flexible cross-country logistics system kept a steady supply of fuel, ammunition, and food moving up to join the onrushing spearheads.

A lack of SIGINT/OPSEC (as in the case of ULTRA), of adequate air-defense (as in the attempt to counter the Normandy beachhead with massed armor) and a shortage of fuel and ammunition (as in North Africa) often thwarted potential successes.

Chapter VII

1. That these attacks can be made is shown in at least two studies other than this one. In war game/simulations done at Ft. Leavenworth, attacks between echelons were successfully carried out, given that the second echelon could be delayed. In a number of iterations of the simulation TACEUR, owned by BDM Corporation, both counterattacks to reestablish the defense and the more ambitious counterattacks were successful. As senior defense analyst Phillip Karber pointed out in his survey response: "...larger brigade sized counterattacks, with battalion operations off the main thrust, into the weak shoulder of a red force penetration, if carried off with audacity, had a positive impact out of all proportion to the effort and losses required to conduct them." Note: The intent of this comment in the survey was verified in a telephone conversation with Mr. Karber.

2. Doughty, p. 92.

3. This study was not able to determine, with certainty, which doctrine has the best philosophical basis and set of basic concepts; or even, in fact, if the study group's perception of the existence of two different approaches, i.e., "maneuver based, force disruption" (the alternative) vs. "firepower based, force destruction" (the base case) was correct.

4. See Chapter VI for a detailed discussion of these issues.

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This study attempts to isolate tactical doctrine as it contributes to the battlefield performance of the U.S. "heavy" division. Using a systems approach, the study evaluates identical divisions as they operate in a 1986 European battlefield environment against a Warsaw Pact force. The variable within each system is the tactical doctrine used by the division. Two tactical doctrines are tested. The first, the "base case," is the current

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doctrine out of "How to Fight" series of Field Manuals, most particularly FM100-5 Operations and FM7-1000 Armored and Mechanized Division Operations. The second, the "alternative," is called "Mobile Operations" and represents the study group's synthesis of some of the best operational features of U.S., USSR, Israeli and German doctrines and their antecedents.

The study uses two testing devices: a war game, a significantly modified version of SPI's NATO Division Commander and two surveys. The study uses measures of performance and effectiveness derived from TRADOC's Division 86 and Battlefield Development Plan. The study provides conclusions and recommendations with respect to current doctrine, doctrine development, force development and modernization, and training development for 1986. While focused upon the European environment, the study's conclusions generally apply to all armored or mechanized operations.