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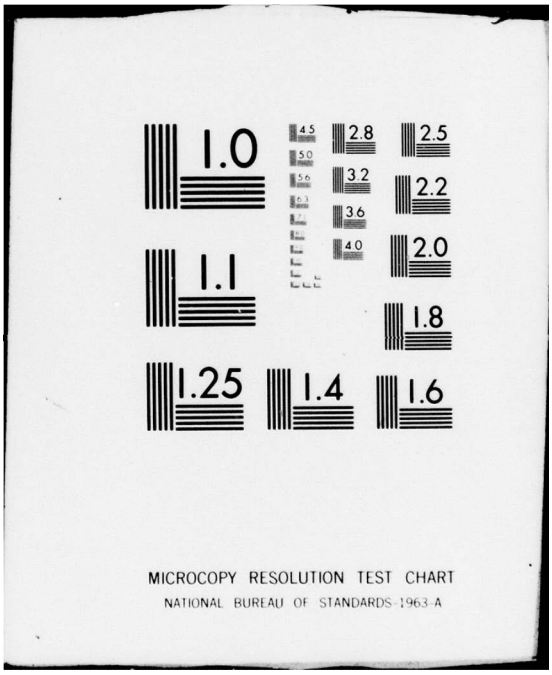
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MANEUVER AND FIRE SUPPORT STUDY (MANFIST).

VOLUME I. EXECUTIVE SUMMARY.

UNITED STATES ARMY
COMBINED ARMS CENTER

Ben Ward Harry Hillis

COMBINED ARMS
COMBAT DEVELOPMENTS ACTIVITY

COMBAT OPERATIONS ANALYSIS
DIRECTORATE

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UNITED STATES ARMY
TRAINING AND DOCTRINE COMMAND

MANEUVER AND FIRE SUPPORT SYSTEM (MANFIST)

VOLUME I

EXECUTIVE SUMMARY

ACN 52700

FINAL STUDY

December 1978

ACKNOWLEDGEMENT

This study was sponsored by Headquarters, Department of the Army (DAMO-RQA) and performed by the Combined Arms Combat Developments Activity (CACDA) at Fort Leavenworth, Kansas.

This report has been approved by the Deputy Commander of CACDA and CATRADA.

The conclusions and recommendations of this study are those of the Deputy Commander, CACDA and CATRADA, MG Louis C. Menetrey. They are based on data gathered and analyzed by the Combat Operations Analysis (COA) Directorate with support provided by the Force Structure and Design (FSD) Directorate of CACDA.

The CACDA study team included LTC Larry W. Padgett, FSD Project Leader and Mr. Benjamin Ward, COA Project Leader and the following team members: LTC Joe E. Outlaw, Dr. David Bash, Mr. John Hansen, Mr. Harry D. Hillis, Ms Martha Moody, and Mr. James M. Ross.

LTC Lawrence A. Singer, LTC William E. Ault, CPT Jack C. Binkley, and Mr. Ronald Magee comprised the gaming staff.

The authors of the report gratefully acknowledge the editorial work performed by Mrs. Elizabeth Etheridge.

CONTENTS

ABSTRACT

This document is the final report of the Maneuver and Fire Support (MANFIST) study.

The purpose of this study was to determine the more cost effective one-battalion add-on to the heavy division: an additional maneuver battalion or an additional field artillery battalion equivalent.

This study was conducted in response to OSD consolidated guidance and to provide information for formulation of the FY81-85 POM. A tradeoff evaluation, using TRADOC Standard Scenario Europe I, Sequence 2A (Short Warning) for combat developments, was conducted among force increments of field artillery, armor, and mechanized units. Assessments were made at the division level using heavy divisions to form the basis for the investigations. The study was limited to conventional warfare.

The Ground Combat Model (GCM) was used in conjunction with a map exercise for the purpose of evaluating the effectiveness of different force increments. Findings of this study were based on the analysis of the game results for each force alternative. Results indicate that the most promising alternative comprised a balanced mix of maneuver and artillery fire support.

EXECUTIVE SUMMARY

1. INTRODUCTION.

a. This two-volume report documents the accomplishments and findings of the Maneuver and Fire Support (MANFIST) study.

b. The study grew out of the need to investigate the payoff in combat effectiveness accruing from alternative maneuver and artillery fire support increments to a heavy division. Results of the study were expected to be used in formulating the OSD FY 81-85 POM.

c. The study was initiated in April 1978 by direction of Headquarters, Department of the Army. Due to the emergence of a large number of possible alternative force increments during the planning stage, the study approach included a candidate screening phase, which was designed to derive a manageable set of the most promising alternatives. This set was to be subjected to a detailed comparative evaluation via the high resolution Division War Game (DIVWAG) during the follow-on phase.

d. Results of the screening phase were favorably received by the Study Advisory Group (SAG) at a meeting on 6 September 1978. Due to the quantity and quality of the work performed, the SAG concluded that continuation of the MANFIST project into the follow-on phase, the detailed comparative evaluations, was not warranted. It was decided, therefore, that a report would be written documenting the study results and that outstanding MANFIST issues would be subsumed in the Division 86 study. Accordingly, this report documents the significant work performed prior to study termination: the development of equal cost candidates and the results of the candidate screening process.

2. PURPOSE.

The purpose of the study was to determine the more cost effective one-battalion add-on to a heavy division: an additional maneuver battalion equivalent or an additional field artillery battalion equivalent. The study responded to OSD consolidated guidance and will provide information for formulation of the FY 81-85 POM.

3. DISCUSSION.

a. Background. HQ, TRADOC recommended to DA that one field artillery battalion equivalent be added to the heavy division slice in the form of three GSRS batteries (LEGAL MIX V). The OSD FY 80-84 consolidated guidance directed the Army to plan for increasing the number of maneuver battalions in the heavy division from 11 to 12. This resulted in the need to resolve the following management issue: Given that resources are available to support a one-battalion increase in the heavy division, which is more cost effective, an additional maneuver battalion equivalent or an additional field artillery battalion equivalent.

b. Objectives.

(1) Establish equal cost alternatives in terms of dollars and/or personnel.

(2) Rank order the alternatives based on operational effectiveness.

(3) Recommend the preferred alternative based on operational effectiveness as tempered by military judgment.

c. Assumptions.

(1) Developmental materiel will be fielded as planned and will achieve expected performance characteristics.

(2) Personnel and funds will be available to support the increase in division strength.

(3) Neither threat nor friendly force will have unlimited air superiority; therefore, sorties can be flown by either, and either can attain local air superiority.

d. Methodology. As plans for conducting the study evolved it became apparent that a large number of alternative force increments were emerging as viable candidates for consideration. It was also apparent that a timely response to the study directive would permit a detailed investigation of only a few alternatives. To accommodate the requirement for timeliness without compromising quality, an approach was adopted to derive a manageable set of alternatives that could then be subjected to a detailed investigation. At the time of termination, the study had progressed through the screening phase, and the results achieved at this stage obviated implementation of the planned detailed analysis phase. Study methodology is depicted in figure 1 and summarized in the paragraphs below.

(1) Task 1, Assess modeling needs. The study required quantitative insights into differences in force effectiveness produced by the alternatives under consideration. To satisfy this requirement the modeling concept centered around the application of models for screening candidate alternatives, rounding out and costing the force alternatives, examining in depth the reduced set of alternatives in a combat simulation, and identifying the best combination of systems/units. The screening and combat models were subjectively examined to insure that they would provide consistent rankings of the alternatives. The modeling concept is summarized as follows.

(a) Screening model. A quick-running, deterministic computer model was used to conduct an analysis designed to isolate, for

in-depth analysis, the more promising candidate alternatives from among the many possible alternative force structures. The Ground Combat Model (GCM), developed by personnel of CACDA's Combat Operations Analysis (COA) Directorate, was used in conjunction with a division level map exercise as the screening mechanism. The process was refined during the assessment period by comparative runs based on the forces and scenarios used for the CARMONETTE model runs supporting the Division Restructuring Evaluation (DRE) battalion level analysis.

(b) Force roundout model. The support requirements for promising alternatives were to be determined by use of the Modular Force Planning System (MODFPS), which is maintained and operated by USAMSSA. Exploratory runs were made to validate the procedures for developing the support slice. The procedure envisioned was to conduct MODFPS runs to roundout forces for the base case and for the alternatives under investigation. The support slice for the alternatives is the difference in the total force results for the runs.

(c) Force costing model. Cost data for each alternative force design was developed by use of the Force Cost Information System (FCIS), which is also maintained and operated by USAMSSA.

(d) Detailed ground combat model. The study required the application of a simulation permitting an in-depth analysis of the screened alternatives, which generally comprised company or battalion size increments to a baseline division structure. Due to the need to consider the complex interactions of weapons, men, tactics, and environment in designing force structure alternatives, it was evident that a relatively high resolution approach was appropriate. Therefore, DIVWAG was to be used for the in depth analysis of alternatives that survived the screening process.

(2) Task 2, Develop candidate alternatives for screening. The starting point for this task was the FY 80 POM H-series TOE armored division, with two attack helicopter companies, upgraded with projected 1985-86 systems.

(3) Task 3, Review and update scenario. The standard scenarios for combat developments, Europe I, Sequence 2A (Short Warning) and a modified version of Europe II, were reviewed for situational and force structure inputs to the study. The Europe I, Sequence 2A (short warning) scenario was selected and updated to reflect 1985 systems.

(4) Task 4, Identify and collect data. Data required for the screening, simulation, and analysis tasks were identified based on model and analysis requirements. Data sources included TRADOC schools and centers, field tests, and completed studies.

(5) Task 5, Screen alternatives. The goal of this task was to reduce the set of possible alternatives to a manageable number for detailed investigation in a high resolution simulation. The screening was accomplished with the assistance of the model identified for that purpose by Task 1. The number of alternatives considered manageable was based on the high resolution combat model selected and the time schedule for study completion. DIVWAG survived the initial model search process as the prime candidate, which imposed a limitation on the number of alternatives that could be investigated in depth. A maximum number of three alternatives could be gamed under study time constraints.

(6) Task 6, Conduct high resolution simulation runs. Each alternative developed by Task 5 was to be examined in depth through simulation analysis. The output of this task was to be a rank-ordering of the alternatives in terms of their contribution to the overall effectiveness of the force. Additionally, it was expected that insights relative to the utilization of increased alternative division firepower and service support assets would be developed. DIVWAG was to be used to produce the effectiveness results.

e. Analysis.

(1) Cost analysis.

(a) Cost analysis for the MANFIST study satisfied two study requirements: the development of costs for force design alternatives formulated independently of cost constraints and the development of costs for use in structuring equal-cost alternatives.

(b) The approach consisted of developing maneuver and fire support modular TOEs to represent "building blocks" for use in structuring alternatives. The principal analytic tool used for this effort was the Force Cost Information System (FCIS). The system provided cost data based on the modified H-series TOE (designated C-series), which reflects the 1986 timeframe.

(2) Development of alternatives. The primary focus of the analysis effort was the assessment of the contribution to force effectiveness of alternative add-on maneuver and artillery fire support increments. The assessments were conducted with a computer-assisted map exercise.

(a) Map exercise. The map exercise was a two-sided, open game involving separate teams of Red and Blue players. Outcomes were derived from the computerized Ground Combat Model. Inputs consisted of tactics, weapon systems, force organizations, and weapon system characteristics.

(b) Scenario. The standard scenario for combat developments, Europe I, Sequence 2A (Short Warning) provided the scenario context for evaluating alternative force structures. The scenario was updated to reflect 1985 weapon systems.

(c) Alternatives considered.

1. The baseline force structure was the FY 80 POM H-series TOE armored division, with six tank battalions, five mechanized infantry battalions, two attack helicopter companies, three DS 155mm howitzer battalions (3x8) and one GS 8-inch howitzer battalion. Additionally, two 8-inch howitzer battalions in the artillery brigade associated with the division were considered as the division slice of corps assets. Weapon systems were included as projected for 1985-86 with the exception that GSRS was not included in the base case. Some relevant background information regarding the absence of GSRS is as follows: The LEGAL MIX V, Phase 3 study recommended a division artillery structure comprised of three 155mm 24-gun battalions and one 8-inch 12-gun battalion in the division supported by two 8-inch 12-gun battalions from corps. Within each of the three 8-inch battalions is a GSRS battery. As the 175 gun is phased out prior to IOC of the GSRS, some realignment of personnel spaces is involved, with an interim situation that resulted in three 155mm battalions and one 8-inch battalion in the division and three 8-inch battalions from corps. LEGAL MIX V, Phase 3, was approved by TRADOC, but GSRS was not included in the POM.

2. Alternative force design structures were made up of mixes of mechanized infantry, armor, and GSRS units. The 155mm field artillery system is not considered a variable in this study for the following reason: the 155mm as a direct support weapon system is normally assigned on the basis of one DS battalion per brigade. The division structure under investigation already included three DS battalions in support of three brigades. Therefore, the 8-inch/GSRS in general support or general support reinforcing was preferred as the artillery fire support variable. The specific alternatives considered in the gaming were as follows.

- o Base case plus two tank battalions.
- o Base case plus two mechanized infantry battalions.
- o Base case plus two general support rocket system (GSRS) battalion equivalents.
- o Base case plus GSRS battalion equivalent plus one tank battalion.
- o Base case plus one tank battalion.

o Base case plus one GSRS battalion equivalent.

f. Findings.

(1) The low resolution map exercise applied in the MANFIST study was an economical and responsive means of screening candidate alternatives to derive a manageable set for in-depth evaluation.

(2) The base case force did not prevent breakthrough by the threat force.

(3) The GSRS battalion equivalent provided the best overall loss exchange ratio but did not prevent breakthrough.

(4) A single maneuver battalion add-on was adequate to stop the threat.

(5) The GSRS/maneuver mix was the best two-battalion add-on.

(6) Differences in effectiveness between mechanized or tank add-ons were not conclusive.

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This document is the final report of the Maneuver and Fire Support Study. The purpose of this study was to determine the more cost effective one-battalion add-on to the heavy division: an additional maneuver battalion or an additional field artillery battalion equivalent. This study was conducted in response to ASD consolidated guidance and to provide information for formulation of the FY81-85 POM. A tradeoff evaluation, using TRADOC Standard Scenario Europe I, Seq 2A (Short Warning) for combat developments, was conducted among force increments of field artillery, armor, and mechanized units. Assessments were made at the

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