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**US ARMY
CONCEPTS
ANALYSIS
AGENCY**

**REPORT
OF
STEWARDSHIP
FY 84**

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8120 Woodmont Avenue
Bethesda, Maryland
December 1984

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Director
US Army Concepts Analysis Agency
ATTN: CSCA-MS
8120 Woodmont Avenue
Bethesda, MD 20814-2797



DEPARTMENT OF THE ARMY
US ARMY CONCEPTS ANALYSIS AGENCY
8120 WOODMONT AVENUE
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REPLY TO
ATTENTION OF

CSCA-MSM

SUBJECT: Report of Stewardship

1. Attached is the US Army Concepts Analysis Agency Report of Stewardship for fiscal year 1984. The report provides an assessment of major accomplishments made during the year and summaries of the analytical activities of the Agency.

2. The period covered by this report was characterized by improvements in CAA's ability to accomplish its primary mission of providing analytical support to Headquarters, Department of the Army. During FY 84, the Agency continued its efforts to improve the quality of its study products and to increase the number of studies completed in support of external sponsors--this despite the fact that a reduction in professional staff was imposed on the Agency. Additionally, improvements in staff skills, analysis models, facilities, and study program management were accomplished to enhance mission performance.

3. At the close of FY 84, Mr. David C. Hardison terminated his stewardship of CAA and departed government service. I assumed the stewardship responsibility from him at that time. During my tenure as Director, CAA, I will ensure that the best possible analytical support continues to be provided to the Department of the Army Staff.

E. B. Vandiver III

E. B. VANDIVER III
Director

US ARMY CONCEPTS ANALYSIS AGENCY

8120 Woodmont Avenue

Bethesda, Maryland 20814-2797

REPORT OF STEWARDSHIP, FY 84

December 1984

PREFACE

The attached Report of Stewardship summarizes Concepts Analysis Agency accomplishments and analyses completed during fiscal year 1984 (1 October 1983 to 30 September 1984). Section I contains a brief description of CAA and outlines major accomplishments of the Agency during the year; Section II contains descriptions of analytical efforts completed during FY 84. Section III lists the title and sponsor for those studies completed by CAA between 15 January 1973 and 30 September 1983.

Copies of most CAA reports for completed studies may be obtained from the Defense Technical Information Center (DTIC). Accession Designation (AD) numbers for CAA reports in the DTIC data bank are listed in parentheses after the study title. For those studies without, or not yet assigned, DTIC numbers, the CAA control number is listed after the study title. Requests for additional copies of this Report of Stewardship and comments or questions relating to the studies should be addressed to:

Director
US Army Concepts Analysis Agency
ATTN: CSCA-MSM-0
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SECTION I
INTRODUCTION

INTRODUCTION

1. BACKGROUND. The United States Army Concepts Analysis Agency (CAA) was established on 15 January 1973 as a Staff Support Agency under the jurisdiction of the Assistant Chief of Staff for Force Development (ACSFOR), Headquarters, Department of the Army. In 1974, CAA was placed under the jurisdiction of the Deputy Chief of Staff for Operations and Plans (DCSOPS), HQDA, as a result of a reorganization of the Army Staff. CAA was redesignated as a Field Operating Agency on 27 November 1977 to more appropriately reflect the scope of support which the Agency provides Army-wide. On 15 August 1979, CAA jurisdiction was transferred to the Director of the Army Staff as a result of a review of Army analysis agencies conducted by the Department of the Army.

2. MISSION. CAA missions include the following areas of responsibility:

Estimate requirements within conventional, nuclear, and chemical environments to support Army inputs to the Planning, Programing, Budgeting and Execution System (PPBES). -

Evaluate the Army's operational capability to mobilize, deploy forces, and conduct unilateral, joint, and combined operations.

Design Army forces and evaluate force alternatives.

Develop theater force level scenarios of conventional, chemical, and nuclear contingencies consistent with HQDA plans, programs, and policies and provide consistent and reasonable scenarios for Army combat development activities.

Provide force level related analytical support to HQDA, MACOMs, and other members of the Army analytical community.

Develop and maintain an Army data base for studies of Army force requirements, operational capability, force design, and related force issues.

Develop, document, maintain, and improve analytical techniques for determining Army force level needs and objectives.

3. MAJOR ACCOMPLISHMENTS DURING FY 83

a. CAA Work Program. The work program for FY 84 was structured to exceed the project/study output level achieved during FY 83 while maintaining excellence of analysis in all projects. The agency work program included full support of the Army Model Improvement Program, completion of recurring major force studies for the DCSOPS and continued support of the DCSPER and the DCSLOG in identifying and analyzing issues of high priority to them. In executing the FY 84 Work Program, the following major accomplishments were achieved:

(1) The number of completed projects increased from 35 in FY 83 to 44 in FY 84. This reflects an increase in productivity of 25 percent for FY 84.

(2) An interruptible version of the Agency's major theater level simulation model (CEM) was implemented to provide an improved basis for force analysis at CAA.

(3) The Force Evaluation Model (FORCEM) development continued as a part of the Army Model Improvement Program. Development work on this theater level simulation model included: (1) extensive expansion of model logic, particularly in communications/intelligence, command and control, and air operations; (2) development of a data base linked preprocessor; (3) application of a commercial information retrieval package, MAPPER, for postprocessor printed and graphics output; and (4) conduct of a large scale production test in parallel with a CAA study in preparation for FORCEM study application in FY 85.

(4) Major methodological-improvement initiatives which increased the efficiency and quality of CAA studies were introduced. Among these were the establishment of a COSAGE maturity effort, the development of an improved version of the Transportation Model (TRANSMO), an exploratory study of alternative force concepts for deterrence and warfighting in Europe, and the initiation of an effort to develop a replacement for WEI/WUV values.

(5) The Agency continued its support of the entire DA Staff and maintained emphasis on assisting the DCSPER and the DCSLOG in these critical areas. Thirteen DCSLOG-sponsored studies and five DCSPER-sponsored studies were completed. In addition, studies were also accomplished for HQ USAREUR, TRADOC, The Surgeon General, ACSI, and the VCSA.

(6) Analysis of Factors That Have Influenced Outcomes of Battles and Wars (HERO) was completed under contract for the Agency. This effort provided a data base which represents factors present in past combat situations that may possibly provide insights which will enhance CAA's capability to more accurately portray hypothetical future battles in simulations.

(7) To heighten the understanding of the results obtained by CAA analyses and to assure sponsor feedback is applied to improve CAA studies, a unique format for sponsor evaluation was developed and a process to formally obtain sponsor feedback was initiated. As a result, the quality of CAA studies has been improved and sponsor appreciation and detailed knowledge of study content have increased.

(8) The MICAF methodology was developed as a means to measure, report, and monitor the Army's increased combat capability resulting from equipment modernization programs. This methodology has been adopted by the Army and is under consideration for extension to the other services.

(9) The RECPOM methodology was developed which allows planners to determine the most effective mix and quantity of conventional munitions to program in support of the total Army's worldwide requirement under constrained funding and industrial production capacity. This methodology also provides an expeditious method to aid in munitions allocation decisions and provides an assessment of the impact of these decisions, given frequently changing priorities and funding guidance during the PPBES cycle. This study received the FY 84 Army Systems Analysis Award for a group effort from the Deputy Undersecretary of the Army for Operations Research.

b. Computer Support. In order to support the increased study program and to support continued increased study productivity, expansion and improvement of the computer facilities at CAA were required. The following are the major accomplishments in this area:

(1) The Sperry-UNIVAC system was expanded from a three to a four CPU configuration.

(2) The number of user access terminals to the Sperry-UNIVAC system was increased to 40 with all of the UTS-20 terminals TEMPEST certified.

(3) The Sperry-UNIVAC MAPPER software package was purchased and installed. This software permits more efficient analysis of the output from computer models during studies.

(4) The Superset color graphics system was upgraded from PGM 1 to PGM 2. This upgrade increased the data storage capacity and the processing speed of Superset.

(5) Approval and funding for further expansion of the Sperry-UNIVAC system was obtained. This expansion includes addition of a 1 megaword memory, provides an increase in on-line disc storage by 80 percent, and adds a front-end communications processor.

(6) Approval and funding for further expansion of the VAX 11/780 computer system was obtained. This expansion includes an increase in storage from 2 to 8 megabytes, an increase in the number of graphics terminals from 3 to 7, and an increase in the number of CRTs from 6 to 14.

(7) Approval to acquire 36 microprocessors for a local network was obtained. Funding for 20 of these microprocessors was approved.

c. Resources Management. In spite of a DA-imposed reduction of 15 personnel spaces from the Agency organization, new efficiencies in work processes and the refinement and continued use of the Agency Management Information System to monitor resource consumption and milestone accomplishment resulted in a 25 percent increase in productivity.

d. Personnel. In the personnel area, the following significant activities were accomplished during FY 84:

(1) A CAA military analyst, CPT David Brown, was recognized for presenting the best Military Operations Research Society (MORS) thesis while attending the Naval Postgraduate School prior to his assignment to CAA. A cash award was included in the recognition.

(2) Seventeen promotions and forty-eight awards were presented to military members of the Agency.

(3) Forty-seven promotions and sixty-two awards were presented to civilian members of the Agency.

(4) Opportunities for education and professional development were made available to all CAA personnel. Approximately \$42,000 was spent in support of training during the fiscal year; \$60,000 has been programmed for training for FY 85.

(5) Mr. Howard Whitley was selected to attend the US Army War College, and Dr. Ralph Johnson was selected for advanced training at Princeton University as part of the DA civilian long-term training program.

(6) Efforts at recruiting from college campuses were increased and the Cooperative Education Program (Co-Op) continued to receive emphasis. The Agency continued to provide support and training to 10 students and began action to increase the program for FY 85.

e. Facilities. As a final area of emphasis for FY 84, actions were taken to continue improving the physical environment at CAA to ensure that it remains conducive to productivity and professionalism. These actions included:

(1) A continuing program of physical renovation and rehabilitation of existing CAA facilities to include:

- Improvements to Room 830 and adjacent loft area.
- Carpeting for the administrative and management support work areas.
- Painting of the premises.
- Improvements to the lighting in the CAA primary conference room, Room 919.

(2) The addition of a second conference room on the ninth floor to provide space for small/medium size conferences when the larger primary conference room is not needed or not available.

SECTION II
STUDY ABSTRACTS

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STUDIES/EFFORTS COMPLETED DURING FY 1984

Title	Proponent	Completion date	Page
First-Term Reenlistment Quality Study (FITREQUEST) CAA-SR-83-13 (ADA135258)	DCSPERS	Nov 83	II-5
TRANSMO Update Program (TUP) CAA-D-83-8 (ADF860001, ADF860002)	CAA	Nov 83	II-7
10K Division Analysis (10K Div Anal) No report published	VCSA	Nov 83	II-9
Army Tank Program Analysis Support (ATPAS) No report published	TRADOC	Dec 83	II-11
Supply Apportionment Methodology (SAM) CAA-TP-83-10 (ADB079173L)	DCSLOG	Dec 83	II-13
Wartime Fuel Factors Model II (WAFF II) CAA-D-83-6 (ADF860007)	DCSOPS	Dec 83	II-15
Total Army Analysis, FY 86-90 (TAA-90) CAA-SR-83-15 (ADA142950)	DCSOPS	Jan 84	II-17
Transportation Workload Forecasting Study (TWFS) CAA-SR-84-2 (ADA139872)	DCSLOG	Jan 84	II-19
War Reserve Requirements, Europe, FY-85 (R85E) CAA-SR-83-20	DCSOPS	Jan 84	II-21
COSAGE-Force Model Comparison (COSAGE-FORCE) No report published	CAA	Feb 84	II-23
Howitzer Improvement Program Support (HIPS) No report published	TRADOC	Feb 84	II-25

Title	Proponent	Completion date	Page
OMNIBUS Capability Study-FY 83 (OMNIBUS-83) CAA-SR-83-18 (ADC033954L, ADC033955L)	DCSOPS	Feb 84	II-27
Regimental Personnel Allocation Study (REPAST) CAA-SR-84-16 (ADA141744)	DCSOPS	Feb 84	II-29
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Southwest Asia Pipeline Study (SWAPS) No report published	DCSLOG	Apr 84	II-45
Army Long Range Appraisal - Trends Analysis (ALRA-TA) CAA-SR-84-13 (ADC035059L)	DCSOPS	May 84	II-47
Effective Date Model Enhancement (EME) CAA-SR-84-17 (ADA145456, ADA146050, ADA144496)	DCSLOG	May 84	II-49

Title	Proponent	Completion date	Page
Joint Program Assessment Memorandum FY 86-93 Army Mobility Analysis (JPAM) No report published	DCSLOG	May 84	II-51
Methodology for Alternative Support Structures (MASS) CAA-TP-84-5 (ADF860005)	CAA	May 84	II-53
Multi-Echelon Stockage Analysis (MESA) CAA-SR-84-14 (ADB084929L)	DCSLOG	May 84	II-55
Analytical Support to Europe Study (ASTOE) CAA-SR-84-19 (ADC035273)	HQ, USAREUR	Jun 84	II-57
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Contingency Force Analysis Demonstration - OPLAN 1004 (CFA DEMO 1004) CAA-SR-84-21 (ADF860008)	DCSOPS	Jul 84	II-61
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Analysis of Factors That Have Influenced Outcomes of Battles and Wars: A Data Base of Engagements and Battles (HERO) CAA-SR-84-6 (ADB086797)	CAA	Sep 84	II-71

Title	Proponent	Completion date	Page
Analysis of Force Potential (AFP) CAA-D-84-14	CAA	Sep 84	II-73
Army Awards Analysis (A3) CAA-SR-84-25	DCSPERS	Sep 84	II-75
Combat Operational Readiness Float Factors (CORF) CAA-SR-84-18 (ADF860000)	DCSLOG	Sep 84	II-77
Combat Sample Generator (COSAGE) Maturity Group (CMG) No report published	CAA	Sep 84	II-79
Containerized Cargo Distribution Analysis, Southwest Asia - 88 (COCADA SWA-88) CAA-SR-84-30	DCSLOG	Sep 84	II-81
Days of Sustainability Study (DOSS) CAA-SR-84-24 (ADF860003)	DCSLOG	Sep 84	II-83
Estimation of Workloads for Logistics Civilian Augmentation Program (EWL) CAA-SR-84-23	DCSLOG	Sep 84	II-85
Personnel Readiness Indicators Model (PRIM) CAA-SR-84-5	DCSPER	Sep 84	II-87
Utilization of Increased Aircraft Capability (UIAC) CAA-SR-84-29	DCSLOG	Sep 84	II-89
Wartime Manpower and Planning Support System, FY 86-90 (WARMAPS 86-90) CAA-SR-84-27	DCSPER	Sep 84	II-91
Wartime Requirements, Programming FY-90, Europe (P90E) CAA-SR-84-9	DCSOPS	Sep 84	II-93



FIRST-TERM REENLISTMENT QUALITY STUDY
(FITREQUEST)

ONE SHEET
STUDY GIST
CAA-SR-83-13

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) There is no widely accepted, general, useful definition of soldier quality available in the US Army.
- (2) Current guidelines to determine quality of first-term soldiers are based only on objective criteria which are poorly correlated with overall quality of first-term soldiers as perceived by unit supervisors.
- (3) Objective data is often incomplete or unavailable.
- (4) A subset of the objective and subjective indicators can be used to identify which first-term soldiers their supervisors would consider to be of high quality for reenlistment.
- (5) Unit level chain of command perception and HQDA DA policy can be combined in a mutually supportive system for identifying soldiers for reenlistment.
- (6) Implementation of a system for estimating quality of first-term soldiers which includes both HQDA and the unit level chain of command will increase the administrative workload.

THE MAIN ASSUMPTION on which the work reported herein rests is as follows:

Local commanders desire to participate in the reenlistment decision process.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) Some elements of quality may not be measurable.
- (2) The study considered only soldiers eligible to reenlist in the Army for the first time. Of the 823 first-term soldiers included in the study, only 164 had complete records of objective data.
- (3) Only enlisted personnel in the grades of E6 through E8 and officers 01 through 04 participated in the survey.

THE SCOPE OF THE STUDY focused on Active Army first-term soldiers in the grade E4 and below to develop a valid and reliable method for identification of the best qualified potential reenlistees, on either an Army-wide or CMF basis.

THE STUDY OBJECTIVES were to:

- (1) Analyze Army first-term selection guidelines and evaluate the quality of first-term soldiers.
- (2) Develop a methodology which provides the ODCSPER and the unit commander with a technique for early identification of quality first-term soldiers.
- (3) Develop a process which allows selection of high-quality, first-term soldiers for reenlistment.

THE BASIC APPROACH followed in doing this study can be described as the application of multiple linear regression to develop prediction equations of quality as a function of objective and subjective quality indicators.

THE REASON FOR PERFORMING THE STUDY is as follows: the Army desires re-enlisting only high quality soldiers at the first-term point; however, no managerial procedures exist to select only the best qualified soldiers in situations where potential reenlistments exceed requirements. This study was directed to address this issue.

THE STUDY SPONSOR was the Deputy Chief of Staff for Personnel, who established the objectives and monitored study activities.

THE STUDY EFFORT was directed by COL Franklin R. Dillard, Personnel Systems Analysis Division, Force Systems Directorate.

COMMENTS AND QUESTIONS may be sent to the Chief, Personnel Systems Analysis Division, Force Systems Directorate (CSFCA-FSP).



TRANSMO USER'S MANUAL ADDENDUM

ONE SHEET
STUDY GIST
CAA-D-83-8

THE PRINCIPAL FINDINGS of the study were:

Greater accuracy and higher resolution of real-world events and reduction in the time required to create input data files.

THE MAIN ASSUMPTION was that the enhanced model results should reflect a realistic deployment of forces as obtained with the former version of the model.

THE PRINCIPAL LIMITATION was that the study was limited to improvements of the present model for known study applications.

THE SCOPE OF THE STUDY was to incorporate improved capabilities within the framework of the former version of the model.

THE STUDY OBJECTIVES were:

- (1) Develop a force definition/force packaging preprocessor for the Transportation Model (TRANSMO), therefore reducing the amount of time required to construct data files.
- (2) Provide an improved graphics output capability.
- (3) Extend the model's capabilities by increasing the number of ports in the transportation network, provide port throughput capacity and improvement of lift allocation rules and cargo prioritization schemes, and the option of simulating ground movement.
- (4) Provide model documentation for users of TRANSMO enhanced features.

THE BASIC APPROACH was to enhance the model, then execute a test case with the improved version of the model. A comparative analysis was performed using the results from the former and improved versions of the model to verify and validate the improvements.

THE REASON FOR PERFORMING THE STUDY was:

The model provides strategic deployment analysis for several studies with shortcomings being realized. New features were necessary to provide an effective analysis of strategic deployment.

THE STUDY SPONSOR was the Director, US Army Concepts Analysis Agency.

THE STUDY EFFORT was directed by Ms. Vera Hayes, Strategy, Concepts and Plans Directorate and Mr. Ernie Rose, Analysis Support Directorate.

COMMENTS AND QUESTIONS may be sent to the Assistant Director, Strategy, Concepts and Plans Directorate (CSCA-SP), US Army Concepts Analysis Agency.



10K DIVISION ANALYSIS

ONE SHEET
STUDY GIST

THE PRINCIPAL FINDINGS of the work are:

- (1) The TRADOC proposed 10K division is a light, strategically mobile force with a high tooth-to-tail ratio.
- (2) The TRADOC proposed 10K division has limited intelligence collection and processing capabilities, limited tactical mobility and limited fire support means.
- (3) Alternative divisional organizations can overcome the weaknesses in the proposed 10K division. Five alternatives are presented.

THE MAIN ASSUMPTIONS on which the work depends are:

- (1) The personnel and airlift data for the proposed 10K division are correct.
- (2) There is a need for a light division with 10,000 personnel that can be moved with less than 500 C-141B sortie equivalents.

THE PRINCIPAL LIMITATIONS of this work are:

- (1) The organizational structure of the Combat Support and Combat Service Support units was not sufficiently detailed to permit a full analysis.
- (2) This study effort was required within one week. This time constraint did not allow a full, detailed analysis of all functional areas of the division.

THE SCOPE OF THE STUDY included: a quick review and analysis of the proposed 10K division (as of 1 November 1983); determination of weaknesses in the proposed 10K division; the development of five alternate division organizations to overcome these weaknesses; and a comparison of these alternatives.

THE STUDY OBJECTIVES were to conduct a quick, independent review and analysis of the 10K division proposed by TRADOC at the Army Commander's Conference in October 1983.

THE BASIC APPROACH followed was: review the proposed organization; identify divisional strengths and weaknesses; develop unit options to overcome these weaknesses; combine the options to develop alternative divisions within the personnel and sortie constraints; and compare the alternative organizations.

THE REASON FOR THE STUDY was to provide a response to a query from the Vice Chief of Staff of the Army.

THE STUDY SPONSOR was the Vice Chief of Staff of the Army.

THE STUDY EFFORT was directed by COL William J. Owen, Requirements and Resources Directorate, US Army Concepts Analysis Agency.

COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director, Requirements and Resources Directorate.



ARMY TANK PROGRAM ANALYSIS SUPPORT
(ATPAS)

ONE SHEET
STUDY GIST

(U) THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) (U) The measures of effectiveness developed by the Concept Evaluation Model (CEM) did not identify one of the four tank fleet variances for 1990 as being clearly superior to the others.

(2) (U) Of the six tank fleet procurement options evaluated for 2000, those with the greatest quantity of 120mm main guns were better capable of opposing the future Soviet threat.

(U) THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

(1) (U) US Army forces would be committed globally in accordance with Defense Guidance.

(2) (U) Antitank weapons and ammunition now under development will meet their projected Initial Operational Capability dates.

(3) (U) Soviets will not develop any new major armor system beyond current intelligence estimates.

(U) THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

(1) (U) The force data employed for the study are based on projected FY90 resource levels.

(2) (U) The simulation models used do not include integrated warfare, automation and communication, electronic warfare, rear area combat, and the impact of combat service support shortfalls on warfighting results.

(3) (U) Tanks are only one of seven antiarmor systems in the theater, and variances in the fleet composition have no major impact on theater warfare.

(U) THE SCOPE OF THE STUDY was the development of factors to measure the relative effectiveness of different options in the projected tank fleet for the years 1990 and 2000.

(U) THE STUDY OBJECTIVES were:

(1) (U) Develop a 1990 European theater warfight for several US tank fleet options, providing FASTALS input to the Logistics Center and measures of effectiveness (MOE) to the Armor Center.

(2) (U) Develop a 1990 Southwest Asia theater warfight for one variance in the tank fleet and provide FASTALS input to the Logistics Center.

(3) (U) Develop a 2000 European theater warfight for several US tank fleet options and provide MOE to the Armor Center.

(U) THE BASIC APPROACH taken for this study was as follows:

(1) (U) For the year 1990, use the data set for the Total Army Analysis 1990 (TAA 90), varying the assignment of type tanks to US organizations, and use CEM to develop a theater warfight.

(2) (U) For the year 2000, use the TAA 90 data set, upgrading the US and Warsaw Pact tank fleets in accordance with current projections and estimates, and use CEM to develop theater warfights for different tank fleet options in Europe.

(U) THE REASON FOR PERFORMING THE STUDY was to support the Armor Center in their review of the US Army Tank Program, which was to provide a plan for developing the best tank force to fight the AirLand Battle against the projected threat for the period 1989 through 2000.

(U) THE STUDY SPONSOR was the US Army Armor Center.

(U) THE STUDY EFFORT was directed by Colonel Javan M. DeLoach, Requirements and Resources Directorate.

(U) COMMENTS AND QUESTIONS may be sent to CAA, ATTN: Assistant Director for Requirements and Resources (CSCA-RQ)



SUPPLY APPORTIONMENT METHODOLOGY (SAM) STUDY

ONE SHEET
STUDY GIST
CAA-TP-83-10

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The logistics planner requires a scenario in which forces are engaged in different theaters concurrently and a strategy on which to base priorities for apportioning available assets to each theater.
- (2) Consumption and attrition rates are required to generate demand data for each theater in which US Army forces are likely to be engaged.
- (3) A list of potential sources and quantities of available assets needs to be maintained; specific sources may be selected from the list for a particular scenario.
- (4) A list of critical items for each theater needs to be maintained. This list should provide the basis for intensely managing the apportionment of critical items (rather than an overly broad tons/man/day factor for a whole class of supply).
- (5) A computer program is required to process all the data necessary to generate apportionment lists by theater quickly.
- (6) The LOGNET computer program is designed to process all the data necessary to generate an apportionment list for a single theater; the LOGNET program can be enhanced to generate an apportionment list for more than one theater concurrently.
- (7) The generation of an apportionment list for JSCP guidance should be based on an accepted, near-time, multi-theater scenario. This could be generated over several months, as part of the ALA process.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) Current roles, missions, and functions of the services and JCS will not change; i.e., logistics support will remain primarily a national, service component responsibility.
- (2) The OMNIBUS Study will provide a listing of time-phased unit deployments for an accepted, near-time, multi-theater scenario and will be available for the production of the JSCP-85 apportionment list.
- (3) Transportation assets will be considered adequate for resupply operations (so as not to control the apportionment).
- (4) Specific troop deployment lists are available to LOGNET via the World Wide Military Command and Control System (WWMCCS).

THE PRINCIPAL LIMITATION of this work which may affect the findings is as follows: This paper outlines two methods to produce asset apportionment lists from on-going Army initiatives; but, it does not generate an apportion list for JSCP-85 guidance nor provide an operating apportionment model. The two methods are untested. II-13

THE SCOPE OF THE STUDY was to develop a systematic method for the apportionment of available, CINC-identified, critical items among multiple theaters. This involved identifying critical items of supply, available stocks of these items, the demands for the items in each theater over time, and a strategy for apportioning available stocks among competing theaters.

THE STUDY OBJECTIVES were:

- (1) To develop a method for identifying critical supply items to be apportioned.
- (2) To develop a priority scheme for apportioning critical items which is consistent with method used to apportion forces.
- (3) To develop a method for determining an apportionment list for JSCP.
- (4) To recommend a course of action for acquiring a computer program capable of generating an apportionment plan.

THE BASIC APPROACH followed in doing this study can be described as follows:

The study team focused on defining the problem, developing a data set, researching related existing and developmental activities, and conceptualizing a method to apportion assets. Defining the problem led to the conclusion that ODCSLOG wanted to do two things: prepare a list for JSCP-85 and develop a computer model for application in periodic exercises. In researching the ALA process, the team found that it generated an apportionment for items assessed based on the OMNIBUS scenario; and, in other discussions, the team learned of LOGNET. While doing this research, the team received an initial list of critical items identified by some CINCs; the data was organized and consolidated into a table for recoordination with the CINCs. It became apparent to the team that some of these critical items were already apportioned in ALA and the others could be for JSCP. Discussions with LFA confirmed this. A comparison of the study team's concept for a computer methodology with the LOGNET program revealed that LOGNET in fact did much of the same data processing; LOGNET could probably be modified more efficiently than starting to program anew. These findings were discussed at the action officer level and then coordinated within ODCSLOG; all agreed that it was a reasonable, efficient approach.

THE REASONS FOR PERFORMING THE STUDY are mainly as follows: The ODCSLOG needs to be able to advise the CINCs on the quantities of critical items that they are likely to receive during a multi-theater war in the near-time period and to advise the DCSOPS on the level of support for evolving plans during training exercises.

THE STUDY SPONSOR was the Director of Plans and Operations, ODCSLOG, HQDA.

THE STUDY EFFORT was directed by Mr. Frank A. Distasio, Jr., Force Systems Directorate, CAA.

COMMENTS AND QUESTIONS may be directed to CAA, Assistant Director for Force Systems, ATTN: CSCA-FSL, 8120 Woodmont Avenue, Bethesda, MD, 20814.



WARTIME FUEL FACTORS (WAFF II) MODEL

ONE SHEET
STUDY GIST
CAA-D-83-6

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The methodology for the current Wartime Fuel Factor (WAFF) Model was still valid, but required expansion to accommodate the computation of fuel factors for additional equipment items that use diesel, MOGAS or JP4/5 (turbine) fuel.
- (2) The methodology for the current WAFF Model was revised resulting in an improved model (WAFF II) which has been tested and documented.
- (3) The improved model (WAFF II) incorporates the current model methodology and has the capability for computing WAFF for three fuels rather than a single fuel type.
- (4) The improved model has the capability to determine fuel factors up to 500 equipment items rather than 26 for the current model.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) In those cases where a temporary loss rate cannot be computed the temporary loss rate for that item of equipment is derived from its permanent loss rate.
- (2) The average travel distance from an issue point to the user for a vehicle is 100 km.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) The computation of fuel factors for additional equipment items is dependent upon the development of usage profiles by responsible major commands.
- (2) Due to limited battlefield requirement, aviation gasoline (AVGAS) was not considered.
- (3) Fuel losses due to enemy action against storage facilities were not considered in the methodology.

THE SCOPE OF THE STUDY was to expand the computation of wartime fuel factors to additional equipment items that use diesel, and to equipment items that use MOGAS or JP4/5 fuel.

THE STUDY OBJECTIVES were:

(1) Review and revise current methodology to develop fuel factors for additional equipment items that use diesel, and for equipment items that use MOGAS or JP4/5 fuels.

(2) Test and document improved model.

THE BASIC APPROACH taken for this study was as follows:

(1) Review data requirement and methodology which support the current computation and use of fuel factors.

(2) Determine the most efficient changes to improve the current model so that fuel factors for additional equipment and fuels can be computed.

(3) Test, verify, and document the improved model.

THE REASONS FOR PERFORMING THE STUDY were as follows: The Army needs a standard, and reliable methodology for computing fuel war reserve requirements similar to that of other wartime consumables such as munitions. The current WAFF methodology meets this purpose but is too limited in application. Improvements to the current methodology will permit it to fully meet Army needs.

THE STUDY SPONSOR was CAA with ODCSOPS interest.

THE STUDY EFFORT was directed by Kenneth R. Simmons, Requirements and Resources Directorate.

COMMENTS AND QUESTIONS may be sent to CAA, ATTN: Assistant Director for Requirements and Resources (CSCA-RQ).



TOTAL ARMY ANALYSIS FY 86-90
(TAA-90)

ONE SHEET
STUDY GIST
CAA-SR-83-15

(U) THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) (U) The support force required in the TAA-90 Design Case (DC) increased in all theaters (SWA, NATO, Korea) over TAA-88 DC. The greatest increases are in SWA and Korea. A variety of factors contribute to the larger requirement.

(2) (U) Shortfalls exist between the TAA-90 DC support force requirements and the programed support forces.

(3) (U) The strategic deployment is generally successful in meeting required latest arrival dates (LAD).

(U) THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

(1) (U) The DC is limited to conventional conflict in three theaters (SWA, NATO, and Korea) with an assumed duration of a 180-day warfight and roundout for each theater.

(2) (U) US forces are at 100 percent of required authorized level of organization-1 (ALO 1), and are ready to move at port of embarkation (POE) when strategic lift is available.

(3) (U) Army Force Planning Data and Assumptions (AFPDA), FY 84-93 (and in selected cases AFPDA FY 83-92) is valid for TAA-90.

(4) (U) Data in the draft OSD Sealift/Deployment Study is valid.

(U) THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

(1) (U) Data reflects projected FY 90 resource levels.

(2) (U) The simulation models used do not reflect integrated warfare, automation and communications, electronic warfare, rear area combat, and the impact of combat service support shortfalls on warfighting results.

(3) (U) The warfight results should not be construed as a prediction of actual combat; they are only an input to simulate force support requirements.

(U) THE SCOPE OF THE STUDY is an analysis of the nondivisional support force required to support a conventional conflict in three theaters. Only nondivisional support force structure requirements are analyzed.

(U) THE STUDY OBJECTIVES were to:

(1) (U) Determine the DC nondivisional support force requirements consistent with guidance and specified resource constraints.

(2) (U) Identify shortages and overages in the programed force as compared to the DC requirements.

(3) (U) Analyze the shortfalls associated with the programed force in accomplishing required tasks and workloads.

(4) (U) Define the division force equivalents worldwide and for each theater.

(5) (U) Conduct excursions to provide force requirements and insights to specific Army issues.

(U) THE BASIC APPROACH followed in doing this study can be described as follows. Using data which originated from the ODCSOPS, the Force Analysis Simulation of Theater Administrative and Logistic Support (FASTALS) Model computed a balanced and time-phased troop list of support requirements based on the combat force and the warfight results. Models used to develop data include: the Transportation Model (TRANSMO) for the strategic deployment; the Combat Sample Generator (COSAGE), the high-resolution input to the Concepts Evaluation Model (CEM); and A Tactical, Logistical, and Air Simulation (ATLAS) Model. The CEM simulated the NATO and Korea warfights, and the ATLAS simulated the SWA warfight.

(U) THE REASONS FOR PERFORMING THE STUDY are mainly as follows. To determine the time-phased requirements for nondivisional forces to support programed divisional combat forces in a global scenario set in SWA, NATO, and Korea. This analysis will assist the Army Staff and MACOMs in structuring the force within initial FY 86-90 program force affordability levels.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Operations and Plans (DCSOPS), HQDA who established the objectives and monitored study activities.

(U) THE STUDY EFFORT was directed by COL L. G. Gibbings, Forces Directorate.

(U) COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director, Forces Directorate (CSCA-F0), US Army Concepts Analysis Agency.



TRANSPORTATION WORKLOAD
FORECASTING (TWF) STUDY

ONE SHEET
STUDY GIST
CAA-SR-84-2

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The transportation workload forecasting system has produced inaccurate forecasts resulting in inefficient Military Sealift Command (MSC) industrial fund operations.
- (2) Accurate forecasting of cargo transportation requirements can be accomplished by forecasting at a single activity.
- (3) Either HQ Military Traffic Management Command (MTMC) or HQ, US Army Materiel Development and Readiness Command (DARCOM) is a suitable location for a single point forecasting activity.
- (4) The Box-Jenkins and Winters Forecasting Models can provide accurate forecasts when used in conjunction with program information.
- (5) Changes to the allocation of transportation account codes and requirements for forecasting shipping mode are also required to improve forecasting accuracy.

THE MAIN ASSUMPTION on which the work reported herein rests is that transportation workload forecasting requirements, contained in JCS Publication 15, would not be changed.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) Only the forecasting of peacetime over-ocean surface cargo transportation requirements was evaluated.
- (2) Historical lift data was extracted exclusively from MSC records and could not be validated from Army sources.

THE SCOPE OF THE STUDY was taken to include an analysis of the Army's long-range cargo transportation requirements forecasting process and its impact on budgets and transportation costs.

THE STUDY OBJECTIVE was to develop cost effective systems and methods for improving the forecasting of Army over-ocean surface cargo transportation requirements.

THE BASIC APPROACH followed in this study can be defined as: research was conducted into the nature and extent of the forecasting problem, to identify its impact, and its systemic and methodological causes. Several alternative systems were evaluated based on their relative costs and efficiency. Then a series of mathematical techniques was evaluated for suitability as forecasting tools. Two of the techniques, the Box-Jenkins and Winters models, were used to forecast the 1982 cargo transportation requirements based on 1977 to 1981 MSC cargo lift data.

REASONS FOR PERFORMING THE STUDY are mainly as follows: recent forecasts of Army over-ocean surface cargo transportation requirements have been inaccurate. As a consequence MSC industrial funds have incurred significant losses and the MSC controlled fleet was not efficiently utilized for cargo transport. This study was directed to develop methods to improve the forecasts.

THE STUDY SPONSOR was the Deputy Chief of Staff for Logistics, who also established the objectives and monitored the study activities.

THE STUDY EFFORT was directed by LTC James N. Keenan, Strategy, Concepts and Plans Directorate.

COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director for Strategy, Concepts and Plans.



WAR RESERVE REQUIREMENTS
EUROPE FY 85 (R-85E) (U)

ONE SHEET
STUDY GIST
CAA-SR-83-20

(U) THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- a. (U) Copperhead, SADARM, and the AH-64 helicopter were not played in the R-85E Study, and this had a major impact on the rates.
- b. (U) There was more artillery fire and an increase in rocket assisted projectile (RAP) munition expenditures in R-85E when compared to P-88E.
- c. (U) In R-85E, fewer artillery kills of armored vehicles result in an increase of direct fire engagements.

(U) THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- a. (U) The basic scenario is an OSD directed global scenario.
- b. (U) There is a nonnuclear, nonchemical conflict in Europe for R-85E.
- c. (U) NATO forces in AFCEM will execute a forward defense strategy to repulse the Warsaw Pact invasion.
- d. (U) Combat samples produced by COSAGE are representative of a 24-hour period of defense intense, delay, attack, and static postures.
- e. (U) There is an assumed duration of 130 days for the CEM theater simulation.

(U) THE PRINCIPAL LIMITATIONS

- a. (U) This study was designed to provide results within a time period significantly shorter than that needed for a full requirements study. The close similarity between this study and another previous study permitted a combination of existing analytical results and new analysis to obtain credible study results. Added time to completely execute a new requirements study would have undoubtedly surfaced lesser, added observations on wartime consumption requirements in FY 85.
- b. (U) The R-85E Study responds to an OSD-directed global scenario. The rates that were developed were compared to the rates developed in P-88E, which used a NATO-only scenario.

(U) THE SCOPE OF THE STUDY focused on the European theater for the FY 85 timeframe with US combat forces employed over a 180-day period.

(U) THE BASIC APPROACH was to use the OMNIBUS-82 Study with an FY 85 force excursion, and the applicable COSAGE runs and the CEM runs that supported OMNIBUS-82. The theater warfare was analyzed, the ammunition postprocessor (APP) and the wartime replacement factors (WARF) postprocessor were run to generate the ammunition rates and WARF rates.

(U) THE REASON FOR PERFORMING THE STUDY was to determine nonnuclear ammunition and equipment war reserve requirements to support the deployment of US forces in Europe in FY 85.

(U) THE STUDY SPONSOR was the Director of Force Development, Office of the Deputy Chief of Staff for Operations and Plans, Headquarters, Department of the Army.

(U) THE STUDY EFFORT was directed by LTC Richard V. Oehrlein, Requirements and Resources Directorate, US Army Concepts Analysis Agency.

(U) COMMENTS AND QUESTIONS may be sent to CAA, ATTN: CSCA-RQL.



COSAGE-FOURCE
COMPARISON PROJECT

ONE SHEET
STUDY GIST

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The COSAGE and FOURCE division level combat models produce similar ammunition expenditure and attrition results when run with identical starting conditions and with their unique capabilities suppressed.
- (2) The unique capabilities of each model effect battle outcomes significantly, and appear to be responsible for the major disparities revealed in previous studies.
- (3) FOURCE is a better model for the study of command and control dynamics because of its unique design and capabilities.
- (4) COSAGE is far superior for requirements, force design and capabilities studies because of its unique design and capabilities.
- (5) Suppression of each model's unique capabilities is inappropriate if the models are used for their intended purposes.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) Major data inputs such as weapon and equipment characteristics and probabilities of kill are comparable for the two models.
- (2) That the COSAGE baseline that was prepared matches the FOURCE armor mission area analysis run.

THE PRINCIPAL LIMITATION of this work which may affect findings is that complete sensitivity analysis of the factors effecting COSAGE results were not conducted.

THE SCOPE OF THE STUDY included qualitative comparisons of the COSAGE and FOURCE models, comparison of simulation results with the two models and limited COSAGE sensitivity analyses.

THE STUDY OBJECTIVE was to compare the COSAGE and FOURCE models to determine if the results of comparable combat simulations with the two models were similar in respect to attrition and ammunition expenditure.

THE BASIC APPROACH followed in the study was:

- (1) Perform a quantitative comparison of simulation results with the two models.
 - (a) Obtain the FOURCE armor mission area analysis run and starting data.
 - (b) Input FOURCE forces and battlefield data into COSAGE.
 - (c) Input FOURCE decision parameters and control parameters into COSAGE.
 - (d) Adjust COSAGE control parameters so that the COSAGE run with FOURCE input matched the FOURCE run in battlefield dynamics.
 - (e) Analyze attrition and ammunition consumption.
 - (f) Conduct limited sensitivity analysis of the COSAGE baseline established in step d.
- (2) Perform a qualitative comparison of the two models.

REASONS FOR PERFORMING THE STUDY were to determine if the differences between the models discovered in a previous study were the result of differences in starting conditions, or more fundamental differences in the modeling of combat within the models.

THE STUDY SPONSOR was the Director, CAA.

THE STUDY EFFORT was directed by MAJ James R. Methered, Requirements and Resources Directorate.

COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director, Requirements and Resources Directorate.



HOWITZER IMPROVEMENT
PROGRAM SUPPORT
(HIPS)

ONE SHEET
STUDY GIST

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

1. The M109E5 Howitzer, with its higher rate of fire and longer RAP range, is more lethal than the M109A2 and M109E4.
2. Increasing the dispersion of the artillery pieces improves their survivability.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

1. The scenario for the P90E study is correct and can be used as the basis for this study.
2. COSAGE IV adequately models all necessary combat functions.
3. The artillery logic in COSAGE IV is sufficiently detailed to respond to small changes in type battery characteristics.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

1. The COSAGE IV model is unable to adequately model RAM data and the changes caused by the HIP and HELP.
2. Due to the small sample size, no real statistical analysis can be made such as hypothesis testing.

THE SCOPE OF THE STUDY was taken to include an examination of the effects on the divisional warfight caused by varying selected type battery parameters for 155 direct support batteries in three COSAGE battle postures.

THE STUDY OBJECTIVE was to determine what, if any, changes in the combat simulation were a result of varying the type battery data for the 155 mm Direct Support batteries.

THE BASIC APPROACH followed in doing this study can be described as follows: Using the P90E scenario as the basic array, the Blue Defend, Red Defend and Static postures were run for each of the three cases to be evaluated. These posture summaries were then evaluated to determine the attrition of howitzers, stylized expenditures of ammunition and kills for each of the cases. These factors were then used in a gross quantitative measure of effectiveness, the

the loss exchange ratio as a means of determining qualitative measures for the howitzers.

THE REASONS FOR PERFORMING THE STUDY are mainly as follows:

The study was performed to see if implementing proposed upgrades to 155mm SP howitzers would have a demonstrable positive effect upon Division level combat operations.

THE STUDY SPONSOR was TRADOC Studies and Analysis Group, Ft. Monroe, VA in conjunction with USAFAS, Directorate of Combat Developments, Ft. Sill, OK.

THE STUDY EFFORT was directed by CPT James M. Burd, Requirements Directorate.

COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director, Requirements (CSCA/RQ).



OMNIBUS CAPABILITY STUDY - FY83
(OMNIBUS-83)

ONE SHEET
STUDY GIST
CAA-SR-83-18

(U) THE PRINCIPAL FINDINGS

(1) (U) Equipment shortage degrades the operational readiness and sustainability of the current Army force.

(2) (U) Strategic lift availability could hamper Army's capability for rapidly projecting combat power.

(3) (U) Force structure shortfall in combat and support units could jeopardize the Army's capability for successfully executing a global military strategy.

(4) (U) The Army's manpower replacement system is adequate to sustain units at required levels, however, a six month projection of combat losses indicates that shortages could occur in some MOSs.

(5) (U) Policy constraints limit the full utilization of pre-trained IRR personnel.

(U) THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

(1) (U) The scenario is global and conventional.

(2) (U) Theater conflicts are concurrent.

(3) (U) Resources are constrained to those on hand or programed to be available by the end of FY 83.

(4) (U) Intertheater transfer of stocks or units is not permitted.

(5) (U) Executive callup and other mobilization actions are implemented early.

(6) (U) Only COMPO 1, 2, and 3 units are simulated.

(7) (U) Reasonably assured levels of host nation support (HNS) are available to facilitate and supplement US reinforcement of NATO and Korea.

(U) THE PRINCIPAL LIMITATIONS. Models used in the OMNIBUS analysis do not reflect integrated warfare, command and control, automation and communications, EW, rear area combat, and many combat service support functions.

(U) THE SCOPE OF THE STUDY is an analysis of FY 83 force capability within the framework of concurrent SWA, Korea, and NATO contingencies.

(1) (U) Determine end FY 83 capability of the Army to mobilize, deploy, fight, and sustain forces in support of multiple contingencies.

(2) (U) Assess the force performance implications of combat and support unit readiness shortfalls and of shortfalls in logistic and personnel sustaining assets.

(3) (U) Identify areas where changes in resource allocation priorities will improve overall force performance.

(U) THE BASIC APPROACH followed in doing this study can be described as follows: force capability assessments were made by using multiple theater level models to deploy, warfight, and identify support requirements. Shortfalls were determined by comparing the existing structure with the required structure. Resulting shortfalls were analyzed for impact on force capability. The product is a written assessment of force capability to deploy, fight, and sustain combat operations in a global scenario.

(U) THE REASONS FOR PERFORMING THE STUDY are to support the following activities: POM and Budget Development; Congressional Budget hearings; OSD Major Issues; Total Army Analysis; Army Logistics Assessment; Army input to JSCP and JSPDSA; AMOPS; and an annual briefing to CSA on current state of Army force readiness.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Operations.

(U) THE STUDY EFFORT was directed by LTC Francis V. Campi, Forces Directorate.

(U) COMMENTS AND QUESTIONS may be directed to LTC R. Hager, DAMO-ODR, point of contact (AUTOVON 695-0320).



US ARMY REGIMENTAL
PERSONNEL ALLOCATION STUDY
(REPAST)

ONE SHEET
STUDY GIST
CAA-SR-84-8

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The proposed armor regimental structure which provides the best balance between CONUS and OCONUS elements of each regiment also provides the most equal career opportunities for MOS 19E and 19K.
- (2) Unit flow requirements constrain so many of the MOS 19E and 19K extraregimental positions that only limited equalization of career opportunities in disadvantaged regiments is possible.
- (3) Affiliating component units of a regiment with other regiments alters the career opportunities of soldiers serving in the regiment from the opportunities afforded to individuals in a similar undivided regiment.
- (4) If MOS 19E and 19K are not considered compatible and substitutable, the maximum number of companies which may cycle overseas is reduced from 176 to 136.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) The authorization data provided by the proponent is accurate. The Army will be manned to that authorization.
- (2) The system is operating in a steady-state peacetime condition and will not be subject to major dislocations such as restationing of units and unit activations, deactivations, and conversions.
- (3) MOS 19E and 19K are compatible and substitutable.
- (4) Equal time in CONUS between overseas tours, equal promotion opportunity, and the best possible assignment locations are the most important individual career characteristics in that order.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) The study did not address questions concerning the effect of the regimental and unit replacement system on the cohesion, readiness, or capability of the units involved.

(2) Only MOS 19E and 19K were considered; questions concerning other combat, combat support, and combat service support personnel were not addressed.

(3) The methodology employed was deterministic and ignored many manning functions and interactions. For example, transitions between primary and secondary MOSs were not considered.

THE SCOPE OF THE STUDY is an analysis of selected individual career characteristics that would result for soldiers serving in any of the proposed tank or cavalry regiments. All armor regiments are included in the analysis because CMF 19 spaces are authorized in tank as well as cavalry units.

THE STUDY OBJECTIVES were to:

(1) Analyze various alternatives for cavalry regiments to determine the proposal which minimizes the deviation between regiments in turnaround time, promotion opportunity, and geographic location.

(2) Determine the allocation of CMF 19 (MOSs 19E and 19K) spaces for each cavalry regiment by grade and MOS.

THE BASIC APPROACH followed in this study was to distribute extraregimental personnel spaces to proposed regiments to minimize the deviation between regiments in turnaround time, promotion opportunity, and location. A sequential linear goal programming model was used for this effort. The achievement function values obtained for each set of regimental proposals were then compared to determine the best proposal.

THE REASON FOR PERFORMING THE STUDY was to assist the Office of the Deputy Chief of Staff for Operations and Plans in the development and implementation of a regimental system for cavalry units.

THE STUDY SPONSOR was the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS).

THE STUDY EFFORT was directed by MAJ William L. Carr, Force Systems Directorate.

COMMENTS AND QUESTIONS may be directed to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Force Systems (CSCA-FS), 8120 Woodmont Avenue, Bethesda, MD 20814.



IMPROVED CASUALTY ESTIMATION AND EVACUATION SYSTEM (ICEES)

ONE SHEET
STUDY GIST
CAA-SR-84-16

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) Changing that portion of the Patient Flow Model (PFM) which treats evacuation dates of patients who must be returned to CONUS hospitals results in:

- more prompt evacuations out of theater,
- reductions in calculated requirements for communication zone (COMMZ) hospital beds given a JCS 15-30-60-day evacuation policy and a fixed evacuation delay user input factor,
- minimal changes in the calculated requirements for combat zone hospital beds,
- increases in evacuation requirements at specific time periods from the COMMZ to CONUS given a JCS 15-30-60-day evacuation policy and a fixed evacuation delay user input factor, and
- fewer COMMZ hospital requirements due to fewer COMMZ bed requirements.

(2) Varying the time patients are held prior to evacuation produces results consistent with intuition.

(3) The modified PFM operates with the redesigned user input evacuation delay factors.

THE PRINCIPAL LIMITATIONS of this work are:

(1) The model verification process involved only a check to ensure that patient dispositions are the same in the modified PFM as in the PFM.

(2) No attempt was made to test model validity. It was assumed that validity testing was done when the original model was developed.

(3) The impact of a more prompt patient evacuation policy on CONUS hospital workload or patient transportation requirements were not addressed in this study.

THE SCOPE OF THE STUDY was taken to include modification of the PFM to allow for the patient's time in hospital prior to evacuation (evacuation delay factor) to be a user input, and testing of the modified PFM using TAA-90 NATO Design Case data to determine impacts on theater bed and evacuation requirements.

THE STUDY PURPOSE was to incorporate the evacuation delay methodology of the Joint Operation Planning System (JOPS) Medical Planning Module (MPM) into the Patient Flow Model program.

THE BASIC APPROACH followed in doing this study can be described as: initially, a thorough examination of the PFM was made to determine the necessary coding changes. After the program was modified, the model was verified to ensure the program changes were correctly implemented. Next, sensitivity tests were run to see if the modified PFM would act in the way expected--not counter to intuition. The TAA-90 NATO Design Case was selected as the base. Three tests were run using evacuation delay factors of 6 days, 10 days, and 14 days as input to the modified PFM. In all three tests the modified PFM was executed and results were compared with the original PFM results and changes to evacuation and bed requirements documented.

THE REASON FOR PERFORMING THE STUDY was mainly as follows: an analysis of the PFM methodology revealed that the PFM data may overstate the time a patient stays in theater hospitals prior to evacuation. The Office of the Surgeon General requested that the model be modified to permit the time taken to resuscitate and stabilize patients be input to the model as a specific input variable. This study was directed to address that issue.

THE STUDY SPONSOR was the Director, Health Care Operations, Office of The Surgeon General, who sponsored the work, established objectives, and monitored study activities.

THE STUDY EFFORT was directed by MAJ R. M. Anthony, Forces Directorate.

COMMENTS AND QUESTIONS may be directed to CAA, Assistant Director for Forces, ATTN: CSCA-F0, 8120 Woodmont Avenue, Bethesda, Maryland 20814.



INTERRUPTIBLE CONCEPTS EVALUATION MODEL
(INTCEM) (U)

ONE SHEET
STUDY GIST
CAA-SR-84-3

(U) THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- a. (U) Operational fidelity of the CEM theater warfight and force laydown was improved through detailed terrain analysis, player team (Red and Blue) participation, and modifications of CEM program in the interrupt mode.
- b. (U) Participation of the CAA Intelligence Team in the interpretation and laydown of threat forces helps assure fidelity in the laydown and operations of Warsaw Pact (WP) forces.
- c. (U) Accuracy of CEM reports was not materially degraded by operating in the interrupt mode, but manual work was required to prepare inputs between cycles.
- d. (U) Small FEBA movements in INTCEM may be the result of incorrect combat worth calculations or FEBA movement factors and requires further examination.
- e. (U) INTCEM discovered that the concentration of major Red forces on selected avenues does not achieve expected FEBA gains but produces more combat losses in CEM.

(U) THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- a. (U) The scenario is conventional war in the NATO AFCEM area of operations.
- b. (U) The critical stage of the war for this analysis was the first 12 days of combat.
- c. (U) Arrival dates of reinforcements, Red and Blue, were identical to P90E/TAA-90 Studies.

(U) THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- a. (U) Data reflects projected FY 90 resource levels.
- b. (U) The CEM Model could not reflect impact of rear-area combat, barriers, integrated warfare, automation, communications, and combat service support on warfighting results.

c. (U) CEM limits tactical operations to frontal battle.

d. (U) INTCEM's dynamic play during each theater cycle reflected decisions of its player commanders.

e. (U) The warfight was an "open" game with information available to both sides.

(U) THE SCOPE OF THE STUDY is an analysis to determine what could be done now using the Concepts Evaluation Model (CEM), in an interrupt mode, to improve the fidelity of modeling theater-level military operations and to gain experience for the introduction of the Force Evaluation Model (FORCEM) as a production model at CAA.

(U) THE STUDY OBJECTIVES WERE: (1) to conduct a laydown based on detailed terrain analysis, (2) to laydown Blue (NATO) and Red (WP) forces from the perspective of their commanders, (3) to gain experience in adjusting CEM parameters/thresholds to perform the commanders' decisions, (4) to gain experience operating CEM for later use in developing the command and control process for FORCEM, and (5) to achieve desired operational fidelity at the expense of degrading CEM's bookkeeping standards.

(U) THE BASIC APPROACH followed in doing this study was to conduct three cycles (four days per cycle) in the interrupt mode. At the beginning of a cycle commanders laid down their forces based upon detailed terrain analysis and estimates of the situation. The commanders' orders after review by a Professional Advisory Panel were given to the Models Team for input to CEM. The CEM Model logic/parameters were modified to perform the orders. CEM was run for a theater cycle. Its results were analyzed and then provided to the player teams for preparation of its next cycle of play. Results were also compared to systemic mode CEM results.

(U) THE REASONS FOR PERFORMING THE STUDY are mainly as follows: the introduction of computers into theater simulation models vastly improved bookkeeping of the data; but at the expense of losing considerable detail, or fidelity, of past manual wargame techniques.

(U) THE STUDY SPONSOR was the Director, Concepts Analysis Agency, who established the objectives and monitored study activities.

(U) THE STUDY EFFORT was directed by COL Leslie G. Gibbings of the Forces Directorate.

(U) COMMENTS AND QUESTIONS may be sent to Assistant Director, Forces Directorate, US Army Concepts Analysis Agency.



MID-RANGE FORCE STUDY-CY 83 (MRFS-83),
PHASE I: REQUIREMENTS (U)

ONE SHEET
STUDY GIST
CAA-SR-84-10

(U) THE PRINCIPAL FINDINGS of the work reported herein are:

(1) (U) US combat forces required to defeat the threat in two scenarios extra to the global DG scenario were determined.

(2) (U) The planning mobility forces required to deploy the FY 1993 US Planning Force were determined.

(U) NOTE: The specific findings are classified SECRET.

(U) THE MAIN ASSUMPTIONS used by this study were:

(1) (U) The global scenario, used in the mobility analysis for FY 1993, would be a conventional conflict in three theaters with a duration of 180 days.

(2) (U) Combat in the two excursion scenarios would be conventional conflicts with a duration of 180 days.

(3) (U) The FY 1993 data contained in the Army Force Planning Data and Assumptions FY 1984-1993 (AFPDA 84-93) were valid.

(U) THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

(1) (U) Data reflect projected FY 1993 resource levels.

(2) (U) The simulation models used do not reflect integrated warfare, communications, electronic warfare, rear area combat, and the impact of combat service support shortfalls on warfighting results.

(U) THE SCOPE OF THE STUDY was an analysis of the capability of and the requirements for:

(1) (U) US Army forces in FY 1993 for two proposed scenarios (specific locations are classified SECRET).

(2) (U) FY 1993 planning mobility forces in the DG global scenario.

(U) THE STUDY OBJECTIVES were to:

(1) (U) Determine the time-phased requirements for US Army forces employed with allied forces to conduct operations based on two specified scenarios.

(2) (U) Determine the planning mobility forces required to deploy the FY 1993 US Planning Forces and the US forces for the two excursion scenarios.

(U) THE BASIC APPROACH for this study can be described as follows. Using data provided by the sponsor, A Tactical, Logistical, and Air Simulation (ATLAS) Model was used to generate combat simulations where the capability of and the requirements for combat units could be evaluated. The Transportation Model (TRANSMO) simulated the strategic deployment of the US Planning Force to determine the sufficiency of lift.

(U) THE REASON FOR PERFORMING THE STUDY was to provide analytical background that will assist the Army Staff in force planning.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Operations and Plans (DCSOPS), HQDA, who established the objectives and monitored study activities.

(U) THE STUDY EFFORT was directed by LTC D. F. Roerty, Strategy, Concepts and Plans Directorate.

(U) COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director, Strategy, Concepts and Plans, US Army Concepts Analysis Agency.



MID-RANGE FORCE STUDY--CY 83 (MRFS-83)
PHASE II: OBJECTIVES (U)

ONE SHEET
STUDY GIST
CAA-SR-84-11

(U) THE PRINCIPAL FINDINGS of the work reported herein are:

(U) The Mid-Range Force Study--CY 83:

(1) (U) Provided affordable alternative forces of comparable firepower for evaluation in the selection of the 1990 Army Objective Force.

(2) (U) Broadened the scope of the MRFS methodology to include consideration of a FEBA index function, inherited assets, war reserve stocks, terrain, and different firepower potentials for Active and Reserve Component forces.

(U) NOTE: The specific findings are classified SECRET.

(U) THE MAIN ASSUMPTIONS used by this study were:

(1) (U) The projected Army total obligation authority was valid.

(2) (U) The stylized force modules used in the design model realistically represented the characteristics of actual forces.

(3) (U) The program force would evolve as projected in the POM.

(4) (U) Estimated maximum production rates and costs of new equipment were accurate.

(5) (U) The FY 85 and FY 90 Base Case forces derived from the Army Plan, FY 85-99 and the study directive, possessed the resource and composition characteristics implied in those documents.

(U) PRINCIPAL LIMITATIONS of this work which may affect the findings are:

(U) The methodology addresses only the deployable Army and does not include the general support or special mission forces. Data are only as valid as the projections for 1990 and beyond. The methodology is restricted to conventional warfare forces. It does not consider attrition or C³I. The measures of effectiveness primarily emphasize resource requirements and firepower potentials. Military judgment is required in order to consider the many nonmodeled combat effectiveness characteristics not included in those categories.

(U) THE SCOPE OF THE STUDY was an analysis of the capabilities and resource requirements of the operational forces (AC and RC) in the context of the Global Force Planning Scenario and Assumptions. Each force was defined in terms of force structure, readiness (i.e., authorized levels of organization), modernization, and sustainability.

(U) THE STUDY OBJECTIVES were:

(U) Support development of force alternatives to be considered by SA/CSA for the 1990 Objective Force to be published in the Army Plan. Continue development and improvement of the MRFS methodology.

(U) THE BASIC APPROACH for this study can be described as follows:

(U) A Base Case force structure was developed to determine data base elements and constraints for the Force Design Model (FDM). The structure, defined in terms of stylized division, nondivisional combat, and tactical support increments, was described by readiness, modernization, sustainability, and resource consumption (costs, personnel, AC/RC mix, and weights). Using the FDM, conceptual forces were designed or compared in terms of FEBA index values and resource use.

(U) THE REASONS FOR PERFORMING THE STUDY were:

(1) (U) To support development of the 1990 Objective Force for The Army Plan.

(2) (U) To continue the evolutionary development of the MRFS methodology for rapid turnaround macro-analysis of alternative forces.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Operations and Plans (DCSOPS), DAMO-SSW/ZDF, HQDA, who established the objectives and monitored study activities.

(U) THE STUDY EFFORT was directed by LTC Dennis F. Roerty, Strategy, Concepts and Plans Directorate.

(U) COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director, Strategy, Concepts and Plans Directorate (CSCA-SP).



OFFICER ASSIGNMENT SYSTEM STUDY (OASYS)

ONE SHEET
STUDY GIST
CAA-SR-84-1

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) It is feasible to combine the Women Officer Strength Model (WOSM) and Age by Grade and Pair (AGEBGPR) Model to determine how many female lieutenants should be accessed annually by allocating current authorizations among various initial specialties to meet a specific size force.
- (2) Women officers in the force can be assigned an additional specialty to reflect the position authorizations allocated to them.
- (3) Preferential distribution of interchangeable spaces within WOSM is required by specialty code within any constrained size women officer force.
- (4) AGEBGPR ages the force and determines accessions based on continuation rates, distribution of authorizations by specialty, and steady-state force size.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) The force structure, the personnel authorizations, and the associated direct combat probability coding of the Officer Force Management Models (OFMM) and submodels provide the basis for the steady-state personnel target mix of this study.
- (2) Personnel distribution, force structure, and historical data provided by MILPERCEN are valid.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) Continuation rates for female officers by specialty code are projected from existing combined male-female continuation rates.
- (2) Casualty rates are projected to be the same for each officer grade within specialty codes.

THE SCOPE OF THE STUDY included only Active Army female commissioned officers in OPMS-managed specialties.

THE STUDY OBJECTIVES were to:

- (1) Review the current methodology used to determine the accession requirements as well as initial and additional specialty (INSPEC/ADSPEC) assignments for women officers.
- (2) Define those constraints such as "set-asides," "management factors," and "grade-space ratio" that limit the number of women officer accessions.
- (3) Modify the methodology to allow flexibility in these constraints, within a rationale that is reasonable and supportable.
- (4) Evaluate the impact of the modifications on women officer accessions, INSPEC/ADSPEC assignments, and career progression.
- (5) Transport the methodology developed and/or model modifications to MILPERCEN.

THE BASIC APPROACH followed in this study was to modify existing models to define the maximum number of women officer authorizations by specialty code. These data were used to determine female officer accessions, their branching (ADSPEC) requirements, and distribution of the women officer force by grade, specialty code, and years of service.

THE REASON FOR PERFORMING THE STUDY was to provide the Army a credible method to compute the number of officer authorizations that could be filled by women and show how they could be branched into additional specialties.

THE STUDY SPONSOR was the Office of the Deputy Chief of Staff for Personnel which established the objectives and monitored study activities.

THE STUDY EFFORT was directed by Mr. Wilbert Schwartzapfel, Deputy Assistant Director, Force Systems Directorate.

COMMENTS AND QUESTIONS may be sent to CAA, ATTN: Assistant Director, Force Systems Directorate (CSCA-FS).

	RESOURCE CONSTRAINED PROCUREMENT OBJECTIVES FOR MUNITIONS (RECPOM) STUDY (U)	ONE SHEET STUDY GIST CAA-SR-84-7
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(U) THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) (U) Based on the validation comparison with P88-Europe results and the demonstration and sensitivity results, the RECPOM Model produces logical responses to realistic and varied program and budget changes, thus adequately representing a sound decisionmaking process.

(2) (U) The RECPOM Model can provide a cost effective mix, allocation and production schedule for up to 40 munitions and 22 requirement priorities when changes occur in funding, priority, production rates, or distribution of existing stockpiles as well as when munition tradeoffs are being considered.

(3) (U) A typical response time to queries not requiring model restructuring or major data base changes is less than 2 weeks.

(4) (U) The RECPOM Model cannot currently accept manual munition allocation, vary munition average unit cost with changes in production quantity, or reconcile the effects of not killing all required enemy targets.

(U) THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

(1) (U) The Army will continue to require more munitions than it can afford.

(2) (U) The nature of the Planning, Programing, Budgeting and Execution System (PPBES) process will continue to require numerous conditional examinations of alternative munition procurements with limited time available for substantial analysis.

(U) THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

(1) (U) Munition transportation and storage constraints are not addressed.

(2) (U) The impact of funding and other resource changes is oriented toward POM development and analysis and thus is shown relative to the program force only.

(3) (U) For the demonstration phase, a selected set of high-dollar, high-visibility munitions has been considered representative of Army munitions over the FY 84-88 program period.

(U) THE SCOPE OF THE STUDY was taken to include that the methodology developed be sufficiently flexible to address program or budget issues and that it be suitable for quick turnaround analysis.

(U) THE STUDY OBJECTIVES were:

(1) (U) To develop a methodology for determining within constrained funding and production levels the most effective mix and quantity of conventional munitions to support the total Army worldwide requirement.

(2) (U) To demonstrate the methodology for assumed constrained funding levels using data from the P88 Europe Study as a baseline.

(U) THE BASIC APPROACH followed in doing this study can be described as follows: A set of war reserve, training, and test munition goals is prioritized consistent with Army force packaging priorities and established munition requirements. The methodology centers around a goal program allocation model which satisfies the prioritized goals considering munition unit cost and consistent with program-budget fund limitations and munition production capacity.

(U) THE REASONS FOR PERFORMING THE STUDY are mainly as follows: This study responds to a need for an expeditious method to aid in munition allocation decisions and an assessment of their impact because of frequently changing priority and funding guidance during the PPBES cycle.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Operations and Plans who sponsored the work, established the objectives, and monitored study activities.

(U) THE STUDY EFFORT was directed by Mr. Ronald J. Iekel, Requirements and Resources Directorate, CAA.

(U) COMMENTS AND QUESTIONS may be sent to the Assistant Director for Requirements and Resources, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814.



AIRCRAFT SPARE STOCKAGE METHODOLOGY (AIRCRAFT SPARES) STUDY

ONE SHEET
STUDY GIST
CAA-SR-84-12

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) Current spares forecasting methodologies are peacetime, steady-state oriented. They address primarily fill rate rather than system availability objectives. They are cumbersome, fragmented, and slow.
- (2) Five models were evaluated as candidate methodologies for forecasting wartime spares requirements. A complementary use of two of the models, Overview and PARCOM, can provide quick (about a day) answers to POM-related questions on wartime spares replenishment needs and costs subject to flying hour and readiness objectives.
- (3) Overview and PARCOM do not play "partial substitution," multi-echelonment, or indenture; they have a limited capability for playing budget constraints; and they cannot make probability or confidence-limit statements. These shortcomings are not considered critical to the sponsor's immediate objectives (quick turnaround analysis, requirements approximations, and identification of problem parts).
- (4) A third model, Dyna-METRIC, appears capable of more detailed answers to a broader spectrum of questions than Overview and PARCOM, but may have problems with theater-level representations. Time did not permit testing Dyna-METRIC.
- (5) Assuring the currency and validity of the data for input to the models is essential and would be augmented by establishment of a centralized data base and data collection system.

THE MAIN ASSUMPTIONS were:

- (1) That the estimates of repair times and order/ship time derived from peacetime operations can be extrapolated to wartime values.
- (2) That wartime logistics support will be provided as currently planned.
- (3) That, with expected warning times, aircraft availability at the beginning of a war can be made to approach 100 percent, as required by the models.

THE PRINCIPAL LIMITATION of the study was that the Rand-developed Dyna-METRIC Model was not tested due to time constraints.

THE SCOPE OF THE STUDY addressed the effects of the Army aviation parts supply system on the ability to achieve a postulated wartime flying program. The study used the AH-1S helicopter fleet and spares inventory in a European scenario as an illustrative case.

THE STUDY OBJECTIVES were:

- (1) To examine the current methodology for forecasting spare parts requirements.
- (2) To identify candidate predictive methodologies for relating aircraft parts requirements to wartime capability.
- (3) To provide demonstration computer runs and analytical computations to illustrate the possible methodologies.

THE BASIC APPROACH was to determine and screen alternative methodologies and to select the most promising for demonstration. The demonstration consisted in answering a test set of questions, to include:

- (1) An assessment of the capability of the current parts inventory to support a wartime flying hour program.
- (2) An estimate of wartime spare requirements and their associated costs.
- (3) An estimate of the effects of variations in spare part funding on the ability of the force to meet flying hour requirements throughout a conflict.

THE REASON FOR PERFORMING THE STUDY was, mainly, to provide the Army with an analytical tool for quick reaction, gross estimation of wartime spare parts requirements and costs as they relate to flying hour and availability objectives. An ability to identify problem parts and possible causes of the problems was also desired.

THE STUDY SPONSOR was the Deputy Chief of Staff for Logistics, Headquarters, Department of the Army.

THE STUDY EFFORT was directed by Mr. Saul L. Penn, Force Systems Directorate, US Army Concepts Analysis Agency.

COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director for Force Systems (CSCA-FS), US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814.



SOUTHWEST ASIA PIPELINE STUDY

ONE SHEET
STUDY GIST

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) When there was an expanded use of pipeline in SWA, the number of medium truck companies (POL) required to move petroleum was reduced.
- (2) With the greater use of pipeline in SWA, the requirement for other POL related units including engineer construction and quartermaster petroleum units increased.
- (3) The overall personnel space requirement was lower when only trucks were used to move petroleum.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

- (1) The 900 miles of new pipeline will be available.
- (2) POL related units will be ready at POE.
- (3) Sufficient time will be available to lay the system.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) US Air Force population data used for POL consumption were best estimates.
- (2) The model cannot represent the redeployment of engineer construction units once the pipeline is constructed.

THE SCOPE OF THE STUDY was to compare two cases where the amount of pipeline used in SWA was expanded over previous levels and no pipeline.

THE STUDY OBJECTIVE was to determine force structure requirement change given an increased use of pipeline in SWA.

THE BASIC APPROACH followed in performing this study can be described as follows: Adjustments were made to the TAA-90 SWA FASTALS scenario following the guidelines and data provided by the study sponsor, ODCSLOG. Two comparative cases were developed for the SWA pipeline analysis. A detailed analysis was made of the support force requirements.

THE REASON FOR PERFORMING THE STUDY is as follows: the Army plans to expand the use of pipeline in SWA and has programed the purchase of a 900-mile system with ancilliary equipment for use in SWA. CAA was asked to determine the force structure implications of the planned pipeline expansion in SWA.

THE STUDY SPONSOR was the Army Energy Office, ODCSLOG, DA.

THE STUDY EFFORT was directed by LTC Elijah Toney, Support Forces Division. Forces Directorate.

COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director, Forces Directorate (CSCA-F0).



ARMY LONG RANGE APPRAISAL - TRENDS
ANALYSIS
(ALRA-TA)

ONE SHEET
STUDY GIST
CAA-SR-84-13

(U) THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) (U) The global trends identified in the Prototype Army Long Range Appraisal (PALRA) and the Georgetown Center for Strategic and International Studies (CSIS) report are, in general, mutually supportive. There is considerable disagreement between the two documents when dealing with regional and national trends. A significant omission in the CSIS study is the lack of trends concerning the strategic US position regarding minerals and metals.

(2) (U) The DOD/Army trends identified in PALRA are supported almost entirely by the planning guidance contained in the current editions of the Defense Guidance (DG), The Army Plan (TAP), the Program Objective Memorandum (POM), and the Extended Planning Annex (EPA). The PALRA trends which were not supported pertain to the Reagan Budget, the quality of manpower, the size of divisions, commander's responsibilities, and medical support.

(3) (U) A description of the US Army in the year 2004 is presented. This description is based on the assumption that the trends presented as valid in the report will remain valid and that current plans concerning the evolution of a lighter, yet larger, more firepower intensive force structure for both Active Component (AC) and Reserve Component (RC) will have been substantially fulfilled.

(U) THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

(1) (U) There will be no general war prior to 2004.

(2) (U) The functions encompassed by the DOD Planning, Programing, Budgeting, and Execution System (PPBES) will continue to be performed during the period covered by ALRA-2004.

(U) THE PRINCIPAL LIMITATIONS of this work are as follows:

(1) (U) The study was conducted by comparing PALRA trends to specified source documents and rendering a decision concerning the validity of that trend based on a subjective analysis.

(2) (U) The specified source documents represent only a small sample of the documents which could yield descriptive trend data.

(U) THE SCOPE OF THE STUDY was to review, validate, and augment the trends developed in PALRA and to coordinate the findings with the appropriate agencies on the Army Staff. Sources used include the Georgetown CSIS Strategic Requirements for the Army to 2000 Study, the Defense Guidance, The Army Plan, Program Objective Memorandum, and Extended Planning Annex.

(U) THE STUDY OBJECTIVES were:

(1) (U) To identify major global and national trends which could have significant impact on US Army requirements in the long-range period.

(2) (U) To develop, document, and coordinate an appraisal of where the US Army is committed to be in 20 years.

(3) (U) To use the information developed in accomplishing the first two objectives as a basis for participation in the Long-Range Planning System Working Group (LRPS WG) development of Long-Range Priority Problem Areas (LRPPA).

(U) THE BASIC APPROACH followed in this study was to state the PALRA trend, comment on its validity when subjectively compared to the specified sources, and provide the reference data to support the comment. In this process some emerging trends were noted and cited for the information of the LRPS WG. The validated trend data became the foundation for the description of the Army 2004 which represents a summary of the study effort.

(U) THE REASONS FOR PERFORMING THE STUDY were mainly as follows: to provide the ALRA-2004 LRPS WG an assessment of Global, DOD, and Army Trends, with a description of the Army 2004, in order to provide the basic groundwork for the prioritization of problem areas required to conduct ALRA-2004.

(U) THE STUDY SPONSOR was the ALRA-2004 Project Director, Long-Range Planning Group, Strategy, Plans and Policy Directorate, Office of the Deputy Chief of Staff for Operations and Plans.

(U) THE STUDY EFFORT was directed by Dr. Robert O. Slagle and MAJ A. W. Beaton of the Strategy, Concepts and Plans Directorate, CAA.

(U) COMMENTS AND QUESTIONS may be sent to the Assistant Director for Strategy, Concepts and Plans, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, Maryland 20814.

	EFFECTIVE DATE (E-DATE) MODEL ENHANCEMENT (EME)	ONE SHEET STUDY GIST CAA-SR-84-17
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THE PRINCIPAL FINDINGS are that the enhanced E-DATE Model now has the capability to:

- (1) Introduce unprogramed units into the force, in the fiscal year (FY) desired.
- (2) Include equipment substitutions identified by the Total Army Equipment Distribution Program (TAEDP) in the computation of unit readiness.
- (3) Process units with no effective limit on the number involved.
- (4) Process units programed for conversion.
- (5) Interface readily with the user.

THE MAIN ASSUMPTIONS were that the TAEDP can be used as a source of table of organization and equipment (TOE) data for the unprogramed units. That is, that the TOEs are present in the data and that the required quantities of each item of equipment are complete and accurate.

THE PRINCIPAL LIMITATIONS are:

- (1) Prototype units are extracted as they are found in TAEDP with no provision for additions, deletions, or adjustment of the TOE values.
- (2) The number of substitute items of equipment associated with an authorized item is limited to the first two encountered. Any additional substitutes which may be present are not processed.

THE SCOPE OF THE STUDY was limited to the five specifically identified enhancements.

THE STUDY OBJECTIVES were:

- (1) Develop an unprogramed unit enhancement.
- (2) Develop an equipment substitution enhancement.

(3) Eliminate the current 400-unit limitation on the number of units which can be rated in a fiscal year.

(4) Process units shown as conversions in TAEDP data.

(5) Develop a user-friendly computer utility program to facilitate use of the model.

THE BASIC APPROACH was tailored to the needs of each enhancement. The unprogramed units enhancement required additional logic to extract the data from the TAEDP tape per the user specifications. The equipment substitution required additional logic to group the LIN and its substitutes into a LIN-SET and to then process this LIN-SET through rating and redistribution. The 400-unit limitation required logic to pass the rating data to mass storage and later retrieve it for display purposes.

THE REASONS FOR PERFORMING THE STUDY were to extend the E-DATE Model capability into areas of interest identified during the original and early operation of the model.

THE STUDY SPONSOR was the Director, Plans and Operations, Office of the Deputy Chief of Staff for Logistics (ODCSLOG).

THE STUDY EFFORT was directed by Mr. James J. Connelly, Force Systems Directorate.

COMMENTS AND QUESTIONS may be directed to US Army Concepts Analysis Agency, ATTN: Assistant Director for Force Systems (CSCA-FS), 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.



JOINT PROGRAM ASSESSMENT MEMORANDUM
(JPAM) FY 86-93 ARMY MOBILITY ANALYSIS

ONE SHEET
STUDY GIST

(U) THE PRINCIPAL FINDINGS. Differences in the movement requirements occurred between this study and the previous study. These were primarily due to changes in the forces and in consumption and replacement rates.

(U) THE MAIN ASSUMPTIONS

- (1) (U) That the force used was correctly rounded and time-phased.
- (2) (U) That the consumption and resupply rates were applicable to the scenarios used.
- (3) (U) That unit strength and weight characteristics contained in the Type Unit Characteristics Army (TUCHA) file are similar to those of a 1986 and 1990 force.

(U) THE PRINCIPAL LIMITATIONS

- (1) (U) The study was concerned with only the 1986 and 1990 projected Army POM forces.
- (2) (U) The draft Defense Guidance FY 1986-1990 provided the scenario for this study.

(U) THE SCOPE OF THE STUDY. The data base that was produced detailed the Army strategic movement requirements for unit equipment, resupply cargo, and replacement personnel for the 1986 and 1990 projected POM forces.

(U) THE STUDY OBJECTIVE was to develop the 1986 and 1990 projected POM Army movement requirements data base for use in the JPAM Mobility Analysis conducted by J-4, OJCS, during the period April-May 1984.

(U) THE BASIC APPROACH followed by this study was as follows. The Computer Assisted Match Programs (CAMP) is the ADP system which produces the movement requirements data base. CAMP takes a force for a given scenario, creates unit records with deployment weights and strengths, and generates nonunit requirements (based on theater strength) in terms of resupply cargo and ammunition and replacement personnel to support the force. Major data elements to produce the final product include the force in Force Accounting System (FAS) format, the Type Unit Characteristics Army (TUCHA) file, POMCUS file, and Army location (ARLOC) file. Delivery dates for and amount of nonunit movement requirements of personnel (filler and replacement) and resupply (dry cargo, ammunition, and bulk POL) are calculated by CAMP based on factors provided by the study sponsor.

(U) THE REASON FOR PERFORMING THE STUDY was to provide the Army movement requirements for use by the J-4, OJCS, in the JPAM Mobility Analysis.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Logistics.

(U) THE STUDY EFFORT was directed by Ms Margaret Loudin, Strategy, Concepts and Plans Directorate.

(U) COMMENTS AND QUESTIONS may be sent to the Assistant Director for Strategy, Concepts and Plans Directorate, US Army Concepts Analysis Agency.

	METHODOLOGY FOR ALTERNATIVE SUPPORT STRUCTURES (MASS)	ONE SHEET STUDY GIST CAA-TP-84-5
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THE PRINCIPAL FINDINGS of the work are:

- (1) A mathematical programming formulation of the Force Analysis Simulation of Theater Administrative and Logistics Support (FASTALS) Model can produce alternative support structures and sufficient additional detail to address support force structure issues.
- (2) The model is driven by the same data base as FASTALS, eliminating the potential need for parallel data gathering and formatting.
- (3) The Sperry UNIVAC Functional Mathematical Programming System (FMPS) meets the methodology's requirement for numerous solutions of large linear programming problems (>6,000 constraints) wherein the solution at each time period generates additional constraints (bounds) for subsequent solutions.

THE PRINCIPAL LIMITATIONS. The model design has maximum compatibility with current warfighting and force structure models and existing data bases. Portrayal of administrative and logistics functional areas in the model are those currently depicted in FASTALS.

THE SCOPE OF THE STUDY included a review of all available methodologies capable of addressing force structure issues to determine their applicability to the principal study objective. Having determined that no single model could satisfy all analytical requirements, a new model development effort was carried out.

THE STUDY OBJECTIVE. Develop a single model for the analysis and determination of force structures capable of operating in several modes.

- (1) The requirements mode will duplicate and/or improve on existing force structure methodologies used in support of studies, such as Total Army Analyses. Given a combat force and certain workloads which must be accomplished, a complete statement of CS and CSS unit requirements over time will be determined.
- (2) The capabilities mode inherent to this model can provide assistance in gaining insights into potential support imbalances of existing or planned force structures. The planner can make decisions regarding shifts of resource allocation or determine which areas need further analysis for alternative means of meeting requirements, such as improved support procedures or seeking offsets against the requirements (i.e., host nation support).

(3) A constrained force analysis capability will assist decisionmakers in "spreading the shortfall" in a balanced support fashion should the necessity to consider resource constraints, such as manpower, become an overriding factor in a force structure requirements determination.

THE BASIC APPROACH of this model development was to transform the Army's principal force structure analysis tool, the FASTALS Model, into a mathematical programming formulation. The model uses the computational framework of FMPS to solve several support force-oriented problems.

THE REASONS FOR PERFORMING THE STUDY were to provide the Army with a force structure methodology to (1) determine CS and CSS unit requirements of a combat force, (2) provide insights into support structure imbalances of current or planned forces, and (3) assist planners in meeting constraints while maintaining maximum combat capability.

THE STUDY SPONSOR was the Director, US Army Concepts Analysis Agency, who sponsored the work, established the objectives, and monitored study activities.

THE STUDY EFFORT was directed by Mr. Howard G. Whitley, Forces Directorate. The study team members are MAJ Herb C. Clifton, Ms Rosie H. Brown, Mr. Robert C. Spiker, MAJ A. C. (Gus) Manguso, and Mr. Richard E. Tuck.

COMMENTS AND QUESTIONS may be sent to the Assistant Director for Forces, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814.

	MULTI-ECHELON STOCKAGE ANALYSIS (MESA)	ONE SHEET STUDY GIST CAA-SR-84-14
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THE PRINCIPAL FINDINGS of the work reported herein are as follows:

a. The Major Assemblies Stockage System (MASS) computes less expensive inventories of reparable items than does the RIMSTOP Model while achieving the same anticipated level of operational availability.

b. The tuning knob mechanism used in RIMSTOP to adjust the model's computations so that a specified inventory performance parameter will be met is ineffective in tuning RIMSTOP when the desired performance from the inventory is to produce a specified level of operational availability for the least cost.

c. Inventory models which compute stockage intended to result in achievement of a specified level of operational availability should be multi-echelon so that all possible sources of nonavailable time are included in the model.

THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

a. The arrivals of demands from the consumer for reparable items are Poisson distributed.

b. The ranges of the values assigned to the various supply environment variables--demand, order ship time, repair cycle time, and percentage repaired--at each level of repair represent reasonable real-world values.

c. There will be no interchange of reparable major assemblies among different end items.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

a. The comparison of the two models was done with simulated data. No field testing of either model was done.

b. The comparison of the two models was based on data for only four major end items; however, the results should hold for any end item.

THE SCOPE OF THE STUDY was to evaluate the MASS multi-echelon model in comparison to the RIMSTOP stockage criteria in DODIs 4140.44 and 4140.46.

THE STUDY OBJECTIVES were:

- a. Determine the appropriate performance parameters by which MASS is to be evaluated.
- b. Conduct sensitivity analyses of MASS compared to the RIMSTOP policy as applied to reparable items.
- c. Assess the performance capabilities and limitations of MASS.
- d. Appraise the applicability of the methodologies, resources, and data management requirements of this analysis to the general process of evaluating other multi-echelon models that may be developed.

THE BASIC APPROACH followed in doing this study was to conduct a formal experiment which allowed the two models to be compared based on 243 different supply environment conditions. These supply environment conditions were defined by varying demand, repair cycle time, order ship time, and the percent of items locally repaired at both DS and GS levels. Each model was tuned to produce an inventory stockage list under each of the 243 different supply environments which should lead to an anticipated operational availability for selected end items of 90 percent. Each model was also tuned to produce operational availabilities ranging from 70 percent to the maximum attainable under common supply conditions. The costs of the inventories were then compared to identify the most economical stockage list. The sizes of the inventories, the amount of change in the types of items stocked, and the distribution of the inventory between the DS and GS levels of maintenance were also compared.

THE REASONS FOR PERFORMING THE STUDY were mainly as follows: it is a long-range objective of the ODCSLOG to develop a comprehensive stockage policy which fully integrates, both horizontally and vertically, all echelons of support activities in a force and which optimizes cost, end item availability, transportability, and other significant supply system parameters. The Army Inventory Research Office (IRO) has been conducting research in the area of multi-echelon supply models with the long-range objective of developing an analytical multi-echelon inventory model. IRO has developed a basic two-echelon inventory model, MASS, for use on a microcomputer. The ODCSLOG requested an evaluation of this model in comparison with the RIMSTOP policy as a means of assessing the effectiveness of it.

THE STUDY EFFORT was directed by Major Robert T. Blake Jr., Force Systems Directorate, US Army Concepts Analysis Agency.

COMMENTS AND QUESTIONS may be directed to US Army Concepts Analysis Agency, Assistant Director for Force Systems (CSCA-FSL), 8120 Woodmont Avenue, Bethesda, MD, 20814.



ANALYTICAL SUPPORT TO EUROPE
(ASTOE) (U)

ONE SHEET
STUDY GIST
CAA-SR-84-19

(U) THE PRINCIPAL FINDINGS

(1) (U) The projected combat support/combat service support (CS/CSS) structure is inadequate to support the NATO station listed combat units in FY 85 due to unit shortfalls. Available structure (strength) in each functional area as a percent of the required level is as follows:

- Engineer - 37 percent
- Medical - 57 percent
- Supply and Service - 32 percent
- Maintenance - 39 percent
- Signal - 22 percent
- Military Police - 51 percent
- Military Intelligence - 60 percent
- Psychological Operations - none
- Transportation - 58 percent

(2) (U) The projected CS/CSS structure is adequate to support the US Army NATO AFCENT M+10 Essential Force in FY 90, except as follows (percent of required):

- Engineer - 55 percent
- Maintenance - 90 percent
- Signal - 67 percent
- Military Police - 88 percent
- Transportation - 74 percent

(U) THE MAIN ASSUMPTIONS on which the study is based are as follows:

(1) (U) Existing data bases, modified and used to represent the designated combat forces specified by the study sponsor, are adequate.

(2) (U) Combat intensities and consumption factors, adjusted to reflect combat activity specified by the sponsor, are appropriate.

(U) THE PRINCIPAL LIMITATIONS

(1) (U) Sponsor specified combat activity levels used in NATO AFCENT requirements analyses are not representative of profiles obtained in CAA warfighting simulations.

(2) (U) The Force Analysis Simulation of Theater Administrative and Logistics Support (FASTALS) Model used in the study is limited in its ability to determine support force requirements for a small, independently deploying combat force. Numerous adjustments by functional area analysts were necessary to overcome this problem.

(3) (U) The flank excursions were run using existing data base inputs reflective of similar geographical areas and intratheater lines of communications location.

(U) THE SCOPE OF THE STUDY

(1) (U) Determine the CS/CSS requirements for the station listed US Army combat force in NATO AFCENT in FY 85 and evaluate based upon the projected force list.

(2) (U) Determine the CS/CSS requirements for the US Army NATO AFCENT M+10 Essential Force in FY 90 and evaluate based upon USAREUR's proposed FY 90 M+10 Essential Force.

(3) (U) Develop force packages for units deployed on NATO's flanks, i.e., one airborne division (south), one mechanized division (south), one mechanized brigade (south), one mechanized division (north), and one infantry division (north).

(U) THE BASIC APPROACH followed in this study was to deploy the designated force and utilize the FASTALS Model in a requirements mode to round out the combat force with the required CS/CSS units.

(U) THE REASON FOR PERFORMING THE STUDY was to assist HQ USAREUR in reviewing their TPFDL and contingency force packages.

(U) THE STUDY SPONSOR was HQ USAREUR and 7th Army.

(U) THE STUDY EFFORT was directed by Mr. Raymond G. McDowall Jr., Forces Directorate.

(U) COMMENTS AND QUESTIONS may be sent to US Army Concepts Analysis Agency, ATTN: Assistant Director, Forces Directorate (CSCA-FO), 8120 Woodmont Avenue, Bethesda, MD 20814-2797.



ARMY INDUSTRIAL FUND ANALYTICAL STUDY
(AIFAS)

ONE SHEET
STUDY GIST
CAA-SR-84-15

THE PRINCIPAL FINDINGS of the work reported herein are as follows:

- (1) The alternative to the current Army Industrial Fund (AIF) financial management system, which is to track the supply function separately by appropriation, would increase the annual financial management costs of the AIF installation as well as require initial implementation costs.
- (2) The alternative would disrupt the current financial management process since two financial management systems would be in operation at the installations adding to management complexity.
- (3) The alternative may decrease the cost control capability of the installation commander.
- (4) The implementation of the alternative would not have a significant impact above the installation level.
- (5) The alternative would improve ability of the installations to respond to DA appropriated fund inquiries.

THE MAIN ASSUMPTIONS of this work which may affect the findings are as follows:

- (1) Research and development will not be funded under AIF with the exception of the US Army Missile Command (MICOM).
- (2) Definition of AIF functions will remain unchanged during the study period.
- (3) HQDA will continue to support AIF activities.

THE PRINCIPAL LIMITATIONS of this work which may affect the finding are as follows:

- (1) Only the Army Industrial Fund is considered in detail.
- (2) Detailed accounting procedures for managing the fund are not addressed.
- (3) Only the supply function is removed from the AIF and tracked by appropriation in the alternative.

THE SCOPE OF THE STUDY was taken to include a cost-benefit study to evaluate the alternative using the current financial management of AIF activities as the base case. A qualitative examination of the current process and the alternative was made.

THE STUDY OBJECTIVES were:

- (1) To review and evaluate the current AIF financial management system.
- (2) To define an alternative financial management system retaining AIF, but with the supply function tracked by appropriation, and evaluate its costs and benefits compared to the current system.

THE BASIC APPROACH in doing this study can be defined as follows:

- (1) A cost-benefit comparison of an alternative with supply function separately tracked by appropriation versus the current AIF system was made by:
 - (a) Using an unequal cost/equal benefit approach.
 - (b) Selecting AIF installation groups and typical installations to represent all installations in the group.
 - (c) Performing a detailed analysis of typical installations.
 - (d) Generalizing results to all other installations in groups.
- (2) The study also examined the current financial management systems for AIF from the installations through HQDA level.
- (3) Examination of the industrial funds for other services, e.g., Navy and Air Force, was performed at HQDA level to review other possible management systems for AIF.
- (4) The study examined other functions within the AIF and made recommendations on additional studies and implementation.

THE REASON FOR PERFORMING THE STUDY is that the Army is confronted with the recurring need to justify the retention of certain functions in the AIF. During the budget process, OSD has suggested that the Army separate the supply function from the AIF in the budget. A cost-benefit study may indicate whether or not the financial management would be more cost effective if the supply function was removed from the AIF.

THE STUDY SPONSOR was the Deputy Chief of Staff for Logistics, who sponsored the work, established the objectives, and monitored study activities.

THE STUDY EFFORT was directed by Kenneth R. Simmons, Requirements and Resources Directorate.

COMMENTS AND QUESTIONS may be sent to the Assistant Director for Requirements and Resources, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814-2797.



CONTINGENCY FORCE
ANALYSIS DEMONSTRATION - OPLAN 1004
(CFA DEMO - 1004) (U)

ONE SHEET
STUDY GIST
CAA-SR-84-21

(U) THE PRINCIPAL FINDINGS of the work reported herein are:

(1) (U) The demonstration determined operations plan analysis requirements to include a measure of territory held, personnel casualties, classes of weapons and supplies consumed, and generation of alternative forces and courses of action.

(2) (U) The demonstration validated the CFA facility method of operation using an interactive simulation model in conjunction with a linear programming model.

(3) (U) The demonstration served as a training vehicle for the US Army Concepts Analysis Agency (CAA) and Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) participants.

(U) THE MAIN ASSUMPTIONS for the OPLAN 1004 are listed in the plan.

(U) THE PRINCIPAL LIMITATIONS of this methodology which may affect the findings are:

(1) (U) The nature of interactive wargaming limits both the scope and resolution of analysis to aggregated weapons and unit types and a limited number of player actions.

(2) (U) The McClintic Theater Model-Plus (MTM+), which was more than doubled in size, including RAMTEK dynamic graphics displays, allows much greater ability for the player to replicate a plan; however, validation of the attrition algorithm and other necessary upgrading needs to be accomplished before the output can be considered valid for more than demonstration purposes.

(U) THE SCOPE OF THE STUDY was to evaluate the capability of the allocated forces in OPLAN 1004 to execute and sustain the plan considering that the output of MTM+ was for "demonstration purposes only."

(U) THE STUDY OBJECTIVES were to conduct a demonstration of methodology using the interactive wargaming simulation (MTM+) and the linear programming model, Contingency Force Analysis Methodology (CFAM), to determine requirements, procedures, and type of reporting desired for an OPLAN analysis.

(U) THE BASIC APPROACH was to model a base case in both MTM and CFAM Models, conduct an excursion with additional forces provided by the sponsor, and a replication of the excursion for a test of player variability. An additional alternative force was provided by the CFAM Model for wargaming in MTM+ as a test of response to a crisis action situation.

(U) THE REASON FOR PERFORMING THE STUDY was to demonstrate for the first time the procedures and requirements necessary for the CFA facility wargaming model and companion resource allocation model.

(U) THE STUDY SPONSOR was the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS) (DAMO-SSW), who sponsored the work, established the objectives, and monitored the study activities.

(U) THE STUDY EFFORT was directed by COL W. Heyman, Strategy, Concepts and Plans Directorate.

(U) COMMENTS AND QUESTIONS may be sent to the Assistant Director for Strategy, Concepts and Plans, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814.



MEASURING IMPROVED CAPABILITIES
OF ARMY FORCES (MICAF) STUDY (U)

ONE SHEET
STUDY GIST
CAA-SR-84-20

(U) THE PRINCIPAL FINDINGS of the work reported herein were:

(1) (U) A process for measuring and reporting changes in potential warfighting capabilities has been developed and demonstrated for armored and mechanized infantry divisions for FY 80-84.

(2) (U) Initial computational results reflect the following:

(a) (U) A J-series mechanized division equipped with modernized items available in FY 84 increased in potential capability 58 percent over an H-series division with 1980 equipment. The division with modernized systems possesses significant increases in potential capabilities for a conflict at night and in three of four tactical postures analyzed.

(b) (U) Changes in divisional capabilities are dependent on the introduction rate of new items and changes in force structure. Since 1980, two divisions, 2AD and 3ID, have been the leading divisions in receiving modernized items; the increase in their potential capabilities from FY 80 to FY 84 is 31 percent and 42 percent, respectively. Other active heavy divisions, because of a slower rate of modernization or force structure changes, show smaller increases in capabilities.

(c) (U) Armored and mechanized infantry divisions increased their potential war-fighting capabilities by an average of 21.5 percent from FY 80 to FY 84.

(U) THE MAIN ASSUMPTIONS

(1) (U) Equipment used by US and opposing units will be operated by adequately trained personnel.

(2) (U) For the purpose of assessing combat potential, divisional combat can be represented by many, largely independent, type-on-type duels.

(U) THE PRINCIPAL LIMITATIONS

(1) (U) Computed potential warfighting capabilities are based principally on selected major items possessed by an organization; shortages of spare parts, lack of training, or other limitations to achieving full potential are not reflected in the estimate of potential capabilities.

(2) (U) Estimates of potential are partially dependent on subjective inputs such as target preferences, range distributions, and the frequency of selected environmental conditions and tactical operations.

(3) (U) The MICAF methodology is sensitive to equipment inventories but not to different organizations with the same inventory.

(4) (U) The measurement process considers sustainability only from a near-term perspective of the capabilities within the division to perform selected combat support/combat service support (CS/CSS) activities.

(U) THE SCOPE OF THE STUDY was to develop and initially apply a process reflecting the quantitative changes in potential warfighting capability resulting from modernization of Army forces.

(U) THE STUDY OBJECTIVES were to:

(1) (U) Develop a reporting procedure that employs an analytically based quantitative method of measuring changes in force capabilities resulting from the introduction of new items, units, and organizations.

(2) (U) Demonstrate application of the reporting procedure for selected units scheduled to receive new items of equipment.

(3) (U) Develop guidelines for implementation of a measurement and reporting process.

(U) THE BASIC APPROACH used was, first, to develop a list of the type and quantity of US and threat divisional items. Item characteristics, such as single shot kill probabilities, were used as inputs to a duel-oriented computational process. Exchange ratios were estimated from the results of type-on-type duels simulated in each of 16 different combinations of environmental conditions and tactical operations. These estimates were influenced by divisional CS/CSS resources in a special computation step called "CS/CSS modulation" that provided a divisional score. Weighting factors were applied to each of the scores based on the expected frequency of environmental/tactical operation combinations to develop the combat organizational potential (COP). Computation and display of the COP for all Army divisions at successive points in time provides an indication of change in potential warfighting capabilities of the Army.

(U) THE REASONS FOR PERFORMING THE STUDY. Army modernization programs are underway which will improve the Army's warfighting capabilities. At the present time, no system exists to measure, report, and monitor this increased capability. The MICAF Study was initiated to correct this problem.

(U) THE STUDY SPONSOR was the Director for Operations, Readiness, and Mobilization, ODCSOPS.

(U) THE STUDY EFFORT involved two CAA studies: Mr. Joseph E. Koletar, Jr., is responsible for Measuring Improved Capabilities of Army Forces (MICAF); Mr. Gerald E. Cooper is directing The Analysis of Force Potential (AFP) Study.

(U) COMMENTS AND QUESTIONS may be directed to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Requirements and Resources (CSCA-RQ), 8120 Woodmont Avenue, Bethesda, MD 20814-2797.



MOBILIZATION BASE REQUIREMENTS MODEL (MOBREM) STUDY

STUDY
SUMMARY
CAA-SR-84-22

THE REASON FOR PERFORMING THE STUDY. The Army required a responsive, consistent, and auditable system for determining the CONUS resources required to support mobilization.

THE PRINCIPAL FINDINGS

- (1) MOBREM incorporates a single source automated data base that integrates the essential elements of information for allocating the workloads and assets planned for the CONUS Base during mobilization.
- (2) Operation of MOBREM has produced mathematically-derived, workload-based output reports that can support mobilization table of distribution and allowances (MOBTDA) guidance from Headquarters, Department of the Army (HQDA) to the major Army commands (MACOM) and HQDA evaluation of MACOM submissions in response to guidance.
- (3) MOBREM provides an automated means for comparing alternative CONUS Base mobilization policies.
- (4) Although improved manpower requirements equations were developed during the study, a need remains for new equations and additional field evaluation.

THE MAIN ASSUMPTIONS

- (1) The Department of the Army (DA) mobilization planning systems (e.g., MTBSP, TAADS, TAEDP, ATRRS) provide an authoritative source on which to base the requirements computations.
- (2) The CONUS installations are organized in conformance with Army management structure code requirements (AR 37-100).
- (3) A HQDA mobilization planning system will be established to implement MOBREM.

THE PRINCIPAL LIMITATIONS

- (1) MOBREM currently operates in the requirements mode, i.e., it does not constrain requirements by the availability of resources or by facility capabilities.
- (2) There is no resources optimization capability. MOBREM will not allocate scarce resources to installations or allocate deploying units to installations in an optimal manner.

(3) Current MOBREM inputs do not consider expansion of the force structure or industrial base.

THE SCOPE OF THE STUDY. The MOBREM study effort has been directed toward the analysis of full mobilization planning, i.e., the identification and integration of data in the DA planning systems that allocate mobilization workloads and assets to the CONUS Base installations and the identification and sizing of CONUS Base functions that provide the support for a NATO/Warsaw Pact scenario requiring full mobilization response.

THE STUDY OBJECTIVES are to:

- (1) Provide the Army with a single source automated data base that will identify the time-phased mobilization workloads and assets for the CONUS Base.
- (2) Develop a model which will compute mathematically derived, workload-based CONUS Base manpower required to mobilize, train, deploy, and sustain the Army during mobilization.
- (3) Provide an automated means for evaluating CONUS Base mobilization policies.
- (4) Improve CONUS Base manpower requirements equations.

THE BASIC APPROACH

- (1) The approach taken to model development was initially to define the data requirements, the output reports, and the logic necessary to model the MOBTDA development process.
- (2) A functional design was developed and approved by the sponsor, after which programs were written and tested using hypothetical test data.
- (3) After acceptance by the sponsor of test data results, actual input data were collected from automated and manual sources; and the model operated to produce test reports for field evaluation by potential users.
- (4) As a result of field evaluations, data and program modifications were made to bring the model to operational level.
- (5) Operational runs of the model were used to verify the functional design, and a complete set of output reports was provided to the study sponsor in May 1984.

THE STUDY SPONSOR is the Force Development Directorate of the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS).

THE STUDY EFFORT was directed by Mr. F. Gordon Barry, Forces Directorate.

COMMENTS AND QUESTIONS may be directed to US Army Concepts Analysis Agency, ATTN: Assistant Director for Forces, 8120 Woodmont Avenue, Bethesda, MD 20814-2797.

 PROJECT 45	STUDY SUMMARY
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THE REASON FOR PERFORMING THE STUDY is mainly as follows: recent exercise reports indicated that air space management and air defense C³ may not adequately prevent engagement of friendly and neutral aircraft by friendly air defense systems and ensure engagement of hostile aircraft. Of principal concern was the complexity of airspace control plans and performance of combat identification systems.

THE PRINCIPAL FINDINGS of the work are as follows:

- (1) Significant problems exist in Central European airspace management and air defense, command, control, and communications.
- (2) The Allied Air Forces Central Europe (AAFCE) OPLAN 35001-M is a complex plan which is difficult for airspace users to comply with.
- (3) Identification friend or foe (IFF) systems have a low performance reliability.
- (4) Airspace management in the forward area is not an effective process.
- (5) The consequences of the airspace management and air defense C³ problem are reduced attrition of hostile aircraft and increased losses of friendly aircraft from supporting ADA.
- (6) Many of the problems in airspace management and air defense C³ can be solved through training and procedural changes. Solution of other problems required development of materiel.
- (7) A tool must be developed to evaluate alternatives to current procedures.

THE MAIN ASSUMPTION on which the work rests is that the provisions of AAFCE OPLAN 35001-M remain unchanged.

THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

- (1) Only Central Europe is addressed.
- (2) Only US forces are addressed.

THE SCOPE OF THE STUDY was taken to include an analysis of Central European airspace management procedures, and air defense, command, control, and communications (C³) and their impact on tactical air and air defense systems.

THE STUDY OBJECTIVE was to define the current airspace management system and air defense C³ conditions in Central Europe in terms of problems related to operations, procedures, and materiel and to perform a preliminary analysis of those problems.

THE BASIC APPROACH followed in this study can be defined as follows: research was conducted to determine the nature and extent of airspace management and air defense C³ problems and to identify their causes. This was primarily achieved through analysis of reports and extensive field investigation in CONUS and Europe. Then a coarse grain evaluative model was developed to determine the effects of current conditions on friendly air losses due to fratricide and hostile aircraft survival. Potential solutions to the current problems were then identified.

THE STUDY SPONSOR was the Director, CAA.

THE STUDY EFFORT was directed by LTC James N. Keenan, Force Systems Directorate.

COMMENTS AND QUESTIONS may be directed to the Assistant Director for Force Systems, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814-2797.

 THREAT PLANNING MODEL (TPM) USER'S MANUAL (U)	STUDY SUMMARY CAA-D-84-11
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(U) THE REASON FOR PERFORMING THE STUDY was to provide intelligence analysts with a convenient set of mathematical tools for use in their studies.

(U) THE PRINCIPAL PRODUCT of this study is a set of interactive computer programs which implement a set of mathematical models for use by intelligence analysts.

(U) THE MAIN ASSUMPTION upon which this product is based is that the set of models included in the system provides an adequate basis for realistic use of the system in intelligence studies. (The details of the models are classified SECRET-NOFORN, as are the computer programs which implement the models.)

(U) THE PRINCIPAL LIMITATIONS of the work which might affect the validity of the product are:

- (1) (U) The effects of nuclear weapons are not modeled.
- (2) (U) The model does not track the geographical locations of combat units (it does, however, compute distances moved).
- (3) (U) This study has been limited to the development of the computer programs which implement the mathematical models. No attempt has been made thus far to obtain realistic data for the models nor to exercise them in an operational setting. Those tasks are left to the intelligence analysts who will use the system.

(U) THE SCOPE OF THE STUDY includes the implementation of an integrated set of models for analysis of Project Evaluation and Review Technique (PERT) networks; ground combat; and air combat. The models are analytic and deterministic--not simulations.

(U) THE STUDY OBJECTIVES were:

(1) (U) To develop computer programs implementing the mathematical models.

(2) (U) To allow for easy transfer of the programs from the UNIVAC computer system used by the US Army Concepts Analysis Agency to the IBM computer system used by the US Army Intelligence and Threat Analysis Center.

(U) THE BASIC APPROACH taken in the study was to design, code, test, and document the computer programs. The computer language used was the 1977 standard FORTRAN. Vendor extensions of the language were avoided in order to enhance the portability of the programs. Documentation consists of a User's Manual and a Programmer's Manual.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Intelligence, who sponsored the work, established the objectives, and monitored the study activities.

(U) THE STUDY EFFORT was directed by Mr. John Warren, Analysis Support Directorate. (Prior to 18 July 1983, the study was directed by Ms Pat Fleming.)

(U) COMMENTS AND QUESTIONS may be sent to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Analysis Support, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.



**ANALYSIS OF FACTORS THAT HAVE INFLUENCED
OUTCOMES OF BATTLES AND WARS:
A DATA BASE OF ENGAGEMENTS AND BATTLES**

**ONE SHEET
STUDY GIST
CAA-SR-84-6**

THE SCOPE OF THE EFFORT documented in this report was as follows:

- (1) Determine a set of descriptive factors which are judged to be useful for characterization of the nature and outcomes of military battles.
- (2) Identify a set of battles (600-plus battles over the past four centuries) for which a usefully large part of the descriptive factors above can be expected to be obtainable from results of earlier historical work.
- (3) Prepare, in effect, a matrix of data in which the matrix columns are the descriptive factors, the matrix rows are the battles, and the column/row intersection cells contain the specific data which pertain to the particular descriptive factor in the particular battle.

THE MAIN THESIS on which the work documented herein rests is that historical data concerning factors present in past combat situations can possibly provide the insights which would enhance the ability to more accurately portray hypothetical future battles in simulations.

THE SCOPE OF THE REPORT includes six volumes, five of which contain battle data, and a main report which discusses Concepts Analysis Agency's assessment of the data collection effort.

THE BASIC APPROACH followed in this study can be defined as: (1) sponsorship of a contract with Historical Evaluation and Research Organization, Dunn Loring, Virginia; (2) invited reviews of a random sample of battle data by four Department of the Army military historical research organizations; and (3) an overall assessment of the original research effort and the subsequent reviews.

REASONS FOR PERFORMING THE STUDY are mainly as follows: a critical feature of simulations used by CAA in addressing theater-level issues is the portrayal of decisions by their commanders and staffs under a variety of conditions. Insights concerning such conditions may be provided through consideration of the conditions existing in previous warfare. Additionally, there is among leaders within the Army analytical community a growing belief that an understanding of the "numbers" of history, when properly employed, could be helpful in predicting the future.

THE STUDY SPONSOR was the Director, US Army Concepts Analysis Agency, who also established the objectives and monitored the study activities.

THE STUDY EFFORT was directed by Ms Zelma M. Harms, Assistant Director for Management Support, and LTC Mike Deems, who was the Contracting Officer's Representative for the HERO contract.

COMMENTS AND QUESTIONS may be directed to US Army Concepts Analysis Agency, ATTN: Assistant Director for Management Support, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.



ANALYSIS OF FORCE POTENTIAL (AFP)

STUDY
SUMMARY
CAA-D-84-14

THE REASON FOR PERFORMING THE STUDY is primarily widespread dissatisfaction with previous combat potential estimation methods that do not give enough attention to influences noted below in the study objectives.

THE PRINCIPAL FINDINGS during AFP System development and implementation and as evidenced by illustrative examples in the Operator's and Programmer's Guide to the AFP System and by the parallel MICAF Study application are:

- (1) All modules, submodules, and special processors of the AFP System for estimating the static combat potential of equipment and organizations have been tested and perform as designed.
- (2) AFP estimates of static combat potentials depend on input to the AFP System and are sensitive to opposing sides' weapon characteristics, weapon quantities, type-on-type engagement preferences, environmental conditions, and combat support and combat service support levels.
- (3) Full application of the AFP System is labor, data, and computer intensive.

THE MAIN ASSUMPTIONS for purposes of estimating static combat potentials:

- (1) The large-scale battlefield may be decomposed into separate firepower-counterfirepower, combat support, and combat service support processes. These processes may be analyzed largely independently. Their separate results may be combined afterward to yield estimates of combat potentials.
- (2) Total division firepower-counterfirepower processes may be decomposed into pure weapon type on pure weapon type engagements. The engagements may be further decomposed into still smaller matchups in which at least one weapon opposes one or more weapons. Only indirect, area fire weapons may impinge on the interaction of otherwise pure type-on-type "duels." The usual techniques of dynamic modeling and simulation need not be applied except to the independent duels of relatively short duration.
- (3) Movement and maneuver need not be represented within the firepower-counterfirepower process. Tactical mobility may be treated adequately within the combat support and combat service support processes. Duels are distributed to fixed ranges.

THE PRINCIPAL LIMITATIONS

- (1) Like all static indicators, AFP combat potentials may be inappropriate bases for estimating prolonged, fluid combat.

(2) Because AFP combat potentials depend on weighted averages for 16 distinct combat environments, the potentials may not be useful estimators for differently weighted or different environments. For example, interest in just one of the combat environments implies a vastly different weighting: just one 1.0 and 15 0.0's.

(3) AFP combat potentials are estimates of achievement for the very special circumstance in which one's own weapons are 50 percent attrited. (This is why AFP combat potentials are often called "half-life potentials.") In general, the potentials do not correspond to any one common moment in projected real time because different weapon types do not reach 50 percent survival at the same instant.

(4) In its current implementation, the AFP System does not represent suppression nor the effects of echelons above division (other than some nondivisional artillery and some fixed wing aircraft).

THE SCOPE OF THE STUDY included development and implementation of the AFP System and parallel support of the MICAF Study. The Operator's and Programmer's Guide to the AFP System provides a wealth of information needed in maintaining and applying the AFP System. Some applications of the AFP System have been made in support of other studies. In particular, the MICAF I and II Studies depended heavily on AFP, and AFP "results" may be found in the MICAF I and II reports.

THE STUDY OBJECTIVES are to develop and demonstrate (via the parallel MICAF application study) a new method for estimating the static combat potential of equipment and organizations. That method is to depend more directly on quantitative data, full division inventories of opposing equipment, combat support, combat service support, and wider range of combat environments than in previous approaches.

THE BASIC APPROACH of AFP is to begin with a highly stylized abstraction of the battlefield, decompose the battlefield into separate processes, provide extensive input data to drive those processes, and then operate a system of specially developed computer programs which replicate estimates of kills and losses for 16 different combat environments, project those estimates to half-lives, modify the estimates in accord with support levels, and roll up everything into final estimates of combat potential.

THE STUDY SPONSOR is the Director, CAA.

THE STUDY EFFORT was directed by Mr. Gerald E. Cooper, Strategy, Concepts and Plans Directorate. All directorates contributed.

COMMENTS AND QUESTIONS may be directed to US Army Concepts Analysis Agency, ATTN: Assistant Director for Requirements and Resources, 8120 Woodmont Avenue, Bethesda, MD 20814-2797



ARMY AWARDS ANALYSIS STUDY
(A³)

STUDY
SUMMARY
CAA-SR-84-25

THE REASON FOR PERFORMING THE STUDY was to examine differing philosophies of the Army Awards Program and to determine the effect of changes in the program made as a result of a 1977 task force study.

THE PRINCIPAL FINDINGS of this study are:

- (1) The Army Awards Program needs no additional awards added to the program.
- (2) Current standards are in general terms that lead to different interpretations by different commanders.
- (3) Present award approval authority levels should be retained and remain the prerogative of commanders only.
- (4) Supplementation of AR 672-5-1 below Department of Army level either by written or oral instructions is perceived to weaken the Army Awards Program.

THE MAIN ASSUMPTIONS upon which this study is based are:

- (1) There is a need for an awards program in the total Army.
- (2) The Army Awards Program will operate in both peace and war.
- (3) For purposes of the study, the total Army is composed only of members of the Active Army, Army Reserve, and Army National Guard.

THE PRINCIPAL LIMITATIONS of the work which might affect the findings are:

- (1) The Army Reserve general officers were the representatives of the Army Reserve portion of the total Army.
- (2) The Army National Guard was not represented in the study.

THE SCOPE OF THE STUDY focused on determining the Army's perceptions of the current military awards program and looked at the program and leadership philosophy on purpose and operation to determine if differences existed.

THE STUDY OBJECTIVES were to:

- (1) Determine the purpose of the Army Awards Program.
- (2) Determine the Army's perception of the purpose of the Army Awards Program.
- (3) Determine the Army's perception of operation of the Army Awards Program.
- (4) Determine the current philosophy of Army leadership (grades O5-O10, E9) toward the Army Awards Program.
- (5) Evaluate the current philosophy of Army leadership to determine consistency with the Army Awards Program.

THE BASIC APPROACH followed in doing this study can be described as the application of simple comparative tabular analysis to frequency of response to questions on standards, equitability, and credibility of the current Army Awards Program, thereby determining the Army's perception of the purpose and operation of the program.

THE STUDY SPONSOR was the Deputy Chief of Staff for Personnel, who, through the Commander, Military Personnel Center, established the objectives and monitored study activities.

THE STUDY EFFORT was directed by LTC Ronald M. Guiberson, Force Systems Directorate.

COMMENTS AND QUESTIONS may be sent to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Force Systems, 3120 Woodmont Avenue, Bethesda, MD 20814-2797.



COMBAT OPERATIONAL READINESS
FLOAT (CORF) FACTORS (U)

ONE SHEET
STUDY GIST
CAA-SR-84-18

(U) THE PRINCIPAL FINDINGS of this study are:

(1) (U) The requirement for wartime (combat) operational readiness float (CORF) quantities can be determined from factors developed through combat simulation of the threat and theater scenario for a given POM study year.

(2) (U) CORF factors are strongly dependent upon the daily repair capabilities of maintenance support units as well as the daily maintenance failure factors.

(U) THE MAIN ASSUMPTIONS made for this study were:

(1) (U) Maintenance capability will be independent of combat posture (attack, defend, delay, static). Additionally, the maintenance capability was treated as constant throughout the theater and over the duration of the war (180 days).

(2) (U) Supply capability will not constrain repair of unserviceable materiel.

(3) (U) Transportation capability will be sufficient during the simulation. The model will not include any delays due to transportation.

(4) (U) The quantity of war reserve items will be sufficient to replace all permanent losses.

(5) (U) Sufficient crews/operators will be available to operate CORF-issued items of equipment.

(U) THE PRINCIPAL LIMITATION imposed on this study was that certain types of losses were not to be considered part of CORF:

(1) (U) Repairable items damaged while in the logistical pipeline.

(2) (U) Repairable items damaged by enemy combat actions while located at general support units (GSU) or direct support units (DSU).

(3) (U) Items requiring depot level maintenance.

(U) THE SCOPE OF THE STUDY was to develop a model to be used for any given Program Force year in conjunction with the Wartime Requirements for Ammunition, Materiel, and Petroleum (WARRAMP) Methodology in order to compute the combat operational readiness float (CORF) factors for major items of equipment (MIE) authorized CORF support.

(U) THE STUDY OBJECTIVE was to develop a model to determine CORF factors that draws on the simulation of a combat environment.

(U) THE BASIC APPROACH can be described as follows: division and theater level combat simulation models compute permanent and temporary losses of combat systems. Their output is used to develop loss rates for the other items of equipment included in the table of organization and equipment (TOE) of the units engaged in combat. A model was developed to combine these losses with the maintenance failures in order to determine the total repairable losses of items authorized CORF support. CORF replacements are computed to bring the on-hand strength of the item to the specified materiel combat readiness level. CORF is issued if the level has fallen below the level specified. Concurrently, repaired items are returned to the CORF stock, thus reducing the net daily float count. If the repaired items returned to the CORF stock raise the stock level above the initial stockage level, the excess is issued to the supported unit irrespective of its current readiness level. The aggregated maximum CORF for an item over a period is then divided by the authorized level for that item to arrive at the CORF factor for the period. The theater war runs for 180 days and is broken down into 7 periods.

(U) THE REASON FOR PERFORMING THE STUDY was to respond to the revisions of AR 710-1 and AR 710-2, effective 1 April 1982, requiring that CORF factor determinations be based on a computer model simulation of an approved war-time scenario.

(U) THE STUDY SPONSOR was the Office of the Deputy Chief of Staff for Logistics, Headquarters, Department of the Army.

(U) THE STUDY EFFORT was directed by Mr. Norig G. Asbed of the Requirements and Resources Directorate.

(U) COMMENTS AND QUESTIONS may be directed to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Requirements and Resources (CSCA-RQ), 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.

 COSAGE MATURITY GROUP (CMG) STUDY	ONE SHEET STUDY GIST
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THE PRINCIPAL PRODUCTS of the COSAGE Maturity Group (CMG) effort are as follows:

- (1) A COSAGE Model which runs to normal termination with a high probability.
- (2) Preprocessing programs which thoroughly edit the input data and provide error and warning messages to the user.
- (3) An automated runstream generator which provides a simple, error-free method for generating a series of production runs and for archiving related files.
- (4) A COSAGE Model with contractor recommended coding efficiencies implemented.

THE PRINCIPAL LIMITATION of this work is that not all model functional areas were thoroughly examined. Emphasis was placed on those model areas necessary for continued production support. Additional model logic evaluation will be accomplished on a continuing basis.

THE SCOPE OF THE STUDY was the five areas identified in the study directive.

- (1) Abnormal run termination due to memory constraints.
- (2) Multiple run generation and file archiving problems.
- (3) Implementation of code efficiencies to reduce run time.
- (4) Clean up output files.
- (5) Upgrade preprocessors to current version of the model.

THE STUDY OBJECTIVE was to produce a COSAGE system which operated reliably and efficiently and which is understood by analysts using and maintaining it.

THE BASIC APPROACH to address each of the areas listed above was as follows:

- (1) Examine model functional areas and input data sets to determine where model data requirements could be reduced and where input data could be restructured. Evaluate functional areas for correctness of logic.
- (2) Using the Sperry Symbolic Stream Generator, build a runstream generator.
- (3) Modify and test code.
- (4) Evaluate output requirements. Modify where necessary.
- (5) Modify preprocessors.

THE REASON FOR PERFORMING THE STUDY was that the model did not operate in a reliable fashion. Model runs aborted due to lack of available memory, logic errors, input data errors, and runstream errors.

THE STUDY SPONSOR was the Director, US Army Concepts Analysis Agency, who established the objectives and monitored study activities.

THE STUDY EFFORT was directed by Ms Patricia Fleming, CSCA-MDA.

COMMENTS AND QUESTIONS may be sent to the Assistant Director, Modeling Directorate, CSCA-MD, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814-2797.

	CONTAINERIZED CARGO DISTRIBUTION ANALYSIS - SOUTHWEST ASIA 88 (COCADA SWA 88) (U)	ONE SHEET STUDY GIST CAA-SR-84-30
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(U) The PRINCIPAL FINDINGS of the work reported provided:

(1) (U) An assessment of the capability of the Southwest Asia intratheater distribution network to support the movement and resupply requirements of the FY 88 force.

(2) (U) An assessment as to the impact of selected containerization policy issues on the delivery of cargo through the intratheater distribution network.

(U) THE MAIN ASSUMPTIONS on which the work depends are:

(1) (U) The data bases provided to the study team from the Worldwide Intratheater Mobility Study and the DOD Sealift Study are correct.

(2) (U) The levels of containerization of cargo in the DOD Sealift Study reflect the upper limit of containerization based on the availability of shipping assets.

(U) THE PRINCIPAL LIMITATIONS of this work which may affect the findings are as follows:

(1) (U) Static forces were simulated. The effects on the length of lines of communications attributable to the movement of combat forces was not reflected in the simulation.

(2) (U) The simulation did not include the attrition of combat and support forces or the interdiction of supply routes.

(U) THE SCOPE OF THE STUDY was the examination of policies pertinent to the containerization of cargo in the Southwest Asia theater of operations in FY 88.

(U) THE STUDY OBJECTIVES were:

(1) (U) To assess the ability of the Southwest Asia intratheater distribution network to meet the movement requirements established in the DOD Sealift Study.

(2) (U) To assess the impact of selected containerization policies on the ability to meet movement requirements.

(3) (U) Identify any changes in support structure required to satisfy the movement requirements.

(4) (U) Enhance the Simulator for Transportation Analysis and Planning (SITAP) Model to more accurately treat the intratheater distribution system.

(U) THE BASIC APPROACH used in this study can be described as follows: the data base was manipulated to reflect the changes in operating conditions imposed by the application of selected containerization policy issues. Alternative cases producing upper and lower bounds were examined. When differences between the bounding cases displayed a measurable impact for a policy issue, intermediate data points were simulated to develop sensitivities.

(U) THE REASON FOR PERFORMING THE STUDY was to provide the Office of the Deputy Chief of Staff for Logistics with an assessment of the impact of selected containerization policies in Southwest Asia.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Logistics.

(U) THE STUDY EFFORT was directed by COL Paul Makowski, Strategy, Concepts and Plans Directorate.

(U) COMMENTS AND QUESTIONS may be sent to the Assistant Director for Strategy, Concepts and Plans, US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797



**DAYS OF SUSTAINABILITY STUDY
(DOSS)**

**ONE SHEET
STUDY GIST
CAA-SR-84-24**

THE PRINCIPAL FINDINGS of the work reported herein are:

- (1) A methodology has been developed to compute days of sustainability as a single measure of the logistics capability to support a theater force. The method provides a more realistic means to assess theater sustainability than the currently used days of supply measure.
- (2) The basic elements of sustainability are the timely ability to supply, to service, and to distribute supplies to the point of consumption on a daily basis. The principal sustainability resource groups are force structure (units), facilities, personnel replacements, equipment, and consumable supplies. The logistic support of each of these resources must be continuous, not intermittent, in order to achieve sustainability.
- (3) Shortfalls in the availability of any of the resource groups compared to requirements are disrupters of continuous support. Sustainability can, therefore, be determined on the basis of assessing on a day-by-day basis according to a given scenario whether assets are available to meet the minimum threshold requirements.

THE MAIN ASSUMPTIONS of this work are as follows:

- (1) The assumptions made for the Army Current Capability Study (CMNIBUS) FY 83 and the Army Logistic Assessment Analysis (ALA) are equally applicable to the study.
- (2) The requirements for the various sustainability resources which are generated by the CMNIBUS/ALA process, including the required supply distribution system inherent in the theater force structure, are accepted as a valid statement of theater requirements.

THE PRINCIPAL LIMITATIONS of this study are:

- (1) Requirements and asset data used in developing the sustainability methodology were limited to that available in the CMNIBUS-83 and FY 83 Army Logistic Assessment process.
- (2) This study addressed only the problem definition and development of a computational methodology for determining a day of sustainability. No automated model was developed although sufficient documentation is provided for future development of such a model.
- (3) This study considered in detail only the methodology to compute sustainability for selected items of Class III, V and VII; however, the resulting method is general enough to permit consideration of all supply classes and resource groups.

THE SCOPE OF THE STUDY was to develop the concept for days of sustainability as a measure of the logistics capability of a theater combat force including problem definition and development of a computational methodology.

THE STUDY OBJECTIVES were:

- (1) To conceptualize "days of sustainability" as a means for HQDA (ODCSLOG) to measure the Army's ability to fully support a theater combat force in combat operations.
- (2) To develop a computational method to produce a type-division standard of full sustainability.
- (3) To develop a computational method for assessing the sustainability of a given combat force by comparing available force support structure and assets against the type-division standard.

THE BASIC APPROACH was to develop a slicing technique to separate a theater into type-division segments and then further group the division slice into 10 functional categories. The resources needed to sustain each of these functions are identified in 10 resource categories of units, facilities, personnel, and classes of supply. By time-stepping through a given scenario on a day-by-day basis, comparing available resources to functional requirements according to a set of decision rules, specific shortfalls to sustainability are identified when the minimum resource group falls below a required threshold. A day of support is accumulated for each day that all available resource groups satisfied all functional requirements thresholds. A day of sustainability is achieved, when a day of support is continuous and consecutive with the previous day of support, beginning at D-day.

THE REASON FOR PERFORMING THE STUDY was to satisfy the Army's requirement for an improved method for quantifying the overall logistics capability to support a theater force in combat operations. The traditional measure of logistic support, days of supply, quantifies materiel required to support a force. However, in order to use materiel, other logistics functions must be performed such as movement, storage and issue, personnel replacement, medical support, facilities construction, etc. The Army presently lacks a method to measure simultaneously both the supply and service components of sustainability. The ODCSLOG requested a conceptual study to determine the feasibility of such a measure which might ultimately lead to an automated sustainability model.

THE STUDY SPONSOR is the Deputy Chief of Staff for Logistics, Headquarters, Department of the Army, who sponsored the work, established the objectives, and monitored the study activities.

THE STUDY EFFORT was directed by LTC James D. Chipps, Force Systems Directorate, US Army Concepts Analysis Agency.

COMMENTS AND QUESTIONS may be sent to the Assistant Director for Force Systems (CSCA-FS), US Army Concepts Analysis Agency, 8120 Woodmont Avenue, Bethesda, MD 20814-2797.

	ESTIMATION OF WORKLOADS FOR LOGISTICS CIVIL AUGMENTATION PROGRAM (EWL)	STUDY SUMMARY CAA-SR-84-23
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(U) THE REASON FOR PERFORMING THE STUDY was that the Army requires a method of converting unit shortfalls into statements of logistic support capability for discussions with civilian industry as a potential source to fill shortages. The first step in planning for civilian personnel augmentation is to determine what types and quantities of work will be required.

(U) THE PRINCIPAL FINDINGS of the work reported herein are as follows:

(1) (U) Most maintenance, supply, transportation, and service unit functions can be performed by civilian organizations under contract.

(2) (U) The employment of civilian contract organizations in division and forward corps areas is least preferred as compared to theater locations more distant from the combat zone.

(U) THE MAIN ASSUMPTIONS on which the work reported herein rests are as follows:

(1) (U) Logistic workload requirements generated by the Force Analysis Simulation of Theater Administrative and Logistic Support (FASTALS) Model for the Total Army Analysis FY 86-90 (TAA-90) design case (DC) are valid.

(2) (U) The unit capabilities, personnel, and equipment authorizations in approved tables of organization and equipment (TOE) for units of interest are properly balanced.

(U) THE PRINCIPAL LIMITATIONS of this work which affect the findings are as follows:

(1) (U) The TAA-90 Study, used as a base for this study, is predicated on projected FY 90 resources applied to a conventional global conflict. TAA-90 and EWL study results can neither be directly applied to a regional conflict in Southwest Asia (SWA), or under levels of conflict other than conventional warfare.

(2) (U) The workloads developed by the EWL methodology using TAA 90 design case data may not be consistent with current Southwest Asia force planning data.

(U) THE SCOPE OF THE STUDY is an analysis of workload shortfalls in Army logistic units in SRC series 09, 10, 29, 42, 43, 54, 55, and 63, as determined in the CAA Force Match process, available for deployment to SWA within the framework of the global scenario in the TAA-90 DC analysis.

(U) THE STUDY OBJECTIVES were to:

(1) (U) Quantify, in terms amenable to understanding and measurement by industry, the logistical workload represented by the shortfall in logistics support force capabilities.

(2) (U) Identify those logistics tasks suitable for accomplishment by industry.

(3) (U) Determine the theater location and timeframe of industry tasks.

(U) THE BASIC APPROACHES followed in doing this study were as follows:

(1) (U) The TAA-90 design case was used to identify the units of interest. The shortfall in logistic support units was determined by comparison of the TAA-90 Force tape furnished by ODCSOPS for that study, and the rounded-out Force developed by the FASTALS Model (Force Match).

(2) (U) The shortfall, in terms of specific quantities of support units, determined in the above match process, was quantified in terms of unit capabilities by functional category. The organizational capabilities, as shown in Section I of applicable TOEs, were used in this quantification process.

(3) (U) Quantified workload shortfalls identified were documented in a manner to indicate the appropriate location (FASTALS Logical Region) and timeframe (FASTALS time period). Workload shortfalls were analyzed and, when appropriate, categorized as suitable for contracting, to assist the study proponent in a final evaluation of the potential for accomplishment by industry. Categorization by the study agency was based on considerations such as task description, location, and other considerations.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Logistics (DCSLOG), HQDA, who established the objectives and monitored study activities.

(U) THE STUDY EFFORT was directed by Major John D. Brosnan, Force Systems Directorate.

(U) COMMENTS AND QUESTIONS may be directed to the Assistant Director, Force Systems Directorate (CSCA-FS), US Army Concepts Analysis Agency.

	PERSONNEL READINESS INDICATOR MODEL (PRIM) STUDY	STUDY SUMMARY CAA-SR-84-5
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THE REASON FOR PERFORMING THE STUDY was to provide the force plans officers at the US Army Military Personnel Center (MILPERCEN) with an automated method for evaluating the effects of personnel assignment policies and for predicting unit personnel readiness.

THE PRINCIPAL FINDINGS are:

(1) Concepts Analysis Agency developed a new computerized model, the Personnel Readiness Indicator Model (PRIM), which provides an automated method for evaluating personnel assignment policies and for predicting Army readiness at the unit level.

(2) PRIM distributes projected personnel inventories to projected jobs (either authorized or structure strengths) using an optimizing (network formulated) algorithm.

(3) PRIM has been installed at MILPERCEN; CAA has provided training and assistance in the use of PRIM; and documentation, including a Functional Description (CAA-D-84-1), Program Maintenance Manual (CAA-D-84-2), and User Manual (CAA-D-84-3), has been prepared and furnished to MILPERCEN.

(4) Sensitivity test analysis showed that PRIM satisfactorily models the personnel assignment policies for which it was designed and computes personnel readiness reports in accordance with AR 220-1 while providing flexibility in the areas of amount and type of unit aggregation, policies to be modeled, and amount of specialty or grade substitution. PRIM is sensitive to the variables important to policy specification--minimum and maximum fill levels and the relative importance of policies.

(5) The modular PRIM design is easily modified and the variable amount (user-specified) of run diagnostic reports provides the user with many opportunities to monitor the progress of the data through the model, make changes to the files that control the model logic, and evaluate the results to ensure the model is properly tuned for each application.

THE MAIN ASSUMPTIONS were:

(1) MILPERCEN projected inventories are adequate for use as personnel data.

(2) MILPERCEN data on Army authorizations are adequate for use as assignment data.

(3) Policy statements can be stated in terms of military occupational specialty (MOS), location, or other defined aggregation of units, grade levels, and minimum/maximum fill levels.

THE PRINCIPAL LIMITATIONS are:

(1) A new algorithm for personnel distribution was not designed for PRIM. The amount of user flexibility desired, when combined with the network program and the amount of information needed for it, creates the need for extensive input requirements, intensive module execution monitoring, and an in-depth knowledge of PRIM and the computer system in order to perform the error correction or data modification functions.

(2) PRIM was not designed as a multi-time period study.

(3) Each complete PRIM execution consumes 15 or more hours of computer time, and the files may consume 20,000 tracks of disk space.

THE SCOPE OF THE STUDY. The PRIM Study has been directed toward development of a computerized model for use within MILPERCEN to:

(1) Project personnel readiness at the battalion size unit using existing data.

(2) Provide information for evaluating personnel assignment policies.

THE STUDY OBJECTIVES were:

(1) Develop the methodology for reporting projected unit personnel readiness commensurate with criteria of AR 220-1.

(2) Distribute projected personnel to projected jobs using an optimizing distribution algorithm.

(3) Provide MILPERCEN with documentation and training sufficient to operate the system and assist in transferring it to a MILPERCEN computer.

THE BASIC APPROACH was to devise a model which gave the user maximum flexibility in choices of unit aggregation... and policies modeled, while incorporating a network distribution program that was already in use at MILPERCEN for a very different purpose. To thoroughly test the model logic and code, a comprehensive sensitivity test and analysis was performed.

THE STUDY SPONSOR was the Deputy Chief of Staff for Personnel.

THE STUDY EFFORT was directed by Ms. Sally J. Van Nostrand, Force Systems Directorate.

COMMENTS AND QUESTIONS may be directed to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Force Systems, 8120 Woodmont Avenue, Bethesda, MD 20814-2797.

	UTILIZATION OF INCREASED AIRLIFT CAPABILITY (UIAC) STUDY	STUDY SUMMARY CAA-SR-84-29
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THE REASONS FOR PERFORMING THE STUDY were to determine the Army's allocation of unsubscribed capacity, and develop a process to assist the sponsor in selecting the most suitable cargo and route combinations to utilize the Army's allocation.

THE PRINCIPAL FINDINGS of this study are:

- (1) The Military Airlift Command's (MAC) flying hour program and scheduled procurement of new aircraft are the major determinants in identifying air routes with additional or unsubscribed capacity.
- (2) The Army's projected allocation of unsubscribed capacity is 55 percent of the total amount available.
- (3) MAC's proposed Airlift Service Industrial Fund (ASIF) incentive tariff rate favors diverting Army-sponsored cargo packed at seaport terminals to realize transportation cost avoidances.
- (4) Sufficient amounts of air eligible port packed cargo to fill the Army's projected allocation of unsubscribed capacity will not be available beyond FY 86.
- (5) Significant increases in forecasted amounts of unsubscribed capacity suggest the Army reconsider utilizing its allocation for airlift resupply.

THE MAIN ASSUMPTIONS upon which this study is based are:

- (1) Increases in unsubscribed capacity detailed in MAC's study, "Airlift Management in a New Era", are accurate.
- (2) Peacetime airlift commitments from the Civil Reserve Air Fleet (CRAF) will be retained and increased commensurate with increases in MAC fleet capability.
- (3) Proposed ASIF tariff changes will be implemented.
- (4) Projected increases in unsubscribed capacity will not be assigned in support of Joint Chiefs of Staff (JCS) exercises.

THE PRINCIPAL LIMITATION of the work which might affect the findings is that the historical lift data extracted from MAC, the Military Sealift Command (MSC), and Military Traffic Management Command (MTMC) records could not be validated by Army sources.

THE SCOPE OF THE STUDY includes an examination of the Army's requirement for over-ocean movement of Army-sponsored cargo in the 1984-1989 timeframe, and the development of a process to select the cargo route combinations best suited to use the additional airlift capacity.

THE STUDY OBJECTIVES were:

- (1) Identify the range of unsubscribed airlift capacity that will be made available to the Army.
- (2) Develop criteria for the selection of cargo categories suitable for airlift.
- (3) Identify the data that affect the selection of cargo and route combinations most suitable for airlift.
- (4) Develop and document a cargo and route selection process for use by the sponsor.

THE BASIC APPROACH followed in this study was to define the Army transportation requirements for sealift and airlift, determine the Army's allocation of unsubscribed capacity, and then develop a methodology to assist the sponsor in selecting the most suitable cargoes and air routes to utilize the Army's capacity allocation. Historical lift data detailing Army peacetime cargo movements were then collected to facilitate the selection of air eligible surface cargoes for diversion and, finally, the transportation cost avoidances resulting from the diversion were computed.

THE STUDY SPONSOR was the Deputy Chief of Staff for Logistics who sponsored the work, established the objectives, and monitored the study activities.

THE STUDY EFFORT was directed by CPT(P) Jeffrey A. Sorenson, Strategy, Concepts and Plans Directorate.

COMMENTS AND QUESTIONS may be sent to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Strategy, Concepts and Plans, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.

	WARTIME MANPOWER PLANNING SYSTEM, FY86 AND FY90 (WARMAPS 86/90)	STUDY SUMMARY CAA-SR-84-27
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THE REASON FOR PERFORMING THE STUDY was to provide Army time-phased theater requirements for military manpower by occupational groupings and manpower category to be used in the WARMAPS (86/90) assessment.

THE PRINCIPAL FINDINGS of this study are:

(1) Results followed previous study trends in that forces at risk and casualties were greater for the far Program Objective Memorandum (POM) year (FY 90) than for the near POM year (FY 86).

(2) Distribution of total casualties percentagewise was:

	<u>FY 86</u>	<u>FY 90</u>
	Global	Global
Combat	60.8	55.4
Medical	4.8	5.6
Logistics/service and supply	13.7	17.6
Other	20.7	21.4
	NATO Only	NATO Only
Combat	63.7	58.7
Medical	4.9	5.2
Logistics/service and supply	11.9	16.2
Other	19.5	19.9

THE MAIN ASSUMPTION on which the work herein is based is: if specific scenario data or combat simulation results are not available, it is adequate to use extrapolation techniques and selective substitution from existing analyses to produce specific data concerning deployments, consumption, and battle intensity.

THE PRINCIPAL LIMITATIONS are that the current on-line, theater-level models do not have the capability to portray casualty data for support functions in the rear area or to consider integrated warfare scenarios.

THE SCOPE OF THE STUDY covers the collection of data and the preparation and the submission of theater military manpower requirements, under specific scenario instructions, in formats which can be directly input to WARMAPS. These requirements were by:

- Theater
- Timeframe
- Occupational category
- Type of casualty

THE STUDY OBJECTIVES were:

(1) To provide time-phased personnel requirements appropriate to the FY 86-90 POM force engaged in global and NATO Only scenarios.

(2) Provide casualty data for officer/warrant officer and for enlisted personnel by occupational category for all scenarios.

THE BASIC APPROACH followed in doing this study was to collect or, where necessary, to substitute and extrapolate from results of similar studies required input data. Stratification by occupational category, casualty type, and status was then conducted using a specially designed system of computer models.

THE STUDY SPONSOR was the Deputy Chief of Staff for Personnel.

THE STUDY EFFORT was directed by Mr. Andrew N. Carras, Forces Directorate.

COMMENTS AND QUESTIONS may be directed to the US Army Concepts Analysis Agency, ATTN: Assistant Director for Forces, 8120 Woodmont Avenue, Bethesda, Maryland 20814-2797.

	WARTIME REQUIREMENTS, PROGRAMING FY-90 EUROPE (P-90E)	STUDY SUMMARY CAA-SR-84-9
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(U) THE PRINCIPAL FINDINGS of the work are:

(1) (U) Many of the munition requirements computed in P-90E differ significantly from those computed in preceding requirement studies.

(2) (U) The simulated war has changed by increasing the relative time spent by NATO in attack and defense intense postures versus defense light and delay postures.

(3) (U) The P90E base case (with Copperhead) when compared to P88E had:

(a) (U) Lower artillery expenditures.

(b) (U) Lower attack helicopter expenditures.

(c) (U) Greater mine expenditures.

(4) (U) The P90E base case when compared to P90E excursion (no Copperhead) had:

(a) (U) Lower ammunition requirements for mines, tanks, tows, and helicopters.

(b) (U) Greater attrition of enemy armored vehicles and artillery.

(c) (U) Fewer losses of blue armored vehicles and artillery.

(U) THE MAIN ASSUMPTIONS are as follows:

(1) (U) The WP force will be in the central region (defended by AFCENT) by D+30.

(2) (U) NATO will commit up to 52 1/3 divisions into the forward defense of the central regions. The US Rapid Deployment Force will not be sent to NATO.

(3) (U) NATO close air support will be allocated to ground forces with the greatest need regardless of nationality.

(4) (U) Air/Land battle doctrine will be utilized by US forces.

(5) (U) WP mobilization is as specified in the global scenario.

(U) THE PRINCIPAL LIMITATIONS which may affect the findings are as follows:

(1) (U) Data reflects projected FY-90 resource levels for all forces included in the study.

(2) (U) The simulation models do not reflect integrated warfare, electronic warfare, rear area combat, and the impact of combat service support shortfalls on the results of the simulated conflict.

(U) THE SCOPE OF THE STUDY

(1) (U) A nonnuclear, nonchemical conflict in Europe during the 1990 time period is simulated using the global scenario.

(2) (U) All weapon/munition combinations appropriate for the designated time period are included in the simulated war.

(3) (U) Ammunition requirements are based upon rounds fired in combat plus all other ways in which ammunition can be consumed.

(4) (U) Requirements for major items of equipment are based upon equipment lost in combat plus all other ways in which equipment can be lost.

(U) THE STUDY OBJECTIVES were:

(1) (U) Develop ammunition combat consumption rates for designated munitions and separate components (e.g., propelling charges, fuzes, primers).

(2) (U) Develop wartime replacement factors (WARF) for designated major equipment items with and without logistic losses.

(3) (U) Develop wartime fuel factors (WAFF) for designated tracked combat vehicles.

(U) THE BASIC APPROACH was to start with the global scenario and then determine both the US, non-US-NATO and WP forces to be included in the NATO war. The force structure is updated to 1990 and new doctrine and tactics are incorporated within model limitations. The methodology known as Wartime Requirements for Ammunition, Materiel and Petroleum (WARRAMP) is used to develop theater level ammunition, materiel, and diesel fuel rates for US forces engaged in a NATO conflict in 1990. Results are compared with the last requirement study (P-88E). All differences between the results of the two studies are analyzed.

(U) REASON FOR PERFORMING THE STUDY was to assist HQDA in determining specified ammunition, fuel, and equipment war reserve requirements of US forces for FY 90.

(U) THE STUDY SPONSOR was the Deputy Chief of Staff for Operations and Plans (DCSOPS), HQDA, who established the objectives and monitored study activities.

(U) COMMENTS AND QUESTIONS may be directed to CAA, ATTN: Assistant Director, Requirements and Resources Directorate (CSCA-RQ), US Army Concepts Analysis Agency.

Section III

STUDIES COMPLETED BETWEEN 15 JAN 73
AND 30 SEP 83

STUDIES COMPLETED BETWEEN 15 JANUARY 1973 AND 30 SEPTEMBER 1982

TITLE	PROPOSER	COMPLETION DATE
- FY 73 -		
Pershing II	DCSOPS	31 Jan 73
Pershing II ROC Evaluation	CAA	19 Feb 73
Restricted Battle Area Tactical Nuclear Employment Option	DCSOPS	12 Mar 73
Wartime Replacement Factors, Phase I (WARF I)	DCSOPS	15 Apr 73
LEGION Division Game	DCSOPS	15 Apr 73
MBFR War Games and Analyses, Phase I	DCSOPS	30 Apr 73
Force Requirements and Methodology (FOREM) War Games	DCSOPS	16 May 73
Firepower Potential (FPP) Methodology Review, FY 73 (529 179)	DCSOPS	1 Jun 73
Capability of US Lines of Communication and Support Forces in Reinforcing NATO	DCSOPS	8 Jun 73
CARMONETTE Model Comparison (B003 053L)	CAA	15 Jun 73
Middle Model Review	DCSOPS	18 Jun 73
- FY 74 -		
Nonnuclear Ammunition Combat Rates Programing, FY 75-79 (AMMO P75-79) (C012 195, C012 196, C012 197, A047 861, C012 198, C012 199)	ACSFOR	19 Jul 73
Nuclear Force Posture	DCSOPS	7 Aug 73
FOREM Short Warning/Mobilization Scenario	DCSOPS	7 Aug 73
Analysis for General Purpose Force Objectives and Resource Determination (AFFORD) Users Test	DCSOPS	23 Oct 73
Validation of the Need for a Nuclear Cannon Projectile	ACSFOR	25 Oct 73
Weapon Effectiveness Index/Weighted Unit Value, Phase I (WEI/WUV I) (C000 453L, C000 454L)	DCSOPS	29 Oct 73
Strategic Forces Quick Reaction Capability Improvement	CAA	8 Nov 73
FOREWON JSOP Exercise - 1973	DCSOPS	9 Nov 73
Objective Force Deployment Requirements	DCSOPS	30 Nov 73

Requirements and Capabilities Automated Planning System Improvement	CAA	30 Nov 73
AFFORD JSOP Exercise	DCSOPS	5 Dec 73
LOC/Port Troop Requirements	DCSOPS	10 Jan 74
Nonnuclear Ammunition Combat Rates Programing, FY 76-80 (AMMO P76-80) (C011 825)	ACSFOR	22 Jan 74
Nonnuclear Ammunition Combat Rates Programing, FY 76-80 SEA Allies (C011 824)	ACSFOR	15 Feb 74
WARF II	DCSLOG	1 Mar 74
AWACS/SAM-D Interoperability Study (C000 417)	ACSFOR	20 Mar 74
Tactical Nuclear Requirements Methodology, Phase I (TANREM I)	DCSOPS	29 Mar 74
Evaluation of Bushmaster Candidates	CAA	31 Mar 74
ATLAS Model Modification	DUSA(OR)	31 Mar 74
MBFR War Games and Analyses, Phase II	DCSOPS	24 Apr 74
Concepts Evaluation Model (CEM) Conversion	CAA	20 May 74
Tactical Air Input Data Requirements	CAA	22 May 74
Mobility Requirements for JFM/POM	DCSLOG	29 May 74
CONAF III (C011 740, C011 741, C011 742, C011 857)	ACSFOR	31 May 74
CEM/ATLAS Comparison	DUSA(OR)	24 Jun 74
MICV Weapon System Support (C011 837)	TRADOC	25 Jun 74
Tactical Nuclear Warfare Analysis	CAA	28 Jun 74
 - FY 75 -		
Heavy Lift Helicopter COEA (C005 323, C011 743)	DARCOM	8 Jul 74
Exercise Plan of Analysis FY 77-84 (C011 739)	DCSOPS	19 Jul 74
Force Planning Guides	DCSOPS	2 Aug 74
AMMO P76-80 Rerun with the M139 (PI)	DCSOPS	2 Aug 74
Derivation of Military Force Structure	CAA	2 Aug 74
JSOP 77-84 Movement Requirements	DCSLOG	5 Aug 74
FPP Methodology Review, FY 74	CAA	16 Sep 74
Programed Force Deployment Requirements (C011 907)	DCSOPS	20 Sep 74
Greater Distinction between Combat Modules in War Games (A046 211)	CAA	18 Oct 74
Strategic Mobility Analysis of the Modified Corps in the Middle East (C011 744)	DCSLOG	24 Oct 74
Cost and Effectiveness Analysis of Enlisted and Reenlistment Bonuses	ASA(M&RA)	18 Nov 74

Nonnuclear Ammunition Combat Rates Methodology Improvement - Part II (A006 939)	DCSOPS	2 Dec 74
Support for the Transfer of METOFOR II to CAA	DCSOPS	6 Dec 74
FOREWON JSOP Exercise - 1974 (C011 746)	DCSOPS	13 Dec 74
TANREM II (C000 795L, C000 796L, B001 496L, B001 497L)	DCSOPS	15 Dec 74
Land Force Requirements, Total Force Study (C011 745)	DCSOPS	10 Jan 75
Catalog of Potential Conflicts	CAA	23 Jan 75
CARMONETTE Model Validation of TETAM Results (B008 161)	CACDA	31 Jan 75
Division Force Equivalent Study (C011 826)	DCSOPS	31 Jan 75
War Reserves Study (C011 482)	DCSOPS	31 Jan 75
Missile and Ammunition System Study	CAA	14 Feb 75
POM Deployment Requirements	DCSOPS	21 Feb 75
Middle East War Game (C011 735)	CAA	24 Feb 75
Application of the 1973 Middle East War to CAA War Games, Models, and Simulations	CAA	28 Feb 75
Logistics Support Baseline Force Structure	DCSLOG	10 Apr 75
Combat Vehicle Swim Criteria (C010 736, C006 411)	DCSOPS	30 Apr 75
Nuclear Requirements Determination #1	DCSOPS	9 May 75
Management of Enlisted Bonus Recipients (B023 060L)	ASA(M&RA)	27 May 75
NIKE HERCULES Effectiveness Study (1976-1980) (C011 736, C011 739)	DCSOPS	10 Jun 75
Total Army Relationships	CAA	27 Jun 75
Preference Ordering of Programs in the Technology Base (C011 738)	DCSOPS	30 Jun 75
Medical Mobilization Requirements	DCSOPS	30 Jun 74
 - FY 76/77 -		
Exercise Plan of Analysis (EPOA) FY 78-85 (C004 848)	DCSOPS	3 Jul 75
Army Total Force Study - 1974 (C011 730, C011 731)	DCSOPS	30 Jul 75
Conceptual Design for the Army in the Field (CONAF IV) (C005 768, C005 769)	DCSOPS	31 Jul 75
Wartime Replacement Factors - FY 80 (WARF 80) (C017 554)	DCSRDA	7 Aug 75

Analysis, Refinement, and Extension of Nuclear Methodology (ARENUM) (C011 733L)	CAA	30 Sep 75
M60A3 Fire Control Instrumentation Cost and Operational Effectiveness Analysis (M60A3 FCI COEA) (C011 728, C011 729)	TRADOC	3 Oct 75
USAREUR Wartime Support Capability (WARSCAP) (C004 474, C004 475)	USAREUR	14 Nov 75
Procurement Study (C011 571)	DCSOPS	26 Nov 75
SAM-D COEA Red Team Support	DCSRDA	10 Dec 75
JSOP Exercise - 1975 (C011 734)	DCSOPS	15 Dec 75
Tilt Rotor Aircraft System Cost and Operational Effectiveness Analysis (Tilt Rotor COEA) (C011 732)	DCSOPS	18 Dec 75
Joint Army/Air Force Air-Ground Study (JAGS)	DUSA(OR)	5 Jan 76
Weapons Effectiveness Indices/Weighted Unit Values II (WEI/WUV II) (C005 371L)	DCSOPS/ CAA	30 Jan 76
Study of Effects of Alternate Allocation of Army Dollar Resources at Various Budget Levels (C011 572)	USA	24 Feb 76
Officer Dual Specialty Allocation System (ODSAS) (A040 832, A037 456)	DCSPER	12 Apr 76
Contribution of Integrated Tactical Communications System (INTACS) Alternatives to Division Combat (B011 227L)	DCSOPS	28 Apr 76
Readiness System Study, Phases I & II (B031 681L, A044 522)	DCSOPS	28 May 76
Total Force Analysis - 82 (C006 882, C006 883)	DCSOPS	1 Jun 76
Target Acquisition Study (TAS)	CAA	1 Jun 76
Operational Effectiveness of Communications	DCSOPS	2 Jun 76
XM1 Systems/Force Mix Cost and Operational Effectiveness Analysis (O05 107, C005 108, C006 856, C010 884, C010 885)	TRADOC	10 Jun 76
Theater Nuclear Force Support Study (C012 109L)	DCSOPS	11 Jun 76

POMCUS Objective Levels for Europe (C011 723)	DCSOPS	30 Jun 76
Army Force Planning Data and Assumptions FY 77-82 (C007 126L)	DCSOPS	2 Jul 76
OMNIBUS Capability Study - FY 76 (C006 813, C006 814, C006 815)	DCSOPS	13 Jul 76
Nonnuclear Ammunition Combat Rates Programing, FY 78-82 (AMMO P78-82) (C009 521, C009 522, C009 523, C009 524)	DCSOPS	16 Aug 76
Advanced Attack Helicopter (AAH) Cost and Operational Effectiveness Analysis (COEA) (C007 828, C007 829, C007 816, C009 661)	TRADOC	30 Sep 76
 - FY 77 -		
Movement Requirements, JSOP FY 79-85 (C011 573)	DCSOPS	8 Oct 76
Conceptual Design for the Army in the Field (CONAF V) (C011 724, C011 725)	DCSOPS	15 Oct 76
Wartime Replacement Factors, FY 78-82	DCSOPS	29 Oct 76
JSOP Exercise - 1976 (C011 727)	DCSOPS	8 Nov 76
Air Defense Study I (ADS-I) (C011 232, C011 233, C011 234)	DCSOPS	24 Nov 76
Nonnuclear Ammunition Combat Rates Distribution, FY 79 (AMMO D-79) (C011 726)	DCSOPS	9 Dec 76
Wartime Requirements for Ammunition, Materiel, and Personnel (WARRAMP) Methodology Definition (WARRAMP I) (B022 044L)	DCSOPS	16 Dec 76
TRADOC Theater Level Scenario Support II	TRADOC	28 Feb 77
Total Army Analysis - 1983 (C008 397, C010 929, C010 930)	DCSOPS	30 Apr 77
Integrated Nuclear and Chemical Analysis (INCA)	DCSOPS	27 May 77
Army Requirements for Close Air Support (RCAS) (C011 169)	DCSOPS	3 Jun 77
Ammunition Lift Analysis (C011 162)	DCSLOG	10 Jun 77
Management of Change (MOC) Study (A041 637)	DCSOPS	30 Jun 77
Analysis of NATO Standardization and Interoperability (C012 366L)	DCSOPS	30 Jun 77
OMNIBUS Capability Study - FY 77 (C010 253L, C010 254L)	DCSOPS	7 Jul 77

Cost Effectiveness Analysis of Bonuses and and Reenlistment Policies (CEABREP) (A042 904)	ASA(M&RA)	8 Aug 77
Contribution of Integrated Tactical Communications System (INTACS) Alternatives to Division Combat-II (C010 994, C010 995)	DCSOPS	15 Aug 77
Trade-off Analysis - Systems/Force Mix (TRANSFORM)	DCSOPS	15 Aug 77
 - FY 78 -		
Alternative Operational Concepts in Europe (AOCEUR) (C014 204, C014 205)	DCSOPS	21 Oct 77
Army Force Planning Data and Assumptions, FY 1978-1984 (AFPDA FY 78-84) (C012 034L)	DCSOPS	28 Oct 77
Comparative Analysis of Exercise Performance - Europe	DCSOPS	2 Nov 77
Nonnuclear Ammunition Combat Rates Distribution FY 78 (AMMO D-78) - Korea and Programing FY 84 (AMMO P-84) - Korea	DCSOPS	28 Nov 77
JSOP Analysis - 1977	DCSOPS	12 Dec 77
Net Assessment of NATO/Warsaw Pact Mobilization Potential, Phase I	DCSOPS	15 Dec 77
Nuclear Requirements Methodology II (NUREM II) (C013 083L)	DCSOPS	21 Jan 78
Nonnuclear Ammunition Combat Rates Programing FY 80-84 - Europe (AMMO P80-84-E)	DCSOPS	7 Feb 78
CEM Research Project	DCSOPS	16 Feb 78
Follow-on NATO Standardization/ Interoperability Analysis (C012 573L)	DCSOPS	21 Feb 78
XM-2 (Infantry Fighting Vehicle) Simulation Support	DCSOPS	25 Mar 78
Study of Effects of Alternate Allocation of Army Dollar Resources at Various Budget Funds - Phase II (ADRA II) (C010 023L, B026 384L)	CSA	31 Mar 78
OMNIBUS Capability Study - FY 78 (C014 355L, C014 356L)	DCSOPS	30 Apr 78
Total Army Analysis - 1984 (TAA-84) (C017 171L, C017 172L)	DCSOPS	30 Jun 78
Defense of Alaska	DCSOPS	7 Jul 78
Readiness System Study, Phase III	DCSOPS	31 Jul 78
Persian Gulf Requirements and Capabilities Analysis (PERCAP)	DCSOPS	15 Aug 78

Wartime Requirements for Ammunition, Materiel, and Personnel (WARRAMP) Methodology Development (WARRAMP II) (B031 053L, B033 623L, B030 048L)	DCSOPS	15 Aug 78
Analysis of NATO Proposal in Mutual and Balanced Force Reductions (MBFR) Negotiations	DCSOPS	31 Aug 78
Army Consideration of Tactical Air Support (ACTAS)	DCSOPS	30 Sep 78
 - FY 79 -		
Army Force Planning Data and Assumptions, FY 1979-1985 (AFPOA FY 79-85) (C016 422L)	DCSOPS	28 Nov 78
Theater Nuclear Force Requirements - 1984 (NUREQ-84) (C017 169L, C017 170L)	DCSOPS	6 Feb 79
Wartime Requirements for Ammunition and Materiel FY 81-85 (AMMO P-85/WARF-85) (C018 233, C018 234, C018 235)	DCSOPS	7 Mar 79
Army Net Assessment of US/NATO and Soviet/ Warsaw Pact Ground Combat Forces in Central Europe, 1978-1984 (ANACE-84) (C017 904L)	DCSOPS	8 Mar 79
Concepts Evaluation Model (CEM) Improvement Management Analysis of Key Resource Operations (MAKRO) (A069 016, A069 017, A069 018)	CAA DCSOPS/ COA	1 Apr 79 6 Apr 79
First Term Reenlistment Projection by Military Occupational Specialty (1-RPM) (A067 427)	ASA(M&RA)	15 Apr 79
Theater Level Scenario-86 (TLS-86)	DCSOPS	30 Apr 79
Attack Helicopter Organization 1985 (ATHELO 1985) (D519 942, C017 905, D519 930)	DCSOPS	9 May 79
Heavy/Light Forces Special Study	DCSOPS	21 May 79
POMCUS Objective Levels (POMOL) (C018 907L)	DCSOPS	29 Jun 79
Methodology to Determine Support and Sustainability Implications of Increased POMCUS Levels (SSIPL) (A072 020)	CAA	30 Jun 79
Total Army Analysis - 1985 (TAA-85) (C018 399L)	DCSOPS	30 Jun 79
Joint Air Defense Interoperability Study FY 78 and 85 (JADIS)	DCSOPS	5 Jul 79
Target Acquisition Systems Force Mix Analysis (TASFMA) (A071 366, C018 519L)	DCSRDA	11 Jul 79

Target Acquisition Study II (TAS II) (C019 121L)	CAA	17 Sep 79
JSPD Analysis - 1979	DCSOPS	25 Sep 79
Evaluation of the Theater Force Evaluation by Combat Simulation (TFECS) Methodology Development	CAA	30 Sep 79
- FY 80 -		
OMNIBUS Capability Study - FY 79 (C020 277L, C020 278L, C020 279L)	DCSOPS	16 Oct 79
Weapons Effectiveness Indices/Weighted Unit Values (WEI/WUV) Update (C020 097L)	CAA	27 Nov 79
Army Force Planning Data and Assumptions, FY 1980-1989 (AFPDA FY 80-89) (C020 943L)	DCSOPS	14 Dec 79
Army Net Assessment of US/NATO and Soviet/ Warsaw Pact Ground Combat Forces in Central Europe, 1979-1986 (ANACE-86)	DCSOPS	26 Mar 80
Automatic Data Processing Equipment (ADPE) Replacement	CAA	28 Mar 80
NATO Air Defense Deployment Study, 1981-1995 (NADDS-95) (C023 159L)	DCSOPS	31 Mar 80
CEM Improvements (A081 415, A081 954)	CAA	30 Apr 80
Nonnuclear Ammunition Combat Rates Distribution, FY 82 (AMMO D-82) (C021 747L)	DCSOPS	8 May 80
Alternative Resource Allocation Priorities (ARAP) (B048 619L, B048 620L, C022 099L)	DCSOPS	14 May 80
Chemical Research Project, 1983-87 (CRP-87)	CAA	3 Jun 80
Implementation of Change (IC) Study (A087 082)	DCSOPS	30 Jun 80
Thrace Requirements Analysis (TRA-80) (C022 450L)	DCSOPS	15 Jul 80
Improving the Definition of the Army Objective Force, Phase I (IDOFOR I) (A089 167, C022 596L)	DCSOPS	31 Jul 80
OMNIBUS Capability Study - FY 80 (C026 929L, C026 930L)	DCSOPS	31 Jul 80
Combat to Support Balance Study (CSBS) (C023 004, C023 067)	DCSOPS	31 Jul 80
Total Army Analysis - 1986 (TAA-86)	DCSOPS	31 Jul 80
Combat Fuel Consumption Factors (C022 367L)	DCSOPS	15 Aug 80
WARRAMP Experimental Test and Production (WARRAMP III/IV)	CAA	30 Sep 80

- FY 81 -		
Korea Wartime Requirements for Ammunition and Materiel, FY 87 - Korea (AMMO P87/WARF P-87)	DCSOPS	12 Mar 81
CAA-SR-81-1 (C024 499L, C024 500L)		
Automated Force/Material Cost Methodology Improvement Project (ACMIP)	CAA	31 Mar 81
CAA-D-81-1		
Rapid Deployment Joint Task Force (RDJTF) Air Defense Study, Phase I (no formal report prepared)	DCSOPS/ USAF	31 Mar 81
Force Electronic Warfare/Tactical SIGINT (FEWTS) Study	TRADOC	30 Apr 81
CAA-SR-81-5 (C025 164L, C025 165L)		
Manpower Tradeoff Methodology (MTM) Study	DCSPER	15 May 81
CAA-SR-81-9 (A100 553)		
Integrated Warfare Requirements Methodology (IWRM)	CAA	1 Jun 81
CAA-SR-81-11		
Graves Registration (GRREG) Study	DCSLOG	30 Jun 81
CAA-SR-81-10		
Total Army Requirements Program - Phase I (TARP-I)	DCSOPS	20 Jul 81
CAA-SR-81-14 (A102 213)		
Joint Strategic Planning Document (JSPD) FY 83-90	DCSOPS	7 Nov 80
CAA-SR-81-13 (C026 453L)		
Army Wartime Asset Distribution Guidance Study (AWADS) (no formal report prepared)	DCSOPS	14 Nov 80
Army Force Planning Data and Assumptions, FY 1981-1990 (AFPDA 81-90)	DCSOPS	22 Dec 80
CAA-SR-80-14 (C023 792L)		
Military Implications of Laser Employment by the Soviets (MILES)	TRADOC	16 Jan 81
CAA-SR-80-8 (C027 109L)		
Requirements for Total Mobilization (RETMOB)	DCSOPS	2 Feb 81
CAA-SR-81-2 (C027 110L)		
Wartime Requirements for Ammunition and Materiel, FY 82-86 (AMMO P-86/WARF P-86)	DCSOPS	12 Feb 81
CAA-SR-80-16 (C024 189L)		
Army Net Assessment of US/NATO and Soviet/Warsaw Pact Ground Combat Forces in Central Europe (1979-1987) (ANACE-87)	DCSOPS	2 Mar 81
CAA-SR-80-15 (C024 384L)		

Wartime Requirements for Ammunition, Materiel, and Personnel, Phase V (WARRAMP V) CAA-SR-81-15 (B058 576L)	CAA	21 Jul 81
Type Unit Characteristics (TUCHA) File Study CAA-TP-81-2	DCSLOG	24 Jul 81
Army Force Planning Data and Assumptions, FY 1982-1991 (AFPPA FY 82-91) CAA-SR-81-7 (C025 950L)	DCSOPS	14 Aug 81
Divisional Electronic Warfare Combat Model Test and Evaluation (DEWCOM T&E) CAA-TP-81-1 (B059 976, B059 977, B059 978, C026 196)	CAA	26 Aug 81
Automatic Data Processing Equipment Transition (ADPET) (no formal report produced)	CAA	21 Sep 81
Mobilization Manpower Policy Analysis Study CAA-SR-81-13 (C026 442L)	DCSPER	30 Sep 81
- FY 82 -		
Total Army Analysis - 1987 (TAA-87) CAA-SR-81-8	DCSOPS	30 Oct 81
Forward of the FEBA (FOFE3A) Weapon System Cost and Benefit Study Phase I - CAA-SR-81-3 (C024 519L) Phase II - CAA-SR-81-12 (C026 710L)	DCSOPS	4 Nov 81
Study for Improving the Definition of the Army Objective Force Methodology, Phase II (IDOFOR II) CAA-SR-81-17 (Vol I - A108 078; Vol II - C026 711L)	DCSOPS	13 Nov 81
Rapid Deployment Joint Task Force (RDJTF) Air Defense (AD) Study, Phase II (no formal report published)	DCSOPS/ USAF	18 Nov 81
Joint Program Assessment Memorandum (JPAM) Mobility Analysis, FY 83-90 CAA-TP-81-3	DCSLOG	15 Nov 81
Joint Strategic Planning Document Analysis (JSPDA), CY 1981 CAA-SR-81-19 (C027 014L)	DCSOPS	31 Dec 81
USAREUR OPLAN 4102Q Force Structure Requirements Study (FSRS) (no formal report published)	HQUSAREUR	15 Jan 82

Prototype Army Long-Range Appraisal (PALRA) CAA-SR-82-20 (Main Report - C027 164L; Incl 1 - C027 165L; Incl 2 - C027 166L)	DCSOPS	15 Jan 82
Unit Replacement System Analysis I (URSA I) CAA-SR-82-1	DCSPER	26 Jan 82
Mobilization Asset Distribution Guidance Study CAA-SR-81-22 (C027 314L)	DCSOPS	28 Jan 82
OMNIBUS Capability Study, FY 81 CAA-SR-81-16	DCSOPS	12 Feb 82
Casualty Estimation Study (CES) CAA-SR-81-21 (B062 705L)	DCSOPS	18 Feb 82
Unit Replacement System Analysis - Extension (URSA II Ex) CAA-SR-82-3	DCSPER	15 May 82
Theater Integrated Warfare Scenario Study (TIWSS) CAA-SR-82-4 (C028 540)	DCSOPS	30 May 82
Wartime Requirements Program FY 88 Europe (P88E), Vols I-IV CAA-SR-82-2	DCSOPS	15 Jun 82
Force Electronic Warfare/Tactical SIGINT- Expanded (FEWTS-EX) CAA-SR-82-7	TRADOC	1 Jul 82
Selective Reenlistment Bonus (SRB) CAA-SR-82-6	DCSPER	15 Aug 82
Army Force Planning Data and Assumptions, FY 1983-1992 (AFPD 83-92) CAA-SR-82-5	DCSOPS	30 Sep 82
- FY 83 -		
Apache, Black Hawk, and Chinook Helicopter Self-deployment Cost and Benefit Study (ABCD) CAA-SR-82-8	DCSOPS	Oct 82
Econometric Model for Optimizing Troop Dining Facility Operations (The Army Master Menu Study (AMMEN)) CAA-SR-82-10	DCSLOG	Nov 82
Southwest Asia Prepositioning (SWASIA PREP) CAA-TP-83-12	DCSLOG	Nov 82
Evaluation of Army Stockage Objectives Phase I (ARSTOCK I) CAA-SR-82-12	DCSLOG	Dec 82
Improving the Definition of the Army Objective Force (IDOFOR III) CAA-SR-82-13	DCSOPS	Dec 82
Tank Fleet Modernization Strategy Study (TFMS) CAA-TP-82-6	DCSRDA	Dec 82

Total Army Analysis FY 1984-1988 (TAA-88) CAA-SR-82-9	DCSOPS	Dec 82
Defense Intelligence Agency Support Study (DIA SPT) Letter/verbal response - no report/ Gist published	DIA	Jan 83
Deterrence and Defense Concepts for Europe (ACE) CAA-TP-82-7	CAA	Jan 83
Division Level Ammunition Consumption Estimates (DIV LEVEL AMMO) Letter/verbal response - no report published	DCSOPS	Jan 83
Joint Strategic Planning Document Analysis - 1982 (JSPDA-82) CAA-SR-82-11	DCSOPS	Jan 83
Observations on Models Used in TAA-88 (TAA-88 AYA) CAA-TP-83-3	CAA	Jan 83
Communications/Intelligence/ Electronic Warfare Methodology (CIEW) CAA-TP-83-1	CAA	Feb 83
Army Long-Range Appraisal Phase I Study (ALRA I) CAA-SR-83-2	DCSOPS	Feb 83
Support for Operational Analysis of Production Surge Planning (USAREUR PROD SUR) Letter/verbal response - no report published	DCSOPS	Mar 83
Joint Program Assessment Memorandum FY 1985-1992 Army Mobility Analysis (JPAM) Computer tape submitted - no report published	DCSLOG	Mar 83
COPPERHEAD Requirement Evaluation (COPPERHEAD REQ) Letter/verbal response - no report published	DCSOPS	May 83
Wartime Requirements for Southwest Asia - FY 87 (R87M) CAA-SR-83-6	DCSOPS	Jun 83
Base Operations Workload Study (BOWS) CAA-SR-83-4	DCSLOG	Jun 83
OMNIBUS Capability Study - FY 82 (OMNIBUS-82) CAA-SR-83-1	DCSOPS	Jun 83
Unit Replacement System Analysis III (URSA III) CAA-SR-83-9	DCSPER	Jul 83
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