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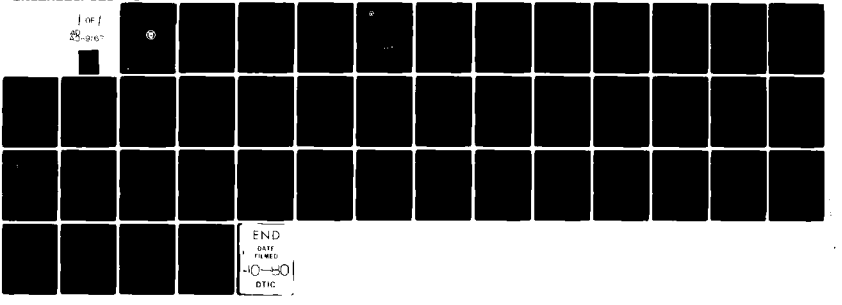

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STUDY REPORT
CAA-SR-80-6

STUDY FOR IMPROVING THE DEFINITION OF THE ARMY OBJECTIVE FORCE METHODOLOGY (IDOFOR)

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VOLUME I - EXECUTIVE SUMMARY

JULY 1980

PREPARED BY
JOINT FORCES DIRECTORATE
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CAA-SR-80-9

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
Provides the Army with an improved methodology to support the exercise of its planning responsibilities within the PPBS. Developed an analytical basis for the design and evaluation of the Army objective force, 10-12 years in the future; provides an interface between mid-range and long-range planning; and has the capability to analyze a designated force from the program force to the planning force. Identifies and quantifies factors that determine reasonable attainability and reasonable assurance.

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REPLY TO ATTENTION OF

CSCA-JFC

JUL 31 1980

SUBJECT: IDOFOR Final Report

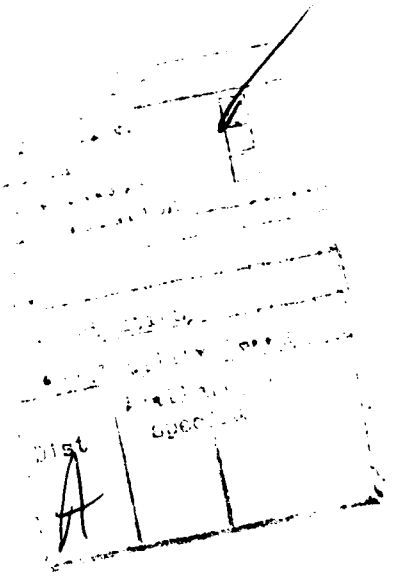
Deputy Chief of Staff for Operations
and Plans
Department of the Army
Washington, DC 20310

1. Reference is made to DAMO-SSW memorandum, 13 August 1979, subject as above which directed the US Army Concepts Analysis Agency (USACAA) to conduct a study to improve the definition of the Army objective force methodology (IDOFOR).

2. This report fulfills the requirements established by the reference and provides analytical methods for force design, evaluation, acquisition, and costing. The results presented include an analytical basis, in terms of hypothetical force designs, for the design and evaluation of the Army objective force, 10-12 years in the future.

3. The analysis addresses top-down force structuring of alternative Army objective forces from a theater-level perspective. Each alternative is analytically derived and quantitatively evaluated. IDOFOR is designed to complement the force design efforts of the US Army Training and Doctrine Command (TRADOC). The results are intended to provide the Army Staff with an improved methodology to support the exercise of its planning responsibilities within the PPBS.

EDWARD B. ATKESON
Major General, USA
Commanding



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STUDY FOR THE IMPROVEMENT OF THE ARMY OBJECTIVE FORCE METHODLOGY (IDOFOR)

VOLUME I - EXECUTIVE SUMMARY

July 1980

Prepared by

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STUDY FOR IMPROVING THE DEFINITION OF THE ARMY OBJECTIVE FORCE METHODOLOGY (IDOFOR)

EXECUTIVE SUMMARY

1. INTRODUCTION

a. Frederick the Great instructed his generals that "A general should choose his ground with regard to the numbers and types of his troops and the strength of the enemy . . .. If . . . you are inferior in numbers do not despair of winning, but do not expect any other success than that gained by your skill."* Technological improvements in lethality, range, and mobility of weapons systems since the time of Frederick have changed the nature of warfare but not the soundness of his advice. The fluid nature of combat anticipated in the event of conflict in Europe has caused reassessment of the value of terrain formerly considered critical to mission accomplishment. As a result, force size ("the number and type of his troops") and balance of weapons capabilities ("and the strength of his enemy") have become even more essential for success. US Army Field Manual 100-5 describes how to "fight outnumbered and win." The Study for Improving the Definition of the Army Objective Force Methodology (IDOFOR) does not purport to further develop the skills of the commander. Rather, this study addresses the strategic tailoring of the ground forces so as to best improve our capability vis-a-vis that of the enemy and to compensate, as much as possible, for any difference in quantity.

b. IDOFOR is a methodology development and expansion effort. It is concerned with top-down force structuring of alternative Army objective forces from a theater-level perspective. These Army objective force alternatives are intended to be achievable long-range US Army force options capable of successfully executing Army missions in support of the national military strategy. Each alternative is analytically derived and quantitatively evaluated. IDOFOR is designed to complement the force design efforts of the US Army Training and Doctrine Command (TRADOC). TRADOC develops types of organizational combat structures; the IDOFOR methodology gives the Headquarters, Department of the Army (HQDA) Staff the capability to determine how many of each type unit the Army needs for a specified scenario and how many it can obtain within some predetermined level of resource constraints (dollars and manpower).

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*Brigadier General Thomas R. Phillips, Frederick II, The Great, Instructions for his Generals (Harrisburg, Pennsylvania: The Telegraph Press), p 82.

2. BACKGROUND

a. The Armed Forces of the United States cannot draw upon unconstrained resources. Even during the extensive mobilization of World War II, national assets had to be allocated between the industrial/agricultural sector and the military, and, within the military, among the services and among the theaters of war. Today, social programs draw upon increased portions of the federal budget and both demographic and economic changes affect the availability of individuals to serve in the military. Long lead times for fielding new systems emphasize the importance of long-range planning for force structures which will use these systems.

b. The Planning, Programing, and Budgeting System (PPBS) is the Department of Defense (DOD) specified process through which the Army, other Services, and Defense agencies obtain the resources with which to man, equip, train, field, maintain, and support forces required to carry out assigned missions. The system provides for joint planning and program coordination to ensure balanced military forces appropriate to the national military strategy and responsive to the threat. Most force development studies and analyses are, however, conducted unilaterally by the Services.

c. The planning phase of the PPBS lays the groundwork for Army force development. It includes joint and unilateral long-range planning, and related combat developments and force design activities aimed at articulating force requirements and objective forces. The planning phase should define the size and character of the Army needed to support the national military strategy, and chart a course for integrating new systems and units into the Total Army force structure.

(1) Long-range planning analyzes, inter alia, trends in US and world societies, political and leadership factors, national aspirations, technology, and world resources. The Army Long-Range Environmental Projection provides planners with probable and possible future world environments. The Science and Technology Objectives Guide provides a base for establishing the characteristics desired in future Army systems. Within JCS, the Joint Long-Range Strategic Appraisal (JLRSA) provides analysis and guidance for the planning effort. Thus, these studies provide strategies and guidelines for structuring the Army to meet future requirements, thereby influencing the course of current and future trends in force development.

(2) In the combat developments process, new units are defined in sufficient detail to permit capability and affordability

assessments. The products of long-range planning activities guide both combat developments and threat analyses pertaining to the mid-range period.

(3) Mid-range force design activities must consider the long-range perceptions of the threat to US national interests and the long-range operational and organizational concepts expressed through the combat developments process. Force design must also be based on extrapolations of the current threat and the current and programed structure of the US Armed Forces. The IDOFOR Methodology has been developed to consider both the long-range perceptions and the short-range constraints in the design of forces for the mid-range and ensuing time periods.

d. Countervailing influences to requirements-based objective force design are the realities of resource and time constraints. It has been suggested that a planning-programing gap exists due to the differential between resources required for the planning forces and resources allocated for the programed force. The gap between objective and program forces must be kept within reasonable bounds if either is to play a useful role in the overall PPBS. The IDOFOR methodology will help bridge the gap between planning and programing functions in a mutually supportive manner. It will also improve the efficiency and responsiveness of objective force resource analysis.

3. PROBLEM. The Army requires improved methodologies to support the exercise of its planning responsibilities within the PPBS. Current methods lack the scope and richness of choice necessary to define comprehensively the kind of Army which is both required and affordable in the mid-range period. While elements of the required methodologies have been available--resource projection, conceptual force design, combat developments--they had not yet been focused collectively on the problem of defining an objective Army force. This must be done in such a way that programers and planners can have a clear indication of Army priorities to guide the development of investment strategies, programing goals, and program priorities.

4. PURPOSE. The purpose of this study was to develop an improved methodology for the design and evaluation of alternative Army objective force structures which would provide an interface between mid-range and long-range planning, 10-12 years in the future. Additionally, the methodology should be useful for analyzing any designated force from the program force through the planning force.

5. OBJECTIVE. The objective of the IDOFOR Study has been to develop an interactive methodology involving the US Army Concepts Analysis Agency (CAA), the Army Staff, and TRADOC that provides:

a. An analytical basis for force sizing decisions in order to aid development and support of Army positions in planning, programing, and budgeting activities.

b. An analytical methodology to determine the character, structure, capabilities, and risks to the Army objective force, and to assist in making affordability decisions to aid development and support of Army positions for the POM and program review cycles.

c. Identification and quantification of the factors that determine reasonable attainability and reasonable assurance.

d. Alternative force concepts to be considered for adoption in the Army objective force.

e. Identification of the kinds of data and information needed from studies and analyses that address the years beyond the time period examined in this study (e.g., long-range planning activities).

f. A quick response analytical capability for special objective force analyses.

6. SCOPE. US national policy has defined the Central European theater as most critical to our national interests and our potential survival. Therefore, the initial methodology development has focused on deployable Army forces for that theater, in the context of a NATO defense against a Warsaw Pact attack. A conventional (nonnuclear, nonchemical) combat scenario has been used in this first phase of the methodology development process since the force structuring requirements have been better defined for this scenario. The methodology permits incorporation of follow-on study efforts which:

a. Expand the methodology for the deployable Army to examine conventional combat on the flanks of NATO and in other theaters worldwide.

b. Expand the worldwide methodology to include consideration of the integrated battlefield (i.e., chemical and nuclear warfare options).

c. Expand the worldwide methodology to encompass the Total Army and assist in developing guidance for the sustaining base and all force related programs in the Program Objective Memorandum (POM).

7. TIMEFRAME. In order to allow sufficient time beyond the POM years for force structure changes to be implemented, this methodology focuses 10-12 years into the future. The specific design year for this phase of the study is 1992. The methodology has the capability of focusing on any specified intervening year when required to satisfy needs for special force analyses. Projection beyond 12 years into the future becomes more difficult because of more limited available quantifiable information.

8. ASSUMPTIONS. Overall study assumptions used for the study are shown below: (specific assumptions keyed to particular portions of the methodology are discussed in the appropriate methodology section):

a. The current organization and functions of the Army, JCS, and OSD will remain basically unchanged.

b. Army force planning will remain focused on conventional conflict in Central Europe.

c. The sequential characteristics of the PPBS will remain essentially unchanged.

9. EARLY METHODOLOGY DEVELOPMENT. Mid-range combat force structuring at CAA has been built upon the foundation of the Conceptual Design for the Army in the Field (CONAF) series of studies. These studies (CONAF I through CONAF V, 1970-1976, plus the follow-on Trade-off Analysis System/Force Mix (TRANSFORM) Study, 1977) have been characterized by growth in the conceptual force design and evaluation methodology and provide a sound evolutionary basis for the IDOFOR approach. In these earlier studies, the force structures which were developed and defined were constrained by limitations of budget and manpower availability. Thus, they were essentially extensions of the program force to the mid-range timeframe. The IDOFOR Study expands beyond these constraints applying their techniques to design of alternative objective force structures, and to determine for those forces the additional manpower needs and budget resources required.

10. THE IDOFOR METHODOLOGY. The overall IDOFOR methodology is shown in Figure 1, and is grouped into three stages: force partitioning, force design, and force acquisition.

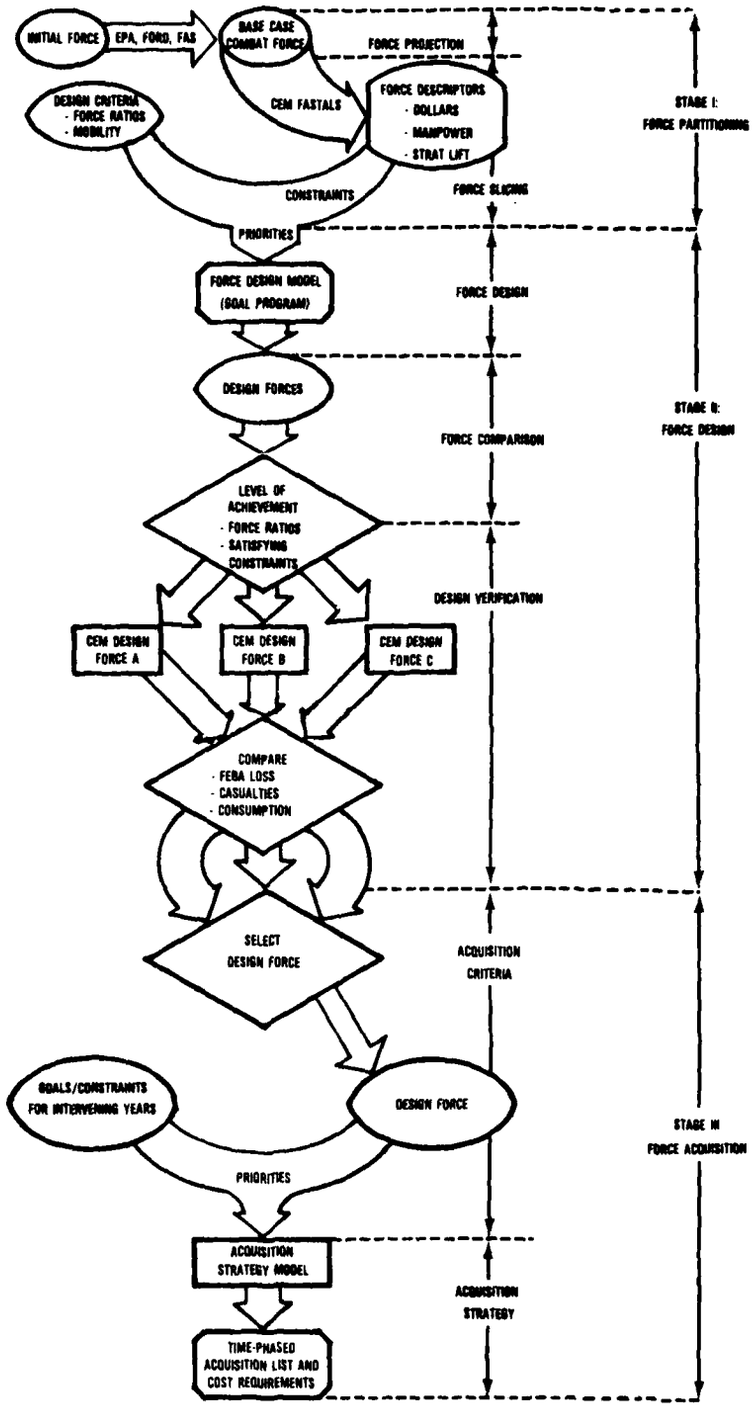

Figure 1. The IDOFOR Methodology

a. Stage I. Force Partitioning

(1) This stage starts with a given combat force, generally the current force. This force is projected, or modernized, out to the design year in accordance with the current plans for procurement and distribution of new equipment, expected changes in force structures, etc. For IDOFOR this was a manual process, but as a part of the methodology improvements, the Force Definition (FORD) System of computer programs was developed and tested. This modernization process includes information from the Force Accounting System (FAS), the Organization and Equipment List (OEL), the Army Equipment Status Report System (AESRS) assets tape, the Extended Planning Annex (EPA), and the Unit Data System (UDS) (Figure 2).

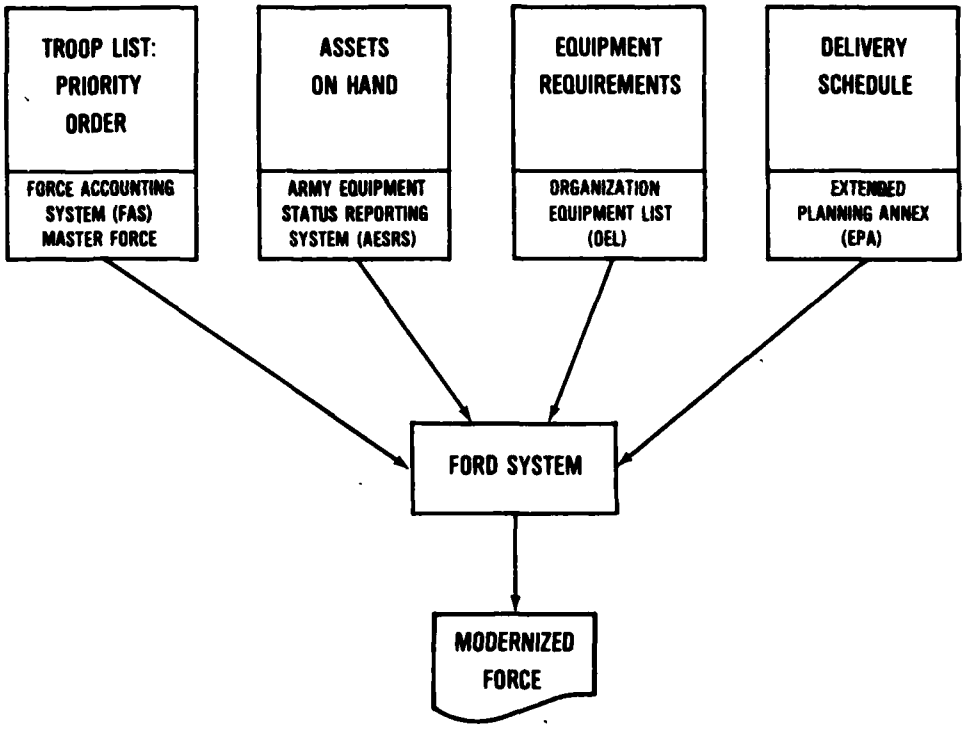

Figure 2. Force Definition System

The Force Definition System combines the unit equipment requirements by TOE, the assets already in the units and the expected delivery of new systems. The system allocates the new equipment to units in Department of the Army Master Priority List (DAMPL) sequence and reallocates the equipment previously in these units to units with a lower priority on the DAMPL. System output can include information on equipment/unit status for each intervening year out to the selected design year. FORD allows rapid consideration and analysis of the impact on the force structure of changing DAMPL priorties or delivery schedules of new equipment. It accomplishes, in less than 1 hour of computer time, that which formerly required several professional man-weeks of work. As a result, it has the potential for widespread application beyond the IDOFOR methodology.

(2) When the fully modernized combat force has been developed, its warfighting capabilities are evaluated in the dynamic, theater-level simulation, the Concepts Evaluation Model (CEM). The results of the simulation are provided to another model, the Force Analysis Simulation of Theater Administrative and Logistic Support (FASTALS), to determine the nature and magnitude of the support structure required for that force. The total combat and support structure can now be described in terms of costs, cumulative personnel requirements, and required strategic lift assets. The costs are in terms of annual recurring costs for the design year, and nonrecurring costs required for modernization of the force for both the Active and Reserve Components. These descriptors of the total force are used to generate similar descriptors for individual elements of the force. The force is "sliced" to allocate to each major system of the force its proportionate share of the total force requirements for support structure as schematically shown in Figure 3. The system slices and their component weapon slices used in IDOFOR are shown in Figure 4. The resource requirements for these slices, described in terms of the dollars, personnel, and strategic lift required per system, become the coefficients for each weapon system in the constraint functions of the design model. The slice requirements were developed for both a fully supported/fully structured force, and for a force reduced by the use of host nation support (HNS), with both forces further delineated into Active Army and Reserve Components (USAR and USARNG).

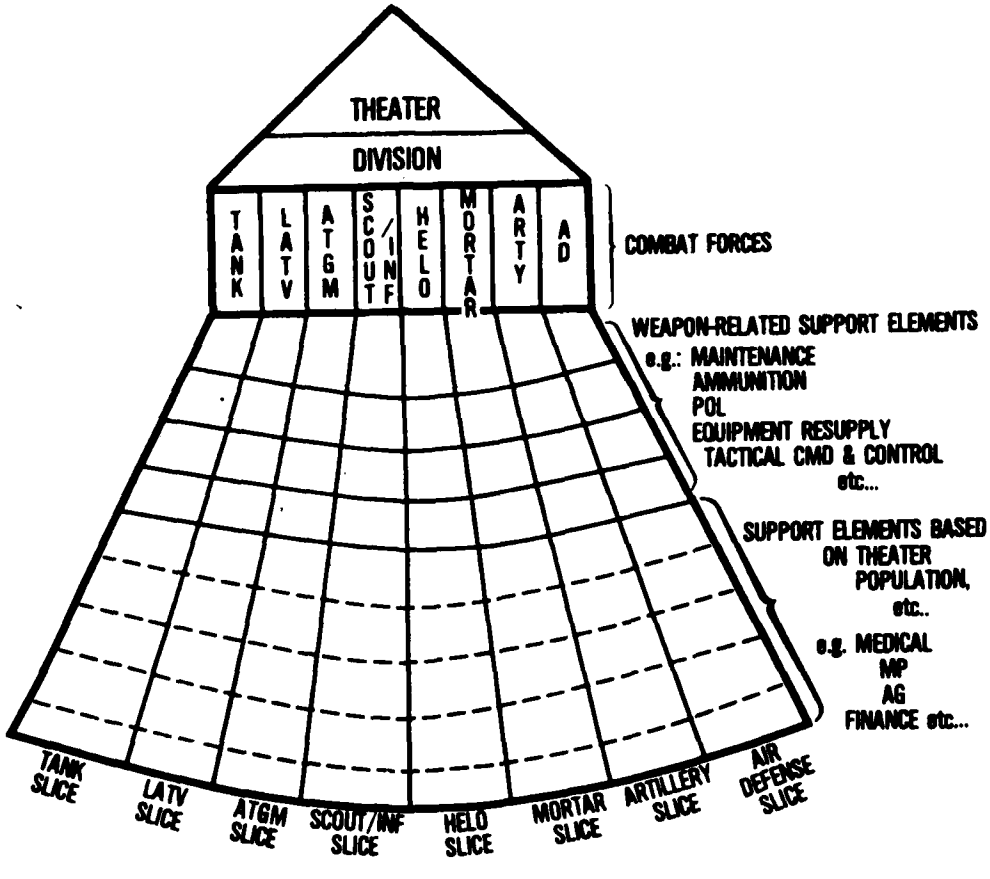

Figure 3. Theater Structure for Slices

System slices	Weapon slice components
Tank	(XM-1 (105), M60A3, XM-1 (120)
Lightly armored tracked vehicle (LATV)	IFV/CFV, ITV, M113A1
Attack helicopter	AH-1S, AAH
Scout/observation helicopter	OH-58
Utility helicopter	UH-60A, UH-1, CH-47D
Mortar	60-81mm, 4.2 in (107mm)
Antitank guided missile (ATGM)	TOW
Scout/infantry	DRAGON, infantry individual weapons
Air defense	VULCAN, DIVAD Gun, CHAPARRAL, ROLAND, HAWK, PATRIOT, STINGER
Field artillery	105mm, 155mm, 8-in, MLRS, LANCE
Division headquarters	
Theater headquarters	

Figure 4. IDOFOR System Slices

(3) The design goals of the force are derived in large measure from the composition of the enemy force postulated for the design year. A series of static measures allows consideration of the force's defensive capabilities at several time periods. (D-day is an obvious point in time; force levels at M-day operate as a hedge against a surprise attack; the times for evaluation of force levels after D-day are derived from analysis of expected enemy and friendly build-up rates). These design goals are used to match the cumulative effects of each type firepower from all US weapons against corresponding targets (antitank firepower against tanks, antilight armor firepower against lightly armored vehicles, antipersonnel firepower against exposed personnel and the counterbattery fire capability of the artillery against the enemy artillery). Counterbreakthrough goals are derived from the Soviet doctrine for breakthrough operations. The lateral mobility of the weapon systems is used to match the expected cumulative firepower potential of the attacker's second echelon forces at the breakthrough point.

b. Stage II, Force Design

(1) Force partitioning allocates the resource requirements of the total combat and support structure among the system slices. These slices are recombined into standard or conceptual units and force structures to attain, or approach, a desired level of combat power. The packaging could be performed by trial-and-error, but without assurance that the selected package is the best possible in terms of the competing factors of combat power versus resource demands. Therefore, a mathematical optimization technique is required. The model developed for the IDOFOR methodology uses the multi-objective optimization technique of linear goal programing to design alternative forces. The algorithm uses a priority structure wherein the solution for one priority level will not be degraded by an attempt to satisfy a lower ranked priority. The design variables for the model are the system slices and candidate units for the force. The design goals and resource constraints are grouped in a priority sequence. An advantage of the Force Design Model is its capability to quickly and easily evaluate changes in the relative ranking of the various goals and constraints.

(2) From the prioritized design goals and resource constraints and alternative force structures, the Force Design Model develops a force design solution. As the model is currently structured, force alternatives may be designed in terms of weapon systems alone, or for various levels of force structuring such as battalions and divisions. The best stationing of these alternatives--forward deployed in Europe, or with equipment in POMCUS, or

based in CONUS in either the Active or the Reserve Components is also generated. The impact of changes in force requirements can be considered for types of units, for trade-offs between POMCUS units and PWRMS assets, and for changes in costs, capabilities, or densities of specific weapons systems caused by high cost "smart" munitions.

(3) As the alternative force structures are generated, the force designer can compare them in terms of their level of achievement of the design goals and the established system constraints, in priority sequence. This "achievement vector" of the goals/constraints is part of the model solution and becomes a descriptor of the force's capabilities and demands.

(4) For purposes of methodology demonstration, a number of sample alternative force structures were generated in the Force Design Model based upon changes to constraints, priorities, and other data for the candidate units. Selections from these, or other force structure options, can be further tested and their performance evaluated in the dynamic theater level combat simulation model, CEM. The comparative evaluation criteria for the CEM include FEBA movement, attrition of personnel and equipment, and the residual force strength at the end of the combat simulation. (The last criterion is a measure of the capability of the force to continue fighting). For IDOFOR, the CEM evaluations were based on a continuous US sector, approximately one-half the AFCENT front, and a 92-day simulation time. CEM calibration, particularly the WP use of the decimation pool for refitting low-strength divisions, was adjusted to hold base case FEBA loss to 150 km, and held constant for all validation simulations. (CEM FEBA loss greater than 150 km will cause inconsistencies in FASTALS results unless FEBA losses for all simulations exceed 150 km).

(5) Seven force structure options were tested in the CEM and are compared here. One was the base case force (BC); OPF represented a stronger, planning-level force submitted by the sponsor; FD-A and FD-B, are IDOFOR force designs equal in resource requirements (dollars and personnel) with the base case; two were forces designed with nonrecurring and annual recurring costs increased by 40 percent (FD-C and FD-D); and the seventh force, FD-E, was designed to satisfy all combat goals, and to measure the resources required for that force structure. FD-B and FD-D were organizationally balanced versions of FD-A and FD-C, respectively, wherein the solution was required to have one light division for every three heavy divisions and one armored cavalry regiment for every three divisions. Table 1 shows the relationships between these forces. Figure 5 shows the cumulative mean FEBA loss for each of these forces over the 92-day period of the simulations. The CEM

results show that the proportional achievement of the combat goals in the Force Design Model is a reliable predictor of force performance in the dynamic simulation, CEM.

Table 1. Design Force Relationships

Force	Cost relationship	Combat power
BC	BC cost	Short 25.5% of goal
OPF	BC + estimated 50%	Short 15.7% of goal
FD-A	BC cost	Short 19.3% of goal
FD-B, balanced FD-A	BC cost	Short 21.8% of goal
FD-C	BC + 40%	Short 10.4% of goal
FD-D, balanced FD-C	BC + 40%	Short 13.4% of goal
FD-E	BC + 55%	Achieved combat goals

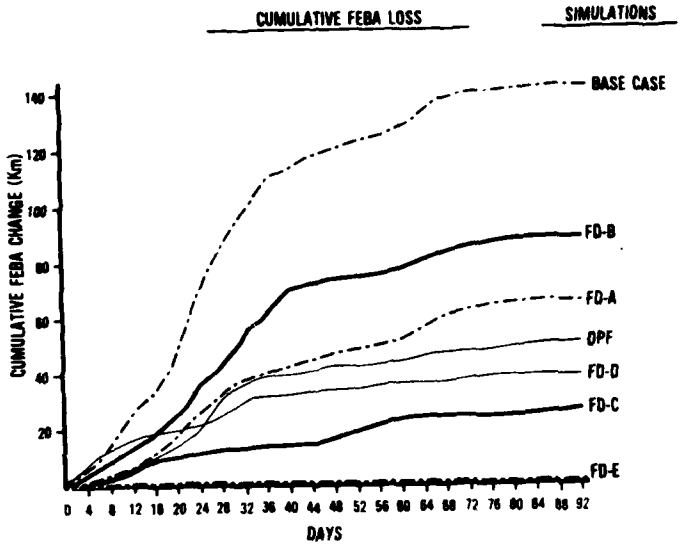

Figure 5. Cumulative Mean FEBA Loss in CEM for Representative Forces

(6) The study developed two methods to evaluate the risks associated with the force structure options. Both methods are in a prototype stage of development, but development of both has progressed sufficiently that there is confidence that they can fulfill the risk assessment requirements of the IDOFOR methodology.

(a) The first risk analysis considers the risks that a force does not perform to its designed level. This approach uses network simulation, the Venture Evaluation and Review Technique (VERT), to consider--as functions of warning time--the impact of shortfalls in force readiness, POMCUS availability, transportation assets for deployment and for movement from the ports/airheads to the combat zone, and variations in WP threat and warfighting ability.

(b) The second considers the risk incurred when the designed level of the force is less than the desired capability of the force. This risk is evaluated by correlating the achievement vector from the Force Design Model with previous CEM runs which used a common scenario and similar calibrations. Figure 6 shows the relationship of shortfalls in achievement of the combat power goals to cumulative mean FEBA losses in CEM. If the force planner can identify the relative terrain loss associated with "minimum," "acceptable," and "unacceptable" risks (as in the example in Figure 6), the output of the Force Design Model could be used to identify the risk category for a designed force.

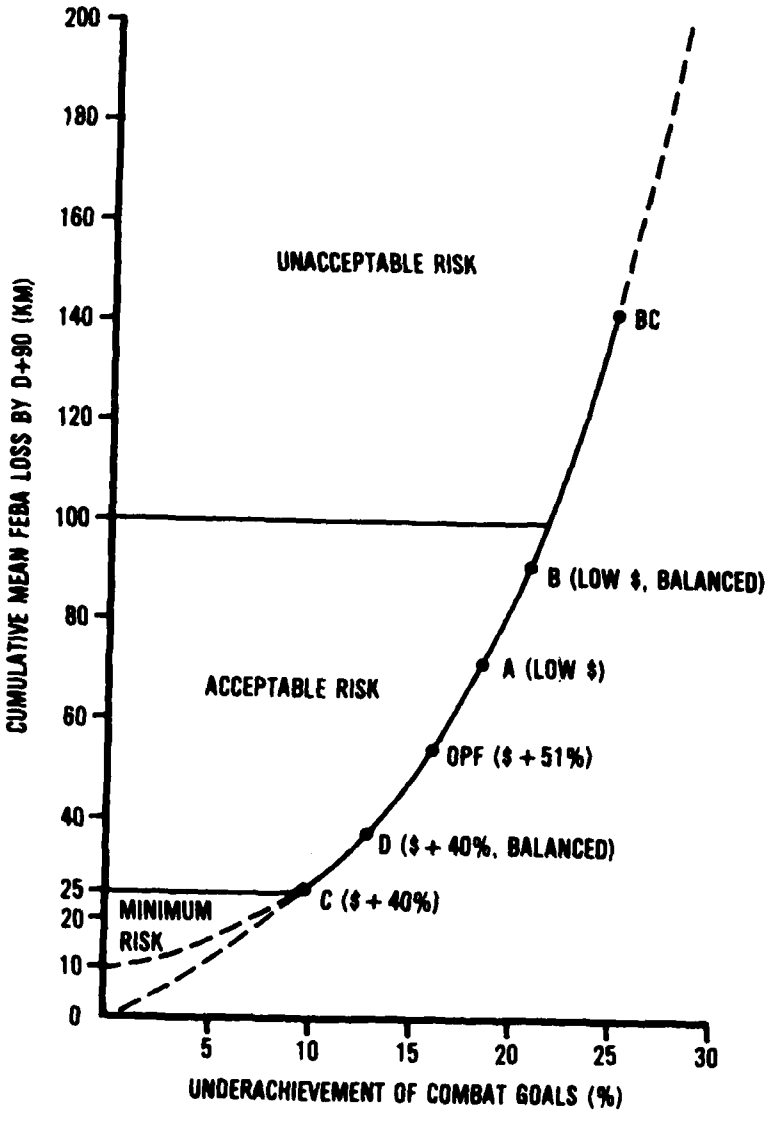

Figure 6. Cumulative FEBA Loss as a Function of Force Design Model Combat Power

c. Stage III, Force Acquisition. In this stage, one of the alternative objective force structures can be selected as the Army Objective Force and be developed in detail using the Acquisition Strategy Model. The model will use goal programing and prioritized design goals, and based on the threat and constraints during the intervening years, develop a strategy to build the initial force into the Army Objective Force. At present the Acquisition Strategy Model is in prototype form; full development will be accomplished during the IDOFOR follow-on effort.

11. ESSENTIAL ELEMENTS OF ANALYSIS

a. Does the methodology produce products useful to Army PPBS, JSPS requirement, unilateral requirements?

Yes. The IDOFOR methodology has produced:

(1) The Force Definition (FORD) System, automated to reduce computation time from weeks to hours, which allows the force planner to modernize the current force out to a target year.

(2) The Force Design Model which, using "slice methodology" and goal programing, allows the force planner to design and compare differently structured forces through the optimization of multiple priorities in an automated program.

(3) The risk analysis models, currently in prototype, which will allow the force planner to compare risks associated with various force structures in terms of combat power to ground gain/loss, or by other selected characteristics.

(4) The Acquisition Strategy Model, currently in prototype, which will allow the force planner to determine phased weapons requirements and forces for the years preceding the target year.

b. Is the methodology responsive to the PPB cycle and to quick reaction force analysis requirements?

Yes. The automated programs are designed to both produce an objective force for input to the PPB cycle and to respond rapidly (days, rather than months) to "what if" questions of force analysis.

c. Is the methodology broadly useful to the Army Staff?

Yes. The Force Definition System can be used in force modernization of the current force to any target year. The Force Design model can be used to compare forces with variable inputs and/or priorities. The risk analysis models will be able to compare the risks associated with different force designs. The Acquisition Strategy Model will be able to project forces from current or programed to objective or planning force levels and to determine the intermediate requirements in terms of forces, units, weapons, personnel, etc.

12. ACCOMPLISHMENTS. This phase of the IDOFOR methodology development has incorporated a number of methodological improvements over the preceding CONAF studies. They are briefly identified here, and explained in detail in Volume II of the report.

a. The force modernization process has been improved with the completion and implementation of the Force Definition (FORD) System.

b. The force partitioning process has been improved by: generation of slice coefficients for both fully supported and for host nation supported force structures; definition of additional system slices for the division headquarters, for utility/cargo helicopters, and for scout/observation helicopters; restructuring of the scout/infantry slice; clarification of the air defense artillery slice; and consideration of additional cost requirements for high cost ammunition.

c. The Force Design Model has been expanded to consider a number of new functions and to better analyze those previously included. New functions have been incorporated for Reserve Components, prepositioned war reserve materiel stocks, high cost ammunition, and prescribed force balances in the force structure. The approach used to generate and evaluate the counterbreakthrough/offensive mobility coefficients of the force was greatl expanded.

d. Two completely new areas have been added to the methodology in prototype form: the Acquisition Strategy Model and the dual approaches to risk analysis.

13. REPORT ORGANIZATION. This report is published in two volumes: Volume I - Executive Summary (UNCLASSIFIED), and Volume II - Main Report and Appendices (SECRET).

APPENDIX A

(U) STUDY CONTRIBUTORS

A-1. STUDY TEAM

a. Study Director

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b. Team Members

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2. PRODUCT REVIEW BOARD

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Mr. H. Frear, Joint Forces and Strategy Directorate, Member

APPENDIX B

STUDY DIRECTIVE

DEPARTMENT OF THE ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS
WASHINGTON, D.C. 20310

REPLY TO ATTENTION OF: DAMO-SSW

13 AUG 1979

SUBJECT: Army Mid-Range Planning

Commander, US Army Concepts Analysis Agency

1. STUDY TITLE. Study for Improving the Definition of the Army Objective Force Methodology (IDOFOR).

2. REFERENCES.

a. CSR 5-11, 25 May 1973, subject: Management of the Automated Force Planning System.

b. CSR 11-1, 25 November 1974, subject: The Planning, Programing, and Budgeting System.

c. AR 1-1, 25 May 1976, subject: Planning, Programing, and Budgeting Within the Department of the Army.

d. AR 5-5, 5 July 1977, subject: The Army Study System.

e. AR 10-38, 25 November 1974, subject: United States Army Concepts Analysis Agency.

f. JCS Memorandum of Policy No. 84 on the Joint Strategic Planning System, 6th Note to Holders of 13th Revision, 6 Apr 78.

3. DEFINITION. The Army objective force is defined as an achievable long-range US Army force required to successfully execute Army missions in support of the national military strategy. The methodology used to develop this force will employ improved analytical methods for force design, evaluation, acquisition, and costing.

4. BACKGROUND.

a. The Planning, Programing, and Budgeting System (PPBS) is the Department of Defense (DOD) specified process through which the Army, other Services, and Defense agencies obtain the resources with which to field, man, equip, train, maintain, and support forces required to carry out assigned missions. The system provides for joint planning and program coordination to ensure balanced military forces appropriate to the national strategy and responsive to the threat. The bulk of force development study and analysis to support the system is conducted unilaterally by the Services.

b. Ground work for Army force development is laid in the planning phase of the PPBS. The planning phase encompasses joint and unilateral

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long-range planning and related combat developments and force design activities aimed at articulating force requirements and objective forces. The intent of the planning phase is to define the size and character of the Army needed to support the national military strategy and to chart a course for integrating new systems and units into the Total Army force structure.

(1) Long-range planning analyzes, inter alia, trends in US and world societies, political and leadership factors, national aspirations, technology, and world resources. The Army Long-Range Environmental Projection provides planners with probable and possible future world environments. The Science and Technology Objectives Guide provides a base for establishing the characteristics desired in future Army Systems. Within JCS, the Joint Long-Range Strategic Appraisal (JLRSA) provides analysis and guidance for the planning effort. Thus, these studies portray strategies and guidelines aimed at structuring the Army to meet the future and at influencing the course of current and future trends in force development.

(2) In the combat developments process, new units and systems are defined in sufficient detail to permit affordability assessments and determination of capabilities.

(3) Force design activities are based on underlying operational and organizational concepts articulated through the combat developments process as well as perceptions of the threat to US national interests. The products of long-range planning activities influence both combat developments and threat analyses pertaining to the mid-range period. Accordingly, the force design capability to be institutionalized by this study will be applicable to the principal analytical activities that currently develop the mid-range planning forces.

c. Countervailing influences to requirements-based objective force design are the realities of resource and time constraints. The gap between objective and program forces must be kept within reasonable bounds if either is to play a useful role in the overall PPBS. It has been suggested that a planning-programing gap exists due to the differential between resources required for the planning forces and resources allocated for the programed force. It is a principal goal of this directive to develop a methodology that bridges the planning and programing functions in a mutually supportive manner. Beyond this goal there is a need to improve the efficiency and responsiveness of objective force resource analysis.

5. LITERATURE SEARCH. A partial list of data sources relevant to this effort are:

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a. Joint Strategic Planning Documents (JSPD).

b. Joint Strategic Planning Document Supporting Analyses (JSPDSA).

c. JSPD Analyses.

d. Joint Strategic Objective Plans (JSOP).

e. JSOP FOREWON Analyses and Exercises.

f. Conceptual Design of the Army in the Field (CONAF) studies.

g. Draft Consolidated Guidance.

h. Army Program Objective Memorandums (POM).

i. Total Force and Total Army Analyses.

j. Trade-off Analysis Systems/Force Mix (TRANSFORM).

k. OMNIBUS studies.

l. Army Strategic Objectives Plans (ASOP).

m. SAGA's Total Force Capability Assessment (TFCA).

n. Alternative Resource Allocation Priorities (ARAP).

o. Army Long-Range Environmental Projection (ALREP).

p. Science and Technology Objectives Guide (STOG).

q. Joint Long-Range Strategic Appraisal (JLRSA).

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

7. STUDY AGENCY. US Army Concepts Analysis Agency (CAA) in coordination with US Army Training and Doctrine Command (TRADOC) and the Army Staff.

8. TERMS OF REFERENCE.

a. Problem: The Army requires improved methodologies to support the exercise of its planning responsibilities within the PPBS. Current

methods lack the scope and richness of choice necessary to define comprehensively the kind of Army which is both required and affordable in the mid-range period. While elements of the required methodologies are available--resource projection, conceptual force design, combat developments--they have not yet been focused collectively on the problem of defining an objective Army force. This must be done in such a way that programers and planners can have a clear indication of Army priorities to guide the development of investment strategies, programing goals, and program priorities.

b. Purpose: To develop an improved methodology for the design and evaluation of the Army objective force which will provide an interface between mid-range and long-range planning, 10-12 years in the future. Additionally, the methodology can be used to analyze any designated force from the program force through the planning force.

c. Objective: Develop an interactive methodology involving CAA, the Army Staff, and TRADOC that will provide:

(1) Analytical basis for force sizing decisions in order to aid development and support of Army positions in planning, programing, and budgeting activities.

(2) Analytical methodology for determining the character, structure, capabilities, and risk to the Army objective force, and to assist in making affordability decisions to aid development and support of Army positions for the POM and program review cycles.

(3) Identification and quantification of the factors that determine reasonable attainability and reasonable assurance.

(4) Alternative force concepts to be considered for adoption in the Army objective force.

(5) Identification of the kinds of data and information needed from studies and analyses that address the years beyond the time period examined in this study (e.g., long-range planning activities).

(6) A quick response analytical capability for special objective force analyses.

d. Scope:

(1) This study will develop a methodology and resultant products applicable to the deployable Army (Active and Reserve Components)

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for conventional combat in Central Europe in the context of a NATO defense against the Warsaw Pact.

(2) The methodology will be structured to incorporate follow-on study efforts of this series to:

(a) Expand the methodology for the deployable Army to examine conventional combat on the flanks of NATO and in other theaters worldwide.

(b) Expand the worldwide methodology to include a theater nuclear warfare option.

(c) Expand the worldwide methodology to encompass the Total Army and assist in developing guidance for the sustaining base and all force-related programs in the POM.

(3) This methodology will exploit and improve existing techniques. It will incorporate current aspects of the JSPD Supporting Analyses. The point of departure is the revitalized long-range planning effort which will provide a necessary backdrop and source of ideas for this effort.

(4) The product requirements will be cyclical, but will not necessarily be required on a fixed annual recurring schedule. This product and subsequent applications of the methodology will be documented and will provide an analytic basis for staff analysis. Analytical products produced by the methodology are expected to have a shelf life of 2 years or more.

(5) Improved methodology must have embedded in it the capability to ascribe funding and other resources to each future objective force design considered. Cost estimates must be attributable to each fiscal year in terms of recurring and nonrecurring costs. The resource model must be capable of relatively rapid use for gross force comparisons.

(6) The improved methodology will provide, as an adjunct to its primary aim, for specific analysis to be done in response to special tasking requirements prepared by the Army Staff in coordination with CAA. The purpose of this capability is to respond to emerging real-time force issues facing the Army by exploiting the force methodology to obtain quick reaction products.

(7) Development of major forces input to the Joint Strategic Planning System (JSPS) in the form of force requirements and a planning force for the JSPD and to the PPBS in the form of Army Objective and Program

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Forces, together with programing strategy for the Army POM, will be accomplished independently by the Army Staff based on products of this methodology.

e. Approach: The methodology to be developed should retain viable features of the current JSPD Analysis and the basic CONAF method. These features should provide a point of departure for a higher level of integral resource analysis and the development of conceptual improvements. Minimum requirements to be reflected in the improved methodology are as follows:

(1) Develop a fully structured and fully supported objective force base case.

(2) Design alternates to the base case which define points in a multidimensional force/resource/concept matrix.

(a) One set of alternative forces will be obtained by incrementally increasing and decreasing base case assumed resource availability to reach higher and lower levels of forces. Annual budgets up to 40 percent greater and 10 percent less than the current budget year may be assumed.

(b) Other alternative forces will be obtained by using such analytic techniques as mathematical programing, net assessment analyses, military judgment, and others as appropriate, to derive alternative force concepts. Alternatives may vary force/combat systems mix, stationing, manpower distribution, investment strategies, strategic and tactical mobility characteristics, weighting of levels of support and structuring (forces less than fully structured and fully supported), and may introduce, in exceptional cases, conceptual weapons systems.

(3) Cost the objective force base case using the CONAF methodology by projection of the FY 79 Army force into the future in consonance with current HQDA plans and programs. Cost projections should be accomplished using constant dollars.

(4) Identify measures of effectiveness applicable to the deployable Army which are sensitive to support structure as well as fire power and weapons systems. Methodology should provide quantifiable measures of force effectiveness to the extent possible, but must also provide for judgmental analysis of intangibles; e.g., people programs vs. hardware.

(5) Examine the sensitivity of alternative force performance to changes in the size, rate of commitment, and qualitative characteristics of the threat.

(6) Develop a specified objective force in detail, which is packaged and prioritized to show application of program assets to achieve to the maximum the inherent capabilities at each step of its development through the mid-range period.

(7) The characteristics and capabilities of the objective force will be identified. Areas for addressal include, but are not limited to:

(a) Investment (dollar costs and other resource requirements).

(b) Structure/support.

(c) Manning.

(d) Organization and doctrine.

(e) Deployability and basing.

(f) Training.

(g) Sustainability.

(h) Equipment.

(i) Readiness.

(j) Overall warfighting capability.

f. Timeframe: The methodology will apply to force development out to 12 years in the future. Methodology must be able to focus on any specific year when required to satisfy needs for special force analyses.

g. Assumptions:

(1) The current organization and functions of the Army, JCS, and OSD will remain basically unchanged.

(2) Army force planning will remain focused on conventional conflict in Central Europe.

(3) The sequential characteristics of the PPBS will remain essentially unchanged.

h. Essential Elements of Analysis:

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(1) Does methodology produce products useful to Army PPBS? JSPS requirements? Unilateral requirements?

(2) Is methodology responsive to the PPB cycle and to quick reaction force analysis requirements?

(3) Is methodology broadly useful to the Army Staff? TRADOC? Other users?

9. RESPONSIBILITIES.

a. Army Staff.

(1) DPAE, OCSA will:

(a) Provide a representative to the Study Advisory Group (SAG).

(b) Project program funding levels for the timeframe under consideration.

(c) Provide POC for changes to programing cycle.

(d) Provide guidance on PPBS to ensure timely impact on study or process.

(2) ODCSOPS will:

(a) Establish a SAG IAW AR 5-5.

(b) Provide the chairman for the SAG.

(c) Provide guidance on assumptions, scenario, and force postulations for timeframe under consideration.

(d) Provide guidance on equipment expected to enter the force during the timeframe under consideration.

(e) Provide guidance on combat support and service support postulations during the timeframe under consideration.

(f) Provide guidance on command and control capabilities for the force structure during the timeframe under consideration.

(3) ODCSPER will:

(a) Provide a representative to the SAG.

(b) Provide guidance related to personnel availability.

(c) Provide related personnel cost projections.

(4) ODCSLOG will:

(a) Provide a representative to the SAG.

(b) Provide guidance on logistical doctrine to be utilized.

(c) Provide guidance in determining logistic requirements and capabilities during the timeframe under consideration.

(d) Provide guidance with regard to host nation support.

(e) Provide strategic mobility guidance as required.

(f) Provide guidance on POMCUS and War Reserve Stocks with regard to the availability and distribution of equipment.

(5) ODCSRDA will:

(a) Provide a representative to the SAG.

(b) Provide projected cost data for materiel and weapons systems under development and fielded during the timeframe under consideration.

(c) Provide materiel planning data.

(6) OACSI will:

(a) Provide a representative to the SAG.

(b) Approve the threat.

(7) OCOA will:

(a) Provide a representative to the SAG.

(b) Provide technical assistance in developing cost methodologies for the study.

(c) Review the costing methodology.

(d) Provide cost inputs to the study.

(e) Provide POC for changes to budget cycle.

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(8) OCE will:

(a) Provide a representative to the SAG.

(b) Provide guidance on requirements and capabilities of the engineer force structure for the timeframe under consideration.

(9) OTSG will:

(a) Provide a representative to the SAG.

(b) Provide guidance on requirements and capabilities of the medical service structure for the timeframe under consideration.

(10) OACSAC will:

(a) Provide a representative to the SAG.

(b) Provide guidance on telecommunication capabilities.

(11) OCNGB will:

(a) Provide a representative to the SAG.

(b) Provide guidance with regard to National Guard forces.

(12) OCAR will:

(a) Provide a representative to the SAG.

(b) Provide guidance with regard to Army Reserve forces.

(13) TAG will:

(a) Provide a representative to the SAG.

(b) Provide guidance on combat service support postulations which fall within AG functional areas of responsibility.

b. TRADOC. Request CDR, TRADOC:

(1) Identify points of contact within his command to consult with CDR, CAA, on the improved methodology.

(2) Provide a representative to the SAG.

(3) Participate in the development of force structure alternatives for evaluation by the methodology.

(4) Assist in the evaluation of the products of the methodology.

(5) Designate and task agencies of TRADOC to participate in the application of this methodology on a continuing basis.

c. *INSCOM. Request CDR, INSCOM:*

(1) Provide a representative to the SAG.

(2) Produce and validate the threat for the timeframe under consideration.

(3) Provide the current and projected organization of non-US NATO forces for the timeframe under consideration.

d. It is anticipated that DARCOM, FORSCOM, and USAREUR will be requested to support this project in an advisory capacity as the methodology matures.

10. ADMINISTRATION.

a. Any funds required will be provided by the parent agency.

b. Control:

(1) Study sponsor's representative and Chairman of the SAG is Deputy Director of Strategy, Plans, and Policy Directorate. The SAG will be composed of representatives of those agencies assigned specific responsibilities and those desiring observer status.

(2) In-progress reviews (IRPs) will be held periodically, as required.

(3) Coordination with TRADOC for support of this action is authorized and encouraged.

(5) Point of contact in LTC C. H. Armstrong, ext 74164.

(6) The study sponsor will prepare the DD Form 1498.

c. Schedule:

(1) Study Plan will be presented to the SAG within 30 days after publication of this directive.

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(2) The basic methodology is to be developed by January 1980.

(3) The initial set of objective force alternatives will be presented to the SAG by March 1980 and will be used as a basis for force planning and a critique of the IDOFOR methodology.

(4) A final report (draft) will be provided by 1 June 1980, final report by 15 July 1980.

d. This directive has been coordinated with CAA in accordance with AR 10-38.

WILLARD W. SCOTT, JR.
Major General, GS
Acting Deputy Chief of Staff
for Operations and Plans

CF:
ASA(M&RA)
SAUS(OR)
TRADOC
INSCOM
DAAG
DARCOM
DACS-DP
DAMO-FD
DAMO-OD
DAMO-RQ
DAMO-SSA
DAMO-SSC
DAMO-SSM
DAMO- NCN
DAMO-SSP
DAAC
DAMO-ZD
DAMO-ZF
DAPE
DALO
DAMA
DACA
DAMI
DAEN
DASG
NGB
DAAR
DAIRO

APPENDIX C

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