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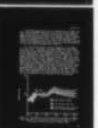
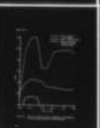
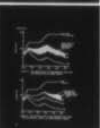
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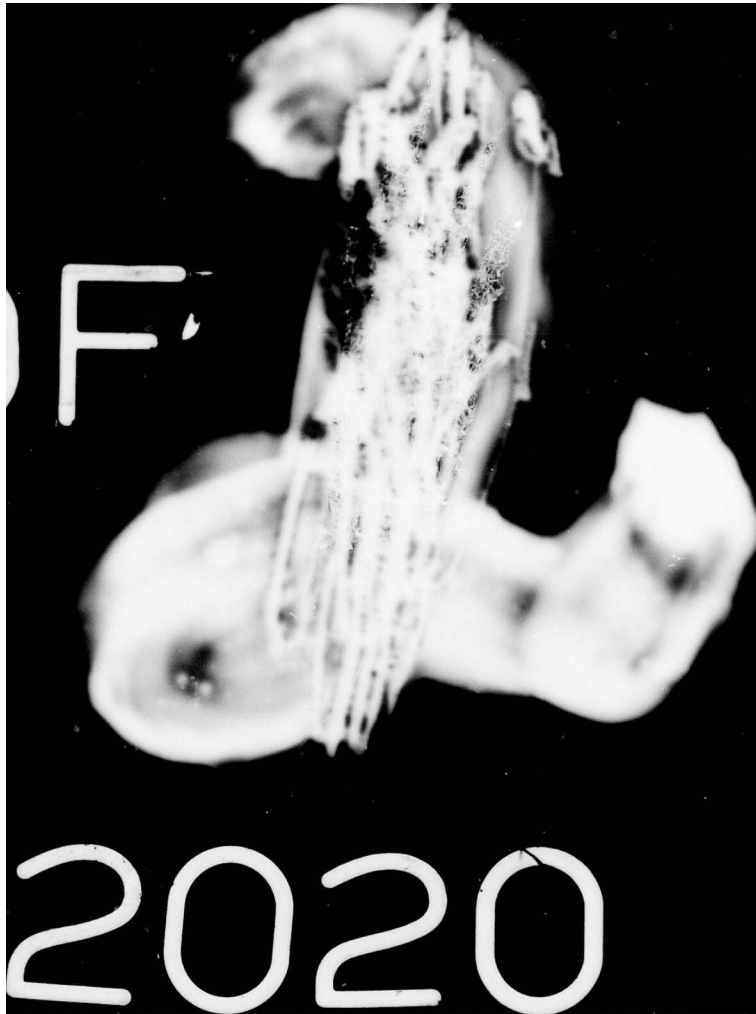
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TECHNICAL REPORT
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METHODOLOGY TO DETERMINE SUPPORT AND SUSTAINABILITY
IMPLICATIONS OF INCREASED POMCUS LEVELS
(SS IPL)

30 June 1979

Prepared by
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ABSTRACT

This CAA (MOCA-FD) study developed and demonstrated a model, the Balanced Force Model (BALFOR) which assesses force performance implications of a change in the POMCUS issue rates, the maintenance return rates, and the prepositioned war reserve materiel stock (PWRMS) issue rates as they affect the committed tank force. Analysis identified areas where changes in resource allocation among support functions will improve force performance. The report describes the methodology with examples and contains a user and programmer guide, in addition to the documentation of the BALFOR Model.

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METHODOLOGY TO DETERMINE SUPPORT AND SUSTAINABILITY
IMPLICATIONS OF INCREASED POMCUS LEVELS
(SS IPL)

1. INTRODUCTION. It has long been said that there are only two absolute certainties--death and taxes. This old saying implies that everything else has some degree of uncertainty attached to it. In the defense planning world, at least, that proposition is certainly true. The resulting natural desire to minimize these uncertainties has led to the development of numerous methods which attempt to evaluate the risk in uncertainty by quantifying it. Two of the more common methods are sensitivity analysis and simulation. Sensitivity analysis might be defined as an examination of the change in results brought about by varying the input assumptions over a given range. Similarly, Monte Carlo simulation might be defined as the limiting case of a sensitivity analysis in that a very large range of data points are considered.

a. One group of simulations used at the Army's Concepts Analysis Agency (CAA) is the OMNIBUS Study. Its purpose is to assist the Army Staff in the allocation of resources and development of priorities in evaluating the readiness of the current US force.

b. OMNIBUS Studies have concluded that the combat force effectiveness is limited by shortfalls in the part of the force which sustains equipment committed to battle--called the combat service support (CSS) capability. However, there is no existing methodology to express these shortfalls in terms which allow a force designer to assess tradeoffs in distributing available fiscal or equipment resources between combat units and support units in developing the most effective force.

2. PURPOSE. The purpose of this paper is to describe a methodology developed at CAA which fills the gap in the Army's ability to analyze the relationship between CSS and the committed force. Central to this methodology is a deterministic simulation, the Balanced Force (BALFOR) Model. The term "balanced force" refers to an improved distribution of resources between combat and CSS units. The BALFOR resources model measures the strength of the combat force as a function of the CSS ability to sustain the force. With sufficient sustainability, the committed strength is no longer constrained by inadequate personnel and equipment resupplies, maintenance units, or transportation capabilities for these supplies.

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3. BACKGROUND. During FY 79 CAA directed its attention to force sustainability in an analysis of the FY 82 force. The Army is considering the costly option of prepositioning additional unit sets of equipment in Europe as POMCUS (prepositioning of materiel configured to unit sets) rather than placing it in prepositioned war reserve materiel stocks (PWRMS). In the FY 80-84 Consolidated Guidance, DOD directed the Army to appraise this option. The guidance led the Army Staff to raise the question, "What is the optimum level of POMCUS for the Army?"

a. To answer this question, CAA compared the performance of two FY 82 force designs. The equipment was added to increased POMCUS in the first force. In the second force, the equipment was put in PWRMS while retaining the FY 78 level of POMCUS. The force design was unaffected by the placement of additional equipment; both force designs performed equally, because the ability of maintenance units to process combat damaged equipment constrained each force.

b. CAA then contrasted these two forces with a third design: a modified FY 78 force with increased maintenance capability. To implement this, three force improvements were assumed: an increase in the maintenance return rate, an increase in the PWRMS issue rate, and placement of equipment added to the FY 82 cases in PWRMS. This modified FY 78 force outperformed both FY 82 forces due to an increased sustainability achieved through the relaxing of maintenance constraints.

c. At this point CAA responded to the Army inquiry concerning an optimum POMCUS level with three conclusions.

(1) First, this level could not be determined in isolation because it was a function of force sustainability. Sustainability depends on at least four variables: the level of PWRMS, the POMCUS site issue rate, the maintenance repair rate of combat damaged vehicles, and the supply issue rate of combat vehicles from PWRMS.

(2) The second conclusion was that no methodology presently available was able to determine the optimum POMCUS level because the tradeoff between increased POMCUS and increased CSS to sustain the force was not determinable.

(3) If the POMCUS level is considered in isolation from the sustainability requirements, the value of the planned addition of combat forces is primarily in the deterrent value. Should this deterrent fail, however, only that part of the combat force which can be sustained will increase the survivability of the NATO alliance.

4. THE BALFOR METHODOLOGY. In an attempt to give a more complete response to the ramifications of POMCUS levels and sustainability, CAA conceived of a three-step methodology to alleviate the present methodology deficiencies. The approach begins with developing the BALFOR simulation to establish the functional relationship between POMCUS levels and sustainability. The next step is to use sensitivity analysis to establish how sensitive the BALFOR Model is to its inputs and to determine what effect changes in the model input assumptions produce on the conclusions drawn from model output. The final and unimplemented step is to change the BALFOR Model from its present form as a deterministic simulation to a probabilistic simulation. This step is an extension of sensitivity analysis because the conclusions may be stated with a corresponding measure of confidence or accuracy.

5. RELATIONSHIP OF BALFOR TO OTHER CAA MODELS. Before detailing the operation of the BALFOR Model, the three-step methodology will be contrasted with earlier methodologies available at CAA in the TRANSMO, CEM, FASTALS, and match methodologies. A brief description of these projects appears in the glossary of this document.

a. There are three key advantages in the BALFOR procedure.

(1) The BALFOR simulation, which models unit deployment, warfighting, and CSS in a single algorithm, is quick and efficient to use. Changing inputs to the model is a trivial step and computer execution time for a 60-day war is just a couple of minutes. The earlier methods are time consuming and require several months to study a single case.

(2) One of the key breakthroughs in the BALFOR methodology is the selection of a common measure of effectiveness for combat units and CSS units. For example, the OMNIBUS-77 and -78 Studies have recognized shortfalls in the CSS capability but have not been able to evaluate the effect of increasing CSS on the effectiveness of the force. Two features of the BALFOR Model equate combat units and CSS. First, maintenance is presented in the form of units rather than simple rates of maintenance returns of combat damaged equipment. Figure 1 (pg 8) shows the flow of maintenance and combat units through the model. The BALFOR Model uses the maintenance units in a detailed system which allows specific stopgaps in the maintenance system to be identified. The second feature is the choice of a committed combat weapon system--tanks--on FEBA from M to M+60 as a common measure of effectiveness of both combat and support units.

(3) The third advantage is the ability of the BALFOR simulation to express tradeoffs in distributing resources between

combat units and CSS. The model allows each of the variables described above which affect sustainability, specifically the level of PWRMS, the POMCUS site issue rate, the maintenance repair rate of damaged vehicles, and the supply issue rate of combat vehicles from PWRMS, to be changed. The effect of the changes can then be observed in the committed tank strength at FEBA. Putting the second and third of these advantages together allows one to determine an improved level of POMCUS after adjusting sustainability variables so that a balanced force is achieved.

b. In view of these advantages, the BALFOR methodology is compatible in two ways with earlier CAA methodologies. On the one hand, many BALFOR Model inputs are derived from the WARF, CEM, TRANSMO, FASTALS, and match methodologies. On the other hand the detailed BALFOR maintenance system can ameliorate maintenance repair rates and maintenance unit deployments input to these earlier models. An overview of these two items underscores the BALFOR Model compatibility with the existing methodology.

(1) Deriving BALFOR Inputs. The BALFOR Model is capable of using deployment sequences of units from TRANSMO, permanent loss rates from WARF, or combat loss rates from CEM. The loss rates for equipment and personnel are compatible with CEM, and the maintenance unit capabilities and heavy equipment supply capabilities are compatible with FASTALS.

(2) Refining Maintenance Rates and Deployments. If the maintenance units and heavy equipment supply companies used in the BALFOR Model are reduced from authorized strengths to actual levels, the simulation will reflect a degraded maintenance unit capability. This more realistic capacity can then be applied to the CEM inputs. Consequently the validity of CEM results, which is highly sensitive to both the maintenance return rate and the PWRMS issue rate, will increase. The BALFOR Model provides the rationale to increase maintenance unit deployment priority because the early arrival of these units can increase committed unit sustainability.

c. While BALFOR is compatible for the most part with other CAA methodologies, it is, independent of the source of its inputs. Earlier CAA methodologies took months to complete because each model depended on the others for inputs, but the BALFOR Model can be used outside CAA because the user is free to derive model inputs from any sources he chooses. For example, the deployment sequence for BALFOR can be developed from Army planning documents instead of the TRANSMO outputs. A major need in implementing the third and final step in the BALFOR Methodology, in which the deterministic model is transformed into a probabilistic model, is obtaining

combat damage distribution and repair times for equipment types other than tanks. Minimally, the repair times for all major weapon systems--track vehicles, missile systems, and helicopters--is needed.

6. BALFOR MODEL OPERATION. This section describes the algorithm used in the BALFOR simulation. The model operates on an event cycle repeated at the beginning of each day. In this cycle is simulated functions by combat units, unit maintenance units, DS and GS maintenance companies, depots and heavy equipment supply companies, a theater stock control center, and an overseas replacement personnel center. The following list details the functions each of these items performs.

(1) Combat unit functions:

- Receive orders (arrival, commitment)
- Conduct operations
- Assess losses
- Evacuate wounded personnel and damaged equipment
- Requisition personnel losses and equipment replacements
- Receive replacement personnel
- Receive repaired and replaced equipment

(2) Unit maintenance functions: (Division maintenance and forward DS units)

- Schedule remaining repairs (nonbattle repair before combat damaged)
- Receive repairable equipment
- Evacuate overflow workload
- Evacuate repairables to GS maintenance units
- Evacuate uneconomical repairables to COMMZ
- Repair equipment
- Return repaired equipment to units

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(3) Rear DS and GS maintenance functions:

- Receive arriving DS and GS units
- Schedule repairs
- Receive unit maintenance overflow (rear DS only)
- Receive evacuated GS repairables (GS only)
- Repair equipment
- Report repaired equipment to the theater stock control center

(4) Depot and heavy equipment supply unit functions:

- Receive arriving heavy equipment supply companies
- Receive CONUS major item resupply
- Allocate supply resources among major items
- Process major items for issue
- Report ready for issue equipment to theater stock control center

(5) Theater stock control center functions:

- Maintain unit equipment status
- Maintain unit back orders
- Maintain theater equipment status
 - Available from maintenance
 - Available from supply (PWRMS and CONUS resupply)
 - Unit back order
 - In transit to units
- Receive unit crew availability from the theater replacement center
- Schedule equipment arrival at units
- Ship equipment to units

(6) Theater replacement center functions

- Maintain unit personnel status
- Receive CONUS individual replacements
- Receive hospital returns to duty
- Allocate available personnel to units
- Ship replacements to units

A better grasp of these functions can be obtained by considering the flow of equipment and personnel separately. The theater equipment flows in BALFOR are shown in Figure 1. The arriving combat units are divisions and brigades with organic maintenance units. Arriving CSS units are DS maintenance, GS maintenance, and heavy equipment supply companies. The arriving maintenance companies increase the maintenance return rate of damaged tanks to theater stocks, and the heavy equipment supply companies increase the rate at which tanks from PWRMS stocks and CONUS resupply equipment can be prepared for issue to units. Theater personnel flows are shown in Figure 2. Crew personnel arrive with combat units. Individual unit replacements to replace crew losses are scheduled based upon DCSPER estimates of replacements by career group. Returns to duty from in-theater hospitals and the CONUS evacuation rates are based upon the theater evacuation policy.

a. Force Relationships. The combined interaction of personnel and equipment is illustrated in Figure 3. This flow diagram shows four types of units being committed to the FEBA: on station units; POMCUS units; Active Army, non-POMCUS units; and Reserve Component units. The on station units are committed immediately. The remaining Active Army and Reserve units are committed after arrival. Unit personnel and equipment first assemble and then move to FEBA.

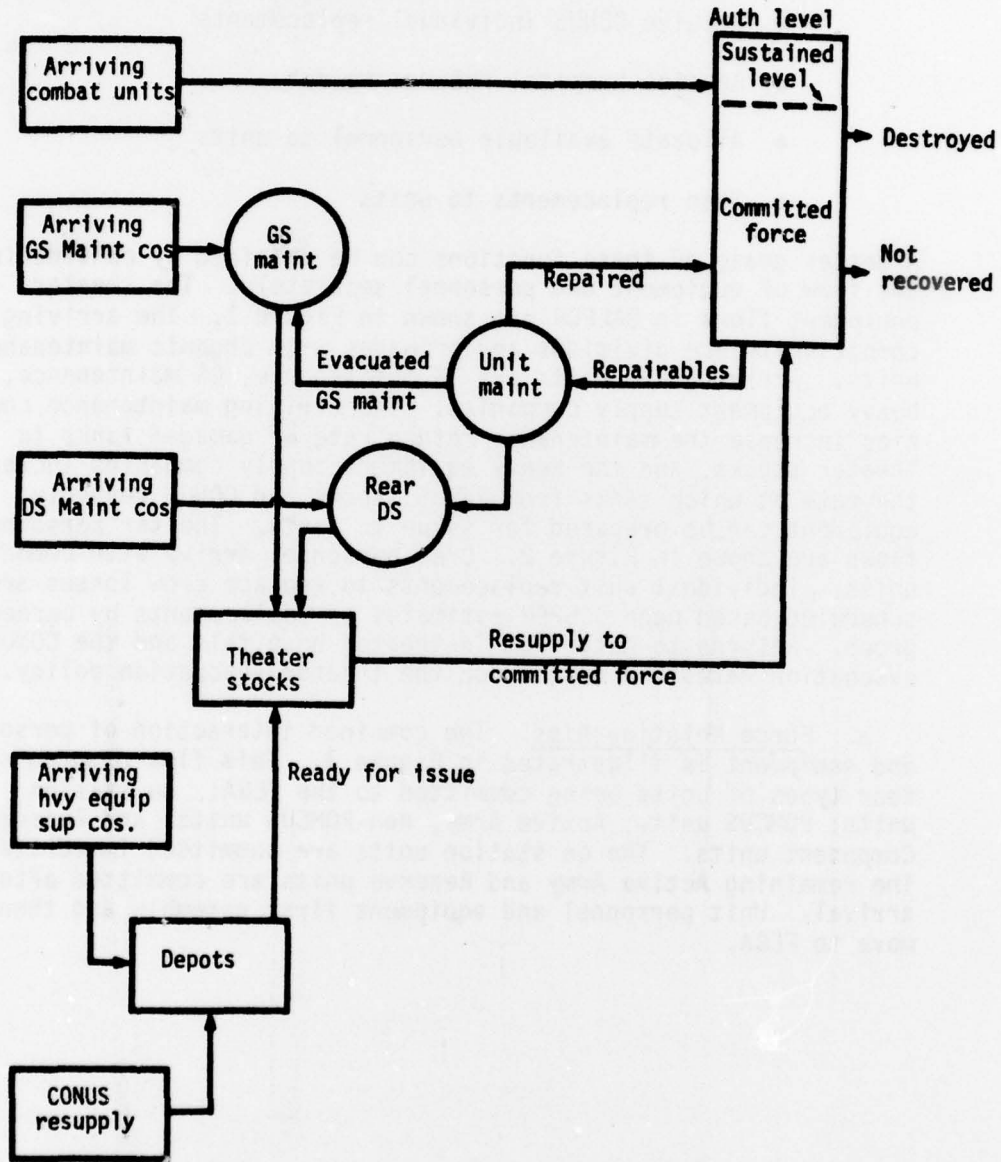


Figure 1. Theater Equipment Flows

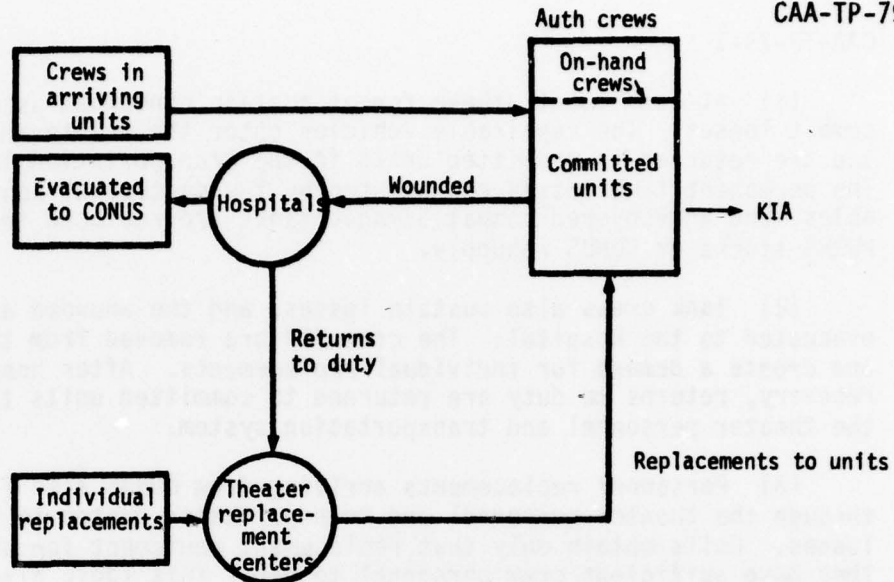


Figure 2. Theater Personnel Flows

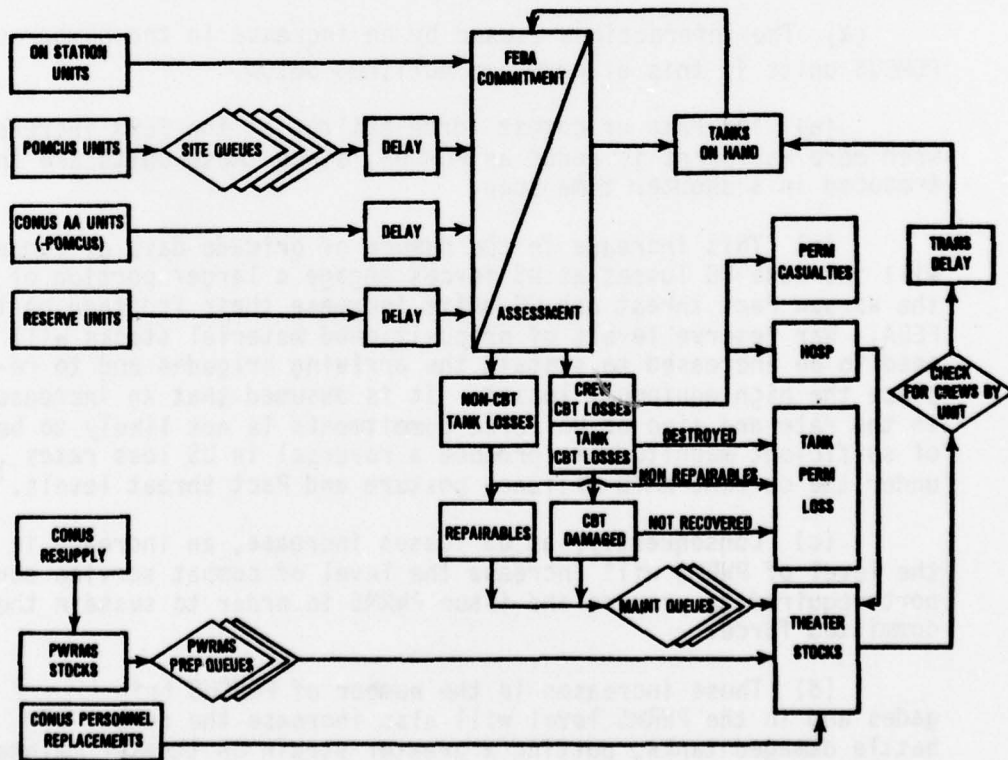


Figure 3. Force Relationships in the Balanced Force Model

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(1) At commitment, these forces sustain noncombat as well as combat losses. The repairable vehicles enter the maintenance loop and are returned to committed units in the transportation loop. The permanent tank losses represented by the destroyed, nonrepairables, and unrecovered combat damaged tanks are replaced from PWRMS stocks or CONUS resupply.

(2) Tank crews also sustain losses, and the wounded are evacuated to the hospital. The crew KIA are removed from the unit and create a demand for individual replacements. After hospital recovery, returns to duty are returned to committed units through the theater personnel and transportation system.

(3) Personnel replacements arriving from CONUS also flow through the theater personnel and transportation system to replace losses. Units obtain only that replacement equipment for which they have sufficient crew personnel to man. This logic allows the availability of tank crewmen to be compared to the availability of replacement tanks from theater stocks.

(4) The interactions caused by an increase in the number of POMCUS units in this diagram are outlined below.

(a) The rate of combat force buildup at the FEBA increases when more equipment is added as POMCUS, since these units are introduced in a shorter time span.

(b) This increase in the number of brigade days of combat will increase US losses as US forces engage a larger portion of the Warsaw Pact threat and US units increase their frontage on the FEBA. War reserve levels of prepositioned materiel stocks will need to be increased to sustain the arriving brigades and to replace the high equipment losses. It is assumed that an increase in the rate and size of US force commitments is not likely to be of sufficient magnitude to produce a reversal in US loss rates under the current NATO alliance posture and Pact threat levels.¹⁷

(c) Consequently, as US losses increase, an increase in the level of PWRMS will increase the level of combat service support required to prepare and issue PWRMS in order to sustain the committed force.

(d) These increases in the number of POMCUS brigades and in the PWRMS level will also increase the number of battle damaged tanks, putting a greater strain on theater maintenance units to recover, repair, and return damaged equipment to the force.

b. Selection of GASP IV Simulation Language and the Gately Optimization Routine. The BALFOR Model is a computer simulation program which uses the popular GASP IV simulation language. Three outstanding features of GASP IV motivated its choice. First, this language is implemented in FORTRAN, which is the most widely employed and hence compatible language at CAA. Second, GASP IV is unique in that it allows continuous events (such as the continual losses of equipment and personnel from the committed force throughout the simulation) and discrete events (for example, the arrival of a CONUS resupply of personnel) to be modeled together in a single simulation. The final and most crucial feature of the GASP IV language is the availability of the Gately optimization routine. From its conception, the BALFOR Model appeared most useful in answering questions concerning optimum levels, such as the optimum level of POMCUS and WRS or the optimum distribution of resources. Whenever a computer simulation is used to find the optimum solution to a problem, it must repetitively simulate each possible solution. Then a better solution can be chosen from the result of each repetition. The Gately routine not only automatically performs this task, but it attempts to save computer time by predicting which solutions will not be an improvement before they are simulated.

7. FORCE ASSUMPTIONS. The simplifying assumptions which are made in using the model are described below.

a. Ammunition and POL resupply were not modeled in this initial effort in order to limit the scope of the modeling task. It is assumed that ammunition and POL resupply can be provided to units without using the resources of theater maintenance and heavy equipment supply units.

b. Transportation units in the corps area were also excluded from the initial modeling tasks. It is therefore assumed that the transportation required to evacuate damaged tanks and to deliver major items from PWRMS and CONUS resupply are available.

c. The model assumes no attrition or interdiction to CSS support units and facilities. Attrition and interdiction can be assessed within the methodology but have not been included in this phase, again to limit the scope of the problem.

d. The model assumes full availability of the repair parts needed to repair both combat and noncombat losses. The model can be refined in the future to reflect maintenance backlogs due to nonavailability of repair parts.

8. FLOW CHART/STRUCTURE. A flow chart of the distribution for equipment losses and maintenance processing is shown in Figure 4. Division and forward DS maintenance companies return tanks directly to the combat units from which they originated. Rear DS and GS maintenance units report repaired equipment to the stock control center which manages the distribution of repaired items to all units. The maintenance policies which govern the echelon at which repair is accomplished are listed in Table 1 and depicted in Figure 4. Uneconomical repairables are assumed to be evacuated to COMMZ and are not available for reissue to corps units.

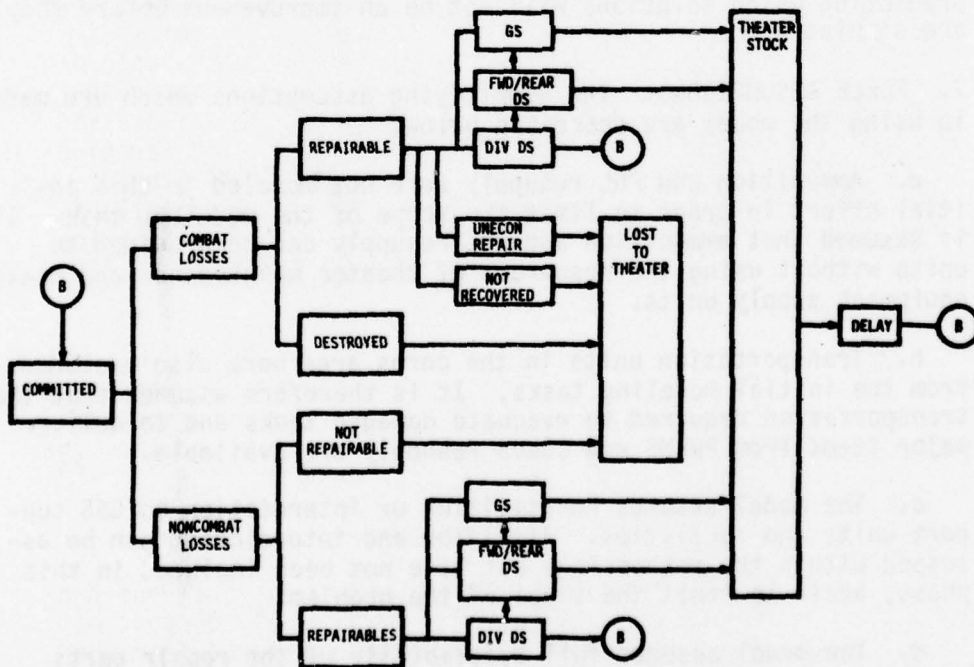


Figure 4. Distribution of Equipment Losses and Maintenance Processing

(U) Table 1. Maintenance Policy/Definitions

- Damage requiring > 48 maint man hrs = GS
- Damage requiring < 48 maint man hrs = DS
- Damage requiring >96 maint man hrs = nonrepairable in corps
- Max backlog in div maint bn = 2 days
- Max backlog in TOE 29-207H = 2 days
- No limit on backlog in TOE 29-137H
- Unit capability to repair stated in TOE summary

9. DESIGN CONSIDERATIONS. The original objective was to model only the CENTAG tank force. This objective was modified when it became necessary to make judgments on how support would be distributed between CENTAG and NORTHAG units. When a theater is constrained for combat service support, the theater commander must allocate available support. The best known historical example of CSS allocation was the decision to provide CSS to Montgomery instead of Patton after the breakout from Normandy. The allocation of CSS between committed US units poses the same problem for planners today. The revised modeling objective was to model the US units in the AFCENT tank force. This objective allowed available support to be distributed to all US units in AFCENT in proportion to need.

10. SAMPLE RESULTS

a. The first example using the BALFOR Model measures the effects of the modeled combat service support functions on the combat force. Expected values for model inputs were derived from the OMNIBUS-79 data base and other current CAA studies.^{17,18,19,22,23} The force size was scaled to represent the commitment of a 1000 tank force. This force is shown in Figure 5 for a type corps.

(1) The force was simulated in the BALFOR Model without providing the committed tank force maintenance or supply support of any kind. There were no returns to the committed force from the division maintenance battalions, DS and GS maintenance companies, or resupply to combat units from theater stocks (Figure 5). The results of this simulation are shown in Figure 6, which displays the decay of the committed force without maintenance support, PWRMS tank issue, tank resupply from CONUS or tank crew replacements. At D+50 only 8.8 percent of the 1000 tanks committed to FEBA remained.

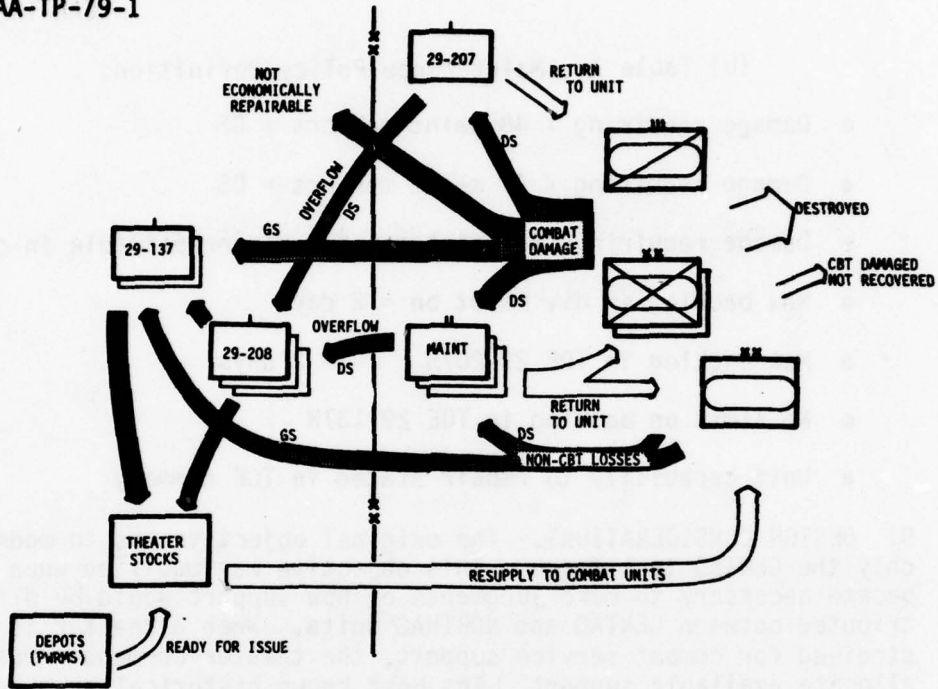


Figure 5. Maintenance Support of Tanks

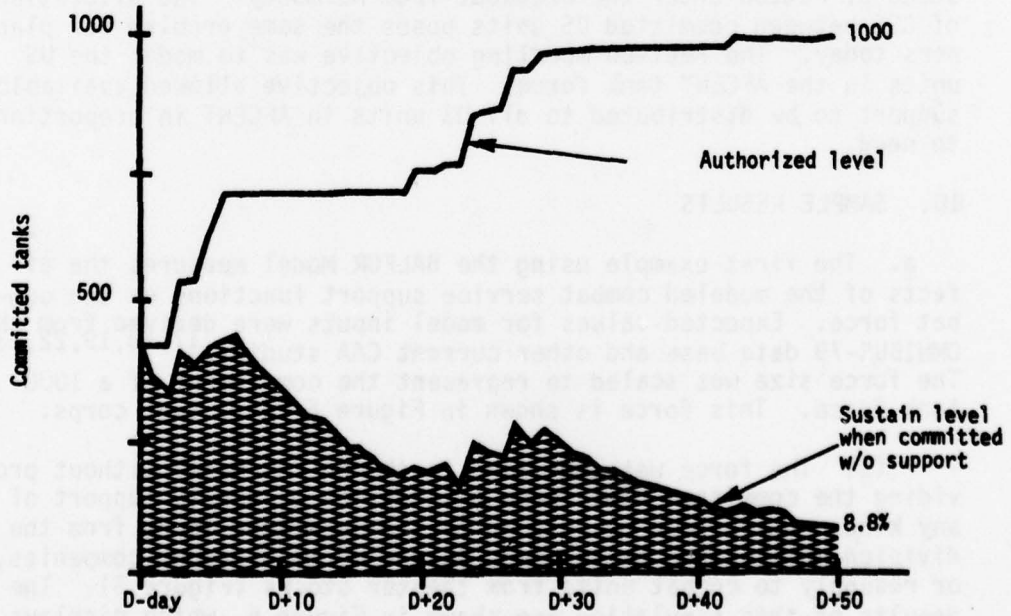


Figure 6. The Sustain Level of the Committed Tank Force Without Maintenance, PWRMS, or Resupply Support

(2) The next simulation in the first example added direct support and general support maintenance to provide returns of repairable noncombat and recovered combat damaged tanks to the force. The committed tank force is sustained at 29 percent of authorization at D+50 (Figure 7).

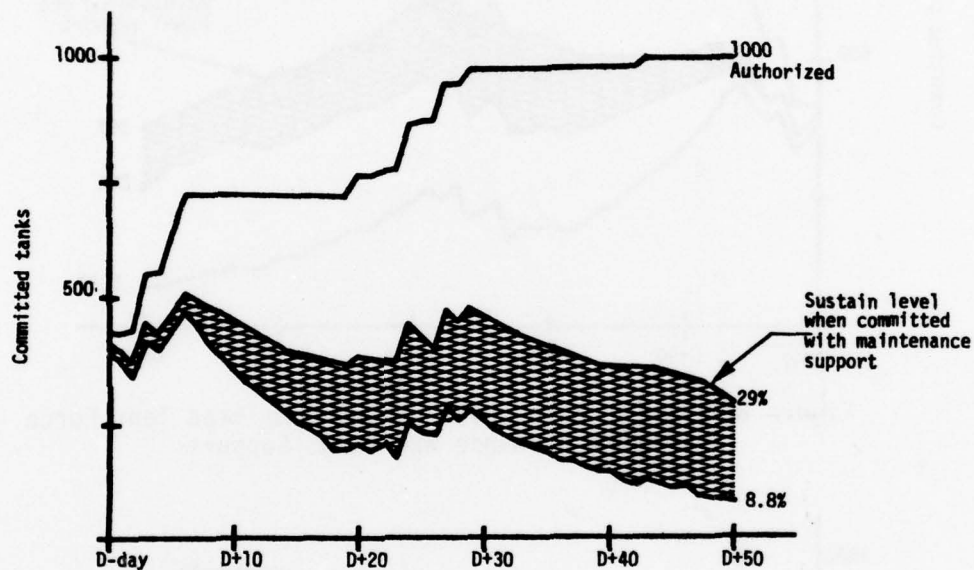


Figure 7. The Sustain Level of the Committed Tank Force With Maintenance Support

(3) The next simulation added resupply of tanks to combat units from PWRMS. PWRMS stocks not only contribute support to the committed force through rapid replacement of early losses, but also increase the number of repairable tanks which are repaired and returned to the committed force through the DS and GS maintenance cycles. The addition of tanks in PWRMS sustains the forces at 39 percent of authorization at D+50 (Figure 8).

(4) The last simulation added CONUS resupply which is made up of POMCUS leave behind and CONUS war reserve stocks. The effect on the committed force is again twofold: (1) a source of replacement for unit losses, and (2) maintenance returns through the maintenance system. The addition of resupply sustains the committed tank force at 55 percent of authorization (Figure 9).

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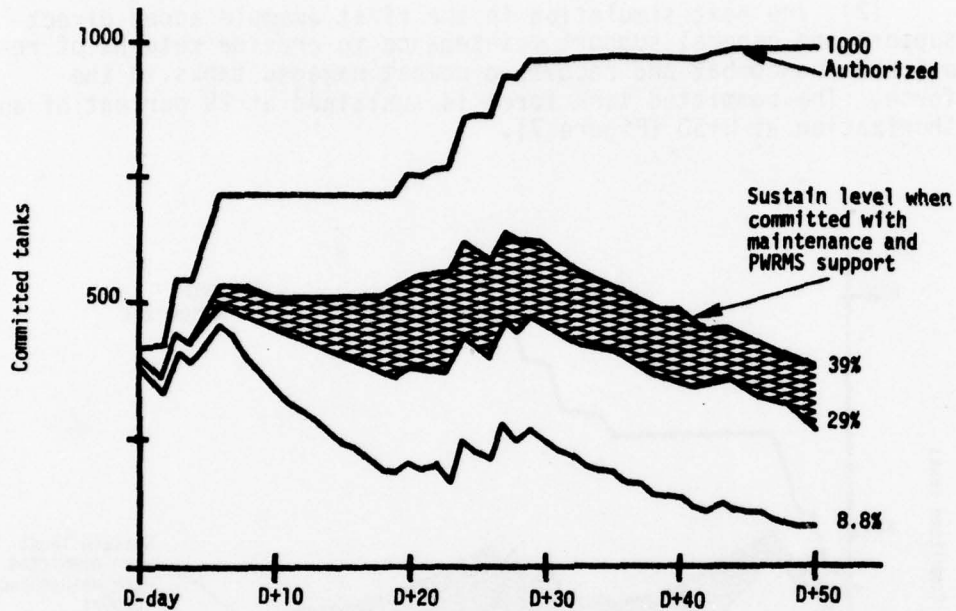


Figure 8. The Sustain Level of the Committed Tank Force With Maintenance and PWRMS Support

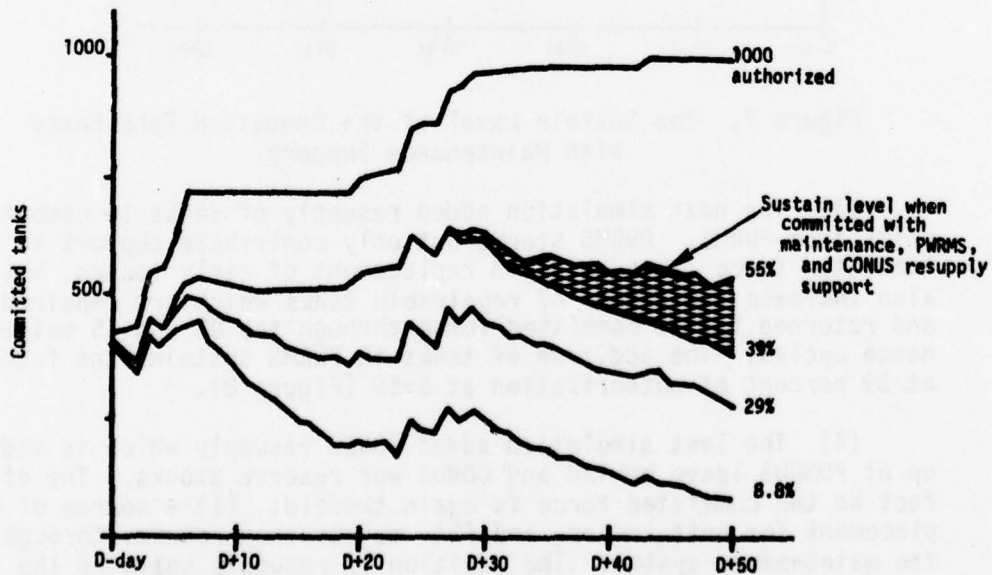


Figure 9. The Sustain Level of the Committed Tank Force With Maintenance, PWRMS, and CONUS Resupply Support

(5) The difference between the authorized curve and the sustained level is accounted for by three constraints: (1) a portion of the 1000 tanks in committed units unsupported with the PWRMS tanks, (2) the response delay of the theater supply and maintenance systems, and (3) the lack of crew replacements to man tanks in the D to D+15 time period. The theater transportation is measured in the model by tanks in transit to units, Figure 10. The theater maintenance delay is measured by the tanks remaining in maintenance at the end of each day. Also shown in Figure 10 are the tanks which are not shipped because units did not have crews for them.

(6) This example with its four simulations illustrates the use of the BALFOR Model in measuring the effects of CSS support on the committed force. These effects are measured in both magnitude and duration. Also measured is the impact of personnel replacements.

b. The second example utilized the BALFOR Model to examine the sensitivity of model results to changes in input values over a range of values. The same tank force used in the first example is also used in the second example. The expected values which provided base case values were again derived from the OMNIBUS-79 data base. The relationships of the committed tank force to three of the four sustainability variables--(1) the level of PWRMS, (2) the PWRMS ready for issue (RFI) rate, and (3) the POMCUS site issue rate--are shown in this example. Also, the risks associated with the estimates of attrition and recovery of damaged vehicles will be shown.

(1) When the PWRMS level is doubled from 287 to 574 tanks in PWRMS, the force is sustained at 64 percent of authorization (Figure 11). As PWRMS is doubled, the tank crew shortage which constrained the committed tank force in the last example is extended through D+23. These crew results are obtained by using the data analysis features of GASP IV.³¹ For example, GASP IV routines collect and print in table and graph form any of the variables computed by the BALFOR Model. In this case the number of tanks which are not issued because units lack tank crews to man them is a model variable.

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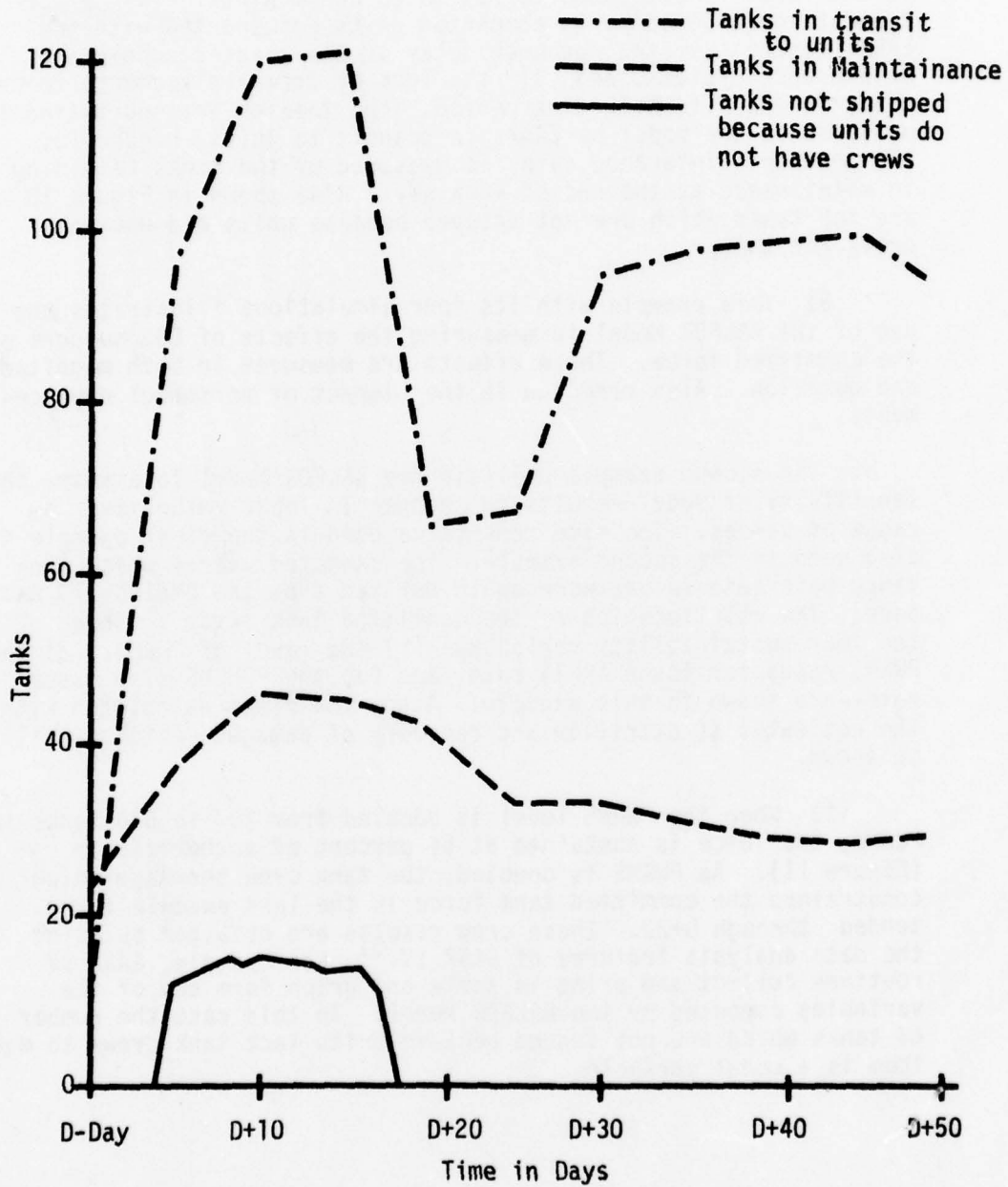


Figure 10. Tanks in Transit to Units, Remaining in Maintenance, and Not Shipped Because of Crew Shortages

(2) The next sensitivity run was conducted on the PWRMS issue rate. When the PWRMS issue rate is cut in half from 11 tanks a day, the tank force is sustained at 46 percent of authorization. PWRMS processing begins at M-day and a buildup of tanks in theater stocks is obtained before D-day. This buildup cannot be maintained at a processing rate of six tanks a day from PWRMS, and the effect on the committed tank force is seen as a decrease beginning at D+10 and extending through D+50 (Figure 11).

(3) The third sensitivity run was conducted on the POMCUS site issue rate. The effect of greater POMCUS site issue delays (four days) on the committed tank force at D+50 is small. The impact of time delays in the commitment of the POMCUS force is seen in the committed tank force between D and D+10 (Figure 11). Although represented as POMCUS site issue delays, other time delays which affect the arrival and commitment of the POMCUS units would have the same impact. Other probable causes of time delays of the POMCUS units are weather conditions at the aerial ports which cause diversions of aircraft into other European airfields, chemical contamination of POMCUS stocks which could delay issue until decontamination was completed, and damage to the POMCUS sites which required salvage and cleanup delays at the sites. The impact on the committed units of an additional four days before relief or reinforcement is not addressed in this methodology.

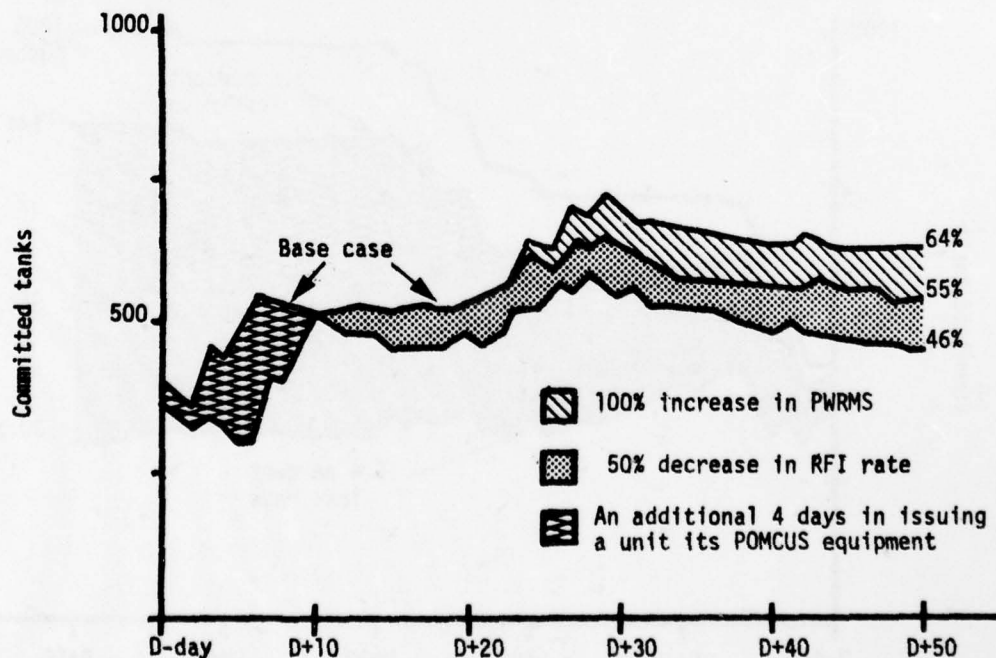


Figure 11. The Effect of (1) an Increase in the Level of PWRMS, (2) a Reduction in the Ready-for-Issue Rate of PWRMS, or (3) an Increase in the Issue Rate at POMCUS Sites

(4) The fourth sensitivity run was a test on the attrition rates. The loss rates used in the base case were derived from the OMNIBUS-79 scenario but many threat and equipment variables affect the loss rates in a theater simulation. In this case, the 6.2 percent per day combat loss rate and a 1 percent per day noncombat loss rate were first decreased by 50 percent and then doubled. At the lower attrition levels of 3.6 percent per day, the PWRMS plus resupply tank level and the ready for issue rate are sufficient to replace the losses to the force. Tanks counted as permanent losses are (1) unrepairable noncombat damaged tanks, (2) damaged tanks not recovered, (3) uneconomically repairable tanks, and (4) the destroyed tanks. The maintenance system at the 3.6 percent loss level is also able to return to the committed force all non-combat losses and all combat damaged tanks that are economically repairable. Only the response lag of the theater maintenance and transportation systems keeps the committed tank level from reaching authorized levels. At higher loss levels, the tanks being added to the committed force in (1) reinforcing units, major item replacement (2) from PWRMS, and (3) from repair in the maintenance system are not sufficient to increase the committed tank force at FEBA after D+6 (Figure 12).

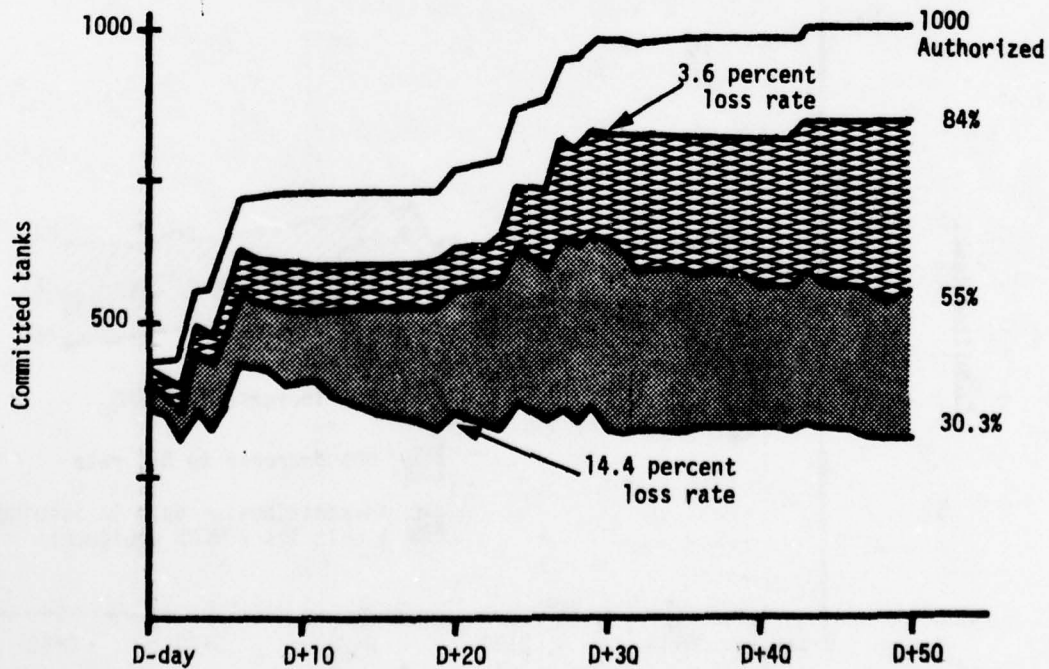


Figure 12. The Effect of (1) an Increase in Combat and Noncombat Loss Rates and (2) a Decrease in Loss Rates

(5) The last sensitivity run of example two evaluated the risks associated with estimates of the recovery rate of damaged vehicles. The recovery of damaged vehicles implies the retention of territory and is estimated at CAA in terms of adverse FEBA movement. The average FEBA movement in OMNIBUS-79 runs was used to obtain the base case value of 98 percent recovery. The 50 percent recovery rate used in this example was selected because of the importance of this variable to the maintenance and supply functions being modeled in BALFOR. PWRMS levels are planned on the basis of the number of tanks in the committed force expected to be destroyed in a given period of time. These PWRMS levels will not support the force when the level of vehicle recovery is low, because for each damaged tank not recovered, one must be processed and issued from PWRMS. The maintenance system is sized to return combat damaged vehicles to the force. Low levels of vehicle recovery will result in unused maintenance capacity. Recovery is also a wartime function added to a maintenance system trained in peacetime repair. The effect of reducing the recovery estimate from 98 percent of damaged vehicles to 50 percent is a 16 percent reduction in the committed force at D+50 (Figure 13).

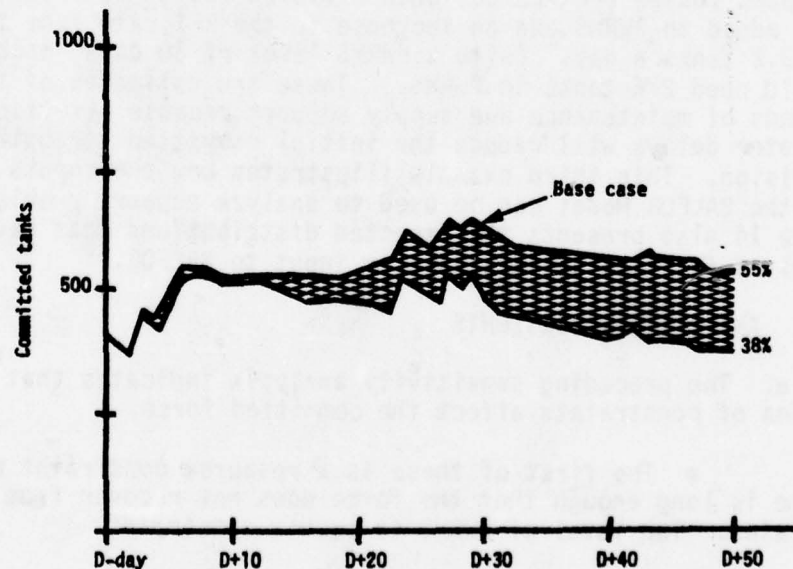


Figure 13. The Effect of a Reduction in the Recovery Rate of Combat Damaged Vehicles on the Committed Force

(6) This second example with five sensitivity simulations illustrates the use of the BALFOR Model in performing sensitivity tests on input variables. These sensitivity tests show how the risk levels associated with estimates of important force variables can be established.

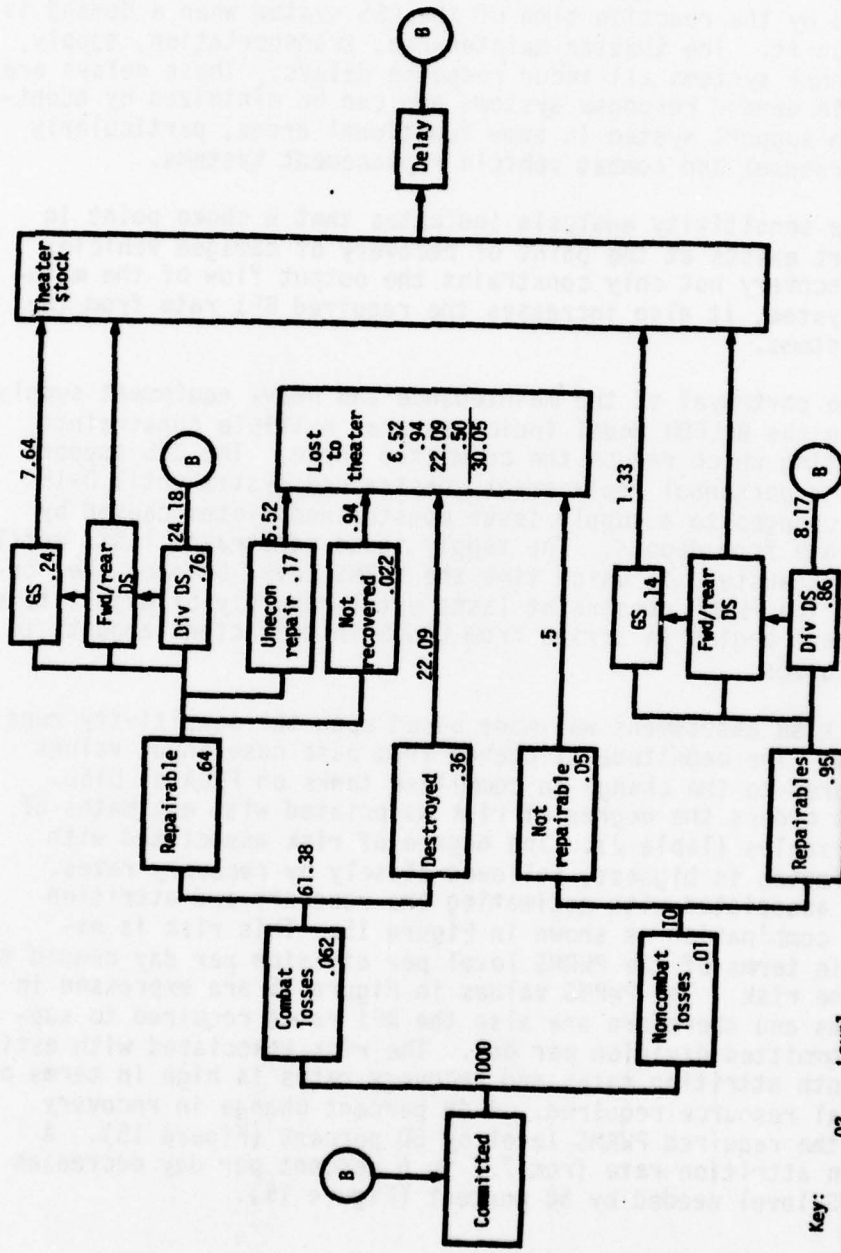
c. The third example estimates the support increase required when one mechanized infantry division is added to the force. The example assumes that the division would be added to POMCUS, but the estimation applies equally to on-line, POMCUS, and other arriving divisions with the same equipment. The example applies to the current as well as the FY 82 and FY 85 forces. The model is run with 1000 tanks committed and then scaled to get values for a mechanized division. The input distributions of losses are shown in Figure 14. Not shown are the repair times for each category of maintenance. These are added in the lower right hand corner of Figure 14 and the DS and GS maintenance hours required to repair the tanks delivered to DS and GS maintenance units is calculated for 1000 tanks (614 manhours at the GS level and 396 manhours at the DS level). The total losses to the theater are 30 tanks a day. These results are next scaled to the 306 tanks in a mechanized infantry division. The support required by the arriving division is 121 hours of DS and 188 hours of GS maintenance. When theater losses are scaled, each division would need 9.2 tanks a day added to PWRMS and an increase in the RFI rate from the depot of 9.2 tanks a day. (With a PWRMS level of 30 days, each division would need 276 tanks in PWRMS.) These are estimates of the upper bounds of maintenance and supply support because attrition and theater delays will reduce the initial committed strength of the division. This third example illustrates how the inputs and logic of the BALFOR Model can be used to analyze support problems. Figure 14 also presents the expected distributions that have been derived from the CODAM Study for input to BALFOR.¹⁶

11. ANALYSIS AND INSIGHTS

a. The preceding sensitivity analysis indicates that three types of constraints affect the committed force.

- The first of these is a resource constraint whose lead time is long enough that the force does not recover from the constraint. The level of PWRMS is such a constraint.

- The second type of constraint operating is a phasing constraint where the rate of delivery of the resource constrains the force. Tank crew replacements are phasing constraints. It is not the quantity of the resource but the rate of delivery which constrains the force. If PWRMS levels are increased, capability to issue PWRMS at a faster rate also has to be added.



DS hours = $[8.17] \times 7 + [24.18] \times 14 = 395.71$
 GS hours = $[1.33] \times 65 + [7.64] \times 69 = 613.61$

Figure 14. DS and GS Workloads

Key: $\begin{matrix} \text{02} & \leftarrow & \text{Level} \\ \text{01} & \leftarrow & \text{Rate} \end{matrix}$

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• The third type of constraint is a system response delay caused by the reaction time of the CSS system when a demand is placed upon it. The theater maintenance, transportation, supply, and personnel systems all incur response delays. These delays are inherent in demand response systems and can be minimized by adopting a push support system in some functional areas, particularly in the personnel and combat vehicle replacement systems.

b. The sensitivity analysis indicates that a choke point in CSS support exists at the point of recovery of damaged vehicles because recovery not only constrains the output flow of the maintenance system, it also increases the required RFI rate from the supply systems.

c. The portrayal of the maintenance and heavy equipment supply systems in the BALFOR Model indicates that multiple constraints are operating which reduce the committed force. The CSS support system is a personnel replacement constrained system until D+15 and then changes to a supply issue constrained system caused by the RFI rate from depots. The supply issue constraint lasts until PWRMS is exhausted, at which time the PWRMS level becomes the constraint. The PWRMS constraint lasts until resupply of major items of equipment begins to arrive from CONUS in sufficient amounts to replace losses.

d. A risk assessment was made based upon the sensitivity runs conducted. The magnitude of change from base case input values was compared to the change in committed tanks on FEBA at D+50. This rank orders the degree of risk associated with estimates of input variables (Table 2). The degree of risk associated with loss estimates is highest, followed closely by recovery rates. The risk associated with estimating the recovery and attrition rates in combination is shown in Figure 15. This risk is expressed in terms of the PWRMS level per division per day needed to offset the risk. The PWRMS values in Figure 15 are expressed in rate terms and therefore are also the RFI rates required to support a committed division per day. The risk associated with estimating both attrition rates and recovery rates is high in terms of additional resource required. A 48 percent change in recovery changes the required PWRMS level by 50 percent (Figure 15). A change in attrition rate from 7.2 to 5 percent per day decreases the PWRMS level needed by 50 percent (Figure 15).

Table 2. Risk Assessment Derived from Sensitivity Analyses

Input variable	Change in the input variable (percent)	Effect of input change measured at output (percent)	Coefficient of change for force variable (output/input)
PWRMS level	+100	9.2	.092
RFI rate	-50	8.3	.166
Issue rate	+25	--	--
Loss rate	-50	29.5	.590
Loss rate	+100	24.3	.243
Recovery rate	-48	16.5	.344

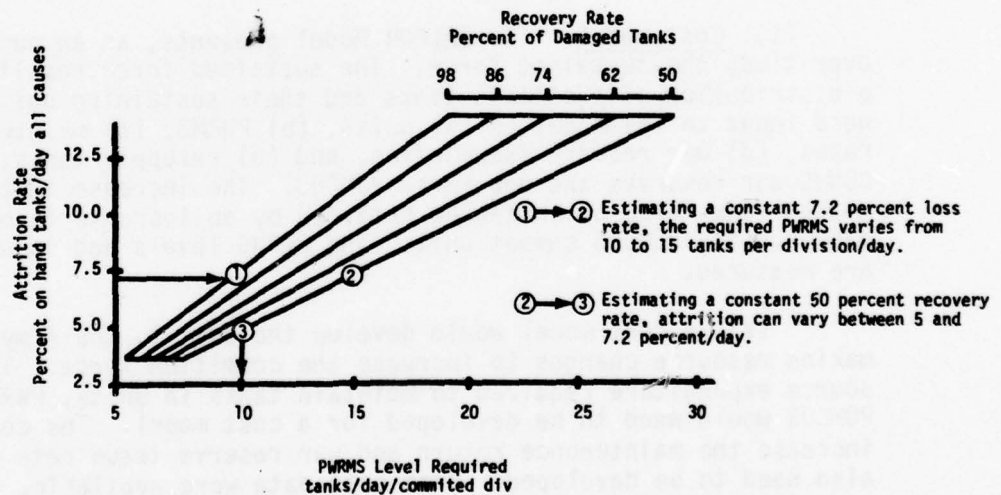


Figure 15. Risk of Estimating Two Force Variables: Attrition Rate and Recovery Rate of Damaged Tanks

12. POTENTIAL USES OF BALFOR

a. Methodology Assessment. The BALFOR Model can be expanded to portray all maneuver units and the combat service support with workloads that are related to maneuver units. It fills a needed gap in assessing CSS support and shortfalls. The methodology cannot be applied to command and control functions or to force-wide support functions that are based upon existence or population allocation rules. The advantages of expansion of the BALFOR Model to other workload related support areas are:

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- (1) Show the sustaining support needed to maximize combat payoff for a given investment in the combat force.
- (2) Attack a wide range of equipment distribution questions.
- (3) Show impact of sustainability on a committed force and risks associated therewith.
- (4) Quantify the risks associated with an imbalance in combat and support forces.

b. Possible Methodology Extensions. Proposed methodology extensions are listed below to inform the reader the type study objectives which can be accomplished with the model. The most promising of these is the addition of a cost submodel to the BALFOR Model. This potential expansion of the methodology is discussed first.

(1) Cost Model. The BALFOR Model presents, as an output over time, the sustained force. The sustained force results from a distribution of available tanks and their sustaining units which were input to the model as (a) units, (b) PWRMS, (c) maintenance rates, (d) war reserve issue rates, and (e) resupply tanks, from CONUS war reserves and uncovered POMCUS. The increase in the committed tank force which can be obtained by an increase in maintenance units, POMCUS combat units, and PWRMS levels and issue rates are measured.

(a) A cost model would develop the cost to the Army of making resource changes to increase the committed force. The resource expenditure required to maintain tanks in units, PWRMS, and POMCUS would need to be developed for a cost model. The cost to increase the maintenance return and war reserve issue rate would also need to be developed. Once cost data were available, the sustained tank force levels would be evaluated for rough, approximate cost.

(b) The current measure of effectiveness in BALFOR is the cumulative tank days on FEBA or the level of the sustained tank force at a specific time. When costs are added to the model the measure of effectiveness would change to the maximum sustained level which can be obtained for a given dollar investment, or a matrix of the cost and the associated levels of sustained tanks. Cost effectiveness of proposed resource allocations could be evaluated. The first step should be to develop only relative cost data in order to avoid the resource commitment required for full cost estimates. Full cost estimates could then be restricted to the alternatives which appear to yield the highest payoff.

(2) Uncovered POMCUS. The model, as written, handles POMCUS uncovered stocks as resupply to the theater and subsequent issue to the committed units. Since the model is a system model which begins the simulation with an M-day distribution of tanks, the processing of uncovered POMCUS equipment can be simulated in the same manner as the processing of PWRMS stocks. In order to accomplish this, the process of preparing a tank for turn-in to DARCOM would have to be modeled. This would determine the workload required in CONUS to prepare the tank for shipment. If uncovered POMCUS is to be issued to reserve units falling in, this option for distributing left-behind tanks would have to be included in the model. To model the processing of uncovered POMCUS at REFORGER and 2+10 stations, available manpower and skills to be available at these CONUS locations would have to be estimated. The BALFOR Model with these changes could then be used to determine the relative effect on the committed tank force of selected plans for handling uncovered POMCUS equipment.

(3) Other Types of Combat Service Support. The model as it is now written addresses maintenance support and the supply support needed to issue major items. Other CSS functions can be evaluated for addition to the model. They are listed below.

- (a) Helicopter maintenance support.
- (b) Missile maintenance support.
- (c) The workload of combat damaged vehicle recovery.
- (d) Workload related support of ammunition, POL, and some hospital functions.
- (e) Supply of repair parts
- (f) Transportation support.

13. CONCLUSIONS/RECOMMENDATIONS

a. Conclusions

- (1) CSS impacts on the committed force can be modeled and measured in magnitude and duration.
- (2) CSS and combat force changes can be evaluated with one measure of effectiveness.

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(3) The committed force at FEBA over a specified time interval can be used successfully as a measure of effectiveness in those force studies which measure the deployment, warfighting, and sustainability of a force.

(4) Sensitivity analysis to establish risk levels can be used within CAA to isolate input variables which are driving study results.

(5) Recovery and attrition levels are key factors in the determination of the PWRMS levels needed to support the force.

b. Recommendations

(1) Combat damage and repair distributions should be derived for weapon systems other than tanks in order for CAA to expand its CSS analysis.

(2) A follow-on study effort to SSIPL should be defined and implemented with the incorporation of cost as its first priority. The priority of adding other CSS functions to the BALFOR should be determined.

(3) The BALFOR Model should be adopted as a standard CAA analytical tool.

APPENDIX A
STUDY CONTRIBUTORS

1. STUDY TEAM

a. Study Director

Mr. Harold D. Frear, Force Concepts and Design Directorate.

b. Team Members

Mr. Marc Abrams

Mr. Erv Gutman

Mr. Paul Fitzpatrick

Mr. Joe Nichols, Methodology, Resources and Computation
Directorate

c. Support Personnel

Ms. Phyllis Voldal

Ms. Bobbie Carol Guenther, Word Processing Center

Ms. Julie Fuller, Word Processing Center

Ms. Joyce Garris, Word Processing Center

Sgt. Norman Price, Graphics Branch

Ms. Judy Bomstein, Graphics Branch

d. Other Contributors

Mr. Howard G. Whitley

LTC Jim Nugent

Mr. Ralph Webb, Joint Forces and Strategy Directorate

e. Product Review Board

Mr. Dan J. Shedlowski, Chairman

LTC James H. M. Malley

LTC Robert L. Stober

APPENDIX B
STUDY DIRECTIVE

MOCA-FDC

14 June 1978

MEMORANDUM FOR: DIRECTOR, FCDD

SUBJECT: Study - Methodology to Determine Support and Sustainability
Implications of Increased POMCUS Levels (SS IPL)

1. PURPOSE OF STUDY DIRECTIVE. To establish a study to assess the contribution of support functions on combat force performance for various levels of POMCUS.
2. STUDY TITLE. Methodology to Determine Support and Sustainability Implications of Increased POMCUS Levels (SS IPL).
3. BACKGROUND. The DOD's FY 80-84 Consolidated Guidance directed major increases to POMCUS levels in Europe. These increases will result in an undetermined increase in the workload of support force units. No method currently exists within DA to analyze the impact on force performance that these increased workloads have. This study will develop an automated method to relate these increased support requirements to POMCUS levels.
4. STUDY SPONSOR. Commander, US Army Concepts Analysis Agency.
5. STUDY AGENCY. US Army Concepts Analysis Agency.
6. TERMS OF REFERENCE
 - a. Problem. To quantify in a common measure of effectiveness the relative contribution to force performance of combat forces, and the supporting and sustaining forces.
 - b. Purpose. To develop a model and methodology to be used to simulate and analyze the contribution of selected support force functions to the combat force performance at selected levels of POMCUS.
 - c. Objectives.
 - (1) To develop and demonstrate a methodology which assesses the force performance implications of a change in the POMCUS issue rates, the maintenance return rates, and the PWRMS issue rates as they affect the committed tank force in CENTAG.

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MOCA-FDC

SUBJECT: Study - Methodology to Determine Support and Sustainability
Implications of Increased POMCUS Levels (SSIPL)

(2) To conduct analysis to identify areas where changes in resource allocation among support functions will improve force performance.

d. Scope. The study will develop a simulation model that represents the state and time events associated with the committed tank force. Added to the simulation is an optimization module to provide maximization of a set of user-defined decision variables.

e. Constraints. The study will not exceed one year.

f. Time Frame. 1978-85.

g. Assumptions. Assumptions not already implied or specified within references will be provided by the Technical Review Board, CAA.

h. Essential Elements of Analysis.

(1) What is the impact on force performance of an increase in POMCUS site issue rates at the FY 78, FY 82 and FY 84 level of POMCUS?

(2) What is the impact on force performance of an increase in maintenance capability at the FY 78, FY 82, and FY 84 level of POMCUS?

(3) What is the impact on force performance of an increase in PW RMS issue capability at the FY 78, FY 82, and FY 84 level of POMCUS?

(4) What is the sensitivity of the results obtained in (1), (2), and (3) above to changes in the rates of noncombat losses, combat losses and major item abandonment?

1. Environment/Threat Guidance. The Army Force Planning Data and Assumptions (AFPDA) and the CAA Technical Review Board recommendation are applicable.

7. RESPONSIBILITIES.

a. Force Concepts and Design Directorate will provide the Study Director.

b. Methodology, Resource and Computation Directorate.

(1) Administer the one-week GASP IV workshop.

(2) Provide computer support.

(3) Provide technical assistance in the model programing.

MOCA-FDC

SUBJECT: Study - Methodology to Determine Support and Sustainability
Implications of Increased POMCUS Levels (SSIPL)

8. LITERATURE SEARCH.

a. DAMO-OD and DAMO-FD have the responsibility for the subject matter of the study.

b. The subject is related and supports the following studies.

(1) Total Army Analysis.

(2) OMNIBUS Capability Study.

9. REFERENCES.

a. AR 5-5, The Army Study System.

b. CSR 71-2, US Army Operational Readiness Analysis.

c. FY 80-84 Consolidated Guidance.

10. ADMINISTRATION.

a. Support Required.

(1) Funds.

(a) TDY funds for two trips Redstone Arsenal, Alabama to CAA for one person (estimated cost \$500.00).

(b) Funds for the temporary hire of two GS-9/11 programmer-analysts (estimated cost \$40,000).

(c) Funds for a one-week GASP IV workshop (estimated cost \$4500).

b. Study Schedule.

(1) 1 Jul 78. Start date with two temporary hires GS-9 or 11 on board.

(2) 15 Oct 78. Steady state simulation of CENTAG tank commitment operating.

(3) 15 Nov 78. Maintenance, POMCUS and PWRMS issue queues added.

(4) 15 Dec 78. Technical Review Board to assess feasibility.

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MOCA-FDC

SUBJECT: Study - Methodology to Determine Support and Sustainability
Implications of Increased POMCUS Levels (SSIPL)

(5) 15 Mar 79. CENTAG simulations completed.

(6) 15 May 79. Theater simulations completed.

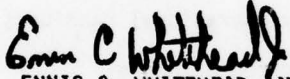
(7) 30 Jun 79. Report preparation complete.

c. Control Procedures.

(1) Direct coordination is authorized and encouraged between CAA
and DA Staff.

(2) FD will submit DD Form 1498.

(3) CAA, TRB will provide study guidance.


ENNIS C. WHITEHEAD, JR.
Major General
Commanding

CF:
DIRECTOR, MRCD
CHIEF, PPCO

APPENDIX C

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5. TOE 29-055 Maint Bn, Abn Div
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7. TOE 29-137 Maint Co, He, GS
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16. Introduction to Combat Damage, Briefing Notes MOCA-FDS, Spring 78

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19. Total Army Analysis 1985 (TAA-85), CAA-SR-79- , to be published

20. Transportation Model (Draft Documentation), to be published

21. POMCUS Objective Levels (POMOL) Study, CAA-SR-79- , to be published

22. Wartime Requirements for Ammunition and Materiel, FY 81-85 (AMMO P-85 WARF-85), CAA-SR-79-1, Feb 79

23. Army Force Planning Data and Assumptions, FY 1978-1985 (AFPDA FY 79-85), CAA-SR-78-6, Oct 78

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24. Maintenance Simulation of Restructured General Support (RGS). Final Report, Jul 78

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APPENDIX D
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and Sons, New York, 1974

APPENDIX E

BALFOR MODEL INTEGRATION WITH GASP IV PROGRAMS.

E-1. GENERAL. This appendix describes the logical relationship that exists between GASP IV and BALFOR Models.

a. Paragraph E-2 presents an overall flow diagram along with a listing of all the routines.

b. Paragraph E-3 describes the basic event data block used by the event routines. This paragraph also describes the linkage structure for these blocks in the file.

c. Paragraph E-4 briefly describes the event processing routines in GASP.

d. Paragraph E-4 presents a brief description of the BALFOR event routines.

e. Paragraph E-5 presents an example of how the BALFOR event routines use the GASP IV language.

E-2. FLOW DIAGRAMS AND EXTERNAL REFERENCES. A flow diagram of GASP IV and BALFOR written subroutines is shown in Figure E-1. Utility routines are shown in Figure E-2. Tables E-1 and E-2 show external references in BALFOR routines and GASP routines.

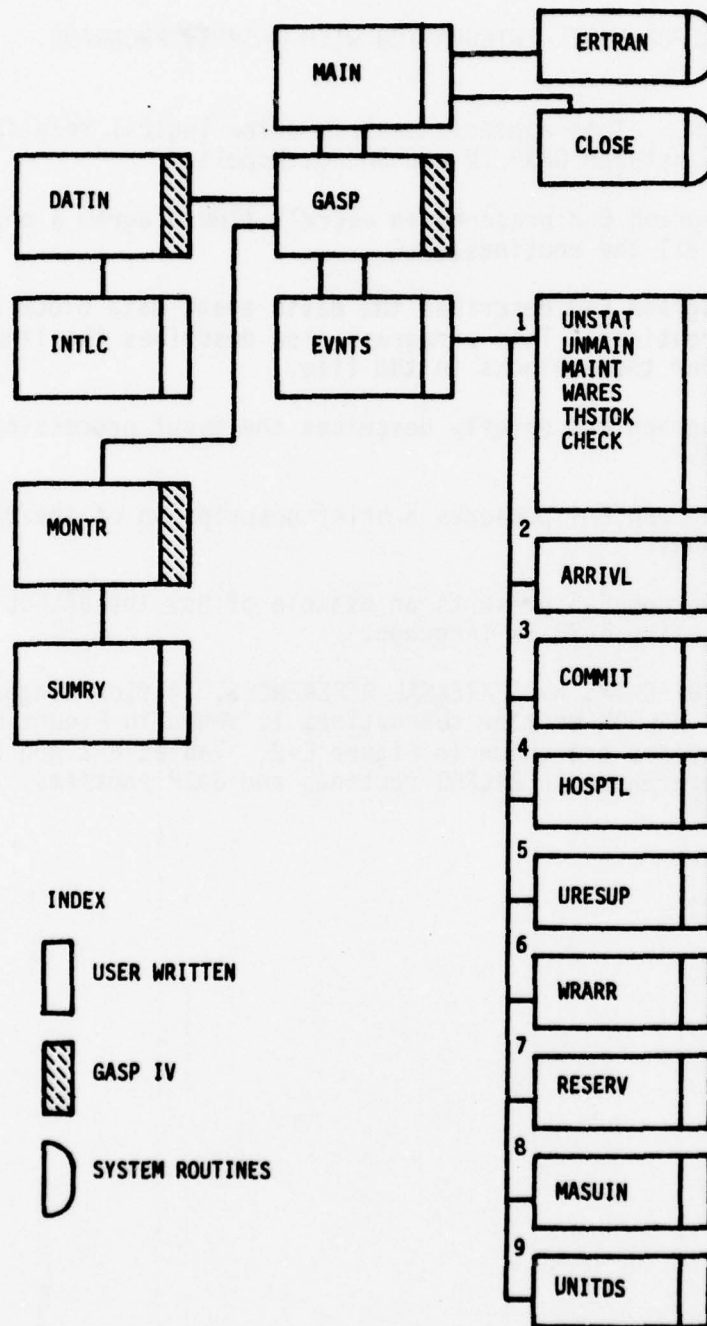


Figure E-1. Flow Diagram of GASP IV, User, and System Routines

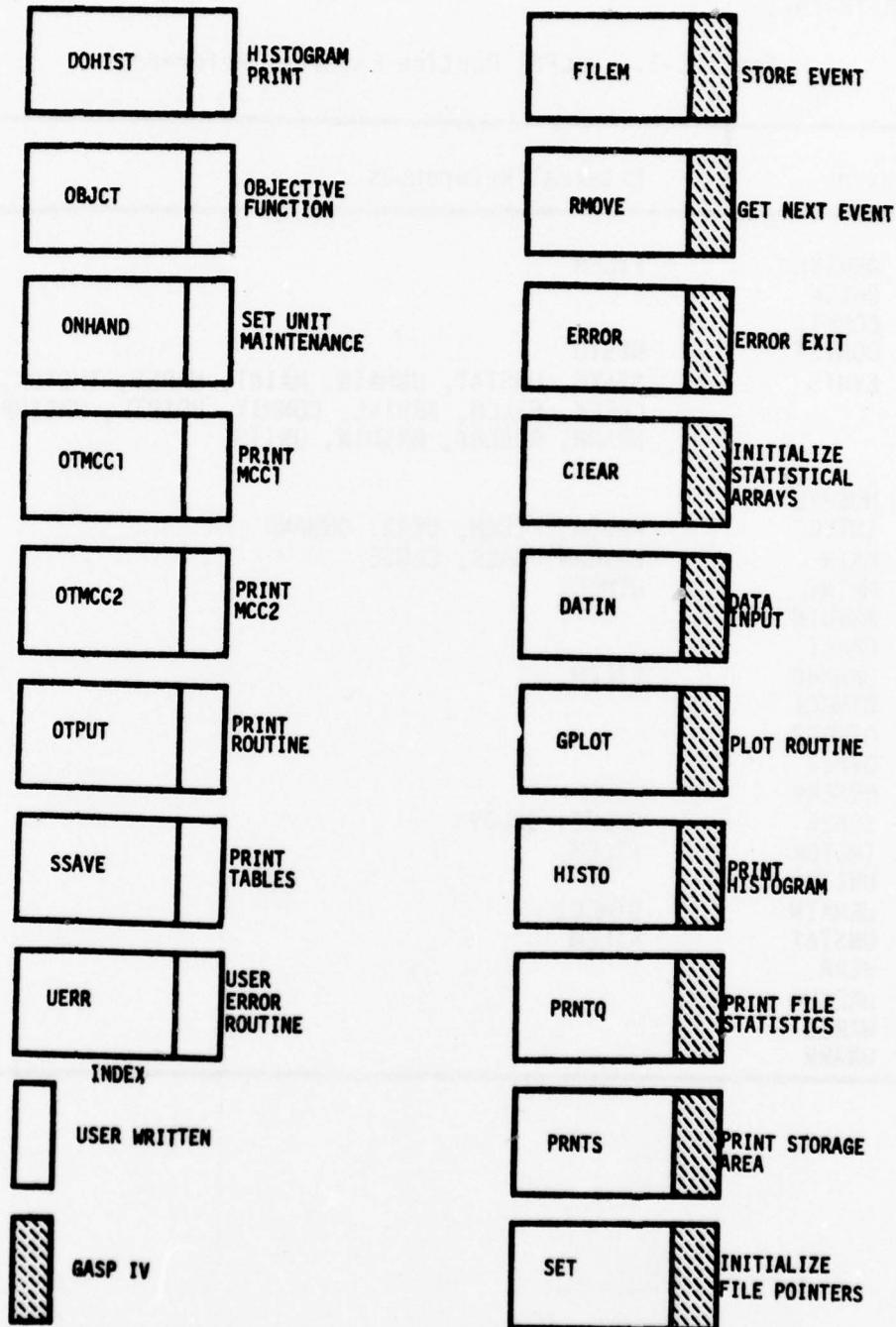


Figure E-2. Utility Routines

CAA-TP-79-1

Table E-1. BALFOR Routine External References

Routine	External References
ARRIVL CHECK COMMIT DOHIST EVNTS	FILEM HISTO SSAVE, UNSTAT, UNMAIN, MAINT, WARES, THSTOK, CHECK, FILEM, ARRIVL, COMMIT, HOSPTL, URESUP, WRARR, RESERV, MASUIN, UNITS
HOSPTL INTLC MAIN MAINT MASUIN	PRNTQ, FILEM, UERR, ONHAND ERTRAN, GASP, CLOSE OTMCC2
OBJCT ONHAND OTMCC1 OTMCC2 OTPUT RESERV	FILEM
SSAVE THSTOK	GPLOT, COLCT FILEM
UNITDS UNMAIN UNSTAT	OTMCC1 FILEM
VERR URESUP WARES WRARR	

Table E-2. GASP Routines External References

Routine	External References
CLEAR	ERROR
COLCT	ERROR
DATIN	ERROR, DRAND, SET, FILEM, CLEAR, INTLC, STATE, PRNTQ, PRNTS
DRAND	
ERROR	UERR, SUMRY, ERTRAN
FILEM	ERROR
GASP	ERROR, DATIN, SSAVE, SCOND, STATE, MONTR, EVNTS, RMOVE, OPUT, SUMRY
GPLOT	ERROR
HISTO	ERROR
MONTR	ERROR, SSTOP, FILEM, UMONT, PRINTQ, CLEAR, PRNTS, SUMRY
PRNTQ	ERROR
PRNTS	ERROR
RMOVE	ERROR
SCOND	DUMMY ROUTINE
SET	ERROR
STATE	DUMMY ROUTINE
SUMRY	ERROR, COLCT, TIMST, PRNTQ, PRNTS, HISTO, GPLOT
TIMST	ERROR
UMONT	DUMMY ROUTINE
SSTOP	OBJCT

E-3. BASIC EVENT BLOCK AND FILE LINKAGE

a. Basic Event Block. The basic event block is an array of seven words, ATRIB. The array contains the necessary information to execute an event routine. When an event is to be placed in the event store, the time of the event and the number of the event are placed in ATRIB(1) and ATRIB(2). Additional data, ATRIB(4) thru (7) is also placed in ATRIB. A call is placed on subroutine FILEM and the data is placed in the event file in proper time sequence. As indicated on the flow diagram, there are nine time events. The data that must be transferred to the event list is described in the following table for each time event.

Table E-3. Data to be Transferred to the Event List

ATTRIB EVENT, CODE	1	2	3	4	5	6
UNSTAT,1	Time Event,Code					
ARRIVL, 2	"	"	Unit			
COMMIT, 3	"	"	Unit			
HOSPTL,4	"	"			C	D
URESUP,5	"	"	Unit	A	C	B
WRARR,6	"	"		A		B
RESER,7	"	"			C	D
MASUIN,8	"	"			G	F B
UNITDS, 9	"	"	Unit	E		

Index for table E-3

- A. Amount of equipment
- B. Equipment type
- C. Number of personnel
- D. Personnel type
- E. Table Index
- F. Option switch

If option switch (F) = 4, increment DS maintenance by ATTRIB(5)
 = 5, increment GS maintenance by ATTRIB(5)
 = 6, increment war reserve output ATTRIB(5)

b. File Linkage Structure. Each routine that calls FILEM supplies the data indicated in Table E-3. FILEM transfers the data into available storage and adds two pointers, one at the front end of the block and one at the back. The linkage structure is a forward and backward linked list. Available storage is also linked in a similar manner, but has a -1 in place of the backwards pointer. Thus, to add an event into the event list one transfers the data to available storage, determines the position of the block in the event list and updates the pointers.*

*A detailed description of the GASP IV filing system is contained on pp 31-36, the GASP IV Simulation Language.³¹

E-4. EVENT PROCESSING

a. FILEM is the GASP routine that handles the storing of event data. Each call on FILEM results in a block of data being transferred to the event list and placed in proper time sequence. A description of the data and how the data is placed in proper time sequence is described in reference 31.

b. RMOVE is the GASP routine that places the first block of data in the event list into ATRIB. It returns the block to available storage and returns control to GASP.

c. EVNTS is a user written routine which transfers control to the proper event routine. GASP calls RMOVE to place the next event data into ATRIB. Next GASP calls EVNTS to execute the routine associated with the data. After executing the event routine, EVNTS returns control to GASP.

d. GASP is the routine that controls the execution of the time events.

e. DATIN is the GASP routine which initializes the GASP arrays and inputs the GASP data.

f. The GASP routines which play a utility role are briefly described. Some of these routines are called but are not used. A complete description of these routines may be found in the GASP IV Simulation Language.³¹

- | | |
|-----------|---|
| (1) DRAND | A psuedo random number generator (not used). |
| (2) COLCT | Computes the mean standard deviation, standard deviation of the mean, coefficient of variation, minimum value, maximum value, and number of observations. |
| (3) GPLOT | The GASP plot routine |
| (4) PRNTQ | Prints the event file storage area. |
| (5) PRNTS | Not used |

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- (6) HISTO Print histograms
- (7) CLEAR Initialize the storage arrays SSOBV and SSTPV, the statistical arrays used by COLCT and TIMST.
- (8) MONTR The subroutine MONTR is a debugging routine. This routine, which may be very useful in the debugging of a program, is not necessary to the logical relationship between GASP IV and the user program. If subroutine MONTR is called, then the following options are available. Let JEVNT be the event code and JX=JEVNT.

(a) JEVNT \geq 0, PRINT TNOW, (ATRI(I), I=1,7)
 PRINT TTNE(X), (QSET(I), I=1,7)
 or PRINT TTFIN if TTNE(X) does not exist.

(b) JEVNT $<$ 0

1 JX \geq 6, call error and return

 JX=2, clear storage arrays and return

2 ATRIB(3) \leq 0 and

 JX=1, call PRNTQ and return

 JX=3, call PRNTS and return

 JX=4, call PRNTQ, PRNTS and return

 JX=5, call SUMRY and return

3 ATRIB(3) $>$ 0

 Plant the event
 ATRI(1)=TNOW+ATRI(3)
 ATRI(2)=JEVNT
 CALL FILEM(1)

 and then proceed as in part B.

- (9) SET Initialize the event file storage area.
- (10) STATE Dummy routine

- (11) SUMRY A summary print routine to:
 a. Print statistics collected by COLCT
 b. Print statistics collected by TIMST
 c. Print event file statistics
 d. Print state storage area
 e. Print histograms
 f. Print tables and plots
- (12) SCOND Dummy routine
- (13) TIMST Computes the mean, standard deviation, minimum, maximum, time interval, and current value.
- (14) UMONT Sets the input parameter to zero.
- (15) ERROR GASP error exit.

E-5. BALFOR EVENT ROUTINES. The event routines are nine in number and each routine will be given a more complete description in Appendix G.

1. Event number 1 consists of six routines: UNSTAT, UNMAIN, MAINT, WARES, THSTOCK and CHECK:

- UNSTAT Computes the noncombat and combat losses for each unit
- UNMAIN Computes the unit maintenance which is associated with each combat unit.
- MAINT Computes the rear maintenance which is associated with each type of equipment.
- WARES Determines the war reserve output rate for each type of equipment.
- THSTOK Supplies units with new equipment and personnel.
- CHECK A summary print table.
2. ARRIVL Sets the units onhand equipment level and schedules the commitment of the unit.
3. COMMIT Sets the status of the unit: THTRSM(N,1)=2.

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4. HOSPTL Returns hospital personnel to theater stocks.
5. URESUP Receives unit supplies from theater stocks.
6. WRARR Determines the increase in war reserve stocks of equipment.
7. RESERV Receives reserve personnel into theater stocks.
8. MASUIN Increases the maintenance or supply capacity.
9. UNITDS Sets the maintenance capacity of a unit.

a. User Utility Routines. The user routines which act in a utility role are briefly described. These routines are generally concerned with input and output; however, a few are computational in nature. A complete description of these routines may be found in Appendix G.

- (1) DOHIST Computes the total number of vehicles of all types in the unit maintenance queue; the total number of vehicles of all types in the area DS maintenance queue. The total number of vehicles of all types in the rear GS maintenance queue. DOHIST then calls the GASP histogram routine, HISTO.
- (2) INTLC The user data input routine, INTLC, also initializes the BALFOR summary arrays.
- (3) OBJECT Dummy routine
- (4) OTMCC1 A diagnostic print routine.
- (5) OTMCC2 A diagnostic print routine.
- (6) OPUT The BALFOR summary print routine.
- (7) ONHAND Sets the onhand equipment level and personnel level of a unit. Also computes the maintenance capacity of a unit.
- (8) SSAVE Prints the tables and plots.
- (9) UERR A user error routine.

E-6. EXAMPLE. The following example explains the basic logical relationship of GASP IV with the BALFOR time events. The example is self-explanatory; however, one should note the following items:

- a. For reasons of clarity, the common blocks have not been included.
- b. Calling sequences have been truncated, if not essential to the logical flow.
- c. One could describe the example as a computational procedure which is time sequenced.
- d. FILEM should not be called with times which are meaningless, since FILEM does not check for erroneous times.
- e. The events counter, NBEVTS, is the total number of events in the file; FILEM increments the counter and RMOVE decrements the counter. (GASP IV does not work exactly this way but for reasons of clarity this method has been used).

```

                                Program Main
C                                Example to illustrate the use of GASP IV
C                                with BALFOR time events
C
C                                Call GASP
C                                Print 1
1                                Format (1x, 'End of Run')
C                                End
C
C                                SUBROUTINE GASP
C                                Initialize GASP and input GASP data cards
C                                Initialize program and input data cards
C                                Call DATIN
C                                Call INTLC
C
C                                Test for NB of events remaining
1                                IF (NBEVTS) 3, 4, 2
C
C                                Place next time event into ATRIB and EXECUTE
2                                Call RMOVE (1)
C                                IF (ATRIB(1) .gt. KDAY) return

```


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```
C      Call EVNTS
C      go to 1
C
C      EVENT counter is negative, signal an error
C      Call ERROR
C      Return
C
C      Number of events is zero, end of run
C      4 Return
C      End
C      SUBROUTINES EVNTS
C
C      Transfer control to proper event routine.
C
C      Ix=ATRIB(2)
C      go to (1,2,3,4,5,6,7,8,9), IX
C
C      Compute noncombat and combat equip losses, maintenance
C      Requirements, war reserve, supplies, and print check table.
C      1 Call UNSTAT
C      Call UNMAIN
C      call MAINT
C      call MAINT
C      call THSTOK
C      call CHECK
C      Test for end of computations
C      IF(TNOW. ge. KDAY) Return
C      Plant an EVENT of Type 1 for next day.
C      ATRIB(1)=TNOW+1
C      ATRIB(2)=1
C      CALL FILEM(1)
C      Return
C
C      Set unit equipment level, arrival status
C      2 Call ARRIVL
C      Return
C
C      Commit unit to combat
C      3 Call COMMIT
C      Return
C
C      Return hospitalized personnel to theater stocks
```

4 Call HOSPTL
Return

C
C
C

Unit supplies are received from theater stocks.
5 Call URESUP
Return

C
C
C

Increase war reserve STOCKS
6 Call WRARR
Return

C
C
C

Reserve Personnel Enter Theater Stocks
7 Call RESERV
Return

C
C
C

Increase Maintenance Capacity or supply capacity.
8 Call MASUIN
Return

C
C
C

Set the maintenance capacity of a unit.
9 Call UNITDS
Return

End

APPENDIX F

A USER AND PROGRAMMER
GUIDE
TO EXECUTE THE BALFOR SIMULATION

BY: MARC ABRAMS
DATE: 22 MARCH 1979
DOCUMENT VERSION: VERSION 4
MASTERFILE VERSION: LEVEL-9R17.2.79
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CAUTION: THIS DOCUMENT HAS BEEN CHECKED FOR ACCURACY,
ALTHOUGH AS IN ANY SOFTWARE DOCUMENTATION, THE
DESCRIPTION MAY NOT BE 100% ACCURATE!

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1. INTRODUCTION

1.1. PURPOSE OF MANUAL

THIS MANUAL DOCUMENTS A UTILITY PROGRAM, MASTERFILE, WHICH EXECUTES THE BALFOR MODEL AND MAINTAINS ITS PROGRAM FILES.

ADDITIONAL COPIES OF THIS DOCUMENT MAY BE OBTAINED BY TYPING

BDCC,DL BZDOC.MASTERFILE

1.2. BRIEF DESCRIPTION OF CONTENTS

CHAPTER 2 IS A USER'S GUIDE TO THE MASTERFILE PROCESSOR. IT DETAILS HOW TO EXECUTE THE BALFOR MODEL AND TO MAINTAIN THE PROGRAM FILES.

THE NEXT CHAPTER IS A PROGRAMMER'S GUIDE TO THE MODEL. OUTLINES OF THE FORTRAN IV CODING IN EACH SUBPROGRAM DESCRIBE THE MASTERFILE PROGRAM. THE CHAPTER ENDS WITH A LIST OF THE BASE CASE INPUT DATA.

1.3. REFERENCES

ADDITIONAL INFORMATION ON GASP IV AND THE BALFOR MODEL CAN BE FOUND IN THE FOLLOWING SOURCES:

1. LEVEL 1-9 BALANCED FORCE (BALFOR) DOCUMENTATION
2. SOURCE CODES OF LEVEL-8, 9, AND 10 GASP IV USER PROGRAMS
3. AUTHOR'S NOTES
4. A. ALAN B. FRITSKER, "THE GASP IV SIMULATION LANGUAGE"
5. MICHAEL PATRICK GATELY, "DECISION OPTIMIZATION MODULE FOR THE GASP IV SIMULATION LANGUAGE"

2. USER'S GUIDE

2.1. OVERVIEW

2.1.1. HISTORY: THE PROBLEM

THERE ARE THREE JOBS INVOLVED IN PROGRAMMING A SIMULATION: WRITING AND DEBUGGING THE CODING, MAINTAINING PROGRAM AND DATA FILES, AND EXECUTING THE MODEL. THIS SECTION TREATS THE LAST TWO STEPS.

MAINTAINING FILES IS A CONFUSING PROCESS BECAUSE EACH MEMBER OF THE STUDY GROUP MUST RELY ON FILE AND ELEMENT NAMES TO FIND PROGRAM VERSIONS, DATA FILES, AND RUNSTREAMS IN A MYRIAD OF FILES. USUALLY THE NAMES ARE AMBIGUOUS BECAUSE MORE THAN ONE VERSION OF A GIVEN ELEMENT EXISTS AS IT IS DEVELOPED. THE SHORT LIFE OF THESE DEVELOPMENTAL ELEMENTS AND THE RATE AT WHICH THEY ARE UPDATED PRECLUDES DOCUMENTING THEM.

2.1.2. MASTERFILE: THE SOLUTION

TO ALLEVIATE THIS STUMBLING BLOCK THE MASTERFILE PROCESSOR WAS CREATED.

WITH RESPECT TO FILE MAINTENANCE THIS UTILITY PROVIDES TWO FUNCTIONS. FIRST IT KEEPS TRACK OF THE LATEST VERSIONS OF DEVELOPMENT PROGRAMS, THEREBY ELIMINATING THE NEED FOR MORE THAN ONE VERSION OF ANY PROGRAM. SECOND IT AUTOMATICALLY DOCUMENTS DATA ELEMENTS AND ABSOLUTE PROGRAMS. IN CONJUNCTION WITH ITS DOCUMENTING FUNCTION MASTERFILE KEEPS A RECORD OF WHAT SOURCE PROGRAMS WERE USED TO CREATE ALL ABSOLUTE PROGRAMS AND MOVES THESE PROGRAMS OUT OF THE USER'S DEVELOPMENTAL FILE INTO A SPECIAL LIBRARY.

THE MECHANICS OF THESE FUNCTIONS ARE COMPLETELY TRANSPARENT TO THE USER AND ARE DESCRIBED IN DETAIL IN THE NEXT CHAPTER.

FROM A USER STANDPOINT THE MASTERFILE PROGRAM IS A CONVERSATIONAL PROGRAM, ASKING THE USER FOR A MINIMAL AMOUNT OF DATA TO COMPILE AND EXECUTE AN ABSOLUTE ELEMENT. THE INTERACTIVE NATURE OF MASTER FILE DOES NOT PRECLUDE ITS BEING USED IN A BATCH ENVIRONMENT.

EXECUTING THE ABSOLUTE, THE THIRD JOB OF A PROGRAMMER AND THE USER, IS A TIME CONSUMING PROCESS BECAUSE WHENEVER A DATA ELEMENT IS UPDATED ALL RUNSTREAMS USED TO EXECUTE THE MODEL BECOME OBSOLETE.

IDEALLY, A USER WOULD ONLY NEED TO TYPE "RUN ABSPROG" OR "XQT ABSPROG" TO QUICKLY EXECUTE A PROGRAM. WHAT COMPLICATES THIS PROCESS IS THAT THE USER MUST ENTER EXEC B CONTROL STATEMENTS BEFORE THE XQT STATEMENT TO TAYLOR THE OPERATING ENVIRONMENT TO THE ENVIRONMENT NEEDED BY A PROGRAM. THIS PREPARATION MAY INCLUDE ASSIGNING FORTRAN DATA FILES, ASSIGNING SYMANTON FILES, AND MAKING DATA FILES AVAILABLE TO THE PROGRAM.

BUT SINCE THIS ENVIRONMENT IS VIRTUALLY THE SAME EACH TIME THE MODEL IS EXECUTED, THE MASTERFILE PROGRAM, IN ADDITION TO MAINTAINING DATA FILES, CREATES THIS ENVIRONMENT. THUS THE MODEL IS NOT RUN DIRE UNDER THE CONTROL OF EXEC B, BUT INDIRECTLY THROUGH THE MASTERFILE PROCESSOR.

THE DESIGN OF MASTERFILE WAS NOT ESSENTIAL TO DEVELOPING THE MODEL. THE DECISION TO DEVOTE TIME TO ITS DEVELOPMENT CAME FROM THE PERCEPTION THAT AS THE SIZE AND COMPLEXITY OF THE MODEL GREW THE SIZE OF PROGRAM FILES AND COMPLEXITY OF EXECUTION WILL ALSO GROW.

2.2. HOW TO USE MASTERFILE

GIVING STEP BY STEP INSTRUCTIONS ON USING THE MASTERFILE PROGRAM, THIS SECTION CONTAINS THE BULK OF THE USER'S GUIDE.

2.2.1. THE FIRST STEP: B2ADD

THE FIRST STEP A USER SHOULD PERFORM AFTER SIGNING A TERMINAL ON IS TO TYPE

```
BADD B2ADD.
```

B2ADD. IS A CANNED RUNSTREAM WHICH PERFORMS TWO FUNCTIONS. FIRST IT COPIES THE MASTERFILE, SUSPEND, AND

RESUME PROGRAMS INTO THE USER'S WORKSPACE. SECOND IT ALLEVIATES THE NEED FOR THE USE TO REMEMBER FILENAMES LIKE "92RUMS" BY ATTACHING 1 OR 2 CHARACTER ABBREVIATIONS TO THEM. A LIST OF ABBREVIATIONS APPEARS IN TABLE 2-1. THE ACTUAL JCL IS LISTED IN APPENDIX B, SECTION 5. A DESCRIPTION OF THE CONTENTS OF EACH FILE LISTED IN TABLE 2-1 IS INCLUDED IN APPENDIX A, SECTION 4.

TABLE 2-1. BUZE ATTACHED MNEMONICS FOR COMMON GASP FILES

MNEMONIC	CORRESPONDING FILENAMES (1)
D	8290C.
B	82GASP.
I	82IG.
M	82MASTEFILF. (2)
R	82RUMS.
RD	82MASTERSRD. (2)
U	82UPDATE.
X	82X0T.
S	68U0M.

NOTES:

- (1) A DESCRIPTION OF THE CONTENTS OF FILES APPEARS IN APPENDIX A (CHAPTER 8).
- (2) THESE ARE THE ONLY FILES WHICH DO NOT RESIDE ON REMOVABLE DISK PACK 36.

OF WHAT VALUE ARE THESE MNEMONICS? A LIST OF ELEMENTS IN A PROGRAM FILE, FOR EXAMPLE, COULD BE OBTAINED BY ENTERING

@PRT,T @20ASP.

OR

@PRT,T @.

THE VALUE OF THESE ABBREVIATIONS MAY NOT SEEM TO BE GREAT, BUT TO A PROGRAMMER WHO REFERENCES THE SAME FILES AT THE TERMINAL MANY TIMES A DAY THEY ARE.

IF ONE FORGETS A MNEMONIC OR A FILENAME HE MAY OBTAIN IT SIMPLY BY TYPING

@PRT,I

THE BEGINNING OF THE RESPONSE IS A LIST OF THE FILES IN TABLE 2-1. A TYPICAL ENTRY IS:

```

UNCLASSIFIED#@ASP(1),F10,A,P, NAME ITEM, 6
*           *           *           *           *
QUALIFIER   *           *           *           *
FILENAME AND CYCLE *           *           *
DISK DRIVE MODEL *           *           *
                DASD OPTIONS *           *
NAME ITEM-->FILE IS NOT @ASD'D *
ASD----->FILE IS @ASD'D *
                                FILE MNEMONIC
    
```

REFERENCE: TYPE

@GUIDE PRT

FINALLY THE USER NOW HAS FOUR ADDITIONAL CONTROL STATEMENTS AVAILABLE TO HIM. THESE ARE LISTED IN TABLE 2-3.

TABLE 2-2. ADDITIONAL EXEC 8 CONTROL STATEMENTS

CONTROL STATEMENT	DESCRIPTION
@MASTERFILE	SEE SECTION 2.2.2
@SUSPEND	DIRECT OUTPUT TO HIGH SPEED PRINTER. SEE SECTION 2.2.3.
@RESUME	SIMILAR TO @SUSPEND
@EDIT	UNIVERSITY OF MARYLAND'S VERSION OF @ED,

2.2.2. THE SECOND STEP: MASTERFILE

IN ORDER TO BECOME FAMILIAR WITH THE USE OF MASTERFILE, READ THROUGH THE FOLLOWING SECTIONS. TO INVOKE MASTERFILE, TYPE

@MASTERFILE,OPTIONS

WHERE THE AVAILABLE OPTIONS ARE LISTED IN TABLE 2-3. THE FILE SHOULD SIGNON WITH:

UNCLASSIFIED*MASTERFILE.MASTERFILE LEVEL-9R17.2.79-TIME-DATE

WHERE THE TIME AND DATE ARE SIX DIGIT NUMBERS. IF THE RESPONSE IS NOT A SIGNON LINE, BUT:

PROGRAM NOT FOUND

OR

FILE ERROR

THEN THE WORKSPACE HAS BEEN ERASED OR THE USER FAILED TO ADD
82ADD. (SEE SECTION 2.2.1). THIS CAN BE REMEDIED BY
TYPING:

```
ENTER  
@ADD 82ADD.  
@MASTERFILEC,OPTIONS}
```

THE OPTIONS PRESENTED BELOW WILL NOT WORK WITH VERSION
17.2.79 OF MASTERFILE, ALTHOUGH A LIST OF OPTIONS IS
INCLUDED BELOW. BY READING TABLE 2-2 THE USER WILL GET A
GRASP OF THE POWER AVAILABLE THROUGH MASTERFILE.

THESE OPTIONS ARE CURRENTLY BEING INSTALLED IN THE NEXT
RELEASE OF MASTERFILE. THEY WILL FACILITATE BATCH RUNS,
WHEN A CONVERSATIONAL PROGRAM IS UNNECESSARY.

TABLE 2-3. OPTIONS ON @MASTERFILE CONTROL STATEMENT

OPTION	SPECIFICATION
--------	---------------

A	DO NOT @ADD OR @START THE RUNSTREAM CREATED BY MASTERFILE DYNAMICALLY. INSTEAD PRINT THE FILE NAME FOR FUTURE USE (THE A OPTION IS IGNORED IF THE X OPTION IS SPECIFIED.).
B	NOT USED.
C	NOT USED.
D	DELETE AN OLD ABSOLUTE PROGRAM AND THE SOURCE PROGRAMS FROM WHICH THE ABSOLUTE WAS CREATED.
E	EDIT THE @BRKPT FILE. (3)
F	RECOMPILE ALL PROGRAMS IN A USER SPECIFIED FILE AND STORE THE SOURCE AND OBJECT PROGRAMS IN FILE @UPDATEVIA @@9UOH.FLIST .
G	NOT USED.
H	HOLD THE @BRKPT FILE. (3)
I	NOT USED.
J	NOT USED.
K	NOT USED.
L	NOT USED.
M	PRINT A MAP OF AN ABSOLUTE. THE OUTPUT IS THE FILENAME.ELEMENT-NAME OF ALL PROGRAMS WHICH THE ABSOLUTE ELEMENT WAS @MAP'D FROM.
N	NOT USED.
O	PRINT OPTIONS (EQUAL TO SPECIFYING NO OPTIONS)
P	NOT USED.
Q	NOT USED.
R	RECOMPILE THE PROGRAMS THE USER NOW SPECIFIES.

- S BSYM THE BRKPT FILE. MASTERFILE WILL QUERY THE USER AS TO THE DESIRED PRINTER.
- T PRINT A TABLE OF CONTENTS FOR ALL USER FILES.
- U NOT USED.
- V NOT USED.
- W NOT USED.
- X BXQT THE MODEL.
- Y NOT USED.
- Z NOT USED (RESERVED FOR DIAGNOSTIC PURPOSES).

NOTES:

- (1) UNUSED SPECIFICATION FIELDS ARE RESERVED FOR FUTURE EXPANSION AND SHOULD NOT BE USED.
- (2) THESE OPTIONS ARE IGNORED IN VERSION 17.2.78 OF MASTERFILE.
- (3) THESE OPTIONS APPLY TO THE BSUSPEND STATEMENT CALLED AFTER PROGRAM EXECUTION (SEE 2.2.3).

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IF THE 0 OPTION IS USED, OR IF NO OPTIONS ARE USED, THE OPTION SPECIFICATIONS WILL BE PRINTED IN A CONVERSATIONAL MODE FOR THE USER. IN OTHER WORDS, THE OPTIONS ARE PROVIDED ONLY SO THAT A USER MAY BYPASS SECTIONS OF THE CONVERSATIONAL CODE. THIS IS ESPECIALLY USEFUL IN A BATCH RUN.

2.2.2.1. EXECUTING THE MODEL

IN THE IDEAL SITUATION DESCRIBED IN SECTION 2.1.2, ONE ONLY HAD TO TYPE "BXT ABSPROG" TO RUN THE MODEL. THIS SITUATION IS ACHIEVED WITH MASTERFILE. NO RUNSTREAM IS EVER NEEDED TO EXECUTE THE MODEL.

BEFORE RUNNING MASTERFILE, SET UP AN INPUT DECK IN SOME FILE OF YOUR CHOICE. THERE IS NO NEED TO

- KNOW THE NAME OF ANY ABSOLUTE ELEMENT,
- KNOW THE NAME OF DATA-DECKS,
- OR KNOW ANY EXEC VIII CONTROL LANGUAGE

TO RUN THE MODEL—MASTERFILE TELLS YOU WHAT IS AVAILABLE! ASSUMING THAT YOU HAVE SET UP AN INPUT DECK WITH THE NAME B2IG.RUNSEC (SEE TABLE 2-4 FOR INPUT DECKS ALREADY IN THE COMPUTER), JUST FOLLOW THE STEPS OUTLINED IN THE NEXT FEW PAGES TO EXECUTE THE MODEL USING B2IG.RUNSEC. CONSEQUENTLY TO EXECUTE THE MODEL TYPE

MASTERFILE

THE RESPONSE IS

UNCLASSIFIED•B2MASTERFILE MASTERFILE LEVEL-9R17.2.79-140854-011579

MASTERFILE IS NOW IN A CONVERSATIONAL MODE. ANY DATA IT NEEDS TO CREATE A RUNSTREAM WHICH WAS NOT SPECIFIED ON THE MASTERFILE STATEMENT WILL BE SOLICITED FROM THE USER. THE FIRST QUERY IS:

ENTER 0 IF THIS IS TO BE A BATCH (OR START) JOB OR 1 FOR A DEMAND JOB.

DEMAND JOBS WILL BE EXECUTED AFTER MASTERFILE HAS CREATED A RUNSTREAM, WHILE IN CONTRAST BATCH JOBS WILL BE @START'D.
NEXT MASTERFILE REQUESTS THE FUNCTION OF THE USER'S RUNSTREAM IF THIS WAS NOT SPECIFIED BY AN OPTION ON THE @MASTERFILE STATEMENT.

WHICH FUNCTION DO YOU WISH? TYPE 7 FOR A LIST?

CHOOSE ONE OF THE FOLLOWING FUNCTIONS:

- 1 CREATE A NEW RUNSTREAM TO EXECUTE THE POMCUS MODEL.
- 2 CREATE A NEW ABSOLUTE BY RECOMPILING ALL PROGRAMS IN YOUR R&D FILE.
- 3 CREATE A NEW ABSOLUTE BY COMPILING ONLY THE PROGRAMS YOU SPECIFY NOW.
- 4 PRINT A MAP OF AN ABSOLUTE PROGRAM.
- 5 PRINT A TABLE OF CONTENTS (TOC) FOR ALL GASP FILES.
- 6 DELETE AN ABSOLUTE PROGRAM AND SOURCE PROGRAMS UNIQUE TO THAT ELEMENT.

WHICH FUNCTION DO YOU WISH?

RESPOND BY ENTERING:

>1

IF YOU ENTER AN INVALID FUNCTION NUMBER, FOR EXAMPLE 9, THE RESPONSE WILL BE:

9 IS A BAD CHOICE—TRY 1, 2, 3, 4, 5, OR 6!
YOUR CHOICE?

NOW YOU MAY ENTER A VALID FUNCTION CODE:

>1

AFTER YOUR RESPONSE MASTERFILE REQUESTS A TITLE WHICH WILL BE USED ON THE @HDD CARD IN THE RUNSTREAM:

WHAT IS THE TITLE OF THIS RUN (≤66 CHARACTERS)?

←—66

THE ARROW AND NUMBER 66 ON THE RIGHT HAND SIDE OF THE PAGE SHOWS THAT THE LENGTH OF YOUR TITLE IS LIMITED TO 66 CHARACTERS, SHOWN BY THE POINT OF THE ARROW. THIS NOTATION IS USED IN OTHER QUERIES, TOO.

A BASIC UNDERSTANDING OF WHAT MASTERFILE IS DOING WHILE THE USER IS BANGING AWAY AT THE KEYBOARD WILL MAKE THE REMAINING EXPLANATION CLEARER.

MASTERFILE EXECUTES IN TWO STEPS:

1. DURING EXECUTION TIME A RUNSTREAM IS CREATED.
2. THE RUNSTREAM IS THEN EXECUTED. THIS PROCESS IS LABELED "DYNAMIC @ADD'ING" OF THE RUNSTREAM (SEE THE @ OPTION IN TABLE 2).

THE END OF STEP ONE AND BEGINNING OF STEP TWO IS MORE OR LESS TRANSPARENT TO THE USER, ALTHOUGH THE PROCESSOR ASKS THE USER IF HE WANTS TO @ADD THE STREAM OR @START THE STREAM IMMEDIATELY IN FUNCTIONS 2 AND 3.

THROUGH THIS DISCUSSION IT HAS PROBABLY BECOME APPARENT THAT THERE IS A DISTICTION BETWEEN DEMAND JOBS AND START JOBS. IN START JOBS, STEP TWO IS SUBMITTED TO THE EXEC AS A BATCH JOB AND IS PUT IN BACKLOG. IN A DEMAND JOB STEP 2 IS EXECUTED WHILE THE USER WAITS. CONSEQUENTLY MASTERFILE INSERTS A SET OF @BRKPT (ACTUALLY @SUSPEND/@RESUME, SEE SECTION 2.2.3) STATEMENTS TO START AND FINISH THE RUNSTREAM. THE FUNCTIONS, THEN, ARE NOT PERFORMED AS THE USER ENTERS THEM BUT ARE EXECUTED IN A SECOND STEP.

2.2.2.2. EXECUTING THE MODEL

THIS SECTION APPLIES IF THE USER WANTS TO CREATE A RUNSTREAM TO EXECUTE THE MODEL. THE PROGRAM ASKS THE USER FOR THE NAME OF A DATA FILE WHICH CONTAINS INPUT FOR THE USER WRITTEN GASP IV SUBPROGRAM INTLC. SECTION 3.4 CONTAINS A COMPLETE SAMPLE INPUT DECK OF THE BASE CASE DATA, WHICH IS USED TO VERIFY EACH LEVEL OF THE MODEL. REFER TO TABLE 2-4

FOR THE LOCATION OF THE INTLC-DATA FILES.

TABLE 2-4. LOCATION OF INTLC-DATA ELEMENTS

FILENAME	ELEMENT NAME	DESCRIPTION
82X07	RUNSEC/PROD	BASE CASE DATA FOR LEVEL-8
82I0	RUNSEC/BASE	BASE CASE DATA FOR LEVEL-9

THUS THE PROCESSOR QUERIES:

WHAT IS THE NAME OF YOUR INTLC FILE (FILENAME.ELEMENTNAME/VERSION)?
 >82I0.RUNSEC
 8ED:D 82I0.RUNSEC
 IS THIS CORRECT 'Y' OR 'N'?
 >Y

THE "82I0.RUNSEC" WAS A USER ENTRY.
 MASTERFILE THEN REQUESTS THE NAME OF AN ABSOLUTE PROGRAM. AT THIS POINT THE AUTOMATIC DOCUMENTATION FEATURE OF MASTERFILE ASSISTS THE USER IN IDENTIFYING THE CONTENTS OF A FILE BY PRINTING THE ABSOLUTE PROGRAM NAMES AND A ONE LINE DESCRIPTION:

CHOOSE ONE OF THE FOLLOWING ABSOLUTE ELEMENTS TO EXECUTE BY NUMBER:

- 1 82X07.ABS/PROD . THE PRODUCTION ABSOLUTE
- 2 82LEVEL-9.ABS . LEVEL-9 ABSOLUTE
- 3 82UPDATE.ABS . LEVEL-10, WITH PWRMS DIVERSION INTO MAINTAINENCE
- 4 82UPDATE.ABSMOD . TEST MODULE FOR VARIABLE COMBAT YOUR CHOICE?

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NEXT THE USER CHOOSES A FILE WHICH CONTAINS DATA FOR THE
GASP IV SUBROUTINE DATIN.

CHOOSE A DATIN DATA FILE BY NUMBER.

1 02X0T.DATIN-DATA . ONE RUN--NO OPTIMIZATION
2 02HA.DATIN-OPT . MNRMS = 5--RUNS THE OPTIMIZATION
3 02HA.DATIN-TEST . TTFIN=20 --STOP AFTER 20 DAYS FOR
TESTING MODEL.
YOUR CHOICE?

A CORE DUMP CAN BE OBTAINED BY REPLYING WITH "Y" TO:

DO YOU WANT A DUMP AFTER EXECUTION OR ONLY ON ERROR (Y OR
N)?
Y

CHOOSE ANY OF THESE OPTIONS:

E DUMP ONLY ON ERROR
F FIELDATA ALPHANUMERIC FORMAT FOR DUMP
B FORTRAN "6" FORMAT FOR DUMP
P DUMP RUN'S PCT
C DUMP ONLY WORDS WHICH HAVE CHANGED DURING EXECUTION
ENTER OPTIONS, SUCH AS EFB ????

JUST AS A NOTE THE B FORMAT DUMP WILL PROPERLY CONVERT
FLOATING POINT NUMBERS TO BASE 10, BUT INTEGERS WILL NOT BE
CONVERTED TO BASE 10, ALTHOUGH THEY WILL BE PRINTED AS
THOUGH THEY WERE IN BASE 10. THE C OPTION IS ESPECIALLY
USEFUL SINCE ONLY CORE LOCATIONS USED IN THE SIMULATION AND
CHANGED DURING EXECUTION WILL BE PRINTED. THIS MAKES
LOCATING VARIABLE QUICKER. FOR MORE INFORMATION, TYPE

00UIDE PHD

AT THIS VERY INSTANT, THE MODEL WILL BE EXECUTING! NO
FURTHER INTERVENTION IS NEEDED. EXECUTION TAKES 1-4
MINUTES, DEPENDING ON HOW BUSY THE SYSTEM IS.

AT THIS POINT MASTERFILE HAS CREATED A RUNSTREAM AND
PLACED IT IN THE TEMPORARY FILE "RUNSTRFAM000." MASTERFILE
THEN USES THE EDITOR TO MANIPULATE THIS ELEMENT, ALTHOUGH
THIS STEP IS TRANSPARENT TO THE USER. NEXT MASTERFILE WILL

8ADD,L RUNSTREAMS88. AGAIN THIS FUNCTION IS TRANSPARENT TO THE USER. THE LEVEL-8 MODEL TAKES ABOUT 1 MINUTE TO EXECUTE, AND LEVEL-9 ABOUT TWICE AS LONG. IF THE DIAGNOSTICS ARE TURNED ON, EXECUTION TIME INCREASES CONSIDERABLY.

BUT THE USER IS COMPLETELY UNAWARE OF THE PROCESSES DESCRIBED IN THE LAST FEW PARAGRAPHS. THE RESPONSE HE RECEIVES IS

SUSPENDED
EXAMINE, PRINT, HOLD, OR DROP?

USE THE LETTERS E,P,H, OR D AS A RESPONSE. "E" WILL ALLOW EDITING OF THE SYMBIONY FILE CONTAINING THE OUTPUT FROM PROGRAM EXECUTION VIA MARYLAND UNIVERSITY'S TEST EDITOR.

ONE NOTE OF WARNING: EDITING THE FILE IS DONE VIA THE UNIVERSITY OF MARYLAND TEXT EDITOR WHICH IS SOMEWHAT SIMILAR TO UNIVAC'S ED. SIMPLE COMMANDS SUCH AS P, N, C, R, T WILL WORK. MANY OTHERS WILL NOT.

WHEN YOU ARE FINISHED EXAMINING THE CONTENTS, TYPE "EXIT" (NOT OMIT). THE ABOVE RESPONSE WILL AGAIN APPEAR ON THE TERMINAL.

"P" WILL RESULT IN THE QUERY

WHERE?

VALID LOCATIONS TO PRINT THE OUTPUT AT INCLUDE

PR ← ANY HIGH SPEED PRINTER PR2 ← "UNLINED" PAPER FROM MEDIUM SPEED PRINTER PR3 OR PR4 ← A PARTICULAR HIGH SPEED PRINTER DCT001 OR DCT002 OR DCT003 ← VERY LOW SPEED PRINTERS IN ROOMS 723 OR 827A

ASSUMING YOUR RESPONSE WAS "PR", THE SYSTEM WILL RESPOND WITH THIS MESSAGE:

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SENT TO PR : A10000

WHERE A10000 IS YOUR RUNID.
IF THE USER TYPES "M" THE FILE IS HELD, AND REMAINS
WAITING UNTIL THE USER TYPES

0RESUME

OR

060UOM.RESUME . IF TPF0 IS ERASED

THIS RESUMES THE SYSTEM'S QUERY AS TO WHAT TO DO WITH
YOUR PRINTFILE— EXAMINE, PRINT, HOLD OR DROP IT.

IN SUMMARY, THE PRINTFILE REMAINS AVAILABLE TO THE USER
UNTIL HE EITHER 0FIN'S, RERUNS MASTERFILE, OR ENTERS "D" TO
DROP THE FILE IN RESPONSE TO THE EXAMINE, PRINT, HOLD, OR
DROP QUERY.

USING THE REMAINING FUNCTIONS OF MASTERFILE IS SIMILAR
TO FUNCTION #1.

IN FIGURE 2-1 A SAMPLE TERMINAL SESSION APPEARS.

FIGURE 2-1. TERMINAL SESSION USING FUNCTION #1

```

MASTERFILE
UNCLASSIFIED#02MASTERFILE.MASTERFILE LEVEL-9R17.2.79-150625-022479
ENTER 0 IF THIS IS TO BE A BATCH (OR START) JOB OR 1 FOR A DEMAND JOB.
>1
WHICH FUNCTION DO YOU WISH (TYPE 7 FOR A LIST)?
>7

CHOOSE ONE OF THE FOLLOWING FUNCTIONS:
1 CREATE A NEW RUNSTREAM TO EXECUTE THE PONCUS MODEL.
2 CREATE A NEW ABSOLUTE BY RECOMPILING ALL PROGRAMS IN YOUR RBD FILE.
3 CREATE A NEW ABSOLUTE BY COMPILING ONLY THE PROGRAMS YOU SPECIFY NOW.
4 PRINT A MAP OF AN ABSOLUTE PROGRAM.
5 PRINT A TABLE OF CONTENTS (TOC) FOR ALL GASP FILES.
6 DELETE AN ABSOLUTE PROGRAM AND SOURCE PROGRAMS UNIQUE TO THAT ELEMENT.

WHICH FUNCTION DO YOU WISH?
>9
9 IS A BAD CHOICE--TRY 1, 2, 3, 4, 5, OR 6!
>1
WHAT IS THE TITLE OF THIS RUN (<66 CHARACTERS)?
<--E6
>ILLUSTRATIVE EXAMPLE OF RUNNING A PROGRAM
WHAT IS THE NAME OF YOUR INTLC FILE (FILENAME.FLTNAME/VERSION)?
>02INTLC.RUNSEC/BASE
0ED;0 02INTLC.RUNSEC/BASE
IS THIS CORRECT (Y OR N)?
>Y
CHOOSE ONE OF THE FOLLOWING ABSOLUTE ELEMENTS TO EXECUTE BY NUMBER:
1 02X0Y.ABS/PROD . PRODUCTION
2 02LEVEL-9.ABS . LEVEL-9
3 02UPDATE.ABS . LEVEL-10, WITH PWRMS DIVFPION INTO MAINT
4 02UPDATE.ABSMOD . TEST MODULE FOR VARIABLE CONRAT
YOUR CHOICE?
>3
CHOOSE A DATIN DATA FILE BY NUMBER.
1 02X0Y.DATIN-DATA . ONE RUN--NO OPTIMIZATION
2 02MA.DATIN-OPT . NNRMS = 5--PUNS THE OPTIMIZATION
3 02MA.DATIN-TEST . TTFIN=20--STOP AFTER 20 DAYS FOR TESTING MODEL
YOUR CHOICE?
>3
DO YOU WANT A DUMP AFTER EXECUTION OR ONLY ON ERROR (Y OR N)?
>Y

```

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CHOOSE ANY OF THESE OPTIONS:
E DUMP ONLY ON ERROR
F FIELDATA ALPHANUMERIC FORMAT FOR DUMP
G FORTRAN "B" FORMAT FOR DUMP
P DUMP RUN'S PCT
C DUMP ONLY WORDS WHICH HAVE CHANGED DURING EXECUTION
ENTER OPTIONS, SUCH AS EFG 7777
>E
SUSPENDED
EXAMINE, PRINT, HOLD, OR DROP? >P
WHERE? >PR
SENT BY A102 : PR

2.2.2.3. COMPILING ALL USER PROGRAMS

IF THE USER HAD CHOSEN FUNCTION 2, ALL PROGRAMS IN HIS RRD FILE WOULD HAVE BEEN RECOMPILED VIA BFOR, BCOB, BASH, BPL/I, ETC. USE OF THIS FUNCTION IS STRAIGHT FORWARD. MASTERFILE WILL FIRST COPY ALL SYMBOLIC PROGRAMS WHICH CREATED THE CURRENT ABSOLUTE PROGRAM INTO A LIBRARY FILE.

BEFORE CONTINUING IT MAY BE USEFUL TO READ SECTION 3.1.2 WHICH GIVES A DESCRIPTION OF HOW MASTERFILE HANDLES USER FILES. MASTERFILE'S HANDLING OF USER FILES IS TRANSPARENT TO THE USER, BUT THE PROCESSOR ATTEMPTS TO KEEP TRACK OF WHAT ELEMENTS MADE UP AN ABSOLUTE ELEMENT.

ANYHOW THE ONLY INPUTS REQUIRED OF THE USER ARE THE NAME OF HIS RRD FILE AND A DESCRIPTION OF UP TO 48 CHARACTERS OF THE PROGRAM. BE SURE TO TYPE A PERIOD AFTER THE NAME OF THE RRD FILE. ENTERING

0210

IS ILLEGAL. WHAT IS NEEDED IS

0210.

THE OUTPUT FROM THE LINE PRINTER WILL BE ACCOMPANIED BY A PUNCH CARD DECK OF THE RUNSTREAM. THE RUNSTREAM WHICH COMPILES EACH PROGRAM IS CREATED BY THE FLIST PROCESSOR FROM THE UNIVERSITY OF MARYLAND.

AFTER RECOMPILING A NEW ABSOLUTE ELEMENT WILL BE CREATED WITH THE COLLECTOR (INVOKED BY BAPI).

FIGURE 2 SHOWS A TYPICAL TERMINAL SESSION WHICH WILL COMPILE ALL PROGRAMS INTO THE RRD FILE.

2.2.2.4. RECOMPILING SELECTED USER PROGRAMS

THIS FUNCTION RESULTS IN AN ACTION SIMILAR TO FUNCTION 2. INSTEAD OF ALL PROGRAMS IN THE RRD FILE BEING RECOMPILED, ONLY THOSE INDIVIDUAL PROGRAMS CHANGED SINCE THE LAST BFLIST ARE RECOMPILED.

THE NECESSARY KEYS FOR THIS FUNCTION ARE THE NAME OF THE RRD FILE, PROGRAM NAMES, AND THE NEW ABSOLUTE PROGRAM NAMES.

2.2.2.5. THE REMAINING FUNCTIONS: COMING SOON!

THESE ARE STILL IN THE DEVELOPMENT STAGE AND ARE UNAVAILABLE TO THE USER. KEYING IN FUNCTIONS 4 OR 6 COULD BE USED TO SIMPLY PACK THE FILE. CHOOSING FUNCTION 5 RESULTS IN A BAURD MODE VIOLATION.

2.2.2.6. ABORTING MASTERFILE

TO TERMINATE EXECUTION OF MASTERFILE AT ANY TIME SIMPLY RESPOND

00X

TO ANY QUEARY. DO NOT BE AFRAID--ABSOLUTELY NO HARM WILL RESULT.

2.2.2.7. LOCATION OF THE RUNSTREAM FILE

THE RUNSTREAM OUTPUT BY MASTERFILE IS PLACED IN A TEMPORARY FILE WHOSE NAME IS

RUNSTREAM88.

SAVING RUNSTREAMS. SINCE AS FILE AND ELEMENT NAMES CHANGE ALL RUNSTREAMS BECOME OUTDATED.

2.2.2.8. START JOBS

IF A USER WISHES TO CREATE A START JOB INSTEAD OF A BATCH JOB MASTERFILE WILL REQUEST AN BRUN CARD:

TYPE AN BRUN CARD EXACTLY AS IT WILL APPEAR IN YOUR RUNSTREAM--OMIT ONLY THE 0 SYMBOL--AND <72 CHARACTERS:

AN EXAMPLE RESPONSE IS

RUN:/RPT A102.I137DT0100,UNCLASSIFIED.S15.10

NOTE THAT THE "@" SYMBOL IS OMITTED! ACCIDENTLY ENTERING AN
@ SYMBOL RESULTS IN

I/O CALLED AT LINE XXX IN MAIN PROGRAM
ATTEMPT TO READ PAST END OF FILE

WHERE XXX IS SOME NUMBER. THE USER MUST NOW TYPE
@MASTERFILE AND START AGAIN.
DO NOT REQUEST THAT THE JOB BE STARTED IMMEDIATELY. THE
RUNSTREAM MUST BE COPIED INTO A PERMANENT START FILE, SUCH
AS START=@2BATCH-JOB VIA

@COPY,I RUNSTREAM@886.,START=@2BATCH-JOB.XXX

WHERE XXX IS AN ELEMENT NAME.
THEN TYPE

@START START=@2BATCH-JOB.XXX

TO START THE JOB.

THE NEXT REVISION OF MASTERFILE WILL CONTAIN FEATURES TO
CORRECT THESE LOOSE EDGES.

2.2.2.9. EMPLOYING OTHER MASTERFILE FUNCTIONS

2.2.3. @SUSPEND/@RESUME

AT THE END OF MASTERFILE EXECUTION, IF THE RUNSTREAM WAS
DYNAMICALLY @ADD'D, THE SUSPEND/RESUME PROCESSOR WILL QUERY:

EXAMINE, HOLD, PRINT, OR DROP?

TYPING THE LETTER E WILL PUT THE USER IN THE EDIT MODE TO
EXAMINE THE CONTENTS OF THE SYMBIONT FILE. THUS YOU CAN
SEE IF YOUR PROGRAM WORKED BEFORE SENDING IT TO THE LINE
PRINTER.

SINCE THE SUSPEND/RESUME IS A UNIVERSITY OF MARYLAND
PROCESSOR, YOU WILL BE IN THE EDIT MODE USING THE UNIVERSITY
OF MARYLAND'S EDITOR, WHICH IS SOMEWHAT EQUIVALENT TO THE
UNIVAC EDITOR AT CAA. CONSEQUENTLY SOME COMMANDS WILL NOT
WORK.

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AFTER EDITING THE FILE TYPE

EXIT

AND THE EARLIER QUERY WILL REAPPEAR.

NEXT, IF THE RESPONSE IS THE LETTER P, THE OUTPUT FILE
WILL BE SENT TO THE LINE PRINTER. THE NEXT QUERY IS

WHERE? CHOOSE ONE OF THE SITES LISTED EARLIER (PR,
DCTD01, ETC.).

FINALLY IF YOU WANT THE SYM FILE DESTROYED, TYPE THE
LETTER D AND THE FILE WILL BE DROPPED.

3. PROGRAMMER'S GUIDE

MASTERFILE IS A FORTRAN PROGRAM WHICH IMPLEMENTS THE SIX FUNCTIONS DESCRIBED BY OPTIONS D,F,M,R,I, AND X IN TABLE 2-3.

3.1. MASTERFILE INPUT AND OUTPUT FILES

3.1.1. INPUTS TO MASTERFILE

SINCE MASTERFILE IS A CONVERSATIONAL PROGRAM MOST INPUTS ARE SOLICITED FROM THE USER VIA READ STATEMENTS.

THE PRIMARY OUTPUT OF MASTERFILE IS A RUNSTREAM OF EXEC 8 CONTROL STATEMENTS THAT IS BADD'D WHEN MASTERFILE TERMINATES. CONSEQUENTLY SOME OF THE CONTROL STATEMENTS INSERTED IN THE RUNSTREAM ARE COPIED FROM CANNED JCL IN FILE 02RUNS.

ANOTHER INPUT TO MASTERFILE IS 02MASTERDATA, WHICH CONTAINS THE NAMES OF ALL 08SP IV ABSOLUTE PROGRAMS, ALL DATIN SUBPROGRAM INPUT DECKS, AND A 98 CHARACTER DESCRIPTION OF EACH ABSOLUTE AND DATIN-0ATA ELEMENT.

3.2. OUTPUTS FROM MASTERFILE

THE OUTPUT RUNSTREAM IS PUT IN TEMPORARY FILE RUNSTREAM00. ANOTHER TEMPORARY JCL FILE IS ALSO CREATED. JCL00. THIS SECOND FILE 0ED*ITS RUNSTREAM00. TO REMOVE SPACES IN EACH CONTROL STATEMENT. FOR EXAMPLE, IN THE STATEMENT

```
0ED,R INTLC-ELT.          15.
```

MUST BE CHANGED TO

```
0ED,R INTLC-ELT.15.
```

3.3. RUNSTREAM INPUTS AND OUTPUT

THE RUNSTREAM RUNSTREAM###, WHETHER IT COMPILES USER WRITTEN GASP IV SUBPROGRAM OR EXECUTES THE ABSOLUTE ELEMENT, MAKES USE OF FOUR FILES FOR INPUT AND OUTPUT.

1. THE USER SPECIFIES HIS RRD FILE WHICH CONTAINS SOURCE PROGRAMS HE HAS WRITTEN.

2. THESE SYMBOLIC PROGRAMS ARE COPIED TO FILE B2UPDATE, WHICH CONTAINS THE LATEST VERSION OF EACH SYMBOLIC USER WRITTEN SUBPROGRAM. ALSO THE RELOCATABLE ELEMENTS CREATED BY BFOR STATEMENTS ARE ALSO INSERTED IN B2 UPDATE. FINALLY, THE ABSOLUTE ELEMENT CREATED FROM THESE PROGRAMS IS ALSO STORED IN THIS FILE.

3. BEFORE (2) IS PERFORMED, SYMBOLIC ELEMENTS WITH SAME NAME IN B2 UPDATE, AND THE USER RRD FILE ARE BCOPY'D INTO B2LIBRARY. THEN THE RELOCATABLE ELEMENTS FROM MASTERFILE'S LAST USE ARE BERASE'D. B2LIBRARY CONTAINS OLD SOURCE AND ABSOLUTE PROGRAMS. THUS ALL PROGRAMS WHICH MAKE UP A PARTICULAR ABSOLUTE ARE SAVED.

4. B2GASP CONTAINS SOURCE AND RELOCATABLE GASP IV SUBPROGRAMS. THIS FILE IS ONLY REFERENCED ON A LIB COLLECTOR DIRECTIVE FOLLOWING THE BMAP STATEMENT IN FILE RUNSTREAM###.

B2RUNS, B2 GASP, AND, PROBABLY, THE USER RRD FILE RESIDE ON REMOVABLE DISK PACK 36. THE REMAINING FILES ARE CATALOGUED ON PACKS B440A, B440C, AND B440D, WHICH ARE RARELY DISMOUNTED ON WEEKDAYS. ONE MAY DISCERN IF THESE FOUR PACKS ARE MOUNTED VIA

BMSCON.X , CHECK FOR B440'S
BMSCON.Y , CHECK FOR PACK36

THE FOLLOWING SECTIONS GIVE A DESCRIPTION AND SOURCE LISTINGS OF MAJOR MASTERFILE SOURCE PROGRAMS.

3.4. SOURCE PROGRAMS

3.4.1. MAIN PROGRAM

```

IMPLICIT INTEGER (A-Z)
DIMENSION ASO(4),USE(5),RUN(12),MDO(12),START(4),ADD(4),FREE(4),
+PROCRO(12)
DATA ASO/'BASO,T', 'RUNST','REAMS','S. . //
DATA USE /'BUSE ', 'D.', 'RUNSTR','EAMSS','. //
DATA START /'BSTART',' 82R','. //
DATA ADD /'BADD.L','RUNST','REAMS','S. //
DATA FREE /'BFREE ', 'RUNSTR','EAMSS','. //
C MASTERFILE MAIN PROGRAM
C
C OUTLINE:
C I. PRINT GREETING
C II. ASO RUNSTREAM FILE FROM ER TIME, PRINT FUNCTION CHOICES
C III. ADD BRUN AND BMDG CARDS
C IV. CALL APPROPRIATE FUNCTION ROUTINE
C V. AFTER RETURN, PACK FILES AND FINISH RUNSTREAM
C
C VARIABLE DEFINITIONS:
C TIME IS THE TIME MASTERFILE SIGNED ON.
C
C *****STEP I.*****
C READ (5,150) PROCRO
C CALL OPT(VALUE)
C CALL ENTRAN (9,DATE,TIME)
C
C PRINT PROCESSOR SIGN ON IMAGE
C PRINT 90,TIME,DATE
90 FORMAT (' UNCLASSIFIED-02MASTERFILE.MASTERFILE LEVEL-9P17.2.79-'
+,A6,'-' ,A6,/)
C
C PRINT 120
120 FORMAT (' ENTER 0 IF THIS IS TO BE A BATCH (OR START) JOB OR 1'
+', FOR A DEMAND JOB. ')
C READ (5,135) R
1 CONTINUE
130 FORMAT (10X5)
C *****STEP II.*****

```

```

C ASK THE USER IF HE WANTS A LIST OF THE FUNCTONS.
C
  PRINT 111
111 FORMAT (' WHICH FUNCTION DO YOU WISH (TYPE 7 FOR A LIST)?')
  READ (5,135) CHOICE
  IF (CHOICE.NE.7) GOTO 47
  PRINT 110
110 FORMAT (' CHOOSE ONE OF THE FOLLOWING FUNCTIONS:','/,
  * 1 CREATE A NEW RUNSTREAM TO EXECUTE THE PONCUS MODEL.'
  * 2 CREATE A NEW ABSOLUTE BY RECOMPILING ALL PROGRAMS'
  * IN YOUR R&D FILE.','/, * 3 CREATE A NEW ABSOLUTE'
  * BY COMPILING ONLY THE PROGRAMS YOU SPECIFY NOW.'
  * 4 PRINT A MAP OF AN ABSOLUTE PROGRAM.','/, * 5 PRINT'
  * A TABLE OF CONTENTS (TOC) FOR ALL GASP FILES.','/, * 6 '
  * DELETE AN ABSOLUTE PROGRAM AND SOURCE PROGRAMS UNIQUE TO'
  * THAT ELEMENT.','/, * WHICH FUNCTION DO YOU WISH?')
  4 READ (5,135) CHOICE
135 FORMAT (I1I1)
  47 IF (CHOICE .LT. 1. OR. CHOICE.GT.6) GOTO 44
  GOTO 45
  44 PRINT 46,CHOICE
  46 FORMAT ('X,I1,' IS A BAD CHOICE--TRY 1,2,3,4,5, OR 6!')
  GOTO 4
C GET DATA
C AS6 FILE FOR RUNSTREAM
  45 CALL ERTRAN (6,AS6)
C USE FILE AS FORTRAN UNIT 10
  CALL ERTRAN (6,USE1)
C
C *****STEP III*****
C
C BRUN CARD
  IF (R) 1,2,3
  2 PRINT 140
140 FORMAT (' TYPE AN BRUN CARD EXACTLY AS IT WILL APPEAR IN YOUR'
  * RUNSTREAM--OMIT ONLY THE @ SYMBOL--AND <72 CHARACTERS!'
  * 72X,@<-72')
  READ (5,150) (RUN(I),I=1,12)
150 FORMAT (I2A6)
  WRITE (10,151) (RUN(I),I=1,12)
151 FORMAT ('@',I2A6)
  GOTO 33
C
C INSERT @BRKPT IN THIS DEMAND JOB
  3 WRITE (10,155)
155 FORMAT ('@@BUON,SUSPND',/, '@LIB.TIME')
C
C @NDB CARD
  33 PRINT 160
160 FORMAT (' WHAT IS THE TITLE OF THIS RUN (66 CHARACTERS)?',/

```

```

*,66X,*C--66 *)
H00(1) = 'BND0 '
READ (5,150) (H00(K), K=2,12)
WRITE (10,150) (H00(K), K=1,12)
C
C .....STEP IV.....
5   GOTO (5,6,7,8,9,10), CHOICE
   CALL SUBRUN
   GOTO 11
6   CALL SUBFLI
   GOTO 11
7   CALL SUBREC
   GOTO 11
8   CALL SUBMAP
   GOTO 11
9   CALL SUBPRT
   GOTO 11
10  CALL SUBDEL
C
C .....STEP IV.....
11  IF (CHOICE.EQ.2.OR. CHOICE.EQ.3) CALL SUBPAK
C
C
C R=D IS BATCH, R=1 IS DEMAND
   IF (R) 12,12,13
12  PRINT 100
100 FORMAT (' DO YOU WANT TO START THIS BATCH JOB IMMEDIATELY?'
*, ' (Y OR N)')
   READ (5,150) M
C CLOSE RUNSTREAM FILE AND BED THE SPACES OUT
   CALL SUBED(CHOICE,R)
C
C
   IF (M.EQ.'N') GOTO 15
   PRINT 105
105  FORMAT (' THIS FACILITY IS NOT YET ACTIVE. JUST COPY YOUR'
*, ' RUNSTREAM INTO',/, ' A START----- FILE. ')
15  PRINT 170
170  FORMAT (' READY')
   GOTO 16
C
C INSERT BBRKPT FOR DEMAND RUN
13  WRITE (10,190)
190  FORMAT ('BLIN.TIME',/, 'B66UCH.RESUME')
C
C CALL SUBED TO CREATE & ADD THE JCL TO EDIT THE SPACES OUT OF THE
C RUNSTREAM. ALSO CLOSE THE RUNSTREAM FILE.
C
   CALL SUBED(CHOICE,R)

```

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```
C
C @ADD THF OUTPUT RUNSTREAM
C
16 CALL ERTRAN (6,20)@ADD JCL@. .
C
STOP
END
```

3.4.2. SUBROUTINES

3.4.2.1. SUBRUN

```
      SUBROUTINE SUBRUN
C
C OUTLINE
C   I. CREATE THE FOLLOWING, MODEL RUNSTREAM
C
C
C
C
C VARIABLE DICTIONARY
C
C   NAME(I,K) <--NAME OF DATA-FILES
C   I IS THE USER CHOICE OF FILES
C
C   DNAME(I,K) <--NAME OF INTLC-DATA FILE
C   I IS THE USER CHOICE
C
C   INTLC(I) <--NAME OF INTLC-DATA FILE
C
C
C   IMPLICIT INTEGER (A-Z)
C   DIMENSION INTLC(7), NAME(20,11), DNAME(20,11)
C   DIMENSION NO(20)
C
C   WRITE (10,100)
100  FORMAT ('@DELETE,C @OPTIMIZAT. ',/, '@DELETE,C @DIAGNOSTIC. ',/
+ '@DELETE,C @SHORT-DIAG. ',/, '@ASO,T 15. ')
C
C GET INTLC FILE NAME
1   PRINT 110
110  FORMAT (' WHAT IS THE NAME OF YOUR INTLC FILE (FILENAME.FLT)
+ ' NAME/VERSION?')
      READ (5,120) INTLC
```

```

120 FORMAT (10A6)
C
C PUT @ED IN RUNSTREAM — CHECK FIRST WITH THE USER
WRITE (6,130) (INTLC(I),I=1,7)
170 FORMAT (' @ED,D ',7A6,/, ' IS THIS CORRECT (Y OR N)?')
READ (5,120) @
IF (@EQ.'N') GOTO 1
WRITE (10,140) (INTLC(I),I=1,7)
140 FORMAT ('@ED,D ',7A6,/,15. ' //,'EXIT',/, '@ASB,UP @2DIAGNOSTIC.'
+ ',F///3000' //, '@ASB,UP @2SHORT-DIAG.,F///3000' //,
+ '@ASB,UP @2OPTIMIZAT.',/, '@USE 17.,@2OPTIMIZAT.',/,
+ '@USE 14.,@2SHORT-DIAG.',/, '@USE 13.,@2DIAGNOSTIC.')
```

C

```

C CHOOSE ABSOLUTE ELEMENT TO EXECUTE
@ PRINT 150
150 FORMAT (' CHOOSE ONE OF THE FOLLOWING ABSOLUTE ELEMENTS TO'
+ ' EXECUTE BY NUMBER:',/)
```

C

```

C GET AND WRITE ABSOLUTE NAMES FROM @2MASTERDATA
CALL ERTRAN (6,30H@ASB,@ @2MASTERDATA.
CALL ERTRAN (6,30H@USE 19.,@2MASTERDATA.
READ (19,160) STOP
DO 5 I=1,STOP
READ (19,160) NO(I),@NAME (I,K), K=1,11
PRINT 160,NO(I),(@NAME(I,K),K=1,11)
5 CONTINUE
PRINT 170
READ (5,175) C
```

C

```

C PUT @ADD DATIN-DATA IN RUNSTREAM
PRINT 200
200 FORMAT (' CHOOSE A DATIN DATA FILE BY NUMBER.',/)
```

C

```

C GET NAMES FROM @2MASTERDATA
READ (19,160) STOP
DO 2 I=1,STOP
READ (19,160) NO(I),@NAME(I,K),K=1,11
160 FORMAT (1X,I2,2X,11A6)
PRINT 160, NO(I), (@NAME(I,K),K=1,11)
2 CONTINUE
PRINT 170
170 FORMAT (' YOUR CHOICE?')
READ (5,175) I
175 FORMAT (I1)
```

C

```

C PUT @PRT,S IN RUNSTREAM
WRITE (10,180) (@NAME(I,K),K=1,10), (INTLC(K),K=1,7)
180 FORMAT ('@PRT,S ',10A6,/, '@PRT,S ',10A6)
C
C PUT @XBT IN RUNSTREAM
```


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```
      WRITE (10,190) IDNAME (C,K),K=1,11)
190  FORMAT ('@XQT ',11A6)
      WRITE (10,220) (NAME(I,K),K=1,11)
220  FORMAT ('@ADD,P ',11A6)
C
C ADD @PHD OPTION
      PRINT 230
230  FORMAT (//,' DO YOU WANT A DUMP AFTER EXECUTION OR ONLY ON'
+ ' ERROR (Y OR N)?')
      READ (5,120) R
      IF (R .EQ. 'N') GO TO 7
      PRINT 240
240  FORMAT (//,' CHOOSE ANY OF THESE OPTIONS: ',10X, 'E DUMP ONLY ON'
+ ' ERROR',10X, 'F FIELDATA ALPHANUMERIC FORMAT FOR DUMP',10X,
+ 'B FORTRAN 'G' FORMAT FOR DUMP',10X, 'P DUMP RUN'S PCT',
+ 'C DUMP ONLY WORDS WHICH HAVE CHANGED DURING EXECUTION',
+ ' ENTER OPTIONS, SUCH AS',20X)
+ 'EF@',20X, '???'')
      READ (5,120) OPT
      WRITE (10,250) OPT
250  FORMAT ('@PHD,DO',A6)
C
7    RETURN
      END
```

3.4.2.2. SUBFLI

```
      SUBROUTINE SUBFLI
C OUTLINE:
C I. COPY ALL PROGRAMS FROM @ZUPDATE TO @ZLIBRARY.
C II. COMPILE ALL PROGRAMS FROM @ZGASP INTO @ZUPDATE.
C III. MAP AN ABSOLUTE ELEMENT.
      DIMENSION ABSNAM(2),NEWABS(11),FN(2)
      IMPLICIT INTEGER (A-Z)
C
C BLANK ARRAYS OF ALPHANUMERIC DATA
      DO 1 I=1,11
1    NEWABS(I) = ' '
C
C .....STEP I.....
C GET THE ABSOLUTE PROGRAM NAME.
      CALL SUBNAM(1,ABSNAM)
C WRITE TO RUNSTREAM
      WRITE (10,100) (ABSNAM(I),I=1,2)
100  FORMAT ('@COPY,SV @ZUPDATE,@ZLIBRARY',2A6,/, 'BASC,T SCRATCH',
+ ' @COPY,A @ZUPDATE,@SCRATCH',/, 'BERS @ZUPDATE',/,
+ '@COPY,A SCRATCH,@ZUPDATE.')
C
```

```

C UPDATE THE MAP
  CALL UPMAP(A9SNAM)
C
C *****STEP II.*****
  PRINT 105
105 FORMAT (' ENTER THE R & D FILE WHICH CONTAINS YOUR SYMBOLIC PROG'
  *'RAMS.',//, ' WARNING: BE SURE TO TYPE A PERIOD AFTER THE FILE'
  *'NAME!')
  READ (5,106) FN(1),FN(2)
106 FORMAT (10A6)
  WRITE (10,110) (FN(I),I=1,2),FN(1),FN(2),FN(1),FN(2)
110 FORMAT ('@HDG @PROC@',//,'@PDP,ILF ',2A6,'PROC',//,
  *'BADD ',2A6,'PROC',//,
  *'BFLIST,@XYLTU ',2A6,'@ZUPDATE,@ZUPDATE.')
C
C *****STEP III.*****
C REQUEST THE NEW ABSOLUTE PROGRAM NAME
  PRINT 120
120 FORMAT (' ENTER ELEMENT NAME FOR YOUR NEW ABSOLUTE PROGRAM.',
  *' FOR EXAMPLE ',//,' ABS1',//,' DO NOT USE A VERSION',
  *'NAME!')
C PUT NEW ABSOLUTE PROGRAM NAME
  CALL SUBNAM(2,ABSNAM)
  READ (5,106) NEWABS(1),ABSNAM(2)
  NEWABS(3) = ' '
  PRINT 145
145 FORMAT (' ENTER UP TO 48 CHARACTERS OF DESCRIPTION OF THE PROGRAM'
  *',',48X,'<--48')
  READ (5,106) (NEWABS(I), I=4,11)
130 FORMAT (2A6)
C WRITE AN @MAP IN RUNSTREAM TO CREATE AN ABSOLUTE ELEMENT
  WRITE (10,140) (NEWABS(I),I=1,10)
140 FORMAT ('@PREP @ZGASP.',//,'@PREP @ZUPDATE.',//,
  *'@MAP,IS @ZLIBRARY.',10A6,/, 'IN @ZUPDATE.',//,
  *'NOT TPF@:',//,'LIB @ZGASP.',//,'END')
C
  RETURN
  END

```

3.4.2.3. SUBREC

```

SUBROUTINE SUBREC
C
C PURPOSE: RECOMPILE SELECTED USER PROGRAMS FROM USER SPECIFIED FILE AND
C          CREATE A NEW ABSOLUTE ELEMENT.
C
C OUTLINE:
C I.SOLICIT USER FOR R & D FILENAME, NEW PROGRAM NAMES, AND ABSOLUTE

```

```

C      PROGRAM NAMES WITH DOCUMENTATION.
C      II. GET OLD ABSOLUTE PROGRAM NAME.
C      III. WRITE INTO RUNSTREAM:
C      BHDG
C      BCOPY,S BZUPDATE--,BZLIBRARY--/ABSNAME
C      BFOR,S RBD FILE, BZUPDATE, BZUPDATE
C      IV. MAP NEW ELEMENT:
C      BMAP,S BZUPDATE,NEWABS
C      IN NEWPROG
C      .
C      .
C      .
C      LIB BZBASP.
C      BEOF
C
C DIMENSION ARRAYS
C      IMPLICIT INTEGER (A-Z)
C      DIMENSION FN(2)          BNAME OF USER RBD FILE
C      DIMENSION NAMES(20)     BNAME OF NEW PROGRAMS
C      DIMENSION ABSNAM(11)    ABSOLUTE ELEMENT NAME TO BE CREATF
DESCRIPTION
C      DIMENSION OLDABS(2)     BNAME OF LATEST ABS ELEMENT
C      DOUBLE PRECISION NAMES
C
C *****STEP I*****
C      PRINT 100
100  FORMAT (' ENTER THE R B D FILE WHICH CONTAINS YOUR SYMBOLIC PROG'
+ 'RAMS.',/, ' WARNING: BE SURF TO TYPE A PERIOD AFTER THF FILE'
+ 'NAME!')
      READ (5,100) (FN(I),I=1,2)
110  FORMAT (11A6)
      PRINT 120
120  FORMAT (' ENTER THE ELEMNT NAMES (1-12 CHARACTERS) THAT YOU WISH'
+ ' TO COMPILE.',/, ' TYPE ONE NAME ON EACH LINE FOLLOWED BY '
+ '"TRANSMIT.'" TYPE "BEOF" AFTER THE',/, ' LAST ELEMENT NAME.')
      N NAMES = 0
      DO 1 I=1,20
      READ (5,115,END=#,ERR=#) NAMES(I)
115  FORMAT (6A12)
      N NAMES=N NAMES+1
1  CONTINUE
4  PRINT 130
130  FORMAT (' ENTER ELEMENT NAME FOR YOUR NEW ABSOLUTE PROGRAM.',
+/, ' FOR EXAMPLE ',/, ' ABS1',/, ' DO NOT USE A VERSION',
+ 'NAME!')
      READ (5,130) ABSNAM(1), ABSNAM(2)
      ABSNAM(3) = ' '
      PRINT 140
140  FORMAT (' ENTER UP TO 48 CHARACTERS OF DESCRIPTION OF THE PROGRAM

```

```

*.,/,48X,4---48*1
  READ (5,110) (ABSNAME(I), I=4,11)
C
C *****STEP II*****
  CALL SUBNAM (1,OLDABS)
  CALL SUBNAM (2,ABSNAME)
C
C *****STEP III*****
  DO 2 I=1,NAMES
    WRITE (10,150) NAMES(I),NAMES(I),NAMES(I),OLDABS(1),OLDABS(2),
    *FN(1),FN(2),NAMES(I),NAMES(I),NAMES(I)
  150 FORMAT ('#DGB #### ',A12,' ####',/, '#COPY,S #ZUPDATE.',A12,
    *',#ZLIBRARY.',A12,'/, '#2AG,/, '#FOR,S ',2AG,A12,' #ZUPDATE.',A12,
    *',#ZUPDATE.',A12)
  2 CONTINUE
C
C *****STEP IV*****
  WRITE (10,160) (ABSNAME(I),I=1,9)
  160 FORMAT ('#PREP #ZBASP.',/, '#PREP #ZUPDATE.',/,
    *',#MAP,IS #ZUPDATE.',9A6)
  DO 3 I=1,NAMES
    WRITE (10,170) NAMES(I)
  170 FORMAT ('IN #ZUPDATE.',A12)
  3 CONTINUE
  WRITE (10,180)
  180 FORMAT ('IN #ZUPDATE.MAIN',2(/, 'LIB #ZUPDATE.,#ZBASP.'))
C
C FIN!!!!!!!!!!!!
C
  RETURN
  END

```

3.4.2.4. SUBED(CHOICE,R)

```

  SUBROUTINE SUBED(CHOICE,MODE)
  IMPLICIT INTEGER (A-Z)
C
C OUTLINE
C I. CLOSE RUNSTREAM FILE 10 SO THAT IT MAY BE USED AS A TEMPORARY
C    JCL FILE.
C
C II. BASH A TEMPORARY JCL FILE.
C
C III. WRITE #ED RUNSTREAM INTO JCL FILE.
C
C IV. CSF# BADD JCL FILE.
C
C IF MODE IS 1, JOB IS DEMAND  MODE=0 IS BATCH

```

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```
C
C .....STEP I.....
C
      ENDFILE 10
      REWIND 10
C
C .....STEP II.....
C
      CALL ERTRAN (6,30H0450,Y JCL888. . . . .)
      CALL ERTRAN (6,30H0450,Y JCL888. . . . .)
      CALL ERTRAN (6,30H0450,Y 82SYMBIONT. . . . .)
C
C .....STEP III.....
C
      WRITE (12,100)
100  FORMAT ('@BRKPT PRINT@/82SYMBIONT' ,
           +/, '8ED,U RUNSTREAM999.' //, '8ADD 82MASTERFILE,MACROS' //,
           +, 'FIX' //, 'EXIT')
110  FORMAT ('@BRKPT PRINT@')
C
C .....STEP IV.....
C
C IF MODE IS BATCH (=D) DO NOT 8ADD RUNSTREAM
C
      IF (MODE.EQ.D) GOTO 3
C
      IF (CHOICE.EQ.1.OR.CHOICE.EQ.5) GOTO 1
120  FORMAT ('8ADD,L RUNSTREAM888.')
C
C ASK USER IF HE WANTS TO 8ADD RUNSTREAM.
C
      PRINT 220
220  FORMAT(' DO YOU WANT TO 8ADD THE RUNSTREAM IMMEDIATELY (Y OR N)?')
      READ (5,150) A
150  FORMAT (A1)
C
      IF (A.EQ.'Y') GOTO 1
      PRINT 130
130  FORMAT (' READY')
3    WRITE (12,110)
      GOTO 2
1    WRITE (12,120)
2    ENDFILE 12
      REWIND 12
      RETURN
      END
```


3.5. SAMPLE DATIN DATA DECK

THE FOLLOWING IS A SAMPLE INPUT DECK TO THE GASP IV SUBROUTINE DATIN.

```

$GENERAL
  NNAME(1)=6HSSIPL,6HOPTINI,6HZATION,
  NNPRJ=8001, NNRMS=001, LLSUP(4)=2,2, LLSUP(9)=2,2, LLSUP(12)=2,0,1
$END
$STATIS
  NNCLT=12, NNPLT=4
$END
$LIMITS
  NNSTR=1, NNTRY=1000, NNATR=7, NNFIL=1, NMSET=10000
$END
$COLCT
  I=1, LLABC(1,1) = 6HPRMEN, 6HT LOSS
$END
$COLCT
  I=2, LLABC(2,1) = 6HTHFATR, 6H STOCK
$END
$COLCT
  I=3, LLABC(3,1) = 6HWAR RE, 6HSERVES
$END
$COLCT
  I=4, LLABC(4,1) = 6HAUTH S, 6HTRENGT
$END
$COLCT
  I=5, LLABC(5,1) = 6HCOMMIT, 6HTED UN
$END
$COLCT
  I=6, LLABC(6,1) = 6HMAINT, 6HRETURN
$END
$COLCT
  I=7, LLABC(7,1) = 6HUNECON, 6HOM FIX
$END
$COLCT
  I=8, LLABC(8,1) = 6HONSTAT, 6HION UN
$END
$COLCT
  I=9, LLABC(9,1) = 6HPONCUS, 6H UNITS
$END
$COLCT
  I=10, LLABC(10,1) = 6HCONUS, 6HUNITS
$END
$COLCT
  I=11, LLABC(11,1) = 6HUNIT A, 6HRRIVED
$END

```

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```
SCOLCT
I=12, LLABC(12,1) = 6HCOMMIT, 6HTED UN
SEND
SPLOT
I=1, LLABP(11,1) = 4HTIME, LLABP(11,2)=1H, IITAP(1)=2, NNVAR(1)=8,
LLPLT=2
DTPLT(1)=0.5
SEND
SPLTVAR
IJ=1, LLSYM(1)=1MP, LLABP(1,1)=6HPRMNE, 6HT LOSS,
LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=154.
SEND
SPLTVAR
IJ=2, LLSYM(2)=1HT, LLABP(2,1)=6HTHEATR, 6H STOCK,
LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=154.
SEND
SPLTVAR
IJ=3, LLSYM(3)=1HR, LLABP(3,1)=6HWAR RE, 6HSERVES,
LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=154.
SEND
SPLTVAR
IJ=4, LLSYM(4)=1HA, LLABP(4,1)=6HAUTH S, 6HTRENT,
LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=154.
SEND
SPLTVAR
IJ=5, LLSYM(5)=1HC, LLABP(5,1)=6HCOMMIT, 6HTED UN,
LLPLC(5)=1, LLPHI(5)=2, PPHI(5)=154.
SEND
SPLTVAR
IJ=6, LLSYM(6)=1HM, LLABP(6,1)=6HMAINT, 6HQEUE,
LLPLO(6)=1, LLPHI(6)=2, PPHI(6)=154.
SEND
SPLTVAR
IJ=7, LLSYM(7)=1HU, LLABP(7,1)=6HUNECON, 6HON FIX,
LLPLO(7)=1, LLPHI(7)=2, PPHI(7)=154.
SEND
SPLTVAR
IJ=8, LLSYM(8)=1HS, LLABP(8,1)=6HIN TRA, 6HNSIT,
LLPLC(8)=1, LLPHI(8)=2, PPHI(8)=154.
SEND
SPLOT
I=2, LLABP(11,1) = 4HTIME, IITAP(2)=3, NNVAR(2)=6, LLPLT=2,
I=2, LLABP(11,1) = 4HTIME, LLABP(11,2)=1H, IITAP(2)=3, NNVAR(2)=6,
LLPLT=2
DTPLT(1)=0.5
SEND
SPLTVAR
IJ=1, LLSYM(1)=1HO, LLABP(1,1)=6HONSTAT, 6HTON UN,
LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=20.
SEND
```

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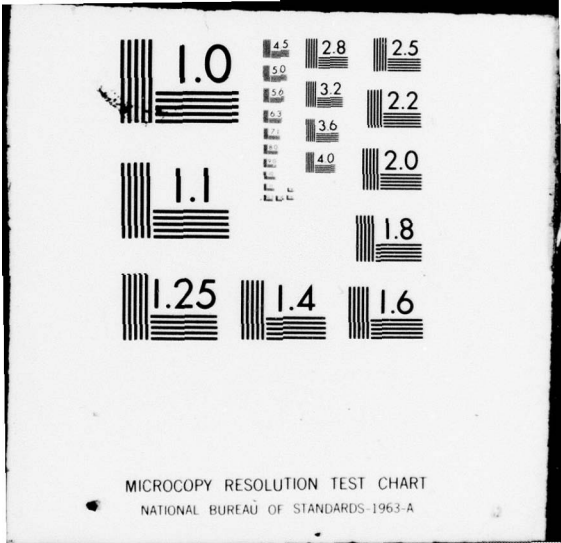
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$PLTVAR
IJ=2, LLSYM(2)=1HP, LLABP(2,1)=6HPOMCUS, 6H UNITS,
LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=20.
SEND
$PLTVAR
IJ=3, LLSYM(3)=1HK, LLABP(3,1)=6HCONUS, 6H UNITS,
LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=20.
SEND
$PLTVAR
IJ=4, LLSYM(4)=1HA, LLABP(4,1)=6HUNCONM, 6HITTED,
LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=20.
SEND
$PLTVAR
IJ=5, LLSYM(5)=1HC, LLABP(5,1)=6HCOMMIT, 6HTED UN,
LLPLO(5)=1, LLPHI(5)=2, PPHI(5)=20.
SEND
$PLTVAR
IJ=6, LLSYM(6)=1HT, LLABP(6,1)=6HCOMMIT, 6HTED,
LLPLO(6)=1, LLPHI(6)=2, PPHI(6)=20.
SEND
$PLOT
I=3, LLABP(11,1) = 4HTIME, LLABP(11,2)=1H, IITAP(3)=4, NNVAR(3)=4,
LLPLT=2
DTPLT(1)=0.5
SEND
$PLTVAR
IJ=1, LLSYM(1)=1HP, LLABP(1,1)=6HPRMNE, 6HT LOSS,
LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=20.
SEND
$PLTVAR
IJ=2, LLSYM(2)=1HT, LLABP(2,1)=6HTEMPRA, 6HRY LOS,
LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=20.
SEND
$PLTVAR
IJ=3, LLSYM(3)=1HN, LLABP(3,1)=6HMAINT, 6HRETURN,
LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=20.
SEND
$PLTVAR
IJ=4, LLSYM(4)=1HR, LLABP(4,1)=6HPWRS R, 6HESERVE,
LLPLO(4)=1, LLPHI(4)=2, PPHI(4)=20.
SEND
$PLOT
I=4, LLABP(11,1) = 4HTIME, LLABP(11,2)=1H, IITAP(4)=7, NNVAR(4)=3,
LLPLT=2
DTPLT(1)=0.5
SEND
$PLTVAR
IJ=1, LLSYM(1)=1HT, LLABP(1,1)=6HTK FRO, 6HTSK,
LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=200.
SEND

```


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```
$PLTVAR
IJ=2, LLSYM(2)=1HN, LLABP(2,1)=6HTK W/N, 6MO CREW,
LLPLO(2)=1, LLPHI(2)=2, PPHI(2)=200.
$SEND
$PLTVAR
IJ=3, LLSYM(3)=1HC, LLABP(3,1)=6HVAVL , 6MCREW/4,
LLPLO(3)=1, LLPHI(3)=2, PPHI(3)=200.
$SEND
$PRIORI KRRNK=1, IINN=1
$SEND
$INITIAL
MSTOP=1, JJCLR=1, JJBEO=1, TYBEE=0., JJFIL=1, TYFIN=61., ITCRD=0
$SEND
$SEEDS
$SEND
$AGAIN
LLSUP(1)=2.2.2.2.2.2.2.2.2.2.2. ITCRD=13
$SEND
```

3.6. BASE CASE DATA

THE FOLLOWING IS A SAMPLE INPUT DECK TO THE SUBPROGRAM INTLC.

```
NUNITS      29
NTYPES      1
DDAY        10.
KDAY        60
NMATE: NUMBER OF ROWS IN THE MAINTAINENCE LOOK-UP TABLE
NMATE       14
TABLE: SERIAL, TOTAL MAINTENANCE, CAPACITY (FOR EACH TYPE)
TABLE      29035.    2542.    .24
TABLE      29075.    2182.    .24
TABLE      29015.    1057.    .24
TABLE      29155.     0172.    .24
TABLE      29075.     0578.    .24
TABLE      29055.     0892.    .24
TABLE      29085.     0502.    .24
TABLE      29137.     0705.    .24
TABLE      29105.     0180.    .24
TABLE      29207.     0442.    .24
TABLE      29135.     0225.    .24
TABLE      29245.     0127.    .24
TABLE      29208.     0279.    .24
TABLE      29127.     0300.    .50
NCMRAT: NONCOMBAT LOSS RATE
NCMRAT     .01     .01
```

COMRAT: COMBAT LOSS RATE
 COMRAT .062 .062
 PERRAT: PERSONNEL LOSS RATE
 PERRAT 1.2 1.2
 UNREP: UNREPAIRABLE LOSS RATE
 UNREP .05 .05
 DAMRAT: PERMANENT DAMAGE RATE
 DAMRAT .36 .36
 ABRAT: ABANDONMENT RATE
 ABRAT .024 .024
 CRWLSR: PERMANENT CREW LOSS RATE
 CRWLSR .926 .926
 PWRSHR: PREPARATION TIME: PWR
 PWRSHR 036. 036.
 UNECRT: UNECONOMICALLY REPAIRABLE RATE
 UNECRT .17 .17
 PWR: INITIAL WAR RESERVES STOCK
 PWR 1131. 1131.
 REPRAT: REPAIR RATFS
 REPRAT 1106. 1106.
 RFRAT 0846. 0846.
 PWRST: WAR RESERVES OUTPUT IN MANHOURS PER DAY
 PWRST 1586. 1586.
 DLYSTA: COMMITMENT DELAY: ON STATION UNITS
 DLYSTA 1.
 DLYPM: COMMITMENT DELAY: POMCUS UNITS
 DLYPM 10.
 DLYCOM: COMMITMENT DELAY: CONUS UNITS
 DLYCOM 8.
 DLYHOS: HOSPITAL RETURNS TO THEATER STOCKS DELAY
 DLYHOS 16.
 DLYSUP: SHIPMENTS TO UNIT FROM THEATER STOCKS DELAY (EQUIPMENT)
 DLYSUP 4.
 DLYPER: SHIPMENTS TO UNIT FROM THEATER STOCKS DELAY (PERSONNEL)
 DLYPER 4.
 DLYMAI: DELAY BEFORE MAINTAINENCE TS SET UP
 DLYMAI 6.
 OSNCM: FRACTION OF OS NONCOMBAT LOSSES TREATED BY OS MAINTAINENCE UNITS
 OSNCM .86
 DSCOM: FRACTION OF OS COMBAT UNITS TREATED BY OS MAINTAINENCE UNITS
 DSCOM .76
 MAFACT(1,J): AVERAGE OS MAINTAINENCE TIME FOR NONCOMBAT EQUIPMENT
 MAFACT(1,J) 7. 7.
 MAFACT(2,J): AVERAGE OS MAINTAINENCE TIME FOR NONCOMBAT EQUIPMENT
 MAFACT(2,J) 65. 65.
 MAFACT(3,J): AVERAGE OS MAINTAINENCE TIME FOR COMBAT EQUIPMENT
 MAFACT(3,J) 14. 14.
 MAFACT(4,J): AVERAGE OS MAINTAINENCE TIME FOR COMBAT EQUIPMENT
 MAFACT(4,J) 69. 69.
 CRWPER: CREW SIZES

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CRWPER	4.	4.		
THTRSM:	UNIT ORIGIN,	SERIAL NUMBER,	ARRIVAL TIME(EXCEPT FOR ONSTATION UNIT	
UNITAU(I,J,1):	UNIT'S AUTHORIZED EQUIPMENT STRENGTH			
UNITAU(I,J,2):	UNIT'S AUTHORIZED EQUIPMENT STRENGTH			
THTRSM	1.	29035.	1.	
UNITAU(1)	360.			
UNITAU(2)	1440.			
THTRSM	1.	29035.	1.	
UNITAU(1)	360.			
UNITAU(2)	1440.			
THTRSM	1.	29025.	1.	
UNITAU(1)	306.			
UNITAU(2)	1224.			
THTRSM	1.	29025.	1.	
UNITAU(1)	306.			
UNITAU(2)	1224.			
THTRSM	1.			1.
UNITAU(1)	159.			
UNITAU(2)	636.			
THTRSM	1.			1.
UNITAU(1)	159.			
UNITAU(2)	636.			
THTRSM	2.	29025.	2.	
UNITAU(1)	306.			
UNITAU(2)	1224.			
THTRSM	2.			2.
UNITAU(1)	159.			
UNITAU(2)	636.			
THTRSM	2.	29035.	3.	
UNITAU(1)	360.			
UNITAU(2)	1440.			
THTRSM	2.	29025.	5.	
UNITAU(1)	306.			
UNITAU(2)	1224.			
THTRSM	3.	29015.	21.	
UNITAU(1)	120.			
UNITAU(2)	480.			
THTRSM	3.	29155.	23.	
UNITAU(1)	0.			
UNITAU(2)	0.			
THTRSM	3.	29015.	23.	
UNITAU(1)	66.			
UNITAU(2)	264.			
THTRSM	3.	29035.	25.	
UNITAU(1)	360.			
UNITAU(2)	1440.			
THTRSM	3.			28.
UNITAU(1)	174.			
UNITAU(2)	696.			
THTRSM	3.			28.

UNITAU(1)	12.		
UNITAU(2)	48.		
THTRSM	3.	29075.	28.
UNITAU(1)	66.		
UNITAU(2)	264.		
THTRSM	3.	29055.	28.
UNITAU(1)	66.		
UNITAU(2)	264.		
THTRSM	3.	29075.	30.
UNITAU(1)	120.		
UNITAU(2)	480.		
THTRSM	3.	29015.	35.
UNITAU(1)	12.		
UNITAU(2)	48.		
THTRSM	3.	29085.	35.
UNITAU(1)	0.		
UNITAU(2)	0.		
THTRSM	3.	29025.	59.
UNITAU(1)	198.		
UNITAU(2)	792.		
THTRSM	3.	29025.	59.
UNITAU(1)	144.		
UNITAU(2)	576.		
THTRSM	3.	29075.	60.
UNITAU(1)	120.		
UNITAU(2)	480.		
THTRSM	3.	20135.	44.
UNITAU(1)	066.		
UNITAU(2)	264.		
THTRSM	3.	29075.	57.
UNITAU(1)	066.		
UNITAU(2)	264.		
THTRSM	3.	29135.	55.
UNITAU(1)	012.		
UNITAU(2)	048.		
THTRSM	3.	29075.	59.
UNITAU(1)	066.		
UNITAU(2)	264.		
THTRSM	3.	29075.	59.
UNITAU(1)	066.		
UNITAU(2)	264.		
NRESUP; NUMBER OF WAR RESERVES RESUPPLY EVENTS			
NRESUP	16		
NRESUP; TIME, QUANTITY, EQUIPMENT TYPE THAT RECEIVES RESUPPLY			
NRESUP	32.	051.	1.
NRESUP	36.	100.	1.
NRESUP	40.	100.	1.
NRESUP	44.	100.	1.
NRESUP	48.	100.	1.
NRESUP	52.	100.	1.

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NRESUP	56.	180.	1.		
NRESUP	60.	97.	1.		
NRESUP	64.	20.	1.		
NRESUP	68.	20.	1.		
NRESUP	72.	20.	1.		
NRESUP	76.	20.	1.		
NRESUP	80.	20.	1.		
NRESUP	84.	20.	1.		
NRESUP	88.	20.	1.		
NRESUP	92.	20.	1.		
NREPL: NUMBER OF RESERVE REPLACEMENT PERSONNEL EVENTS RECEIVED BY THEATER					
NREPL	23				
NREPL: TIME, QUANTITY, EQUIPMENT TYPE THAT RECEIVES PERSONNEL					
NREPL	4.	724.	1.		
NREPL	8.	724.	1.		
NREPL	12.	724.	1.		
NREPL	16.	724.	1.		
NREPL	20.	724.	1.		
NREPL	24.	724.	1.		
NREPL	28.	724.	1.		
NREPL	32.	724.	1.		
NREPL	36.	577.	1.		
NREPL	40.	577.	1.		
NREPL	44.	577.	1.		
NREPL	48.	577.	1.		
NREPL	52.	577.	1.		
NREPL	56.	577.	1.		
NREPL	60.	577.	1.		
NREPL	64.	407.	1.		
NREPL	68.	407.	1.		
NREPL	72.	407.	1.		
NREPL	76.	407.	1.		
NREPL	80.	407.	1.		
NREPL	84.	407.	1.		
NREPL	88.	407.	1.		
NREPL	92.	407.	1.		
NARRMS: NUMBER OF ARRIVALS OF MAINTAINENCE AND RESUPPLY UNITS					
NARRMS	69				
NARRMS: TYPE, TIME, SERIAL, INCREASE IN CAPACITY, EQUIPMENT TYPE					
NARRMS	4.	02.	29207.	106.	1.
NARRMS	4.	15.	29207.	106.	1.
NARRMS	4.	15.	29207.	106.	1.
NARRMS	4.	17.	29207.	106.	1.
NARRMS	4.	29.	29207.	106.	1.
NARRMS	4.	30.	29207.	106.	1.
NARRMS	4.	30.	29207.	106.	1.
NARRMS	4.	32.	29207.	106.	1.
NARRMS	4.	33.	29207.	106.	1.
NARRMS	4.	35.	29207.	106.	1.
NARRMS	4.	36.	29207.	106.	1.

NARRMS	4.	37.	29207.	106.	1.
NARRMS	4.	37.	29207.	106.	1.
NARRMS	4.	42.	29207.	106.	1.
NARRMS	4.	43.	29207.	106.	1.
NARRMS	4.	45.	29207.	106.	1.
NARRMS	4.	49.	29207.	106.	1.
NARRMS	4.	49.	29207.	106.	1.
NARRMS	4.	51.	29207.	106.	1.
NARRMS	4.	56.	29207.	108.	1.
NARRMS	4.	71.	29207.	106.	1.
NARRMS	4.	74.	29207.	106.	1.
NARRMS	4.	77.	29207.	106.	1.
NARRMS	4.	78.	29207.	106.	1.
NARRMS	4.	78.	29207.	106.	1.
NARRMS	4.	79.	29207.	106.	1.
NARRMS	4.	85.	29207.	106.	1.
NARRMS	4.	87.	29207.	106.	1.
NARRMS	4.	102.	29207.	106.	1.
NARRMS	4.	107.	29207.	106.	1.
NARRMS	4.	113.	29207.	106.	1.
NARRMS	4.	114.	29207.	106.	1.
NARRMS	5.	17.	29208.	067.	1.
NARRMS	5.	20.	29208.	067.	1.
NARRMS	5.	21.	29208.	067.	1.
NARRMS	5.	48.	29208.	067.	1.
NARRMS	5.	50.	29208.	067.	1.
NARRMS	5.	52.	29208.	067.	1.
NARRMS	5.	70.	29208.	067.	1.
NARRMS	5.	70.	29208.	067.	1.
NARRMS	5.	75.	29208.	067.	1.
NARRMS	5.	175.	29208.	067.	1.
NARRMS	5.	175.	29208.	067.	1.
NARRMS	5.	175.	29208.	067.	1.
NARRMS	5.	175.	29208.	067.	1.
NARRMS	5.	21.	29137.	169.	1.
NARRMS	5.	21.	29137.	169.	1.
NARRMS	5.	24.	29137.	169.	1.
NARRMS	5.	27.	29137.	169.	1.
NARRMS	5.	33.	29137.	169.	1.
NARRMS	5.	33.	29137.	169.	1.
NARRMS	5.	33.	29137.	169.	1.
NARRMS	5.	38.	29137.	169.	1.
NARRMS	5.	45.	29137.	169.	1.
NARRMS	5.	51.	29137.	169.	1.
NARRMS	5.	52.	29137.	169.	1.
NARRMS	5.	65.	29137.	169.	1.
NARRMS	5.	69.	29137.	169.	1.
NARRMS	5.	73.	29137.	169.	1.
NARRMS	5.	79.	29137.	169.	1.
NARRMS	5.	85.	29137.	169.	1.

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NARRMS	5.	88.	29137.	169.	1.		
NARRMS	5.	90.	29137.	169.	1.		
NARRMS	6.	30.	29127.	300.	1.		
NARRMS	6.	47.	29127.	300.	1.		
NARRMS	6.	51.	29127.	300.	1.		
NARRMS	6.	76.	29127.	300.	1.		
REDEPLOY	1.0	1.0	30.0	2.0	1.0	4.0	
GSU RESV	5.0	0.0	6.0	2.0	1.0	1.0	

4. APPENDIX A LIST: 02ADD.

06BUOM.SUSPEND
0USE X.,UNCLASSIFIED#02X0Y.
0USE 0.,020ASP.
0USE I.,02IG.
0USE R.,02RUNS.
0USE M.,02MASTERFILE.
0USE U.,02UPDATE.
0USE RD.,02MASTERRD.
0USE S.,02UOM.
0COPY:A 02UOM.SUSPEND
0COPY:A 02UOM.RESUME
0COPY:A 02MASTERFILE,MASTERFILE,TPF0.MASTERFILE
0ADD 04NACLIB.MACRO
0COPY:A 0.EDIT,TPF0.EDIT
06BUOM.RESUME,D

APPENDIX G

BALFOR Simulation Documentation

INTRODUCTION. The purpose of Appendix G is to present the listing of the BALFOR simulation programs and subroutines, the flow diagrams of selected subroutines and a list of the computer variables used in the BALFOR simulation programs. Section I contains the computer listings of routines and subroutines in alphabetical order. Section II contains flow diagrams of routines and subroutines and the flow diagrams also appear in alphabetical sequence. Section III contains definitions of the FORTRAN variables which appear in the computer listings and flow diagrams.

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***** ARRIVL *****

```
000001      09      SUBROUTINE ARRIVL
000002      09      INCLUDE COMMON/LIST
000003      09      C
000004      09      C SUBROUTINE ARRIVAL HANDLES THE ARRIVAL OF UNIT INTO THE THEATER. PERSONNEL
000005      09      C AND EQUIPMENT ARE MOVED INTO A UNIT'S ON HAND STRENGTH FILE. IN ADDITION THE
000006      09      C UNIT'S COMMITMENT IS SCHEDULED
000007      09      C
000008      13      C$      WRITE (13, 1971) TNOW
000009      09      1971 FORMAT (' *****SUBROUTINE ARRIVL CALLED AT *F10.1* *****')
000010      09      C
000011      09      N=IFIX(ATTRIB(3))
000012      09      ATTRIB(2)=3.0
000013      09      DO 400 I=1,N*NPDES
000014      09      UNITOM(N,I,1)=UNITAU(N,I,1)
000015      09      400 UNITOM(N,I,2)=UNITAU(N,I,2)
000016      09      C
000017      09      C CHANGE THE UNIT'S STATUS TO UNCOMMITTED
000018      09      C
000019      09      THTRSM(N,1)=1.0
000020      09      ATTRIB(1)=TNOW*OLYCON
000021      09      IF(THTRSM(N,2).EQ.2.0) ATTRIB(1)=OLYPO*TNOW
000022      09      C
000023      09      C THE COMMITMENT OF THE UNIT HAS BEEN SCHEDULED. IF THTRSM(N,2) IS 2.0 THE
000024      09      C UNIT IS A POMCUS UNIT, OTHERWISE IT IS A COMUS UNIT
000025      09      C
000026      09      CALL FILEM(1)
000027      09      C
000028      09      C INCREASE DS MAINTENANCE FOR ARRIVING COMBAT UNIT
000029      09      C FIRST DO TABLE LOOK UP FOR VALUE
000030      09      C
000031      09      DO 500 I=1,NHATE
000032      09      500 IF(THTRSM(N,3).EQ.NACAPT(I,1)) GO TO 510
000033      13      C$      WRITE (13,505) ATTRIB(3)
000034      09      505 FORMAT(1X,'UNIT NUMBER',F5.0,'HAS NO DS MAINTENANCE SUPPORT')
000035      09      RETURN
000036      09      C
000037      09      C SCHEDULE THE ARRIVAL OF ADDITIONAL MAINTENANCE (DS MAINTENANCE)
000038      09      C
000039      09      510 ATTRIB(1)=TNOW + DLYMAI
000040      12      ATTRIB(2)=9.0
000041      12      ATTRIB(3)=N
000042      12      ATTRIB(4)=I
000043      09      520 CALL FILEM(1)
000044      09      RETURN
000045      09      END
```

***** ARRIVL *****


```

***** CHECK *****
000001 36 SUBROUTINE CHECK(I)
000002 36 INCLUDE COMMON/LIST
000003 36 COMMON /BCOMS/ IIEVT,IISD(6),JJBE6,JJCLR,MMNIT,MMON,MNAME(3),MWCBCOMS 1
000004 36 1I,MMDAY,MNPT,MNSET,MNPLJ,MNPRM,MNPRS,MNRLN,MNSTR,MNYS,SSEED(6) BCOMS 2
000005 36 GO TO(1111,2222),II
000006 36 C
000007 36 C VARIABLE DICTIONARY
000008 36 C
000009 36 C SUPTOT(I)- THE RESUPPLY TOTAL
000010 36 C
000011 36 C WARRES(I)- THE INITIAL WAR RESERVES
000012 36 C
000013 36 C UNDSIN(I) - THE TOTAL INPUT TO UNIT DS
000014 36 C
000015 36 C RDSIN(J) - THE TOTAL INPUT TO REAR DS
000016 36 C
000017 36 C TOSIN(J) - THE TOTAL INPUT TO OS
000018 36 C
000019 36 C PERARR(I) - TOTAL REPLACEMENT PERSONNEL ARRIVED
000020 36 C
000021 36 C OTUNDS(I)- THE CUMULATIVE UNIT DS TOTAL
000022 36 C
000023 36 C OTROS(J) - CUMULATIVE REAR DS TOTAL
000024 36 C
000025 36 C OTOS(J) - CUMULATIVE OS TOTAL
000026 36 C
000027 36 C HOSP(J) - HOSPITALIZED PERSONNEL TOTAL
000028 36 C
000029 36 C PTRANS(I)- PERSONNEL IN TRANSIT
000030 36 C
000031 36 C @CAP(I,IDAY,TYPE)- THE CAPACITY OF DS, OS, AND PWRS MAINTENANCE QUEUES,
000032 36 C FOR X=1,2, AND 3, RESPECTIVELY.
000033 36 C SEE COMMENTS JUST BEFORE LZNE 1930 FOR MORE EXPLICIT INFORMATION.
000034 36 C
000035 36 1111 IDAY=TNOW
000036 36 IF (IDAY.EQ.0) IDAY=1
000037 36 DO 1000 J=1,MYTYPES
000038 36 DO 900 I=1,MUNITS
000039 36 IF (YHTRSM(I,1).LT.1.0) GO TO 900
000040 36 IN(1, IDAY, J)=IN(1, IDAY, J)+UNITAU(I, J, 1)
000041 36 IN(7, IDAY, J)=IN(7, IDAY, J)+UNITAU(I, J, 2)
000042 36 C
000043 36 C COMPUTE AUTHORIZE EQUIPMENT AND PERSONNEL STRENGTH TODATE
000044 36 C
000045 36 900 CONTINUE
000046 36 IN(2, IDAY, J)=SUPTOT(I, J)
000047 36 C
000048 36 C CUMULATIVE RESUPPLY TOTAL TODATE
000049 36 C
000050 36 IN(3, IDAY, J)=WARRES(I, J)
000051 36 C
000052 36 C INITIAL WAR RESERVES
000053 36 C
000054 36 IN(4, IDAY, J)=UNDSIN(I, J)
000055 36 C
000056 36 C UNIT DS INPUT TOTAL
000057 36 C
000058 36 IN(5, IDAY, J)=RDSIN(I, J)
000059 36 C
000060 36 C REAR DS INPUT TOTAL
000061 36 C
000062 36 IN(6, IDAY, J)=TOSIN(I, J)
000063 36 C
000064 36 C OS INPUT TOTAL
000065 36 C
000066 36 IN(8, IDAY, J)=PERARR(I, J)
000067 36 C
000068 36 C REPLACEMENT PERSONNEL TOTAL TODATE
000069 36 C
000070 36 IN(9, IDAY, J)=IN(1, IDAY, J)+IN(2, IDAY, J)+IN(3, IDAY, J)
000071 36 IN(10, IDAY, J)=IN(4, IDAY, J)+IN(5, IDAY, J)+IN(6, IDAY, J)
000072 36 IN(11, IDAY, J)=IN(7, IDAY, J)+IN(8, IDAY, J)
000073 36 C
000074 36 C COMPUTE TOTALS FOR EQUIPMENT, MAINTENANCE AND PERSONNEL
000075 36 C
000076 36 1000 CONTINUE
000077 36 DO 2000 J=1,MYTYPES
000078 36 OUT(1, IDAY, J)=PWRS(I, J)
000079 36 C
000080 36 C THE CURRENT TOTAL IN WAR RESERVES
000081 36 C
000082 36 OUT(2, IDAY, J)=TSTOCK(1, J)+TSTOCK(2, J)
000083 36 C
000084 36 C THE TOTAL EQUIPMENT IN THEATER STOCKS
000085 36 C
***** CHECK *****

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***** CHECK *****

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000086 36 DO 1900 I=1,MUNITS
000087 36 IF (IHTRSMI I, 27 .EQ. 1. 0) OUT(3, IDAY, J) = OUT(3, IDAY, J) + UNITOM(I, J, 1)
000088 36 C
000089 36 C COMPUTE UNCOMMITTED IN THEATER EQUIPMENT TOTAL
000090 36 C
000091 36 IF (IHTRSMI I, 27 .EQ. 1. 0) OUT(14, IDAY, J) = OUT(14, IDAY, J) + UNITOM(I, J, 2)
000092 36 C
000093 36 C COMPUTE PERSONNEL IN COMBAT UNITS TOTAL
000094 36 C
000095 36 IF (IHTRSMI I, 27 .EQ. 2. 0) OUT(4, IDAY, J) = OUT(4, IDAY, J) + UNITOM(I, J, 1)
000096 36 C
000097 36 C COMPUTE COMMITTED EQUIPMENT TOTAL
000098 36 C
000099 36 IF (IHTRSMI I, 27 .EQ. 2. 0) OUT(14, IDAY, J) = OUT(14, IDAY, J) + UNITOM(I, J, 2)
000100 36 C
000101 36 C COMPUTE PERSONNEL IN COMBAT UNITS TOTAL
000102 36 C
000103 36 OUT(8, IDAY, J) = MCC1(I, J, 1, 1) + MCC1(I, J, 1, 2) + OUT(8, IDAY, J)
000104 36 C
000105 36 C COMPUTE AMOUNT IN UNIT DS MAINTENANCE
000106 36 C
000107 36 1900 CONTINUE
000108 36 OUT(5, IDAY, J) = PRMLOS(J)
000109 36 C
000110 36 C PERMANENT EQUIPMENT LOSSES
000111 36 C
000112 36 OUT(6, IDAY, J) = UNECON(J)
000113 36 C
000114 36 C UNECONOMICALLY REPAIRABLE
000115 36 C
000116 36 OUT(7, IDAY, J) = TRANST(J)
000117 36 C
000118 36 C EQUIPMENT IN TRANSIT
000119 36 C
000120 36 OUT(9, IDAY, J) = MCC2(1, 1, J) + MCC2(3, 1, J)
000121 36 C
000122 36 C REAR DS MAINTENANCE QUEUE LENGTH
000123 36 C
000124 36 OUT(10, IDAY, J) = MCC2(2, 1, J) + MCC2(4, 1, J)
000125 36 C
000126 36 C GS MAINTENANCE QUEUE LENGTH
000127 36 C
000128 36 OUT(11, IDAY, J) = OTUMDS(J)
000129 36 C
000130 36 C TOTAL OUTPUT OF UNIT DS MAINTENANCE
000131 36 C
000132 36 OUT(12, IDAY, J) = OTROS(J)
000133 36 C
000134 36 C TOTAL OUTPUT OF REAR DS MAINTENANCE
000135 36 C
000136 36 OUT(13, IDAY, J) = OTGS(J)
000137 36 C
000138 36 C TOTAL OUTPUT OF GS MAINTENANCE
000139 36 C
000140 36 OUT(15, IDAY, J) = PERLOS(J)
000141 36 C
000142 36 C PERMANENTLY LOST PERSONNEL TOTAL
000143 36 C
000144 36 OUT(16, IDAY, J) = HOSPI(J)
000145 36 C
000146 36 C HOSPITALIZED PERSONNEL
000147 36 C
000148 36 OUT(17, IDAY, J) = TPER(1, J) + TPER(2, J)
000149 36 C
000150 36 C COMPUTE THE THEATER PERSONNEL POOL
000151 36 C
000152 36 OUT(18, IDAY, J) = PTRP(SI, J)
000153 36 C
000154 36 C PERSONNEL IN TRANSIT TO THE UNITS
000155 36 C
000156 36 DO 1910 II=1,10
000157 36 OUT(19, IDAY, J) = OUT(19, IDAY, J) + OUT(II, IDAY, J)
000158 36 C
000159 36 C COMPUTE EQUIPMENT TOTAL
000160 36 C
000161 36 1910 CONTINUE
000162 36 DO 1920 II=8,13
000163 36 OUT(20, IDAY, J) = OUT(20, IDAY, J) + OUT(II, IDAY, J)
000164 36 C

```

***** CHECK *****

```

***** CHECK *****

000165      36      C COMPUTE MAINTENANCE TOTAL
000166      36      C
000167      36      1920 CONTINUE
000168      36      DO 1930 IX=14,18
000169      36      OUT(21, IDAY, J) = OUT(21, IDAY, J) + OUT(IX, IDAY, J)
000170      36      C
000171      36      C COMPUTE THE PERSONNEL TOTAL
000172      36      C
000173      36      C COMPUTE OS, BS, PWRRS MAINTENANCE QUEUE CAPACITIES.
000174      40      @CAP(1, IDAY, J) = REPRAT(1, J)   BS CAPACITY
000175      40      @CAP(2, IDAY, J) = REPRAT(2, J)   BS CAPACITY
000176      40      @CAP(3, IDAY, J) = PWRSRT( J)   SPWRRS CAPACITY
000177      36      C
000178      36      1930 CONTINUE
000179      36      2000 CONTINUE
000180      36      RETURN
000181      36      C
000182      36      C READ ARRAY VALUES AND PRINT IN THE OUTPUT REPORT.
000183      36      C
000184      36      C PRINT ONE REPORT FOR EACH EQUIPMENT TYPE
000185      36      2222 DO 2 KTYPE = 1, NTYPE5
000186      36      C
000187      36      C PRINT 10 DAYS ON EACH PAGE.
000188      36      DO 3 NDAY = 1, NDAY, 10
000189      36      C
000190      36      C HOME PRINTER AND PRINT HEADING.
000191      36      NSTOP = NDAY + 9
000192      36      PRINT 100, KTYPE, NNRUN, NDAY, NSTOP, (I, I=NDAY, NSTOP)
000193      36      C
000194      36      C PRINT EQUIPMENT INPUTS
000195      38      PRINT 110, ((IN(I, I, KTYPE), I=NDAY, NSTOP), N=1, 3)
000196      36      C
000197      36      C PRINT MAINTENANCE INPUTS
000198      38      PRINT 120, ((IN(I, I, KTYPE), I=NDAY, NSTOP), N=1, 6)
000199      36      C
000200      36      C PRINT PERSONNEL INPUTS
000201      38      PRINT 130, ((IN(I, I, KTYPE), I=NDAY, NSTOP), N=7, 8)
000202      36      C
000203      36      C PRINT INPUT TOTALS
000204      36      C
000205      38      PRINT 135, ((IN(I, I, KTYPE), I=NDAY, NSTOP), N=9, 11)
000206      36      C PRINT DIFFERENCE BETWEEN INPUT AND OUTPUT TOTALS :
000207      36      C DELTA = ABS(IN - OUT) ]
000208      36      DO 4 I=1, 3
000209      36      IIN=I+8
000210      36      IOUT=I+18
000211      36      DO 4 J=NDAY, NSTOP
000212      39      DELTA (I, J, KTYPE) = ABS( IN(IIN, J, KTYPE) - OUT(IOUT, J, KTYPE) )
000213      36      4 CONTINUE
000214      38      PRINT 170 ((DELTA (N, I, KTYPE), I=NDAY, NSTOP), N=1, 3)
000215      36      C
000216      36      C PRINT MAINTENANCE QUEUE CAPACITIES
000217      38      PRINT 180, ((CAP(N, I, KTYPE), I=NDAY, NSTOP), N=1, 3)
000218      36      C
000219      36      C PRINT OUTPUTS
000220      36      C
000221      36      C
000222      36      C PRINT EQUIPMENT OUTPUT
000223      38      PRINT 140, ((OUT (N, I, KTYPE), I=NDAY, NSTOP), N=1, 10)
000224      36      C
000225      36      C PRINT MAINTENANCE OUTPUT
000226      38      PRINT 150, ((OUT (N, I, KTYPE), I=NDAY, NSTOP), N=8, 13)
000227      36      C
000228      36      C PRINT PERSONNEL OUTPUT
000229      38      PRINT 160, ((OUT (N, I, KTYPE), I=NDAY, NSTOP), N=14, 18)
000230      36      C
000231      36      C PRINT TOTALS OF OUTPUT
000232      38      PRINT 165, ((OUT(N, I, KTYPE), I=NDAY, NSTOP), N=19, 21)
000233      36      C
000234      36      C CONTINUE REMAINING DAYS ON ANOTHER PAGE.
000235      36      3 CONTINUE
000236      36      2 CONTINUE
000237      36      RETURN
000238      36      100 FORMAT ('1 EQUIPMENT TYPE ', I2, '3X', 'RUN NUMBER ', I2, '11S, 'DAYS
000239      36      +', I2, ' TO ', I2, '/,
000240      36      +', DAY----->', I30, '1015X, I2, '3X', /,
000241      36      +130(' * ')

```

***** CHECK *****

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***** CHECK *****

000242 36 C
000243 36 110 FORMAT (' * * * T55 * I * T65 * N * T75 * P * T85 * U *
000244 36 * T95 * T * T105 * S *
000245 36 * T131 * * * T131 * * * / * 1321 * * * / * *
000246 36 * * A) EQUIPMENT * T131 * * * / * *
000247 36 * 5X * 1) AUTHORIZED IN UNITS * T30 * 10E10 * * * / * *
000248 36 * 5X * 2) RESUPPLY * T30 * 10E10 * * * / * *
000249 36 * 5X * 3) WAR RESERVES * T30 * 10E10 * * *
000250 36
000251 36 C
000252 36 120 FORMAT (' * * B) MAINTENANCE * T131 * * * / * *
000253 36 * 5X * 1) UNIT DS * T30 * 10E10 * * * / * *
000254 36 * 5X * 2) REAR DS * T30 * 10E10 * * * / * *
000255 36 * 5X * 3) GS * T30 * 10E10 * * *
000256 36 C
000257 36 130 FORMAT (' * * C) PERSONNEL * T131 * * * / * *
000258 36 * 5X * 1) AUTHORIZED * T30 * 10E10 * * * / * *
000259 36 * 5X * 2) REPLACEMENTS * T30 * 10E10 * * *
000260 36 C
000261 36 135 FORMAT (1301 * * * / * * TOTALS OF INPUTS * T131 * * *
000262 36 * / * * 5X * A) EQUIPMENT * T30 * 10E10 * * * / *
000263 36 * * 5X * B) MAINTENANCE * T30 * 10E10 * * * / *
000264 36 * * 5X * C) PERSONNEL * T30 * 10E10 * * *
000265 36 C
000266 36 140 FORMAT (' * * * * * 1301 * * * / *
000267 36 * * * T55 * O * T65 * U * T75 * T * T85 * P * T95 * U * T105 * T * T131 *
000268 36 * / * 1311 * * * / *
000269 36 * * A) EQUIPMENT * T131 * * * / * * 5X * 1) WAR RESERVES *
000270 36 * T30 * 10E10 * * * / * *
000271 36 * 5X * 2) THREATEN STOCKS * T30 * 10E10 * * * / * *
000272 36 * 5X * 3) ARRIVED, NOT COMMITTED * T30 * 10E10 * * * / * *
000273 36 * 5X * 4) COMMITTED *
000274 36 * T30 * 10E10 * * * / * *
000275 36 * 5X * 5) PERMANENT LOSSES *
000276 36 * T30 * 10E10 * * * / * *
000277 36 * 5X * 6) UNECONOMICALLY REPAIRABLE *
000278 36 * T30 * 10E10 * * * / * *
000279 36 * 5X * 7) IN TRANSIT *
000280 36 * T30 * 10E10 * * * / * *
000281 36 * 5X * 8) DIV MAINTENANCE *
000282 36 * T30 * 10E10 * * * / * *
000283 36 * 5X * 9) REAR DS MAINT * T30 * 10E10 * * * / * *
000284 36 * 5X * 10) GS MAINTENANCE * T30 * 10E10 * * *
000285 36 C
000286 36 150 FORMAT (' * * B) MAINTENANCE * T131 * * * / * *
000287 36 * 5X * 1) IN DIV MAINT * T30 * 10E10 * * * / * *
000288 36 * 5X * 2) IN REAR DS MAINT * T30 * 10E10 * * * / * *
000289 36 * 5X * 3) IN GS MAINT * T30 * 10E10 * * * / * *
000290 36 * 5X * 4) DIV MAINT OUTPUT * T30 * 10E10 * * * / * *
000291 36 * 5X * 5) REAR DS MAINT OUTPUT * T30 * 10E10 * * * / * *
000292 36 * 5X * 6) GS MAINT OUTPUT * T30 * 10E10 * * *
000293 36 C
000294 36 160 FORMAT (' * * B) PERSONNEL * T131 * * * / * *
000295 36 * 5X * 1) TOTAL IN COMBAT UNITS * T30 * 10E10 * * * / * *
000296 36 * 5X * 2) PERMANENT LOSSES * T30 * 10E10 * * * / * *
000297 36 * 5X * 3) IN HOSPITAL * T30 * 10E10 * * * / * *
000298 36 * 5X * 4) THEATER POOL, NO EQUIPMENT * T30 * 10E10 * * * / * *
000299 36 * 5X * 5) IN TRANSIT * T30 * 10E10 * * *
000300 36 C
000301 36 165 FORMAT (1311 * * * / * * TOTALS OF OUTPUTS * T131 * * *
000302 36 * / * * 5X * A) EQUIPMENT * T30 * 10E10 * * * / * *
000303 36 * 5X * B) MAINTENANCE * T30 * 10E10 * * * / * *
000304 36 * 5X * C) PERSONNEL * T30 * 10E10 * * * / * 1311 * * *
000305 36 C
000306 36 170 FORMAT (1301 * * * / * * 1301 * * * / * * * 43X
000307 36 * * DISCREPANCIES BETWEEN INPUTS AND OUTPUTS * T131 * * * / * 1301 * * *
000308 36 * / * * * 5X
000309 36 * * A) EQUIPMENT * T30 * 10E10 * * * / * * 5X * B) MAINTENANCE *
000310 36 * T30 * 10E10 * * * / * * 5X * C) PERSONNEL * T30 * 10E10 * * *
000311 36 * / * 1301 * * *
000312 36 C
000313 36 180 FORMAT (1311 * * * / * * * 43X * DS * OS * AND PWMS *
000314 36 * * MAINTENANCE CAPACITIES * T131 * * * / * 1311 * * * / * * 5X
000315 36 * * UNIT DS * T30 * 10E10 * * * / *
000316 36 * * 5X * REAR DS * T30 * 10E10 * * * / *
000317 36 * * 5X * PWMS * T30 * 10E10 * * * / * 1311 * * *
000318 36 C
000318 36 END

```

***** CHECK *****

***** COMMIT *****

```
DELTA 82BACKUP-9.COMMIT
ELT007 573R1A 03/21/79 07:54:50 (5.1)
000001 01 SUBROUTINE COMMIT
000002 01 INCLUDE COMMON-LIST
000003 05 CS WRITE (13, 1971ITM0)
000004 01 1971 FORMAT (' *****SUBROUTINE COMMIT CALLED AT ',F10.1,' *****')
000005 01 C
000006 01 C SUBROUTINE COMMIT WILL COMMIT A COMBAT UNIT TO THE FEBA
000007 01 C
000008 01 N=IFIX(ATRIB(3))
000009 02 TMRSMIN(1)=2.0
000010 01 RETURN
000011 01 END
```

***** COMMIT *****

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***** DATIN-DATA *****

```

000001 56 @GENERAL
000002 60 NNAME(1)=GMSIPL ,GH LEVEL ,GM-9
000003 56 NNPRJ=9002, NNRRS=1, LLSUP(4)=2.2, LLSUP(9)=2.2, LLSUP(12)=2.0.1
000004 56 SEND
000005 56 $STATIS
000006 56 NNCLT=12, NNPLT=5
000007 56 SEND
000008 56 $LIMITS
000009 56 NNSTR=1, NNTRY=500, NNATR=7, NNFXL=1, NNSET=10000
000010 56 SEND
000011 56 $COLCT
000012 56 I=1, LLABC(1,1) = GMPRMEN, GMT LOSS
000013 56 SEND
000014 56 $COLCT
000015 56 I=2, LLABC(2,1) = GMTHEATR, GM STOCK
000016 56 SEND
000017 56 $COLCT
000018 56 I=3, LLABC(3,1) = GNNAR RE, GMSERVES
000019 56 SEND
000020 56 $COLCT
000021 56 I=4, LLABC(4,1) = GMAUTH S, GMTRENBT
000022 56 SEND
000023 56 $COLCT
000024 56 I=5, LLABC(5,1) = GMMONIT, GMTED UN
000025 56 SEND
000026 56 $COLCT
000027 56 I=6, LLABC(6,1) = GMMWINT, GMMRETURN
000028 56 SEND
000029 56 $COLCT
000030 56 I=7, LLABC(7,1) = GMMWECN, GMMFIN
000031 56 SEND
000032 56 $COLCT
000033 56 I=8, LLABC(8,1) = GMMSTAT, GMMON UN
000034 56 SEND
000035 56 $COLCT
000036 56 I=9, LLABC(9,1) = GMMPCUS, GMMUNITS
000037 56 SEND
000038 56 $COLCT
000039 56 I=10, LLABC(10,1) = GMMCOMJ, GMMUNITS
000040 56 SEND
000041 56 $COLCT
000042 56 I=11, LLABC(11,1) = GMMUNIT A, GMMRIVED
000043 56 SEND
000044 56 $COLCT
000045 56 I=12, LLABC(12,1) = GMMCOMIT, GMTED UN
000046 56 SEND
000047 56 $PLT
000048 56 I=1, LLABP(1,1) = GMTIRE, LLABP(1,2)=1H, IITRP(1)=2, NNVAR(1)=7,
000049 56 LLPLT=2
000050 56 DTPLT(1)=0.5
000051 56 SEND
000052 56 $PLTVAR
000053 56 IJ=1, LLSYN(1)=IMP, LLABP(1,1)=GMPRMEN, GMT LOSS,
000054 56 LLPLO(1)=1, LLPNI(1)=2, PPHI(1)=1.5.
000055 56 SEND
000056 56 $PLTVAR
000057 56 IJ=2, LLSYN(2)=IMT, LLABP(2,1)=GMTHEATR, GM STOCK,
000058 56 LLPLO(2)=1, LLPNI(2)=2, PPHI(2)=1.5.
000059 56 SEND
000060 56 $PLTVAR
000061 56 IJ=3, LLSYN(3)=IMR, LLABP(3,1)=GNNAR RE, GMSERVES,
000062 56 LLPLO(3)=1, LLPNI(3)=2, PPHI(3)=1.5.
000063 56 SEND
000064 56 $PLTVAR
000065 56 IJ=4, LLSYN(4)=IMA, LLABP(4,1)=GMAUTH S, GMTRENBT,
000066 56 LLPLO(4)=1, LLPNI(4)=2, PPHI(4)=1.5.
000067 56 SEND
000068 56 $PLTVAR
000069 56 IJ=5, LLSYN(5)=IMC, LLABP(5,1)=GMMONIT, GMTED UN,
000070 56 LLPLO(5)=1, LLPNI(5)=2, PPHI(5)=1.5.
000071 56 SEND
000072 56 $PLTVAR
000073 56 IJ=6, LLSYN(6)=IMU, LLABP(6,1)=GMMWECN, GMMREPAIR,
000074 56 LLPLO(6)=1, LLPNI(6)=2, PPHI(6)=1.5.
000075 56 SEND
000076 56 $PLTVAR
000077 56 IJ=7, LLSYN(7)=IMS, LLABP(7,1)=GMMIN TRA, GMMSTAT,
000078 56 LLPLO(7)=1, LLPNI(7)=2, PPHI(7)=1.5.
000079 56 SEND

```

***** DATIN-DATA *****

***** DATIN-DATA *****

```

000080 56 $PLOT
000081 56 I=2, LLABP(11,1) = QNTINE, IITAP(2)=3, NNVAR(2)=5, LLPLT=2,
000082 58 I=2, LLABP(11,1) = QNTINE, LLABP(11,2)=1H, IITAP(2)=3, NNVAR(2)=6,
000083 56 LLPLT=2
000084 56 DTPLT(1)=0.5
000085 56 SEND
000086 56 $PLTVAR
000087 56 IJ=1, LLSYN(1)=IM0, LLABP(1,1)=GHWSTAT, GHWON UN,
000088 56 LLPLO(1)=1, LLPNI(1)=2, PPHI(1)=20.
000089 56 SEND
000090 56 $PLTVAR
000091 56 IJ=2, LLSYN(2)=IMP, LLABP(2,1)=GHPORCUS, GH UNITS,
000092 56 LLPLO(2)=1, LLPNI(2)=2, PPHI(2)=20.
000093 56 SEND
000094 56 $PLTVAR
000095 56 IJ=3, LLSYN(3)=IMK, LLABP(3,1)=GHCORUS, GH UNITS,
000096 56 LLPLO(3)=1, LLPNI(3)=2, PPHI(3)=20.
000097 56 SEND
000098 56 $PLTVAR
000099 58 IJ=4, LLSYN(4)=IMA, LLABP(4,1)=GHUNCOMH, GHITTED,
000100 56 LLPLO(4)=1, LLPNI(4)=2, PPHI(4)=20.
000101 56 SEND
000102 56 $PLTVAR
000103 56 IJ=5, LLSYN(5)=IMC, LLABP(5,1)=GHCOMMIT, GHTEC UN,
000104 56 LLPLO(5)=1, LLPNI(5)=2, PPHI(5)=20.
000105 56 SEND
000106 56 $PLTVAR
000107 58 IJ=6, LLSYN(6)=IMT, LLABP(6,1)=GHCOMMIT, GHTEC,
000108 56 LLPLO(6)=1, LLPNI(6)=2, PPHI(6)=20.
000109 56 SEND
000110 56 $PLOT
000111 56 I=3, LLABP(11,1) = QNTINE, LLABP(11,2)=1H, IITAP(3)=0, NNVAR(3)=0,
000112 56 LLPLT=2,
000113 56 DTPLT(1)=0.5
000114 56 SEND
000115 56 $PLTVAR
000116 56 IJ=1, LLSYN(1)=IMP, LLABP(1,1)=GHPRMEN, GHT LOSS,
000117 56 LLPLO(1)=1, LLPNI(1)=2, PPHI(1)=20.
000118 56 SEND
000119 56 $PLTVAR
000120 56 IJ=2, LLSYN(2)=IMT, LLABP(2,1)=GHTENRA, GHRY LOS,
000121 56 LLPLO(2)=1, LLPNI(2)=2, PPHI(2)=20.
000122 56 SEND
000123 56 $PLTVAR
000124 56 IJ=3, LLSYN(3)=IMN, LLABP(3,1)=GHNAINI, GHRETURN,
000125 56 LLPLO(3)=1, LLPNI(3)=2, PPHI(3)=20.
000126 56 SEND
000127 56 $PLTVAR
000128 56 IJ=4, LLSYN(4)=IMR, LLABP(4,1)=GHPURS A, GHSERVE,
000129 56 LLPLO(4)=1, LLPNI(4)=2, PPHI(4)=20.
000130 56 SEND
000131 56 $PLOT
000132 59 I=4, LLABP(11,1) = QNTINE, LLABP(11,2)=1H, IITAP(4)=7, NNVAR(4)=0,
000133 56 LLPLT=2
000134 56 DTPLT(1)=0.5
000135 56 SEND
000136 56 $PLTVAR
000137 56 IJ=1, LLSYN(1)=IMT, LLABP(1,1)=GHTK FRO, GHT TMSK,
000138 56 LLPLO(1)=1, LLPNI(1)=2, PPHI(1)=200.
000139 56 SEND
000140 56 $PLTVAR
000141 56 IJ=2, LLSYN(2)=IMN, LLABP(2,1)=GHTK W/N, GND CREW,
000142 56 LLPLO(2)=1, LLPNI(2)=2, PPHI(2)=200.
000143 56 SEND
000144 56 $PLTVAR
000145 56 IJ=3, LLSYN(3)=IMC, LLABP(3,1)=GHAVAIL, GNCREW/A,
000146 56 LLPLO(3)=1, LLPNI(3)=2, PPHI(3)=200.
000147 56 SEND
000148 59 $PLTVAR
000149 59 IJ=4, LLSYN(4)=IM0, LLABP(4,1)=GHRACKLO, GND SUP,
000150 59 LLPLO(4)=1, LLPNI(4)=2, PPHI(4)=200.
000151 59 SEND
000152 56 $PLOT
000153 56 I=5, LLABP(11,1) = QNTINE, LLABP(11,2)=1H, IITAP(5)=9, NNVAR(5)=3,
000154 56 LLPLT=2,
000155 56 DTPLT(1)=0.5
000156 56 SEND
000157 56 $PLTVAR
000158 58 IJ=1, LLSYN(1)=IM0, LLABP(1,1)=GHDTY NA, GHINT 0,
000159 56 LLPLO(1)=1, LLPNI(1)=2, PPHI(1)=20.
000160 56 SEND
000161 56 $PLTVAR
000162 56 IJ=2, LLSYN(2)=IM0, LLABP(2,1)=GHDS NA, GHINT 0,
000163 56 LLPLO(2)=1, LLPNI(2)=2, PPHI(2)=150.
000164 56 SEND

```

***** DATIN-DATA *****

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***** DATIN-DATA *****

```
000165      56      $PLTVAR
000166      56      IJ=3, LLSYN(3)=240, LLAP(3,1)=6N05 NA,GMINT 0,
000167      56      LLPLO(1)=1, LLPHI(1)=2, PPHI(1)=150.
000168      56      SEND
000169      56      $PRIORI  KRRNK=1, .IINN=1
000170      56      SEND
000171      56      $INITAL
000172      56      $STOP=1, JJCLR=1, JJBEG=1, TYBEG=0., JFJL=1, TYFIN=61, IICRD=0
000173      56      SEND
000174      56      $SEEDS
000175      56      SEND
000176      56      $AGAIN
000177      56      LLSUP(1)=2,2,2,2,2,2,2,2,2,2, IICRD=13
000178      56      SEND
```

***** DATIN-DATA *****

***** DOWIST *****

```

000001      00      SUBROUTINE DOWIST
000002      00      C
000003      00      C THIS SUBROUTINE CALLS THE DASP HISTOGRAM ROUTINE FOR
000004      00      C DS MAINTENANCE ASSOCIATED WITH EACH COMBAT UNIT
000005      00      C
000006      00      INCLUDE COMMON LIST
000007      00      TOTAL=0.0
000008      01      TOTALA=0.0
000009      01      TOTALB=0.0
000010      00      DO 100 J=1,NTYPES
000011      00      DO 100 I=1,NUMITS
000012      00      DO 100 L=1,2
000013      00      TOTAL=TOTAL+MCC1(I,J,L)
000014      00      100 CONTINUE
000015      01      DO 200 J=1,NTYPES
000016      01      DO 150 I=1,4
000017      01      150 TOTALA=TOTALA + MCC2(I,I,J)
000018      03      DO 175 I=2,4
000019      01      175 TOTALB=TOTALB + MCC2(I,I,J)
000020      01      200 CONTINUE
000021      01      CALL HISTO(TOTAL,1)
000022      01      CALL HISTO(TOTALA,2)
000023      01      CALL HISTO(TOTALB,3)
000024      01      C
000025      01      C HISTOGRAM 2 PLOTS NEAR DS MAINTENANCE QUEUE
000026      01      L HISTOGRAM 3 PLOTS NEAR OS MAINTENANCE QUEUE
000027      01      C
000028      00      RETURN
000029      00      END

```

***** DOWIST *****

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***** EVNTS *****

```

000001 30 SUBROUTINE EVNTS (IX)
000002 30 INCLUDE COMMON/LIST
000003 30 DATA TANK,ND,0/
000004 30 NAMELIST /OUTREP/ DSNCH,DSNCH,DSCOM,BSCOM
000005 30 NAMELIST /TINE/ TNOW,TTLAS,INSTOP,NDAY
000006 30 C6 WRITE (13,TINE)
000007 30 IF (TTLAS.NE. TNOW-1.) GOTO 10
000008 30 C6 WRITE (13, 2971)TNOW
000009 30 1971 FORMAT (' *****SUBROUTINE EVNTS CALLED AGAIN AT TNOW= ',
000010 30 1 F10.1,' *****')
000011 30 C6 WRITE (13,OUTREP)
000012 30 GOTO 11
000013 30 10 TTLAS = TNOW - 1.
000014 30 IF (IFIX(TNOW) .EQ.1 .OR. IFIX(TNOW) .GE. NDAY) GOTO 19
000015 30 CALL SSAVE
000016 30 19 WRITE (6, 1970)TNOW
000017 30 1970 FORMAT (' IN ', *****SUBROUTINE EVNTS INITIALLY CALLED AT TNOW= ',
000018 30 1 F10.1,' *****')
000019 30 11 IF (TNOW.GE. IFIX(NDAY)) GOTO 199
000020 30 C
000021 30 C6 WRITE (13,OUTREP)
000022 30 C
000023 30 00 TO(1,2,3,4,5,6,7,8,9)IX
000024 30 C
000025 30 C THE DAILY EVENTS CYCLE
000026 30 C SUBROUTINE EVNTS (IX)
000027 30 1 CALL UNSTAT(DLYNOS)
000028 30 CALL UNMAIN
000029 30 CALL MAINT
000030 30 CALL VARES
000031 30 CALL THSTOK(DLYSUP,DLYPER)
000032 30 CALL CHECK(1)
000033 30 ATRIB(2)=-1.0
000034 30 ATRIB(1)=TNOW-1
000035 30 CALL FILEM(1)
000036 30 BSS=GSUS
000037 30 IF (TNOW.GE. MELOC) BSS=0.0
000038 30 DO 430 I=1,NUNITS
000039 30 IF (MTRSH(I,1) .GE. 2.0) TANK=TANK+UNITM(I,1)
000040 30 430 CONTINUE
000041 30 GOTO 27
000042 30 C
000043 30 C THE ARRIVAL OF A UNIT
000044 30 C
000045 30 2 CALL ARRIVL
000046 30 GOTO 27
000047 30 C
000048 30 C THE COMMITMENT OF A UNIT
000049 30 C
000050 30 3 CALL COMMIT
000051 30 GOTO 27
000052 30 C
000053 30 C THE ARRIVAL OF PERSONNEL FROM HOSPITAL TO THEATER
000054 30 C
000055 30 4 CALL HOSPTL
000056 30 GOTO 27
000057 30 C
000058 30 C THE ARRIVAL OF RESUPPLIES FROM THEATER
000059 30 C
000060 30 5 CALL URESUP
000061 30 GOTO 27
000062 30 C
000063 30 C THE ARRIVAL SUPPLIES TO WAR RESERVES
000064 30 C
000065 30 6 CALL WRARR
000066 30 GOTO 27
000067 30 C
000068 30 C THE ARRIVAL COMMS REPLACE PERSONNEL TO THE THEATER
000069 30 C
000070 30 7 CALL RESERV
000071 30 GOTO 27
000072 30 C
000073 30 C THE ARRIVAL OF ADDITIONAL MAINTENANCE OR RESUPPLY CAPACITY
000074 30 C
000075 30 8 CALL MASUIN
000076 30 GOTO 27
000077 30 9 CALL UNITOS
000078 30 GO TO 27
000079 30 199 CONTINUE
000080 30 C6 WRITE (13,TINE)
000081 30 27 RETURN
000082 30 END

```



```
***** HOSPTL *****  
000001      02      SUBROUTINE HOSPTL  
000002      02      INCLUDE COMMON-LIST  
000003      06      C6      WRITE (13, 1071) TROU  
000004      02      1971 FORMAT (' *****SUBROUTINE HOSPTL CALLED BY ', F30.1, ' *****')  
000005      02      C  
000006      02      C THIS SUBROUTINE HANDLES ARRIVAL OF HOSPITAL TO THEATER STOCK RETURNEES  
000007      02      C  
000008      02      N=FIX(ATTRIB(2))  
000009      06      C6      WRITE (13, 1979) HOSPIN(N)  
000010      03      HOSPIN(N)=HOSPIN(N)+ATTRIB(5)  
000011      06      C6      WRITE (13, 1979) HOSPIN(N),ATTRIB(5)  
000012      02      RETURN  
000013      02      END
```

```
***** HOSPTL *****
```



```

***** INTLC *****
000083      23      PTRANS(J)=0.
000084      23      ROSIN(J)=0.
000085      23      SUPTOT(J)=0.
000086      23      YOSIN(J)=0.
000087      23      UMOSIN(J)=0.
000088      23      DO 40 I=1,4
000089      23      40 CONTINUE
000090      23      DO 45 I=1,MUNITS
000091      23      C
000092      23      C COLUMN 1 OF THE TWEATER STATUS MATRIX (MTRSM) CAN HAVE A VALUE
000093      23      C BETWEEN 0 AND 2, INCLUSIVE. THE MEANINGS ARE:
000094      23      C 0= THE UNIT HAS NOT ARRIVED.
000095      23      C 1= THE UNIT HAS ARRIVED.
000096      23      C 2= THE UNIT IS COMMITTED.
000097      23      C
000098      23      C THE MEANINGS OF COLUMNS 2 AND 3 ARE EXPLAINED LATER IN THIS PROGRAM.
000099      23      C
000100      23      MTRSM(I,1)=0.
000101      23      CREWAV(I,J) = 0.
000102      23      BACKPL(I,J)=0.
000103      23      BACKLG(I,J)=0.
000104      23      RESUPA(I,J,1)=0.
000105      23      RESUPA(I,J,1)= 0.
000106      23      RESUPA(I,J,2)= 0.
000107      23      RESUPA(I,J,2)=0.
000108      23      TSTOCK(I,J)=0.
000109      23      TPERSA(I,J)=0.
000110      23      UNITOM(I,J,1)=0.
000111      23      UNITMAC(I,J)=0.0
000112      23      45 UNITOM(I,J,2)=0.
000113      23      50 CONTINUE
000114      23      PRINT 92
000115      23      92 FORMAT ( ' INTLC: ZEROING OUT OF ARRAYS COMPLETED. ' )
000116      23      C *****
000117      23      C *
000118      23      C *                               MNATE
000119      23      C *
000120      23      C *****
000121      23      C
000122      23      C INPUT THE NUMBER OF ROWS IN THE MAINTENANCE CAPACITY LOOKUP TABLE
000123      23      C
000124      23      WRITE(INPRNT,1020) L3A
000125      23      READ (15,1030) ALPHA
000126      23      C WRITE (INPRNT,1031) ALPHA
000127      23      READ(15,1010) MNATE
000128      23      WRITE(INPRNT,1079) MNATE
000129      23      WRITE(INPRNT,1020) L4
000130      23      READ (15,1030) ALPHA
000131      23      C WRITE (INPRNT,1031) ALPHA
000132      23      DO 500 I=1,MNATE
000133      23      C INPUT THE DIRECT SUPPORT COMBAT UNIT ASSOCIATED MAINTENANCE CAPABILITY LOOK-UP
000134      23      C TABLE. IN EACH ROW, INPUT THE SERIAL NUMBER, THE TOTAL MAINTENANCE CAPACITY,
000135      23      C AND THEN THE FRACTION OF THE COMBAT UNIT'S CAPACITY DEVOTED TO EACH TYPE OF
000136      23      C EQUIPMENT.
000137      23      C UNITS FOR MAINTENANCE IS NUMBER OF MAN HOURS AVAILABLE PER DAY.
000138      23      NCOUNT=NTYPES*2
000139      23      READ(15,1000) MACAPT(I,J),J=1,NCOUNT)
000140      23      WRITE(INPRNT,1079) (MACAPT(I,J),J=1,NCOUNT)
000141      23      500 CONTINUE
000142      23      WRITE(INPRNT,1020) L5
000143      23      C *****
000144      23      C *
000145      23      C * CHECK ARRAY SIZE AGAINST INPUT DATA REQUIREMENTS.
000146      23      C * ERROR CONDITIONS ARE:
000147      23      C * S < MNATE
000148      23      C * D < KDAY
000149      23      C * U < MUNITS
000150      23      C * T < NTYPES
000151      23      C *
000152      23      C *****
000153      23      IF (S.LT.MNATE.OR.D.LT.KDAY.OR.U.LT.MUNITS.OR.T.LT.NTYPES)
000154      23      + GOTO 3001
000155      23      GOTO 3002
000156      23      3001 III S = S
000157      23      III D = 0
000158      23      III U = U
000159      23      III T = T
000160      26      WRITE (6,3000) III S, III D, III U, III T, MNATE, KDAY, MUNITS, NTYPES
000161      23      3000 FORMAT ( //, ' INTLC: FATAL ERROR-- THE PROGRAM ARRAY SIZE *
000162      23      +, ' SPECIFIED IN FORTRAN PROC PARAMETER STATEMENT) IS SMALLER THAN *
000163      23      +, ' THE REQUIREMENTS OF THE INPUT DECK. % //, ' PARAMETERS: *
000164      23      + ' S,D,U,T= ', TSD, '(15,3X) //, ' INTLC DATA DECK: MNATE,KDAY,MUNITS, *

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***** INTLC *****

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***** INTLC *****
000165      23      * NNTYPES=*,T30,4 (I5,3X)
000166      23      CALL UERR(1)
000167      23      STOP
000168      23      C .....
000169      23      C *
000170      23      C *                               MCHRAT
000171      23      C *
000172      23      C .....
000173      23      C INPUT NONCOMBAT LOSS RATES FOR EACH EQUIPMENT TYPE.
000174      24      3002 READ (15,1030) ALPHA
000175      23      C WRITE (NPRNT,1031) ALPHA
000176      23      READ(15,1000) (MCHRAT(I),I=1,NNTYPES)
000177      23      WRITE(NPRNT,1979) (MCHRAT(I),I=1,NNTYPES)
000178      23      WRITE(NPRNT,1020) L6
000179      23      C .....
000180      23      C *
000181      23      C *                               CONRAT
000182      23      C *
000183      23      C .....
000184      23      C INPUT COMBAT LOSS RATES FOR EACH EQUIPMENT TYPE
000185      23      READ (15,1030) ALPHA
000186      23      C WRITE (NPRNT,1031) ALPHA
000187      23      READ(15,1000) (CONRAT(I),I=1,NNTYPES)
000188      23      WRITE(NPRNT,1979) (CONRAT(I),I=1,NNTYPES)
000189      23      WRITE(NPRNT,1020) L7
000190      23      C .....
000191      23      C *
000192      23      C *                               PERRAT
000193      23      C *
000194      23      C .....
000195      23      C INPUT CREW LOSS RATES WHICH WILL OCCUR DURING COMBAT.
000196      23      READ (15,1030) ALPHA
000197      23      C WRITE (NPRNT,1031) ALPHA
000198      23      READ(15,1000) (PERRAT(I),I=1,NNTYPES)
000199      23      WRITE(NPRNT,1979) (PERRAT(I),I=1,NNTYPES)
000200      23      WRITE(NPRNT,1020) L8
000201      23      C .....
000202      23      C *
000203      23      C *                               UNREP
000204      23      C *
000205      23      C .....
000206      23      C INPUT UNREPAIRABLE RATES (FOR NONCOMBAT LOSSES).
000207      23      READ (15,1030) ALPHA
000208      23      C WRITE (NPRNT,1031) ALPHA
000209      23      READ(15,1000) (UNREP(I),I=1,NNTYPES)
000210      23      WRITE(NPRNT,1979) (UNREP(I),I=1,NNTYPES)
000211      23      WRITE(NPRNT,1020) L9
000212      23      C .....
000213      23      C *
000214      23      C *                               DAMRAT
000215      23      C *
000216      23      C .....
000217      23      C INPUT PERMANENT DAMAGE RATES
000218      23      READ (15,1030) ALPHA
000219      23      C WRITE (NPRNT,1031) ALPHA
000220      23      READ(15,1000) (DAMRAT(I),I=1,NNTYPES)
000221      23      WRITE(NPRNT,1979) (DAMRAT(I),I=1,NNTYPES)
000222      23      WRITE(NPRNT,1020) L10
000223      23      C .....
000224      23      C *
000225      23      C *                               ABRAT
000226      23      C *
000227      23      C .....
000228      23      C INPUT ABANDON RATE
000229      23      READ (15,1030) ALPHA
000230      23      C WRITE (NPRNT,1031) ALPHA
000231      23      READ(15,1000) (ABRAT(I),I=1,NNTYPES)
000232      23      WRITE(NPRNT,1979) (ABRAT(I),I=1,NNTYPES)
000233      23      WRITE(NPRNT,1020) L11
000234      23      C .....
000235      23      C *
000236      23      C *                               CRMLSR
000237      23      C *
000238      23      C .....
000239      23      C INPUT PERMANENT CREW LOSS RATE
000240      23      READ (15,1030) ALPHA
000241      23      C WRITE (NPRNT,1031) ALPHA
000242      23      READ (15,1000) (CRMLSR(I),I=1,NNTYPES)
000243      23      WRITE(NPRNT,1979) (CRMLSR(I),I=1,NNTYPES)
000244      23      WRITE(NPRNT,1020) L12
000245      23

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***** INTLC *****

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***** INTLC *****
000246 23 C .....
000247 23 C *
000248 23 C * PWRSHR
000249 23 C *
000250 23 C .....
000251 23 C INPUT THE MAN HOURS OF PREPARATION EACH PIECE OF EQUIPMENT REQUIRES.
000252 23 READ (15,1030) ALPHA
000253 23 C WRITE (NPRNT,1031) ALPHA
000254 23 READ(15,1000)(PWRSHR(J),J=1,NTYPES)
000255 23 WRITE(NPRNT,1979)(PWRSHR(J),J=1,NTYPES)
000256 23 WRITE(NPRNT,1020) L13
000257 23 C .....
000258 23 C *
000259 23 C * UNECRT
000260 23 C *
000261 23 C .....
000262 23 C INPUT THE UNECONOMICALLY REPAIRABLE RATES.
000263 23 READ (15,1030) ALPHA
000264 23 C WRITE (NPRNT,1031) ALPHA
000265 23 READ(15,1000)(UNECRT(J),J=1,NTYPES)
000266 23 WRITE(NPRNT,1979)(UNECRT(J),J=1,NTYPES)
000267 23 WRITE(NPRNT,1020) L14
000268 23 C .....
000269 23 C *
000270 23 C * PWR
000271 23 C *
000272 23 C .....
000273 23 C INPUT INITIAL WAR RESERVES STOCK
000274 23 READ (15,1030) ALPHA
000275 23 C WRITE (NPRNT,1031) ALPHA
000276 23 READ(15,1000)(PWR(J),J=1,NTYPES)
000277 23 DO 600 J=1,NTYPES
000278 23 600 WARRES(J)=PWR(J)
000279 23 WRITE(NPRNT,1979)(PWR(J),J=1,NTYPES)
000280 23 WRITE(NPRNT,1020) L15
000281 23 C .....
000282 23 C *
000283 23 C * REPRAT
000284 23 C *
000285 23 C .....
000286 23 C INPUT INITIAL REPAIR RATES IN HANHOOURS
000287 23 C 1 IS FOR DS
000288 23 C 2 IS FOR OS
000289 23 READ (15,1030) ALPHA
000290 23 C WRITE (NPRNT,1031) ALPHA
000291 23 READ(15,1000)(REPRAT(1,J),J=1,NTYPES)
000292 23 READ(15,1000)(REPRAT(2,J),J=1,NTYPES)
000293 23 WRITE(NPRNT,1979)(REPRAT(1,J),J=1,NTYPES)
000294 23 WRITE(NPRNT,1979)(REPRAT(2,J),J=1,NTYPES)
000295 23 OS = REPRAT(2,1)
000296 23 WRITE(NPRNT,1020) L16
000297 23 C .....
000298 23 C *
000299 23 C * PWRST
000300 23 C *
000301 23 C .....
000302 23 C INITIALIZE WAR RESERVE OUTPUT RATES IN HANHOOURS PER DAY.
000303 23 READ (15,1030) ALPHA
000304 23 C WRITE (NPRNT,1031) ALPHA
000305 23 READ(15,1000)(PWRST(J),J=1,NTYPES)
000306 23 WRITE(NPRNT,1979)(PWRST(J),J=1,NTYPES)
000307 23 WRITE(NPRNT,1020) L17
000308 23 C .....
000309 23 C *
000310 23 C * DLYSTA
000311 23 C *
000312 23 C .....
000313 23 C INPUT ON STATION COMMITMENT DELAY
000314 23 READ (15,1030) ALPHA
000315 23 C WRITE (NPRNT,1031) ALPHA
000316 23 READ(15,1000) DLYSTA
000317 23 WRITE(NPRNT,1979) DLYSTA
000318 23 WRITE(NPRNT,1020) L19
000319 23 C INPUT POMCUS COMMITMENT DELAY
000320 23 C .....
000321 23 C *
000322 23 C *
000323 23 C * DLYPON
000324 23 C *
000325 23 C .....
000326 23 C READ (15,1030) ALPHA
000327 23 WRITE (NPRNT,1031) ALPHA
000328 23 READ(15,1000) DLYPON
000329 23 WRITE(NPRNT,1979) DLYPON
000329 23 WRITE(NPRNT,1020) L20

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***** INTLC *****

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***** INTLC *****

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000330 23 C .....
000331 23 C * .....
000332 23 C * DLYCON .....
000333 23 C * .....
000334 23 C .....
000335 23 C INPUT CONUS COMMITMENT DELAY .....
000336 23 READ (15,1030) ALPHA .....
000337 23 C WRITE (NPRNT,1031) ALPHA .....
000338 23 READ(15,1000) DLYCON .....
000339 23 WRITE(NPRNT,1979) DLYCON .....
000340 23 WRITE(NPRNT,1020) L21 .....
000341 23 C INPUT HOSPITAL RETURN TO THEATER PERSONNEL DELAY .....
000342 23 C .....
000343 23 C * .....
000344 23 C * DLYHOS .....
000345 23 C * .....
000346 23 C .....
000347 23 READ (15,1030) ALPHA .....
000348 23 C WRITE (NPRNT,1031) ALPHA .....
000349 23 READ(15,1000) DLYHOS .....
000350 23 WRITE(NPRNT,1979) DLYHOS .....
000351 23 WRITE(NPRNT,1020) L22 .....
000352 23 C INPUT DELAY FOR SUPPLIES SHIPPED FROM THEATER STOCKS TO UNITS. ....
000353 23 C .....
000354 23 C * .....
000355 23 C * DLYSUP .....
000356 23 C * .....
000357 23 C .....
000358 23 READ (15,1030) ALPHA .....
000359 23 C WRITE (NPRNT,1031) ALPHA .....
000360 23 READ(15,1000) DLYSUP .....
000361 23 WRITE(NPRNT,1979) DLYSUP .....
000362 23 WRITE(NPRNT,1020) L23 .....
000363 23 C INPUT PERSONNEL TO UNIT SHIPMENT DELAY .....
000364 23 C .....
000365 23 C * .....
000366 23 C * DLYPER .....
000367 23 C * .....
000368 23 C .....
000369 23 READ (15,1030) ALPHA .....
000370 23 C WRITE (NPRNT,1031) ALPHA .....
000371 23 READ(15,1000) DLYPER .....
000372 23 WRITE(NPRNT,1979) DLYPER .....
000373 23 WRITE(NPRNT,1020) L24 .....
000374 23 C INPUT DELAY IN DS MAINTENANCE .....
000375 23 C .....
000376 23 C * .....
000377 23 C * DLYHAI .....
000378 23 C * .....
000379 23 C .....
000380 23 READ (15,1030) ALPHA .....
000381 23 C WRITE (NPRNT,1031) ALPHA .....
000382 23 READ(15,1000) DLYHAI .....
000383 23 WRITE(NPRNT,1979) DLYHAI .....
000384 23 C .....
000385 23 C * .....
000386 23 C * DSNCH .....
000387 23 C WHERE DO THE DAMAGED UNITS GO? INPUT THE FRACTION OF NONCOMBAT LOSSES THAT .....
000388 23 C * .....
000389 23 C .....
000390 23 C GOES TO DS MAINTENANCE. ....
000391 23 READ (15,1030) ALPHA .....
000392 23 C WRITE (NPRNT,1031) ALPHA .....
000393 23 READ(15,1000) (DSNCH(I), I=1, NTPES) .....
000394 23 WRITE(NPRNT,1020) L25 .....
000395 23 WRITE(NPRNT,1979) (DSNCH(I), I=1, NTPES) .....
000396 23 C .....
000397 23 C * .....
000398 23 C * DSCON .....
000399 23 C * .....
000400 23 C .....
000401 23 C WHERE DO THE DAMAGED UNITS GO? INPUT THE FRACTION OF COMBAT LOSSES THAT .....
000402 23 C GOES TO DS MAINTENANCE. ....
000403 23 READ (15,1030) ALPHA .....
000404 23 C WRITE (NPRNT,1031) ALPHA .....
000405 23 READ(15,1000) (DSCOM(I), I=1, NTPES) .....
000406 23 WRITE(NPRNT,1020) L26 .....
000407 23 WRITE(NPRNT,1979) (DSCOM(I), I=1, NTPES) .....
000408 23 DO 2 I=1, NTPES .....
000409 23 6SNCH(I)=1-DSNCH(I) .....
000410 23 6SCOM(I)=1-DSCOM(I) .....
000411 23 2 CONTINUE

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***** INTLC *****

***** INTLC *****

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000412 23 WRITE(NPRT,1020) L27
000413 23 WRITE(NPRT,1979) (SMCN(I),I=1,NTYPES)
000414 23 WRITE(NPRT,1020) L28
000415 23 WRITE(NPRT,1979) (SCOM(I),I=1,NTYPES)
000416 23 WRITE(NPRT,1020) L29
000417 23 C .....
000418 23 C *
000419 23 C * MAFACT
000420 23 C *
000421 23 C .....
000422 23 C MAFACT(1,J) = AVERAGE DS MAINTENANCE TIME FOR NONCOMBAT EQUIPMENT BY TYPE.
000423 23 C MAFACT(2,J) = AVERAGE BS MAINTENANCE TIME FOR NONCOMBAT EQUIPMENT BY TYPE.
000424 23 C MAFACT(3,J) = AVERAGE DS MAINTENANCE TIME FOR COMBAT EQUIPMENT BY TYPE.
000425 23 C MAFACT(4,J) = AVERAGE BS MAINTENANCE TIME FOR COMBAT EQUIPMENT BY TYPE.
000426 23 DO 3 I=1,4
000427 23 READ (15,1030) ALPHA
000428 23 C WRITE (NPRT,1031) ALPHA
000429 23 READ(15,1000) (MAFACT(I,J),J=1,NTYPES)
000430 24 WRITE(NPRT,1979) (MAFACT(I,J),J=1,NTYPES)
000431 23 3 CONTINUE
000432 23 WRITE(NPRT,1020) L30
000433 23 C .....
000434 23 C *
000435 23 C * CRMPER
000436 23 C *
000437 23 C .....
000438 23 C INPUT CREW SIZES BY TYPE EQUIPMENT.
000439 23 READ (15,1030) ALPHA
000440 23 C WRITE (NPRT,1031) ALPHA
000441 23 READ(15,1000) (CRMPER(I),I=1,NTYPES)
000442 23 WRITE(NPRT,1979) (CRMPER(I),I=1,NTYPES)
000443 23 C .....
000444 23 C *
000445 23 C * THTRSH
000446 23 C *
000447 23 C .....
000448 23 C
000449 23 C HERE'S THE EXPLANATION FOR COLUMNS TWO AND THREE IN THE
000450 23 C THEATER STATUS MATRIX (THTRSH). COLUMN TWO RECORDS WHERE THE UNIT
000451 23 C CAME FROM. THE MEANINGS ARE:
000452 23 C 1.0- COMBAT UNIT ON STATION
000453 23 C 2.0- PONCUS UNIT
000454 23 C 3.0- CONUS UNIT
000455 23 C
000456 23 C THE THIRD COLUMN CONTAINS THE SERIAL NUMBERS ASSOCIATED WITH EACH
000457 23 C UNIT. THEY ARE USED IN THE MODEL IN THE MAINTENANCE LOOKUP TABLE.
000458 23 C AND THE LAST ENTRY IN THE ROW IS THE ARRIVAL TIME.
000459 23 C
000460 23 READ (15,1030) ALPHA
000461 23 C WRITE (NPRT,1031) ALPHA
000462 23 READ (15,1030) ALPHA
000463 23 C WRITE (NPRT,1031) ALPHA
000464 23 READ (15,1030) ALPHA
000465 23 C WRITE (NPRT,1031) ALPHA
000466 23 WRITE(NPRT,1020) L31
000467 23 DO 200 I=1,NUMITS
000468 23 ATRIB(2)=2.0
000469 23 ATRIB(3)=I
000470 23 READ(15,1000) THTRSH(I,2),THTRSH(I,3),ATRIB(1)
000471 23 WRITE(NPRT,1979) THTRSH(I,2),THTRSH(I,3),ATRIB(1)
000472 23 IF (THTRSH(I,2) .NE. 1.0) CALL FILEN(I)
000473 23 C .....
000474 23 C *
000475 23 C * UNITAU
000476 23 C *
000477 23 C .....
000478 23 C
000479 23 C INPUT THE UNIT'S AUTHORIZED EQUIPMENT
000480 23 C
000481 23 READ(15,1000) (UNITAU(I,J),J=1,NTYPES)
000482 23 WRITE(NPRT,1979) (UNITAU(I,J),J=1,NTYPES)
000483 23 C
000484 23 C INPUT THE UNIT'S AUTHORIZED PERSONNEL
000485 23 C
000486 23 READ(15,1000) (UNITAU(I,J),J=1,NTYPES)
000487 23 WRITE(NPRT,1979) (UNITAU(I,J),J=1,NTYPES)
000488 23 C
000489 23 C IF YOU HAVE AN ORSTATION UNIT, SCHEDULE ARRIVAL OF UNIT AT FEBA
000490 23 C
000491 23 IF (THTRSH(I,2) .EQ. 1.0) CALL ONHAND(I,DLYSTA)
000492 23 200 CONTINUE

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***** INTLC *****

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***** INTLC *****
000493 23 C .....
000494 23 C *
000495 23 C *
000496 23 C *
000497 23 C .....
000498 23 C
000499 23 C INPUT THE NUMBER OF WAR RESERVES RESUPPLY EVENTS.
000500 23 C
000501 23 WRITE (NPRNT,1020) L33
000502 23 READ (15,1030) ALPHA
000503 23 C WRITE (NPRNT,1031) ALPHA
000504 23 READ (15,1010) NRESUP
000505 23 WRITE (NPRNT,1979) NRESUP
000506 23 READ (15,1030) ALPHA
000507 23 C WRITE (NPRNT,1031) ALPHA
000508 23 IF (NRESUP) 270,270,261
000509 23 261 ATRIB(2)=-6.0
000510 23 ATRIB(3)=-0.0
000511 23 DO 269 I=1,NRESUP
000512 23 C
000513 23 C INPUT THE TIME, EQUIPMENT QUANTITY AND TYPE THAT RECEIVES RESUPPLIES IN
000514 23 C WAR RESERVES.
000515 23 C
000516 23 READ(15,1000) ATRIB(1), ATRIB(4), ATRIB(7)
000517 23 WRITE(NPRNT,1979) ATRIB(1), ATRIB(4), ATRIB(7)
000518 23 269 CALL FILEN(1)
000519 23 270 CONTINUE
000520 23 C .....
000521 23 C *
000522 23 C *
000523 23 C *
000524 23 C .....
000525 23 C
000526 23 C INPUT THE NUMBER OF RESERVE REPLACEMENT PERSONNEL EVENTS RECEIVED BY
000527 23 C THE THEATER.
000528 23 C
000529 23 WRITE(NPRNT,1020) L34
000530 23 READ (15,1030) ALPHA
000531 23 C WRITE (NPRNT,1031) ALPHA
000532 23 READ(15,1010) NREPL
000533 23 WRITE(NPRNT,1979) NREPL
000534 23 IF (NREPL) 280,280,271
000535 23 271 ATRIB(2)=-7.0
000536 23 ATRIB(3)=-0.0
000537 23 READ (15,1030) ALPHA
000538 23 C WRITE (NPRNT,1031) ALPHA
000539 23 DO 279 I=1,NREPL
000540 23 C
000541 23 C INPUT TIME, QUANTITY AND TYPE OF PERSON RESUPPLY TO THEATER STOCK
000542 23 C
000543 23 READ(15,1000) ATRIB(1), ATRIB(5), ATRIB(7)
000544 23 WRITE(NPRNT,1979) ATRIB(1), ATRIB(5), ATRIB(7)
000545 23 279 CALL FILEN(1)
000546 23 280 CONTINUE
000547 23 C .....
000548 23 C *
000549 23 C *
000550 23 C *
000551 23 C .....
000552 23 C
000553 23 C INPUT TIME, QUANTITY, AND EQUIPMENT TYPE WHERE PERSONNEL IS RESUPPLIED
000554 23 C FROM THEATER STOCKS.
000555 23 C
000556 23 READ (15,1030) ALPHA
000557 23 C WRITE (NPRNT,1031) ALPHA
000558 23 WRITE(NPRNT,1020) L35
000559 23 READ(15,1010) NARRMS
000560 23 WRITE(NPRNT,1979) NARRMS
000561 23 READ (15,1030) ALPHA
000562 23 C WRITE (NPRNT,1031) ALPHA
000563 23 IF (NARRMS) 290,290,281

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***** INTLC *****

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***** MAINT *****

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000001      06      SUBROUTINE MAINT
000002      06      C
000003      06      C MCC2(I,J,K)- MAINTENANCE CONTROL CENTER2
000004      06      C      I=1- DS NONCOMBAT
000005      06      C      I=2- BS NONCOMBAT
000006      06      C      I=3- DS COMBAT
000007      06      C      I=4- BS COMBAT
000008      06      C      J=1- QUEUE LENGTH
000009      06      C      J=2- QUEUE INPUT FOR CYCLE
000010      06      C      J=3- QUEUE OUTPUT FOR CYCLE
000011      06      C      K= COMBAT EQUIPMENT TYPE
000012      06      C
000013      06      C      INCLUDE COMMON-LIST
000014      06      C
000015      06      C      INITIAL CURRENT CYCLE INPUT TOTALS
000016      06      C
000017      10      DO 2005 J=1,NTYPES
000018      06      REPOUT(I,J)=0.0
000019      06      DO 190 J=1,4
000020      06      190 MCC2(J,2,J)=0.0
000021      06      DO 200 I=1,NUMITS
000022      06      C
000023      06      C      APPORTION LOSSES TO REAR DS AND BS MAINTENANCE
000024      06      C
000025      06      MCC2(1,2,J)=MCC2(1,2,J)*DSN(I,J)
000026      08      RESUP(I,J,1)=RESUP(I,J,1)+DSN(I,J)
000027      06      MCC2(2,2,J)=MCC2(2,2,J)+GSM(I,J)
000028      08      RESUP(I,J,1)=RESUP(I,J,1)+GSM(I,J)
000029      06      MCC2(3,2,J)=MCC2(3,2,J)+DSC(I,J)
000030      08      RESUP(I,J,1)=RESUP(I,J,1)+DSC(I,J)
000031      06      MCC2(4,2,J)=MCC2(4,2,J)+BSC(I,J)
000032      08      RESUP(I,J,1)=RESUP(I,J,1)+BSC(I,J)
000033      07      200 CONTINUE
000034      06      TBSIN(I)=TBSIN(I)+MCC2(2,2,J)+MCC2(4,2,J)
000035      06      RDSIN(I)=RDSIN(I)+MCC2(1,2,J)+MCC2(3,2,J)
000036      10      2005 CONTINUE
000037      09      CS      WRITE(13,1000)
000038      06      1000 FORMAT(1X,'INPUT TO REAR REPAIR QUEUES')
000039      06      DO 201 J=1,NTYPES
000040      09      CS      WRITE(13,1010) J,MCC2(I,2,J),I=1,4)
000041      06      1010 FORMAT(1X,'TYPE=',I4,' QUEUE INPUT',4(F10.2,1X))
000042      06      201 CONTINUE
000043      06      C
000044      06      C      COMPUTE THE OUTPUT OF MAINTENANCE FOR THE CURRENT DAY
000045      06      C
000046      06      DO 220 J=1,NTYPES
000047      06      C      INITIALIZE DIRECT SUPPORT MAINT OUTPUT
000048      06      REPCAP=REPRAT(I,J)
000049      09      CS      WRITE(13,1020) J,REPCAP
000050      06      1020 FORMAT(1X,'TYPE=',I4,' DS-REPCAP=',F10.2)
000051      06      C
000052      06      C      COMPUTE DS MAINTENANCE OUTPUT
000053      06      C
000054      06      DO 210 I=1,4,2
000055      06      C
000056      06      C      COMPUTE OUTPUT ONLY IF THERE IS REMAINING DS CAPACITY
000057      06      C
000058      06      IF(REPCAP.EQ.0) GO TO 210
000059      06      1030 FORMAT(1X,'TYPE=',I4,' MAINT=',I3,' QUEUE=',F10.2)
000060      06      C
000061      06      C      GO TO 205 IF EQUIPMENT AWAITING REPAIR IS GREAT THAN THE REMAINING DS
000062      06      C      REPAIR CAPACITY
000063      06      C
000064      06      IF(REPCAP-LY*MAFACT(I,J)+MCC2(I,1,J))100 TO 205
000065      06      C
000066      06      C      COMPUTE DS MAINTENANCE OUTPUT FOR THE CASE OF HAVING FEWER PIECES
000067      06      C      OF EQUIPMENT AWAITING REPAIR THAN THE REPAIR CAPACITY
000068      06      C
000069      06      MCC2(I,3,J)=MCC2(I,1,J)
000070      06      MCC2(I,1,J)=0.0
000071      06      REPOUT(I,J)=REPOUT(I,J)+MCC2(I,3,J)
000072      06      REPCAP=REPCAP-MAFACT(I,J)+MCC2(I,1,J)
000073      09      CS      WRITE(13,1040) J,I,REPCAP,MCC2(I,1,J)
000074      06      1040 FORMAT(1X,'TYPE=',I4,' MAINT. TYPE=',I3,' DS-REPCAP=',F10.2,
000075      06      1 * QUEUE LENGTH=',F10.2)
000076      06      OTRDS(I)=OTRDS(I)+MCC2(I,3,J)
000077      06      GO TO 210
000078      06      C
000079      06      C      COMPUTE DS MAINTENANCE OUTPUT WHEN DS REPAIR CAPACITY IS SMALLER
000080      06      C      THAN EQUIPMENT AWAITING REPAIR
000081      06      C
000082      06      205 MCC2(I,3,J)=REPCAP/MAFACT(I,J)
000083      06      REPOUT(I,J)=REPOUT(I,J)+MCC2(I,3,J)
000084      06      MCC2(I,1,J)=MCC2(I,1,J)-MCC2(I,3,J)
000085      06      REPCAP=0.0

```

***** MAINT *****


```

***** MAINT *****
000086      09  C#  WRITE(13,10#D)J,I,REPCAP,MCC2(I,1,J)
000087      06      OTRS(I,J)=OTRS(I,J)+MCC2(I,3,J)
000088      06      210 CONTINUE
000089      06  C
000090      06  C INITIALIZE 65 REPAIR CAPACITY
000091      06  C
000092      06      REPCAP=REPRAT(2,J)-65*65
000093      09  C#  WRITE(13,10#D)J,REPCAP
000094      06      1050 FORMAT(1X,'TYPE=',I3,' 65-REPCAP=',F10.2)
000095      06      DO 220  I=2,4,2
000096      06  C
000097      06  C IF REPAIR CAPACITY IS 0.0 THEN DONOT OUTPUT EQUIPMENT FROM MAINTENANCE
000098      06  C
000099      06      IF(REPCAP .LE. 0.0)GO TO 220
000100      06  C
000101      06  C IF 65 MAINTENANCE CAPACITY LESS THEN EQUIPMENT AWAITING REPAIR 60Y0215
000102      06  C
000103      09  C#  WRITE(13,10#D)J,I,MCC2(I,1,2)
000104      06      1060 FORMAT(1X,'TYPE=',I3,' MAINT TYPE=',I3,' QUEUE=',F10.2)
000105      06      IF(REPCAP.LT.MCC2(I,1,J)+MAFACT(I,J)) GO TO 215
000106      06  C
000107      06  C 65 OUTPUT WHEN 65 REPAIR CAPACITY IS GREATER THAN QUEUE LENGTH
000108      06  C
000109      06      MCC2(I,3,J)=MCC2(I,1,J)
000110      06      MCC2(I,1,J)=0.0
000111      06      REPCAP=REPCAP-MCC2(I,3,J)+MAFACT(I,J)
000112      06      REPOUT(I,J)=REPOUT(I,J)+MCC2(I,3,J)
000113      09  C#  WRITE(13,10#D)J,I,REPCAP,MCC2(I,1,J)
000114      06      1070 FORMAT(1X,'TYPE=',I3,' MAINT TYPE=',I3,' 65-REPCAP=',F10.2,
000115      06      1 ' QUEUE-LENGTH=',F10.2)
000116      06      OT65(I,J)=OT65(I,J)+MCC2(I,3,J)
000117      06      GO TO 220
000118      06  C
000119      06  C 65 MAINTENANCE OUTPUT IF REPAIR CAPACITY IS LESS THAN QUEUE LENGTH
000120      06  C
000121      06      215 MCC2(I,3,J)=REPCAP/MAFACT(I,J)
000122      06      REPCAP=0.0
000123      06      MCC2(I,1,J)=MCC2(I,1,J)-MCC2(I,3,J)
000124      06      REPOUT(I,J)=REPOUT(I,J)-MCC2(I,3,J)
000125      09  C#  WRITE(13,10#D)J,I,REPCAP,MCC2(I,1,J)
000126      06      OT65(I,J)=OT65(I,J)+MCC2(I,3,J)
000127      06      220 CONTINUE
000128      09  C#  WRITE(13,10#D)
000129      06      1080 FORMAT(1X,'QUEUES AFTER MAINTENANCE')
000130      06      CALL OTMCC2
000131      06  C
000132      06  C INPUT NEW ITEMS INTO REPAIR QUEUES
000133      06  C
000134      06      DO 230 J=1,NTYPES
000135      06      DO 230 I=1,4
000136      06      230 MCC2(I,1,J)=MCC2(I,1,J)+MCC2(I,2,J)
000137      09  C#  WRITE(13,10#D)
000138      06      1090 FORMAT(1X,'QUEUES AFTER NEW INPUTS')
000139      06      RETURN
000140      06      END

```

```

***** MAINT *****

```

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***** MASUIN *****

```

000001 07 SUBROUTINE MASUIN
000002 07 INCLUDE COMMON LIST
000003 11 C6 WRITE (13,197)ITNOW
000004 07 1971 FORMAT (' *****SUBROUTINE MASUIN CALLED AT ',F20.1,' *****')
000005 07 C
000006 07 C THIS SUBROUTINE INCREASES THE SYSTEM'S MAINTENANCE OR SUPPLY CAPACITY
000007 07 C
000008 07 N=IFIX(ATTRIB(2))
000009 07 N=IFIX(ATTRIB(6)-3.0)
000010 11 C6 WRITE (13,1979) REPRAT(1,N), REPRAT(2,N), PMSRT(M), DAMRAT(N),
000011 10 C6 1 ABRAT(N),M,M
000012 07 60 TO(100+200,300),M
000013 07 100 REPRAT(1,N)=REPRAT(1,M)+ATTRIB(5)
000014 11 C6 WRITE (13,1979) REPRAT(1,N), ATTRIB(5)
000015 07 RETURN
000016 07 200 REPRAT(2,N)=REPRAT(2,M)+ATTRIB(5)
000017 11 C6 WRITE (13,1979) REPRAT(2,N)
000018 11 C6 WRITE (13,1979) REPRAT(2,N)+ATTRIB(5)
000019 07 RETURN
000020 07 300 PMSRT(M)=PMSRT(M)+ATTRIB(5)
000021 11 C6 WRITE (13,1979) PMSRT(M)+ATTRIB(5)
000022 07 RETURN
000023 07 END

```

***** MASUIN *****

***** OBJECT *****

```

000001 00 SUBROUTINE OBJECT(MEAN,PVAR,MNSAM)
000002 00 INCLUDE COMMON LIST
000003 01 PVAR=TANK
000004 00 PVAR=-1
000005 00 MNSAM=-1
000006 00 RETURN
000007 00 END

```

***** OBJECT *****

***** ONHAND *****

```

000001 03 SUBROUTINE ONHAND(NUNIT,DELAY)
000002 03 INCLUDE COMMON LIST
000003 03 C
000004 03 C SUBROUTINE ONHAND WILL CREATE THE ON HAND STRENGTH FOR ON STATION UNITS.
000005 03 C IN ADDITION, THIS ROUTINE SCHEDULES THE COMMITMENT TO THE PEGA FOR ALL ON
000006 03 C STATION UNITS
000007 03 C
000008 03 DO 10 I=1,NTYPES
000009 03 UNITON(NUNIT,I)=UNITAJ(NUNIT,I,1)
000010 03 10 UNITON(NUNIT,I,2)=UNITAJ(NUNIT,I,2)
000011 04 THTRSM(NUNIT,I)=1.0
000012 03 ATTRIB(2)=3.0
000013 03 ATTRIB(1)=TNOW*DELAY
000014 03 ATTRIB(3)=FLOAY(NUNIT)
000015 03 CALL FILEN(1)
000016 03 C INCREASE DS MAINTENANCE FOR UNIT
000017 03 C
000018 03 DO 400 I=1,NDATE
000019 03 400 IF(THTRSM(NUNIT,3).EQ.MACAPT(I,1))GO TO 420
000020 03 WRITE(6,410) NUNIT
000021 03 410 FORMAT(1X,'COMBAT UNIT',I5,' HAS NO ASSOCIATED DS MAINTENANCE')
000022 03 RETURN
000023 03 420 JJ=NTYPES+2
000024 03 DO 430 J=3,JJ
000025 06 430 UNTHAC(NUNIT,J-2)=MACAPT(I,2)+MACAPT(I,J)
000026 03 RETURN
000027 03 END

```

***** ONHAND *****

```

***** 0TNC1 *****
000001 00      SUBROUTINE 0TNC1
000002 00      C
000003 00      C THIS SUBROUTINE OUTPUTS THE ARRAY NCC1 INTO THE DIAGNOSTIC FILE
000004 00      C
000005 01      INCLUDE COMMON-LIST
000006 00      DO 100 I=1,NUNIT'S
000007 04      C$ WRITE(13,1000)
000008 00      1000 FORMAT(1X,'NCC1 FOR UNIT NUMBER ',I3)
000009 04      C$ WRITE(13,1010)((NCC1(I,J,1)),J=1,NTYPES)
000010 00      1010 FORMAT(1X,'NONCOMBAT LOSS QUEUE'/12(1X,F9.2))
000011 04      C$ WRITE(13,1020)((NCC1(I,J,1)),J=1,NTYPES)
000012 00      1020 FORMAT(1X,'COMBAT LOSS QUEUE'/12(1X,F9.2))
000013 04      C$ WRITE(13,1030)((NCC1(I,J,2)),J=1,NTYPES)
000014 00      1030 FORMAT(1X,'NONCOMBAT QUEUE OUTPUT'/12(1X,F9.2))
000015 04      C$ WRITE(13,1040)((NCC1(I,J,2)),J=1,NTYPES)
000016 00      1040 FORMAT(1X,'COMBAT QUEUE OUTPUT'/12(1X,F9.2))
000017 04      C$ WRITE(13,1050)((NCC1(I,J,3)),J=1,NTYPES)
000018 00      1050 FORMAT(1X,'NONCOMBAT QUEUE INPUT'/12(1X,F9.2))
000019 04      C$ WRITE(13,1060)((NCC1(I,J,3)),J=1,NTYPES)
000020 00      1060 FORMAT(1X,'COMBAT QUEUE INPUT'/12(1X,F9.2))
000021 04      C$ WRITE(13,1070)(UNITOM(I,J,1),J=1,NTYPES)
000022 00      1070 FORMAT(1X,'UNIT STRENGTH'/12(1X,F9.2))
000023 01      100 CONTINUE
000024 00      RETURN
000025 00      END

***** 0TNC1 *****

```

```

***** 0TNC2 *****
000001 02      SUBROUTINE 0TNC2
000002 01      INCLUDE COMMON-LIST
000003 01      DO 200 J=1,NTYPES
000004 05      C$ WRITE(13,2000) J
000005 01      2000 FORMAT(1X,'TYPE= ',I4)
000006 05      C$ WRITE(13,2100)((NCC1(I,1,J)),I=1,4)
000007 01      2100 FORMAT(1X,'QUEUE LENGTH',5X,4(F10.2,3X))
000008 01      2200 FORMAT(1X,'QUEUE INPUT ',5X,4(F10.2,3X))
000009 01      2300 FORMAT(1X,'QUEUE OUTPUT',5X,4(F10.2,3X))
000010 05      C$ WRITE(13,2200)((NCC2(I,2,J)),I=1,4)
000011 05      C$ WRITE(13,2300)((NCC2(I,3,J)),I=1,4)
000012 01      200 CONTINUE
000013 01      RETURN
000014 01      END

***** 0TNC2 *****

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***** OPUT *****

```

000001 00      SUBROUTINE OPUT
000002 00      INCLUDE COMMON.LIST
000003 00      PRINT 99,TNOW
000004 00      99 FORMAT (1M1,'*****SUBROUTINE OPUT CALLED AT TNOW = ',F5.0 ,
000005 00      2 '*****//')
000006 00      WRITE(6,100)
000007 00      100 FORMAT(1X,'THE TNRSM IS')
000008 00      DO 1000 I=1,NUNITS
000009 00      1000 WRITE(6,110) (TNRSM(I,J),J=1,3)
000010 00      110 FORMAT (1M , 3 (F9.3,1X) )
000011 00      WRITE(6,120)
000012 00      120 FORMAT(1X,'THE UNIT AUTHORIZE STRENGTHS ARE')
000013 00      DO 1100 I=1,NUNITS
000014 00      1100 WRITE(6,110) (UNITAU(I,J,K),J=1,NTYPES),K=1,2)
000015 00      WRITE(6,130)
000016 00      130 FORMAT(1X,'THE ONHAND UNIT STRENGTH IS')
000017 00      DO 1200 I=1,NUNITS
000018 00      1200 WRITE(6,110) (UNITAU(I,J,K),J=1,NTYPES),K=1,2)
000019 00      WRITE(6,140) (CONRAT(I),I=1,NTYPES), (INCRAT(I),I=1,NTYPES), (
000020 00      1 PERRAT(I),I=1,NTYPES), (UNREP(I),I=1,NTYPES), (DMRAT(I),I=1,NTYPES)
000021 00      2, (ABRAT(I),I=1,NTYPES)
000022 00      140 FORMAT(1X,'THE COMBAT LOSS RATE IS',F10.5/1X,'THE NONCOMBAT LOSS R
000023 00      1ATE IS',F10.5/1X,'THE PERSON
000024 00      2 *REL LOSS RATE IS',F10.5/'THE UNREPAIRABLE RATE IS',F10.5/1X,
000025 00      3 *THE DAMAGE RATE IS',F10.5/1X,'THE ABANDONMENT RATE IS',F10.5)
000026 00      WRITE(6,150) (REPRAT(I),I=1,NTYPES), (PWRS(I),I=1,NTYPES)
000027 00      1)
000028 00      150 FORMAT(1X,'THE REPAIR RATE IS',F35.5,2X,F10.2/1X,'THE WAR RESERVES
000029 00      1 SUPPLY RATE IS',F10.2)
000030 00      WRITE(6,160)
000031 00      160 FORMAT(1X,'THE WAR RESERVES STOCKS ARE')
000032 00      WRITE(6,110) (PWRS(I),I=1,NTYPES), (PWRSIN(I),I=1,NTYPES)
000033 00      WRITE(6,170)
000034 00      170 FORMAT(1X,'THE THEATER SUPPLIES ARE')
000035 00      WRITE(6,110) (TSTOCK(1,J),J=1,NTYPES)
000036 00      WRITE (6,110) (TSTOCK(2,J),J=1,NTYPES)
000037 00      WRITE(6,180)
000038 00      180 FORMAT(1X,'THE THEATER PERSONNEL POOL')
000039 00      WRITE(6,110) (TPERS(1,J),J=1,NTYPES), (PERSIN(I),I=1,NTYPES)
000040 00      WRITE (6,110) (TPERS(2,J),J=1,NTYPES)
000041 00      WRITE(6,190) (LYSTA,DLYCON,DLYPON,DLYMOS,DLYPER,DLYSUP
000042 00      190 FORMAT(1X,'ONSTATION, PONCUS, CONUS, HOSPITAL, PERSONNEL RESUPPLY,
000043 00      1 AND RESUPPLY DELAYS'/1X,10(F6.1,1X))
000044 00      WRITE(6,200)
000045 00      200 FORMAT(1X,'DS CAPACITY LOOK UP TABLE')
000046 00      DO 1300 I=1,NMATE
000047 00      1300 WRITE(6,110) (INCAPT(I,J),J=1,3)
000048 00      CALL CHECK(2)
000049 00      WRITE (6,10) TNOW
000050 00      10 FORMAT ( ' THE SIMULATION HAS ENDED AT',F10.1)

000051 00      PRINT 2020,(IDEC(I),K=1,6)
000052 02      2020 FORMAT ( ' THE VALUES OF THE DECISION VARIABLES ARE',/,6(2X,F10.3))
000053 00      PRINT 2021,TANK,OS
000054 02      2021 FORMAT ( ' THE NUMBER OF COMMITED TANK DAYS IS ',F10.3, /
000055 00      * ' AND THE SIZE OF A OS UNIT IS',F10.0)
000056 00      RETURN
000057 00      END

```

***** OPUT *****

***** PROC *****

```

0001 COMMON PROC
0002 C
0003     PARAMETER U=35, T=3, W=T+2, S=20, D=60
0004 C
0005 C U IS THE NUMBER OF UNITS IN THE INPUT DECK; U=NUNITS
0006 C T IS THE NUMBER OF TYPES IN EACH UNIT OF THE INPUT DECK; T=NTYPES
0007 C S IS THE NUMBER OF ROWS IN THE LOOK-UP TABLE; S=NRAYS
0008 C D THE NUMBER OF DAYS THE SIMULATION IS RUN FOR; D=NDAY
0009 C THESE PARAMETERS MUST BE CHANGED IF THE NUMBER OF UNITS OR TYPES
0010 C IS CHANGED, AND THEN ALL SUB-PROGRAMS MUST BE RECOMPILED.
0011 C
0012     COMMON / ARRAY1 / ABRAT(I),
0013     1 BACKL(U,T), BACKPL(U,T), BUFRN(I),
0014     2 CONRAT(I), COMLOS(U,T), CRENAV(U,T), CREMLS(U,T),
0015     3 CRVLR(I), CRMPER(I),
0016     4 DANRAT(I), DAYLOS(I), DSCOM(I), DSNCN(I),
0017     5 DSREP(I), DSC(U,T), DSN(U,T),
0018     6 GSCOM(I), GSNCN(I), GSREP(I),
0019     6 GSC(U,T), GSN(U,T),
0020     7 HOSPER(I), HOSPIN(I),
0021     8 MACAPT(S,W), MAFACT(I,T), MCC1(U,T,3,2),
0022     * MCC2(I,3,T),
0023     9 MCMLOS(U,T), MCMRAT(I)
0024     COMMON / ARRAY2 /
0025     1 PERFACT(I), PERLOS(I), PERRAT(I), PERSEN(U,T),
0026     2 PERSIN(I), PRMLOS(I), PWR(I), PWRSHR(I),
0027     3 PWSIN(I), PWSOUT(I), PWSRT(I),
0028     4 REPAIR(I,T), REPOUT(I), REPRAT(2,T),
0029     5 RESUP(U,T,2), RESUPA(U,T,2), RESUPB(U,T,2),
0030     6 SUPFACT(I), SUPSEN(U,T),
0031     7 TBCKLG(I), TBCKPL(I), TCOM(I), TMTSRM(U,4),
0032     8 TLOS(I), TMCN(I), TOTLOS(U,T), TOTPER(I),
0033     9 TOTSTK(I), TPERLS(I), TPER(2,T), TPRSEN(I),
0034     1 TSPNOT(I), TSPSEN(I), TSTOCK(2,T), TRANST(I),
0035     2 UMCN(I), UMCRT(I), UNITAU(U,T,2), UNITOH(U,T,2),
0036     3 UNREP(I), UNTHAC(U,T)
0037 C
0038 C
0039     COMMON / SSAVE / DVAR1(7),DVAR2(6),DVAR3(4),DVAR4(4),DVAR5(3)
0040 C
0041     COMMON / CHECK / HOSP(I), OTGS(I), OTRDS(I), OTUNDS(I),
0042     1 PERARR(I), PTRANS(I), RDSIN(I), SUPTOT(I), TBSINI(I),
0043     2 UNDSIN(I), VARRES(I), IN(11,0,T), OUT(21,0,T), DELTA(3,D,T),
0044     3 QCAP(3,D,T)
0045 C
0046     COMMON / TOTS / NUNITS, NTYPES, NMAINT, NMAIYP, NSPUNT, NSPTYP
0047 C
0048 C
0049     COMMON / NGNARR / DAYPRN, OLYSTA, DLYPCM, DLYCON,
0050     1 DDAY, DLYMOS, OLYSUP, DLYPER, DLYHAI, KDAY, NMATE,
0051     2 PERMS
0052 C
0053 C
0054     COMMON / BCN1 / ATRIB(25), JEVNT, MFA, MFE(100), HLE(100), WSTOP,
0055     2 NCRDR, NNAPO, NNAPT, NNAIR, NNFIL, NND(100), NNTRY, NPRT,
0056     3 PPARH(50,4), TNOW, TYBEG, TTCLR, TYFIN, TTRIB(25), TTSET
0057 C
0058     COMMON / BCN3 / AAEMR, DTHAX, DTHIN, DTSAV, IITES, LLEMR, LLSAV, LLSEV, RREG
0059     1 RR, TLAS, TTSAV
0060 C
0061     COMMON / GOPT1 / IPNT, OPTMUN, JOLD, NNDLD, DDOLD(6,7), NND(100), LLDEC(5,2) GOPT1 1
0062     1, NOPTNR, PAVB, LMBP, LUOP, LIP, LYBP, LSP, LUSP, LISP, LOPT, NNRX, SSPTS, GOPT1 2
0063     2 TFCAR, DIRECT, TTFST, TTTM, DDEC(6) GOPT1 3
0064 C
0065     COMMON / TANKS / TANK, BS, SSS
0066     EQUIVALENCE (DDEC(1), RELOC), (DDEC(2), BSUS)
0067 C
0068     COMMON / SET(100)
0069     EQUIVALENCE (HSET(1), QSET(1))
0070 C
0071     REAL MFACT, MACAPT, MCMLOS, MCMRAT, MCC1, MCC2, IN
0072     1976 FORMAT ( )
0073     1977 FORMAT (10010,4)
0074     1978 FORMAT (1015)
0075     1979 FORMAT ( )
0076     END

```

***** PROC *****

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***** RESERV *****

```

000001 00 SUBROUTINE RESERV
000002 00 INCLUDE COMMON LIST
000003 01 C$ WRITE (13, 1971) TNOW
000004 00 1971 FORMAT (' *****SUBROUTINE RESERV CALLED AT ', F10.1, ' *****')
000005 00 C
000006 00 C THIS SUBROUTINE HANDLES RESUPPLY OF CONUS RESERVE PERSONNEL TO THEATER
000007 00 C PERSONNEL POOLS
000008 00 C
000009 00 M=FIX(ATRIB(7))
000010 01 C$ WRITE (13,1979) PERSIN(M)
000011 00 PERSIN(M)=PERSIN(M)+ATRIB(5)
000012 01 C$ WRITE (13,1979) PERSIN(M),ATRIB(5)
000013 00 RETURN
000014 00 END

```

***** RESERV *****

***** SSAVE *****

```

000001 27 SUBROUTINE SSAVE
000002 27 INCLUDE COMMON LIST
000003 28 NAMELIST /OUTPUT/ DPVAR1,DPVAR2,DPVAR3,DPVAR4,DPVAR5
000004 27 WRITE (13, 1971) TNOW
000005 27 1971 FORMAT (' *****SUBROUTINE SSAVE CALLED AT ', F10.1, ' *****')
000006 27 C
000007 27 C ZERO LOCAL VARIABLES
000008 27 C
000009 27 DO 1 I=1,4
000010 31 DPVAR4(I)=0.
000011 27 DPVAR1(I)=0.
000012 27 DPVAR2(I)=0.
000013 27 1 DPVAR3(I)=0.
000014 27 DPVAR1(5)=0.
000015 27 DPVAR2(5)=0.
000016 27 DPVAR1(6)=0.
000017 30 DPVAR2(6)=0.
000018 27 DPVAR1(7)=0.
000019 28 DPVAR5(1)=0.
000020 28 DPVAR5(2)=0.
000021 28 DPVAR5(3)=0.
000022 27 C
000023 27 C GRAPH NUMBER 1 BREAKS THE COMMITTED HARDWARE INTO ITS LOCATION IN THE
000024 27 C MODEL.
000025 27 C
000026 27 DO 100 J=1,NTYPES
000027 27 DPVAR1(1)=PNNLOS(J)
000028 28 C DPVAR1(1) IS THE CUMULATIVE NUMBER OF PERMANENT EQUIPMENT LOSSES.
000029 27 C
000030 27 C
000031 27 DPVAR1(2)=DPVAR1(2)+TSTOCK(1,J)+TSTOCK(2,J)
000032 27 C DPVAR1(2) IS THE QUANTITY OF HARDWARE IN THE THEATER STOCKS.
000033 27 C
000034 27 DPVAR1(3)=DPVAR1(3)+PWR5(J)
000035 27 C DPVAR1(3) IS THE QUANTITY OF EQUIPMENT IN WAR RESERVES.
000036 27 C
000037 29 DO 201 I=1,NUMITS
000038 28 C
000039 28 DPVAR1(4)=DPVAR1(4)+UNITAU(I,J,1)
000040 28 C DPVAR1(4) IS THE LEVEL OF AUTHORIZED EQUIPMENT. IT SHOULD BE A CONSTANT.
000041 28 C
000042 28 DPVAR1(5)=DPVAR1(5)+UNITOH(I,J,1)
000043 28 C DPVAR1(5) IS THE QUANTITY OF COMMITTED HARDWARE.
000044 28 C
000045 29 201 CONTINUE
000046 28 DPVAR1(6)=UMECON(J)
000047 28 C DPVAR1(6) IS THE QUANTITY OF HARDWARE THAT IS UNECONOMICALLY REPAIRABLE.
000048 27 C
000049 28 DPVAR1(7)=TRANST(I)
000050 27 C
000051 28 C DPVAR1(7) IS THE NUMBER OF TANKS IN TRANSIT
000052 27 C
000053 27 100 CONTINUE
000054 27 CALL GPLOT(DPVAR1, TNOW, 1)
000055 27 C
000056 27 C GRAPH NUMBER 2 BREAKS DOWN THE ORIGIN OF COMMITTED UNITS.
000057 27 C
000058 27 DO 101 I=1,NUMITS
000059 30 IF (TMTSRM(I,2) - 1) 112,113,110
000060 27 C

```

***** SSAVE *****

```

***** SSAVE *****
000061 27 C IF (-) THEN UNIT HAS NOT ARRIVED.
000062 27 C IF (0) THEN UNIT IS COMMITTED.
000063 27 C IF (+) THEN UNIT IS COMMITTED AND WAS AN ON STATION CONTRAT UNIT.
000064 27 C
000065 27 112 DPVAR2(1)=DPVAR2(1)+ UNITOM(I,1)
000066 27 C DPVAR2 IS THE QUANTITY OF ON STATION UNITS.
000067 27 C
000068 27      GOTO 115
000069 30 113 DPVAR2(2)=DPVAR2(2)+ UNITOM(I,1)
000070 27 C DPVAR2(2) IS THE QUANTITY OF POMCUS UNITS.
000071 27 C
000072 27      GOTO 115
000073 27 114 DPVAR2(3)=DPVAR2(3)+ UNITOM(I,1)
000074 27 C DPVAR2(3) IS THE QUANTITY OF COMUS UNITS.
000075 27 C
000076 30 115 IF (MTRSM(I,1).EQ.2) DPVAR2(5) = DPVAR2(5)+1
000077 30      IF (MTRSM(I,1).EQ.2) DPVAR2(6) = DPVAR2(6)+UNITOM(I,1)
000078 30      IF (MTRSM(I,1).EQ.1) DPVAR2(4) = DPVAR2(4)+UNITOM(I,1)
000079 30 C DPVAR2(5) IS THE NUMBER OF COMMITTED UNITS
000080 30 C DPVAR2(6) IS THE AMT OF EQUIPMENT IN THE COMMITTED UNITS
000081 30 C DPVAR2(4) IS THE AMT OF EQUIPMENT IN UNCOMMITTED UNITS
000082 27 C
000083 27 101 CONTINUE
000084 27      CALL G PLOT (DPVAR2,TNOW,2)
000085 27 C
000086 27 C GRAPH NUMBER 3
000087 27 C
000088 28      DO 120 J=1,NTYPES
000089 28      DPVAR3(1)=DPVAR3(1)+MCMLOS(J) - BUFFRM(J)
000090 28 C DPVAR3(1) IS THE NUMBER OF PERMANENT EQUIPMENT LOSSES BY DAY.
000091 27 C
000092 27      DO 119 I=1,NUMITS
000093 27 119 DPVAR3(2)=DPVAR3(2) + COMLOS(I,J) + MCMLOS(I,J)
000094 27 C THIS IS THE NUMBER OF TOTAL DAILY LOSSES (SEE REDEFINITION OF
000095 27 C DPVAR3(2) BELOW).
000096 27      DPVAR3(3) = DPVAR3(3) + REPOUT(J)
000097 27 C DPVAR3(3) IS THE MAINTENANCE RETURNS.
000098 27 C
000099 27      DPVAR3(4) = DPVAR3(4) + PMSOUT(J)
000100 27 C DPVAR3(4) IS THE WAR RESERVE ISSUES
000101 27 C
000102 27 120 CONTINUE
000103 27 C
000104 27      CALL G PLOT (DPVAR3,TNOW,3)
000105 27 C
000106 27 C GRAPH NUMBER 4
000107 27 C
000108 27      DO 116 J=1,NTYPES
000109 27      DPVAR4(1) = DPVAR4(1) + TSPSEN(J)
000110 27 C DPVAR4(1) IS THE NUMBER OF TANKS ISSUED FROM THEATER STOCKS.
000111 27 C
000112 27      DPVAR4(2) = DPVAR4(2) + TSPNOT(J)
000113 27 C DPVAR4 IS THE NUMBER OF TANKS WITHOUT A CREW AVAILABLE.
000114 27 C
000115 27      DO 116 I=1,NUMITS
000116 31      DPVAR4(3) = DPVAR4(3) + CREWAV(I,J)/4.
000117 31      DPVAR4(4)=DPVAR4(4)+BACKLG(I,J)
000118 31 116 CONTINUE
000119 27 C DPVAR4(3) IS THE AVAILABLE CREW.
000120 27 C
000121 28 C *****
000122 28 C ***** GRAPH 5 *****
000123 28 C *****
000124 28      DO 6 I17=1,NUMITS
000125 28      DO 6 J17=1,NTYPES
000126 28 C
000127 29      DPVAR5(1) = DPVAR5(1) + MCC1(I17,J17,1,1) + MCC1(I17,J17,1,2)
000128 28 C DPVAR5(1) IS THE QUEUE LENGTH FOR DIVISION MAINTENANCE.
000129 28 C SEE PROGRAM MAINT FOR THE DEFINITION OF THE MCC1 VARIABLE.
000130 28 C
000131 29      DPVAR5(2) = DPVAR5(2) + MCC2(1,1,J17) + MCC2(3,1,J17)
000132 28 C DPVAR5(2) IS THE QUEUE LENGTH FOR REAR DS MAINTENANCE.
000133 28 C SEE PROGRAM MAINT FOR THE DEFINITION OF THE MCC2 VARIABLE.
000134 28 C
000135 29      DPVAR5(3) = DPVAR5(3) + MCC2(2,1,J17) + MCC2(4,1,J17)
000136 28 C DPVAR5(3) IS THE QUEUE LENGTH FOR BS MAINTENANCE.
000137 28 C SEE PROGRAM MAINT FOR THE DEFINITION OF THE MCC2 VARIABLE.
000138 28 C
000139 29      CALL G PLOT (DPVAR5,TNOW,5)
000140 27      CALL G PLOT (DPVAR4,TNOW,4)

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***** SSAVE *****

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***** SSAVE *****

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000141 27 C
000142 27 CALL COLCT(OPVAR1(1),1)
000143 27 CALL COLCT(OPVAR1(2),2)
000144 27 CALL COLCT(OPVAR1(3),3)
000145 27 CALL COLCT(OPVAR1(4),4)
000146 27 CALL COLCT(OPVAR1(5),5)
000147 27 CALL COLCT(OPVAR1(6),6)
000148 27 CALL COLCT(OPVAR1(7),7)
000149 27 C
000150 27 CALL COLCT(OPVAR2(1),8)
000151 27 CALL COLCT(OPVAR2(2),9)
000152 27 CALL COLCT(OPVAR2(3),10)
000153 27 CALL COLCT(OPVAR2(4),11)
000154 27 CALL COLCT(OPVAR2(5),12)
000155 27 C
000156 27 C WRITE OUT THE VARIABLES TO CHECK THEIR ACCURACY.
000157 27 C
000158 27 C WRITE (13,OUTPUT)
000159 27 C
000160 27 C THAT'S ALL FOLKS
000161 27 C
000162 27 C RETURN
000163 27 C END

```

***** SSAVE *****

***** THSTOK *****

```

000001 00 SUBROUTINE THSTOK(DELAY1,DELAY2)
000002 00 C
000003 00 C THIS SUBROUTINE HANDLES THE THEATER STOCKS OF BOTH PERSONNEL AND EQUIPMENT
000004 00 C BACKLOG ORDERS ARE MAINTAINED FOR EACH UNIT ORDERS ARE FILLED IN PROPORTION
000005 00 C TO THE AVAILABLE SUPPLIES OR PERSONNEL. EQUIPMENT SUPPLIES ARE ONLY FILED FOR
000006 00 C A UNIT IF THERE ARE ENOUGH PERSONNEL AVAILABLE TO MAN THE EQUIPMENT.
000007 00 C ARRIVALS OF NEW SUPPLIES TO THEATER STOCK ARE HANDLED AFTER THEATER STOCKS
000008 00 C HAVE ATTEMPTED TO RESUPPLY THE UNIT. FINAL, A UNIT'S NEW REQUEST FOR SUPPLIES
000009 00 C UNIT BE TOTALED INTO THE UNITS BACK ORDER TOTAL AS THE FINAL TASK IN THE
000010 00 C SUBROUTINE
000011 00 C
000012 00 C INCLUDE COMMON-LIST
000013 00 C
000014 00 C TOTAL THEATER'S AVAILABLE SUPPLIES AND PERSONNEL
000015 00 C
000016 02 C WRITE (13, 1971)NOW
000017 00 1971 FORMAT (' **>SUBROUTINE THSTOK/ CALLED AT ',F10.3,' ****')
000018 00 C
000019 00 DO 400 J=1,NTYPES
000020 00 TOTSTK(J)=TSTOCK(1,J)+TSTOCK(2,J)
000021 00 400 TOTPER(J)=TPERS(1,J)+TPERS(2,J)
000022 02 C WRITE (13,1000) TOTSTK(1),TOTPER(1)
000023 00 1000 FORMAT (1X,'TOTSTK = ',F10.0,'TOTPER = ',F10.0)
000024 00 C
000025 00 C COMPUTE THE BACKLOG OF SUPPLY AND PERSONNEL ORDERS
000026 00 C
000027 00 DO 410 J=1,NTYPES
000028 00 TBCKLG(J)=0.01
000029 00 TBCKPL(J)=0.01
000030 00 TSPNOT(J) = 0.
000031 00 DO 410 I=1,NUMITS
000032 00 TBCKLG(J)=TBCKLG(I,J)+BACKLG(I,J)
000033 00 410 TBCKPL(J)=TBCKPL(I,J)+BACKPL(I,J)
000034 02 C WRITE (13,1010) TBCKLG(1),TBCKPL(1)
000035 00 1010 FORMAT (1X,'TBCKLG = ',F10.0,'TBCKPL = ',F10.0)
000036 00 DO 420 J=1,NTYPES
000037 00 C
000038 00 C CALCULATE THE PROPORTION OF A BACK ORDER TO BE FILLED AND INITIAL THE SUPPLIES
000039 00 C SENT ON THIS CYCLE TOTAL TO ZERO
000040 00 C
000041 00 PERFAC(J)=AMIN1(TOTPER(J)/TBCKPL(J),1.0)
000042 00 TPRSEN(J)=0.0
000043 00 SUPFAC(J)=AMIN1(TOTSTK(J)/TBCKLG(J),1.0)
000044 02 C WRITE (13,1020) SUPFAC(1),PERFAC(1)
000045 00 1020 FORMAT (1X,'SUPFAC = ',F10.0,'PERFAC = ',F10.0)
000046 00 TSPSEN(J)=0.0
000047 00 DO 420 I=1,NUMITS
000048 00 C
000049 02 C CALCULATE THE PERSONNEL ORDER REFILLED AND UPDATE THE APPROPRIATE TOTALS
000050 00 C

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***** THSTOK *****

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***** THSTOK *****

000051 00 PERSEN(I,J)=PERFAC(I,J)*BACKPL(I,J)
000052 00 BACKPL(I,J)=BACKPL(I,J)-PERSEN(I,J)
000053 00 TPRSEN(J)=TPRSEN(J)+PERSEN(I,J)
000054 00 C
000055 00 C COMPUTE THE EQUIPMENT RESUPPLIES SENT TO UNITS AND UPDATE TOTALS
000056 00 C
000057 00 C
000058 00 SUPPLY1= SUPFAC(J) * BACKLO(I,J)
000059 00 SUPPLY2= CREWAV(I,J)/CRMPER(J)
000060 00 SUPSEN(I,J)=AMIN1(SUPFAC(J)*BACKLO(I,J),CREWAV(I,J)/CRMPER(J))
000061 00 SUPNOT=0.
000062 00 IF (SUPPLY1.LT.SUPPLY2) GO TO *15
000063 00 SUPNOT=SUPPLY1-SUPPLY2
000064 02 C* WRITE (13,2000) I,J,SUPNOT
000065 00 2000 FORMAT (1X,' UNIT= ',I3, ' TYPE= ',I3, ' SUPPLIES NOT SENT DUE TO
000066 00 LACK OF CREW = ', F10.4)
000067 00 *15 TSPNOT(J) = TSPNOT(J) + SUPNOT
000068 00 CREWAV(I,J)=CREWAV(I,J)-SUPSEN(I,J)*CRMPER(J)
000069 00 TSPSEN(J)=TSPSEN(J)+SUPSEN(I,J)
000070 02 C* WRITE (13,1030) I,SUPSEN(I,J), PERSEN(I,J)
000071 00 1030 FORMAT (1X,' PUNIT = ',I3, ' SUPSEN = ', F10.4,
000072 00 + ' PERSEN = ', F10.4)
000073 00 *20 BACKLO(I,J)=BACKLO(I,J)-SUPSEN(I,J)
000074 00 C
000075 00 C SCHEDULE THE ARRIVAL OF THE SUPPLIES SENT TO THE UNITS AFTER A DELAY OF DELAY
000076 00 C
000077 02 C* WRITE (13,1040) TSPSEN(I),TPRSEN(I)
000078 00 1040 FORMAT (1X,' TSPEN = ', F10.4, 'TPRSEN = ', F10.4)
000079 00 ATRIB(1)=TNOW*DELAY1
000080 00 ATRIB(2)=5.0
000081 00 DO *30 J=1,NTYPES
000082 00 DO *30 I=1,NUMITS
000083 00 ATRIB(3)=FLOAT(I)
000084 00 ATRIB(4)=SUPSEN(I,J)
000085 00 ATRIB(5)=0.0
000086 00 ATRIB(6)=0.0
000087 00 ATRIB(7)=FLOAT(J)
000088 00 *30 IF (ATRIB(4).GT.0.0)CALL FILEM(1)
000089 00 C
000090 00 C SCHEDULE ARRIVAL OF REPLACEMENT PERSONNEL AFTER DELAY DELAY2
000091 00 C
000092 00 ATRIB(1)=TNOW*DELAY2
000093 00 ATRIB(4)=0.0
000094 00 DO *40 J=1,NTYPES
000095 00 DO *40 I=1,NUMITS
000096 00 ATRIB(3)=FLOAT(I)
000097 00 ATRIB(5)=PERSEN(I,J)
000098 00 ATRIB(7)=FLOAT(J)
000099 00 *40 IF (ATRIB(5).GT.0.0)CALL FILEM(1)
000100 00 C
000101 00 C REDUCE THEATER STOCKS BY THE SUPPLIES SENT TO UNITS
000102 00 C
000103 00 DO *50 J=1,NTYPES
000104 00 TRANST(J)=TRANST(J)+TSPSEN(J)
000105 00 PTRANS(J)=PTRANS(J)+TPRSEN(J)
000106 00 C
000107 00 C CHECK TO SEE IF REPAIRED THEATER STOCKS CAN HANDLE ORDER
000108 00 C
000109 00 IF (TSPSEN(J).GT.TSTOCK(2,J)) GO TO *41
000110 00 TSTOCK(2,J)=TSTOCK(2,J)-TSPSEN(J)
000111 00 GO TO *42
000112 00 C
000113 00 C DEplete REPAIR THEATER STOCKS BEFORE DEPLETING WAR RESERVES
000114 00 C
000115 00 *41 TSTOCK(1,J)=TOTSTR(J)-TSPSEN(J)
000116 00 TSTOCK(2,J)=0.0
000117 00 C
000118 00 C CHECK TO SEE IF HOSPITALIZED RETURNEES CAN HANDLE PERSONNEL ORDERS
000119 00 C
000120 00 *42 IF (TPRSEN(J).GT.TPERS(2,J)) GO TO *43
000121 00 TPERS(2,J)=TPERS(2,J)-TPRSEN(J)
000122 00 GO TO *450
000123 00 C
000124 00 C DEplete HOSPITAL RETURNED PERSONNEL BEFORE DEPLETING CONUS RESUPPLY PERSONNEL
000125 00 C
000126 00 *43 TPERS(1,J)=TOTPER(J)-TPRSEN(J)
000127 00 TPERS(2,J)=0.0
000128 00 *450 CONTINUE
000129 00 DO *60 J=1,NTYPES
000130 00 C

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***** THSTOK *****

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***** THSTOK *****
000131 00 C RESUPPLY THEATER STOCKS
000132 00 C
000133 02 C% WRITE (13,1050) (TPERS(I,1),I=1,2), (TSTOCK(I,1), I=1,2)
000134 00 1050 FORMAT (1X, 'TPERS1 = ', F10.4, 'TPERS2 = ', F10.4,
000135 00 * 'TSTOCK1 = ', F10.4, 'TSTOCK2 = ', F10.4)
000136 00 TPERS(I,J)=TPERS(I,J)+PERSIN(I,J)
000137 00 TPERS(2,J)=TPERS(2,J)+HOSPIN(I,J)
000138 01 PERARR(I)=PERARR(I)+PERSIN(I,J)
000139 01 HOSP(I)=HOSP(I)+HOSPIN(I,J)
000140 00 TSTOCK(I,J)=TSTOCK(I,J)+PMSOU(I,J)
000141 00 *60 TSTOCK(2,J)=TSTOCK(2,J)+REPOUT(I,J)
000142 02 C% WRITE (13,1060) PERSIN(I),HOSPIN(I),PMSOU(I),REPOUT(I)
000143 00 1060 FORMAT (1X, 'PERSIN = ', F10.4, 'HOSPIN = ', F10.4, 'PMSOU = ',
000144 00 * F10.4, 'REPOUT = ', F10.4)
000145 02 C% WRITE (13,1050) (TPERS(I,1),I=1,2), (TSTOCK(I,1),I=1,2)
000146 00 DO *70 J=1,NTYPES
000147 00 DO *70 I=1,NUMITS
000148 00 C
000149 00 C UPDATE UNIT'S BACKLOG FILES
000150 00 C
000151 02 C% WRITE (13,1070) I,J,BACKLG(I,J),BACKPL(I,J)
000152 00 1070 FORMAT (1X, 'UNIT = ', I3, 'TYPE = ', I3, 'BACKLG = ',
000153 00 * F10.4, 'BACKPL = ', F10.4)
000154 00 BACKLG(I,J)=BACKLG(I,J)+RESUP(I,J,1)
000155 00 BACKPL(I,J)=BACKPL(I,J)+RESUP(I,J,2)
000156 02 C% WRITE (13,1070) I,J,BACKLG(I,J),BACKPL(I,J)
000157 00 *70 CONTINUE
000158 00 C
000159 00 C REINITIALIZE PERSIN AND HOSPIN TO ZERO
000160 00 C
000161 00 DO *90 I=1,NTYPES
000162 00 PERSIN(I)=0.0
000163 00 *90 HOSPIN(I)=0.0
000164 00 RETURN
000165 00 END

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***** THSTOK *****

```

***** UNITDS *****
000001 02 SUBROUTINE UNITDS
000002 02 C
000003 02 C THIS SUBROUTINE HANDLES THE ARRIVAL OF DS MAINTENANCE TO
000004 02 C COMBAT UNITS.
000005 02 C
000006 02 INCLUDE COMMON-LIST
000007 02 N=IFIX(ATTRIB(3))
000008 02 M=IFIX(ATTRIB(4))
000009 02 C
000010 02 C ATTRIB(3) IS THE COMBAT UNIT
000011 02 C ATTRIB(4) IS THE LINE NUMBER OF THE SRC LOOK UP TABLE
000012 02 C
000013 02 JJ=NTYPES+2
000014 02 DO 520 J=3,JJ
000015 02 UNTHAC(M,J-2)=MACAPT(M,J)+MACAPT(M,2)
000016 02 520 CONTINUE
000017 06 C% WRITE(13,1000)TNOW,M,M,(UNTHAC(M,I),I=1,NTYPES)
000018 02 1000 FORMAT(1X,'** IN UNITDS AT',F10.2,' **')
000019 02 1 IX,'UNIT=',I3,' LINE IN SRC TABLE=',I3/
000020 02 2 IX,'THE UNIT DS MAINTENANCE IS'/
000021 02 3 IX,10(F10.2,2X)
000022 02 RETURN
000023 02 END
***** UNITDS *****

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***** UNMAIN *****
000001 13 SUBROUTINE UNMAIN
000002 13 C
000003 13 C THIS SUBROUTINE HANDLES THE DS MAINTENANCE WHICH IS ASSOCIATED WITH
000004 13 C EACH OF COMBAT UNITS. THIS DS MAINTENANCE UNITS HAVE TWO DAY MAINTENANCE
000005 13 C QUEUE. ANY OVERFLOW FROM THESE MAINTENANCE UNITS ARE PASSED ON TO REAR
000006 13 C DS MAINTENANCE UNITS. BS MAINTENANCE WILL FLOW DIRECTLY TO REAR BS
000007 13 C MAINTENANCE UNIT. THE OUTPUT OF THE COMBAT UNIT ASSOCIATED DS MAINTENANCE
000008 13 C WILL FLOW DIRECT TO THE ASSOCIATED COMBAT UNIT
000009 13 C
000010 13 C
000011 13 C
000012 13 C
000013 13 C
000014 13 C
000015 13 C
000016 13 C
000017 13 C
000018 13 C
000019 13 C
000020 13 C
000021 13 C
000022 13 C
000023 13 C
000024 13 C
000025 13 C
000026 13 C
000027 13 C
000028 13 C
000029 13 C
000030 13 C
000031 13 C
000032 13 C
000033 13 C
000034 13 C
000035 13 C
000036 13 C
000037 13 C
000038 13 C
000039 13 C
000040 13 C
000041 13 C
000042 13 C
000043 13 C
000044 13 C
000045 13 C
000046 13 C
000047 13 C
000048 13 C
000049 14 C
000050 13 C
000051 13 C
000052 13 C
000053 16 C
000054 13 C
000055 16 C
000056 13 C
000057 16 C
000058 13 C
000059 16 C
000060 13 C
000061 16 C
000062 13 C
000063 13 C
000064 13 C
000065 13 C
000066 13 C
000067 16 C
000068 13 C
000069 13 C
000070 13 C
000071 13 C
000072 13 C
000073 13 C
000074 13 C
000075 13 C
000076 13 C
000077 13 C
000078 13 C
000079 13 C
000080 13 C
000081 13 C
***** UNMAIN *****

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***** UNMAIN *****
000182      13  C INCREASE CUMMULATIVE UNIT DS MAINT INPUT TOTAL
000183      13  C
000184      17      REPCAP=REPCAP-MCC1(I,J,2,1)*MAFACT(1,J)
000185      13      UNITON(I,J,1)=UNITON(I,J,1)+MCC1(I,J,2,1)
000186      13      MCC1(I,J,1,1)=MCC1(I,J,1,1)+MCC1(I,J,2,1)
000187      13      IF(REPCAP.LE.0)GO TO 200
000188      13  C
000189      13  C OUTPUT REPAIRABLE COMBAT LOSSES
000190      13  C
000191      13      MCC1(I,J,2,2)=MIN(REPCAP/MAFACT(3,J),MCC1(I,J,1,2)+
000192      13      1 CREWAV(I,J)/CRMPER(J))
000193      13      CREWAV(I,J)=CREWAV(I,J)+MCC1(I,J,2,2)*CRMPER(J)
000194      13      OTUNDS(I,J)=OTUNDS(I,J)+MCC1(I,J,2,2)
000195      13  C
000196      13  C INCREASE CUMMULATIVE UNIT DS MAINT INPUT TOTAL
000197      13  C
000198      13      UNITON(I,J,1)=UNITON(I,J,1)+MCC1(I,J,2,1)
000199      13      MCC1(I,J,1,2)=MCC1(I,J,1,2)+MCC1(I,J,2,2)
000200      13  200 CONTINUE
000201      16  C$ WRITE(13,9000)
000202      13  9050 FORMAT(1X,'MCC1 AFTER QUEUE PROCESSING')
000203      13  CALL OTMCC1
000204      13  C
000205      13  C INCREASE THE QUEUES WITH THE CURRENT CYCLE LOSSES IF POSSIBLE
000206      13  C
000207      13  DO 300 J=1,NTYPES
000208      13  DO 300 I=1,NUMITS
000209      13  IF(I.NTRSN(I,1).LE.0)GO TO 300
000210      13  REPCAP=2.0*UNITNAC(I,J)
000211      13  IF(REPCAP.EQ.0)GO TO 300
000212      13  REPCAP=REPCAP-MCC1(I,J,1,1)*MAFACT(1,J)-MCC1(I,J,1,2)*MAFACT(3,J)
000213      13  IF(REPCAP.LE.0)GO TO 300
000214      13  MCC1(I,J,3,1)=MIN(REPCAP/MAFACT(1,J),DSN(I,J))
000215      13  DSN(I,J)=DSN(I,J)-MCC1(I,J,3,1)
000216      13  MCC1(I,J,1,1)=MCC1(I,J,1,1)+MCC1(I,J,3,1)
000217      17  REPCAP=REPCAP-MCC1(I,J,3,1)*MAFACT(1,J)
000218      13  UNDSIN(J)=UNDSIN(J)+MCC1(I,J,3,1)
000219      13  C
000220      13  C INCREASE UNIT DS MAINT OUTPUT TOTAL (CUMMULATIVE)
000221      13  C
000222      13  IF(REPCAP.LE.0)GO TO 300
000223      13  MCC1(I,J,3,2)=MIN(REPCAP/MAFACT(3,J),DSC(I,J))
000224      13  DSC(I,J)=DSC(I,J)-MCC1(I,J,3,2)
000225      13  MCC1(I,J,1,2)=MCC1(I,J,1,2)+MCC1(I,J,3,2)
000226      13  UNDSIN(J)=UNDSIN(J)+MCC1(I,J,3,2)
000227      13  C
000228      13  C INCREASE UNIT DS MAINT OUTPUT TOTAL (CUMMULATIVE)
000229      13  C
000230      13  300 CONTINUE
000231      16  C$ WRITE(13,9000)
000232      13  9060 FORMAT(1X,'MCC1 AFTER INPUT TO QUEUES')
000233      13  CALL OTMCC1
000234      13  RETURN
000235      13  END

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***** UNMAIN *****

```

***** UNSTAT *****
000001      23      SUBROUTINE UNSTAT(DELAY)
000002      23      C THIS SUBROUTINE DETERMINES A COMBAT UNIT'S COMBAT AND NONCOMBAT LOSSES. IN
000003      23      C ADDITION THIS SUBROUTINE REORDERS NECESSARY SUPPLIES AND PERSONNEL FOR THE
000004      23      C COMBAT UNITS. THIS SUBROUTINE WILL RECEIVE ANY SUPPLIES SENT FROM THEATER
000005      23      C STOCKS
000006      23      C
000007      23      INCLUDE COMMON/LIST
000008      23      C
000009      23      C
000010      27      C#  WRITE(14,1971) THOU
000011      23      1971 FORMAT (' *****SUBROUTINE UNSTAT CALLED AT ',F10.1,' *****')
000012      23      C
000013      23      DO 100 J=1,NTYPES
000014      22      C
000015      23      C BUFFER(J) STORES THE LAST DAY'S PERMANENT LOSSES FOR THE GRAPNS.
000016      23      C IN SSAVE, TWO VALUES OF THE PERMANENT LOSSES ARE PRINTED. THE FIRST
000017      23      C IS PRNLOS(J), WHICH IS A CUMULATIVE TOTAL OF THE LOSSES, CUMULATIVE-
000018      23      C LY ADDED EACH DAY. THE SECOND IS PRNLOS(J)-BUFFER(J), WHICH REFLECTS
000019      23      C THE NUMBER OF LOSSES PER DAY, AND IS NOT CUMULATIVE.
000020      23      C
000021      23      BUFFER(J) = PRNLOS(J)
000022      23      C
000023      23      C INITIALIZE SOME VARIABLES USED IN COMBAT LOSS CALCULATION
000024      23      C
000025      23      NOSPER(I,J)=0.0
000026      23      TPERLS(I,J)=0.0
000027      23      DAYLOS(I,J)=0.0
000028      23      TNCH(I,J)=0.0
000029      23      TCON(I,J)=0.0
000030      23      DO 100 I=1,NUMITS
000031      23      RESUP(I,J+1)=0.0
000032      23      RESUP(I,J+2)=0.0
000033      23      CONLOS(I,J)=0.0
000034      23      NCHLOS(I,J)=0.0
000035      23      CREVLS(I,J)=0.0
000036      23      DO 100 TOTLOS(I,J)=0.0
000037      23      C
000038      23      C MAIN LOOP TO PERFORM THE CALCULATION - THE LOOP IS COMPUTE BY EQUIPMENT TYPE
000039      23      C AND BY UNIT
000040      23      C
000041      23      DO 110 J=1,NTYPES
000042      23      PERMS = PRNLOS(J)
000043      23      DO 110 I=1,NUMITS
000044      23      C
000045      23      C THE FIRST COLUMN OF THE THEATER STATUS MATRIX (THTRSH) IS USED TO
000046      23      C DETERMINE IF THE UNIT HAS NOT YET ARRIVED, IN WHICH CASE THE FOLLOWING
000047      23      C UNIT UPDATE LIST IS SKIPPED. THE VALUES AND MEANINGS OF THTRSH(I,1)
000048      23      C ARE:
000049      23      C
000050      23      C 0-THE UNIT HAS NOT ARRIVED.
000051      23      C 1-THE UNIT HAS ARRIVED, AND
000052      23      C 2-THE UNIT IS COMMITTED.
000053      23      C
000054      23      IF(THTRSH(I,1).LT.1.0) GO TO 110
000055      23      C
000056      23      C CALCULATE A UNIT'S NONCOMBAT LOSSES AND DECREASE THE UNIT'S STRENGTH
000057      23      C APPROPRIATELY. ALSO, UPDATE THE CURRENT CYCLE LOSS TOTALS
000058      23      C
000059      23      NCHLOS(I,J)=UNITON(I,J+1)*NCHMAT(I,J)
000060      23      UNITON(I,J+1)=UNITON(I,J+1)-NCHLOS(I,J)
000061      23      CREVAV(I,J) = CREVAV(I,J) + NCHLOS(I,J) * CRMPER(I,J)
000062      23      TNCH(I,J)=TNCH(I,J)+NCHLOS(I,J)
000063      23      DAYLOS(I,J)=DAYLOS(I,J)+NCHLOS(I,J)
000064      23      TOTLOS(I,J)=NCHLOS(I,J)
000065      27      C#  WRITE(14,1000)I,NCHLOS(I,J),UNITON(I,J+1),TOTLOS(I,J)
000066      23      1000 FORMAT(1X,'UNIT=' ,I2,' NCHLOS = ',F10.4,' UNITON=',
000067      23      2 F10.4,' TOTLOS=',F10.4)
000068      23      C
000069      23      C REORDER SUPPLIES TO REPLACE NONCOMBAT LOSSES
000070      23      C
000071      27      C#  WRITE(14,1010)I,RESUP(I,J+1)
000072      23      1010 FORMAT(1X,'UNIT=' ,I2,' RESUP=',F10.4)
000073      23      C
000074      23      C ELIMINATE THE UNREPAIRABLE LOSSES FROM THE NONCOMBAT LOSSES
000075      23      C
000076      23      PRNLOS(J)=PRNLOS(J)+NCHLOS(I,J)+UNREPI(J)
000077      23      RESUP(I,J+1)=RESUP(I,J+1)+NCHLOS(I,J)+UNREPI(J)
000078      23      NCHLOS(I,J)=NCHLOS(I,J)-NCHLOS(I,J)+UNREPI(J)
000079      27      C#  WRITE(14,1020)PRNLOS(J),NCHLOS(I,J)
000080      23      1020 FORMAT(1X,'PRNLOS=',F10.4,' NCHLOS=',F10.4)
000081      23      C
000082      23      C IF THE UNIT IS UNCOMMITTED OR IF IT IS PRIOR TO DDAY DO NOT CALCULATE
000083      23      C COMBAT LOSSES
000084      27      C#  WRITE(14,1979) THTRSH(I,1),DDAY
000085      23      C
***** UNSTAT *****

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***** UNSTAT *****

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000086 23      IF(ITMTRSN(I,1) LT 2.0 .OR. DDAY.GT.TNOW)GO TO 105
000087 23      C
000088 23      C CALCULATE UNIT COMBAT LOSSES OF BOTH EQUIPMENT AND PERSONNEL. ADJUST THE
000089 23      C UNIT'S STRENGTH APPROPRIATELY AND UPDATE THE CURRENT CYCLE CUMULATIVE LOSS
000090 23      C TOTALS.
000091 23      C
000092 23      COMLOS(I,J)=UNITOM(I,J,1)+COMRAT(J)
000093 23      UNITOM(I,J,1)=UNITOM(I,J,1)-COMLOS(I,J)
000094 23      CREMLS(I,J)=COMLOS(I,J)+PERRAT(J)
000095 23      UNITOM(I,J,2)=UNITOM(I,J,2)-CREMLS(I,J)
000096 23      TOTLOS(I,J)=TOTLOS(I,J)+COMLOS(I,J)
000097 23      DAYLOS(I,J)=DAYLOS(I,J)+COMLOS(I,J)
000098 23      TPERLS(I,J)=TPERLS(I,J)+CREMLS(I,J)
000099 23      TCOM(I,J) = TCOM(I,J) + COMLOS(I,J)
000100 27      C#  WRITE(14,1030)I,COMLOS(I,J),CREMLS(I,J),UNITOM(I,J),UNITOM(I,J,2)
000101 23      1030 FORMAT(1X,'UNIT=' ,I2,' COMLOS=' ,F10.4,' CREMLS=' ,F10.4,' UNITOM1='
000102 23      1 ,F10.4,' UNITOM2=' ,F10.4)
000103 23      C
000104 23      C REORDER LOST PERSONNEL AND LOST EQUIPMENT
000105 23      C
000106 23      RESUP(I,J,2)=CREMLS(I,J)
000107 23      C
000108 23      C PLACE EQUIPMENTLESS PERSONNEL INTO THE AVAILABLE CREW TOTALS
000109 23      C
000110 23      CREWAV(I,J)=CREWAV(I,J)+COMLOS(I,J)+COMPER(I,J)-CREMLS(I,J)
000111 27      C#  WRITE(14,1040)I,RESUP(I,J,1),RESUP(I,J,2),CREWAV(I,J)
000112 23      1040 FORMAT(1X,'UNIT=' ,I2,' RESUP1=' ,F10.4,' RESUP2=' ,F10.4,' CREWAV=' ,
000113 23      1 ,F10.4)
000114 23      C
000115 23      C REDUCING COMBAT LOSS BY CALCULATING THE PERMANENT LOSSES DUE TO COMBAT DAMAGE
000116 23      C AND DUE TO ABANDONMENTS. IN ADDITION CALCULATE THE PERMANENT LOSSES OF
000117 23      C PERSONNEL
000118 23      C
000119 23      PRMLOS(I,J)=PRMLOS(I,J)+COMLOS(I,J)+DAMRAT(J)
000120 23      RESUP(I,J,1)=RESUP(I,J,1)+COMLOS(I,J)+DAMRAT(J)
000121 23      COMLOS(I,J)=COMLOS(I,J)-COMLOS(I,J)+DAMRAT(J)
000122 27      C#  WRITE(14,1050)I,PRMLOS(I,J),COMLOS(I,J)
000123 23      1050 FORMAT(1X,'UNIT=' ,I2,' PRMLOS=' ,F10.4,' COMLOS=' ,F10.4)
000124 23      PRMLOS(I,J)=PRMLOS(I,J)+COMLOS(I,J)+ABRAT(I,J)
000125 23      RESUP(I,J,1)=RESUP(I,J,1)+COMLOS(I,J)+ABRAT(I,J)
000126 23      COMLOS(I,J)=COMLOS(I,J)-COMLOS(I,J)+ABRAT(I,J)
000127 23      PERLOS(I,J)=PERLOS(I,J)+CREMLS(I,J)+CRMLSR(I,J)
000128 23      CREMLS(I,J)=CREMLS(I,J)-CREMLS(I,J)+CRMLSR(I,J)
000129 27      C#  WRITE(14,1060)PRMLOS(I,J),COMLOS(I,J),PERLOS(I,J),CREMLS(I,J)
000130 23      1060 FORMAT(1X,'PRMLOS=' ,F10.4,' COMLOS=' ,F10.4,' PERLOS=' ,F10.4,
000131 23      1 ,CREMLS=' ,F10.4)
000132 23      C
000133 23      C TOTAL THE NUMBER OF PERSONNEL TO BE ENTERED INTO HOSPITAL DELAY CYCLE
000134 23      C
000135 23      HOSPER(I,J)=HOSPER(I,J)+CREMLS(I,J)
000136 23      C
000137 23      C RESUPPLY THE UNITS WITH PERSONNEL AND UPDATE RESUPPLY ON ORDER TOTALS
000138 23      C
000139 23      105 UNITOM(I,J,1)=UNITOM(I,J,1)+RESUPAT(I,J,1)
000140 23      RESUP(I,J,1)=RESUP(I,J,1)+RESUP(I,J,1)-RESUPAT(I,J,1)
000141 23      UNITOM(I,J,2)=UNITOM(I,J,2)+RESUPAT(I,J,2)
000142 23      RESUP(I,J,2)=RESUP(I,J,2)+RESUP(I,J,2)-RESUPAT(I,J,2)
000143 23      CREWAV(I,J) = CREWAV(I,J) + RESUPAT(I,J,2)
000144 27      C#  WRITE(14,1070)UNITOM(I,J,1),RESUPAT(I,J,1),RESUP(I,J,1)
000145 23      1070 FORMAT(1X,'UNITOM1=' ,F10.4,' RESUPAT1=' ,F10.4,' RESUP1=' ,F10.4)
000146 27      C#  WRITE(14,1080)UNITOM(I,J,2),RESUPAT(I,J,2),RESUP(I,J,2)
000147 23      1080 FORMAT(1X,'UNITOM2=' ,F10.4,' RESUPAT2=' ,F10.4,' RESUP2=' ,F10.4)
000148 23      PTRANS(I,J)=PTRANS(I,J)+RESUPAT(I,J,2)
000149 23      C
000150 23      C THE ARRAY, TLOS(I,J), CONTAINS A CUMULATIVE TOTAL OF ALL TANKS LOST
000151 23      C DURING THIS SIMULATION. THE "DAYLOS," OR TANKS LOST EACH DAY, ARE
000152 23      C ADDED TO THE CUMULATIVE TOTAL EACH DAY.
000153 23      C
000154 23      TLOS(I,J)=TLOS(I,J) + DAYLOS(I,J)
000155 27      C#  WRITE(14,1085)I,CREWAV(I,J)
000156 23      1085 FORMAT(1X,'UNIT = ' ,I2,' CREWAV = ' , F10.4)
000157 23      C
000158 23      DAYPRM= DAYPRM + PRMLOS(I,J)
000159 23      110 CONTINUE
000160 23      DAYPRM = DAYPRM - PERMS
000161 23      C
000162 23      C ENTER PERSONNEL INTO THE HOSPITAL DELAY CYCLE
000163 23      C
000164 23      IF(DDAY.GT.TNOW)GO TO 130

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***** UNSTAT *****

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***** UNSTAT *****

000165      23      DO 120 J=1,NTYPES
000166      23      ATRIB(1)=TNOW*DELAY
000167      23      ATRIB(2)=0.0
000168      23      ATRIB(3)=0.0
000169      23      ATRIB(4)=0.0
000170      23      ATRIB(5)=HOSPER(J)
000171      23      ATRIB(6)=0.0
000172      23      ATRIB(7)=FLOTT(J)
000173      23      CALL FILEN(I)
000174      23      HOSP(J)=HOSP(I)*HOSPER(J)
000175      23      120 CONTINUE
000176      23      130 CONTINUE
000177      27      CS      WRITE(14,1090)HOSPER(1),DAYLOS(1),TPERLS(1),TCOM(1),TNCH(1)
000178      23      1090 FORMAT(1X,'HOSPER=',F10.4,' DAYLOS=',F10.4,' TPERLS=',F10.4,
000179      23      1'TCOM=',F10.4,' TNCH=',F10.4)
000180      23      DO 140 J=1,NTYPES
000181      23      DO 140 I=1,NUNITS
000182      23      C
000183      23      C ZERO OUT ARRIVALS ONHAND MATRIX
000184      23      C
000185      27      CS      WRITE(14,1100) I,TOTLOS(I,J)
000186      23      1100 FORMAT(1X,' UNIT=',I3,' TOTLOS=',F10.4)
000187      23      RESUPA(I,J,1)=0.0
000188      23      140 RESUPA(I,J,2)=0.0
000189      27      CS      WRITE(14,1110) TLOS(I)
000190      23      1110 FORMAT(1X,' TLOS = ',F10.4)
000191      27      CS      WRITE(14,2000)
000192      23      2000 FORMAT(1X,'THE END OF UNSTAT')
000193      23      RETURN
000194      23      END

***** UNSTAT *****

***** URESUP *****

000001      04      SUBROUTINE URESUP
000002      04      INCLUDE COMMON.LIST
000003      08      CS      WRITE(13,1971)TNOW
000004      04      1971 FORMAT(1' *****SUBROUTINE URESUP CALLED AT ',F10.1,' *****')
000005      04      C
000006      04      C THIS SUBROUTINE RECEIVES A UNIT RESUPPLIES FROM THEATER STOCKS
000007      04      C
000008      04      M=IFIX(ATRIB(3))
000009      04      N=IFIX(ATRIB(7))
000010      08      CS      WRITE(13,1979) M,N,RESUPA(M,N,1),RESUPA(M,N,2)
000011      04      RESUPA(M,N,1)=RESUPA(M,N,1)+ATRIB(4)
000012      05      TRANST(M)=TRANST(M)+ATRIB(4)
000013      04      RESUPA(M,N,2)=RESUPA(M,N,2)+ATRIB(5)
000014      08      CS      WRITE(13,1979) RESUPA(M,N,1), ATRIB(4), RESUPA(M,N,2), ATRIB(5)
000015      04      RETURN
000016      04      END

***** URESUP *****

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***** WARES *****

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000001 09 SUBROUTINE WARES
000002 09 INCLUDE COMMON.LIST
000003 13 C# WRITE (13, 1971)TMON
000004 09 1971 FORMAT (' *****SUBROUTINE WARES CALLED AT ',F10.1,' *****')
000005 09 C
000006 09 C THIS SUBROUTINE HANDLES THE WAR RESERVES PORTION OF THE DAILY EVENTS CYCLE
000007 09 C INITIALLY, THE WAR RESERVE OUTPUTS ARE DETERMINED. AFTERWARD, NEWLY ARRIVED
000008 09 C SUPPLIES ARE ADDED TO RESERVE STOCKS
000009 09 C
000010 09 DO 100 I=1,NTYPES
000011 13 C# WRITE (13,1000) PWRST(I)
000012 09 1000 FORMAT (1X, 'INITIAL PWRST= ', F10.4)
000013 09 C
000014 09 C DETERMINE WARE RESERVES OUTPUT AND ADJUST PWRST STOCK
000015 09 C
000016 09 WRSRT=PWRST(I)
000017 09 IF (I.EQ.1) WRSRT=WRSRT*655 * 05
000018 09 PWRST(I)=WRSRT/PWRSHR(I)
000019 09 C
000020 09 C IF REMAIN PWRST STOCKS LESS THAN OUTPUT RATE THEN OUTPUT REMAINING STOCKS
000021 09 C
000022 09 IF (PWRST(I).LT.PWRSTO(I)) PWRSTO(I)=PWRST(I)
000023 11 PWRST(I)=PWRST(I)-PWRSTO(I)
000024 13 C# WRITE (13,1010) PWRSTO(I)
000025 11 100 CONTINUE
000026 09 1010 FORMAT (1X, 'PWRSTO= ', F10.4)
000027 09 DO 150 I=1,NTYPES
000028 09 C
000029 09 C INCREASE WAR RESERVES BY NEWLY ARRIVED SUPPLIES
000030 09 C
000031 09 PWRST(I)=PWRST(I)+PWRSTIN(I)
000032 13 C# WRITE (13,1020) PWRST(I),PWRSTIN(I)
000033 09 1020 FORMAT (1X, 'PWRST ', F10.4, 'PWRSTIN = ', F10.4)
000034 10 SPTOT(I)=SPTOT(I)+PWRSTIN(I)
000035 09 PWRSTIN(I)=0.0
000036 09 150 CONTINUE
000037 09 RETURN
000038 09 END

```

***** WARES *****

***** WRARR *****

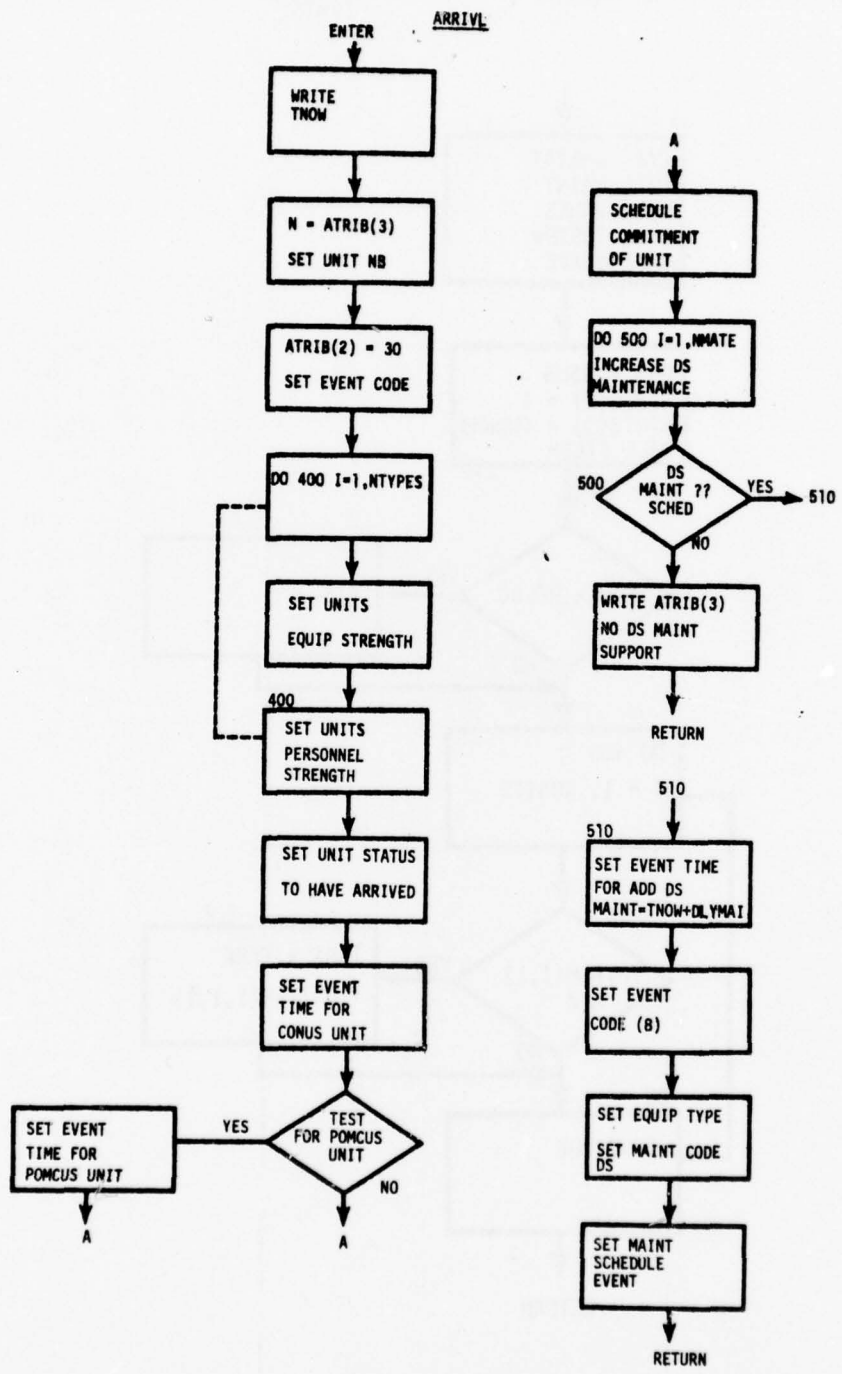
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000001 00 SUBROUTINE WRARR
000002 00 INCLUDE COMMON.LIST
000003 01 C# WRITE (13, 1971)TMON
000004 00 1971 FORMAT (' *****SUBROUTINE WRARR CALLED AT ',F10.1,' *****')
000005 00 C
000006 00 C THIS SUBROUTINE RECEIVES WAR RESERVE RESUPPLIES FROM CONUS
000007 00 C
000008 00 M=IFIX(ATTRIB(7))
000009 00 PWRSTIN(M)=PWRSTIN(M)+ATTRIB(4)
000010 00 RETURN
000011 00 END

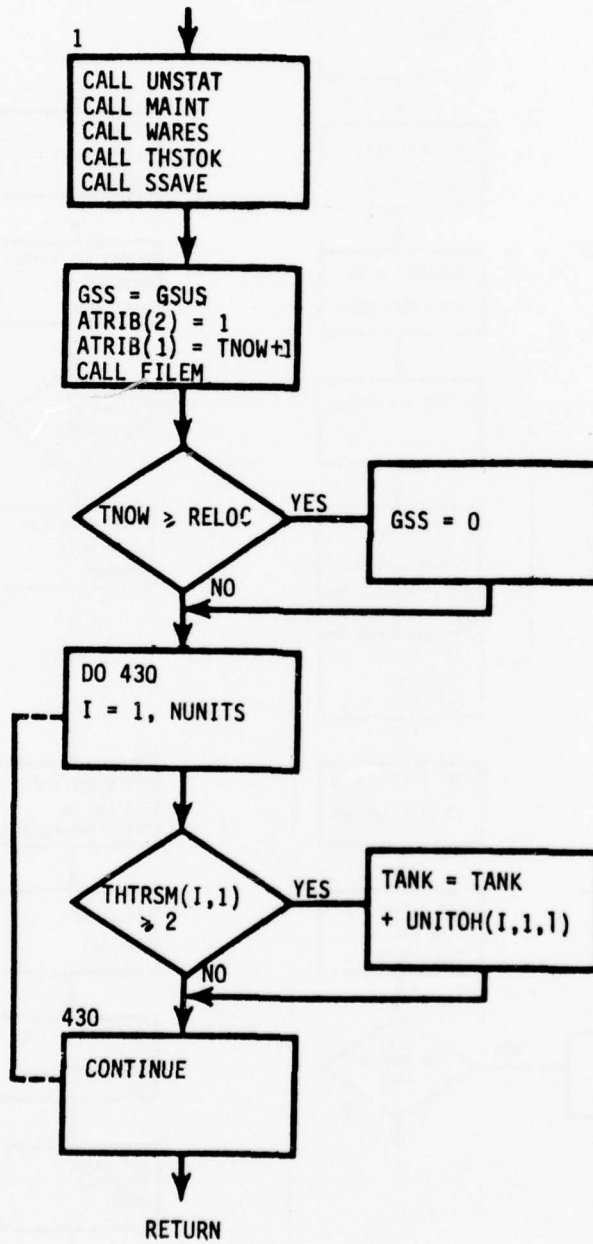
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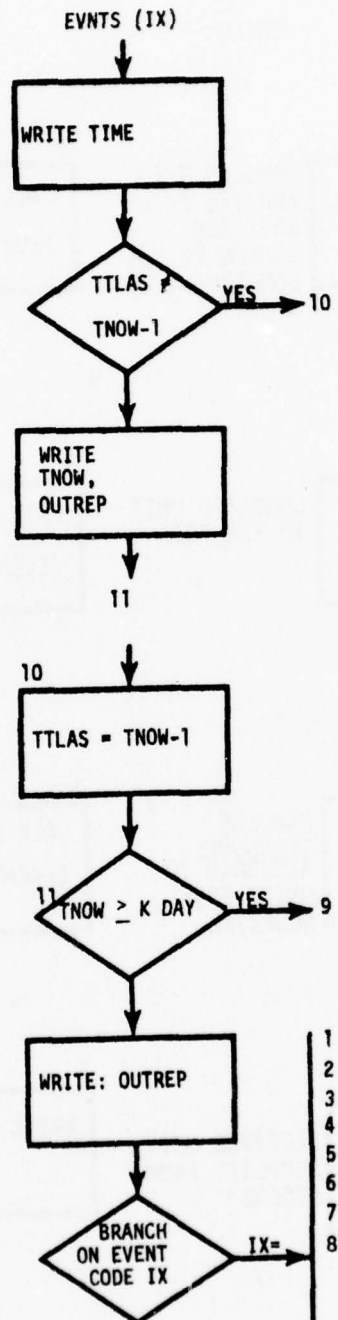
***** WRARR *****

Section II. FLOW DIAGRAMS

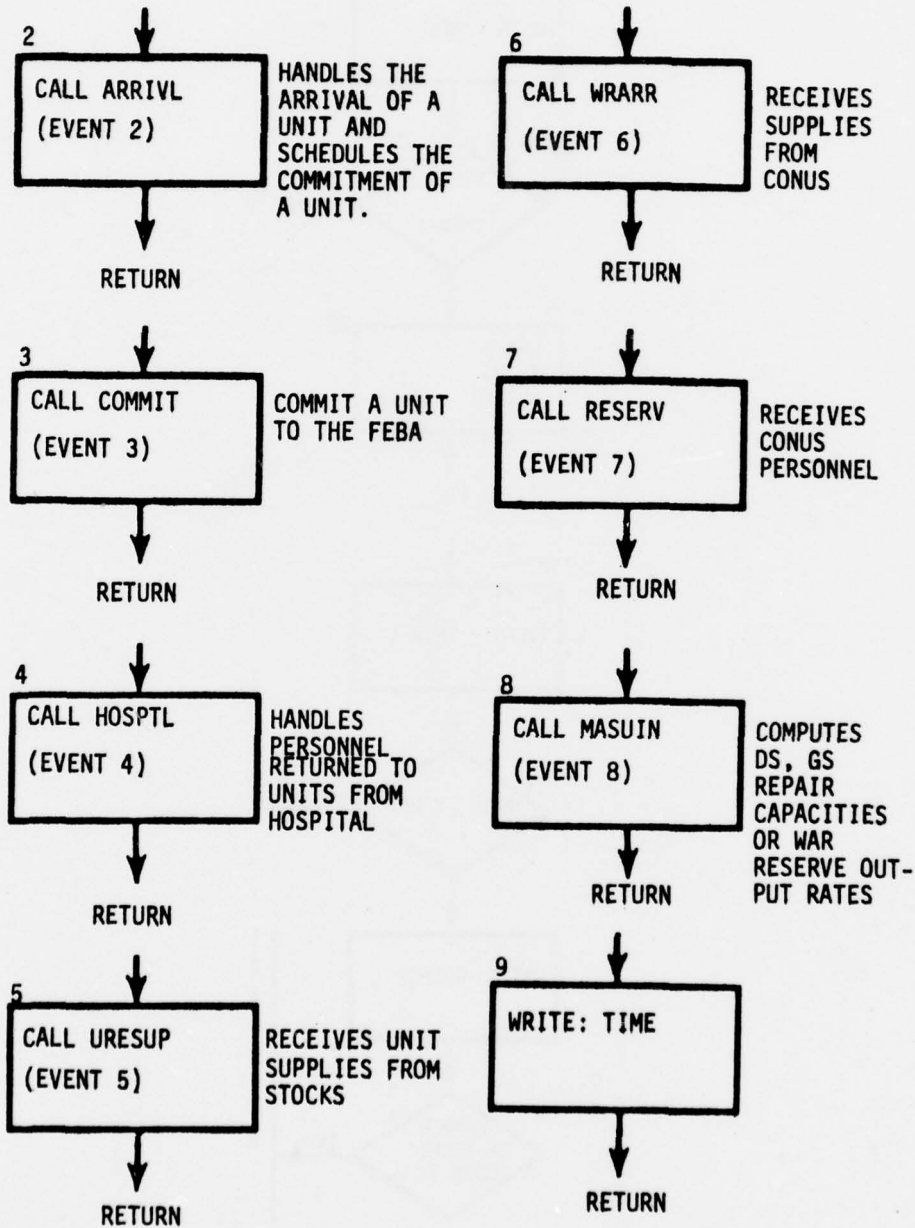


EVNTS

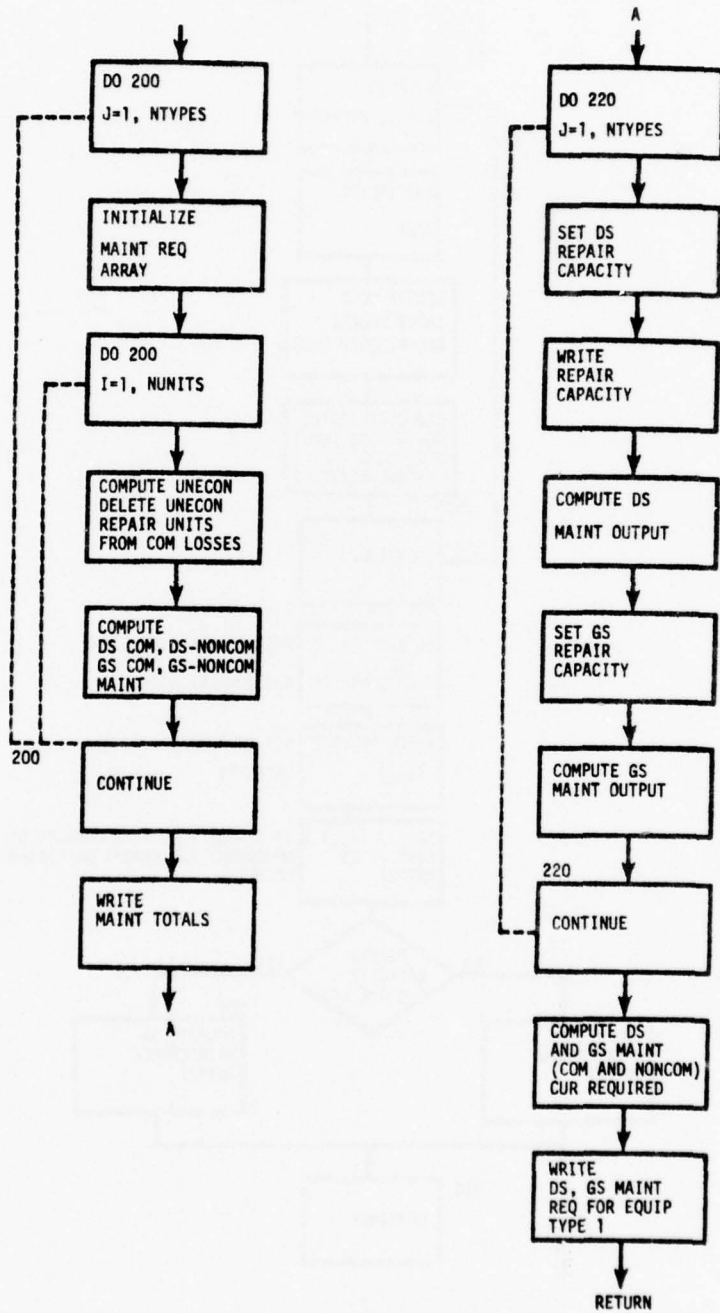


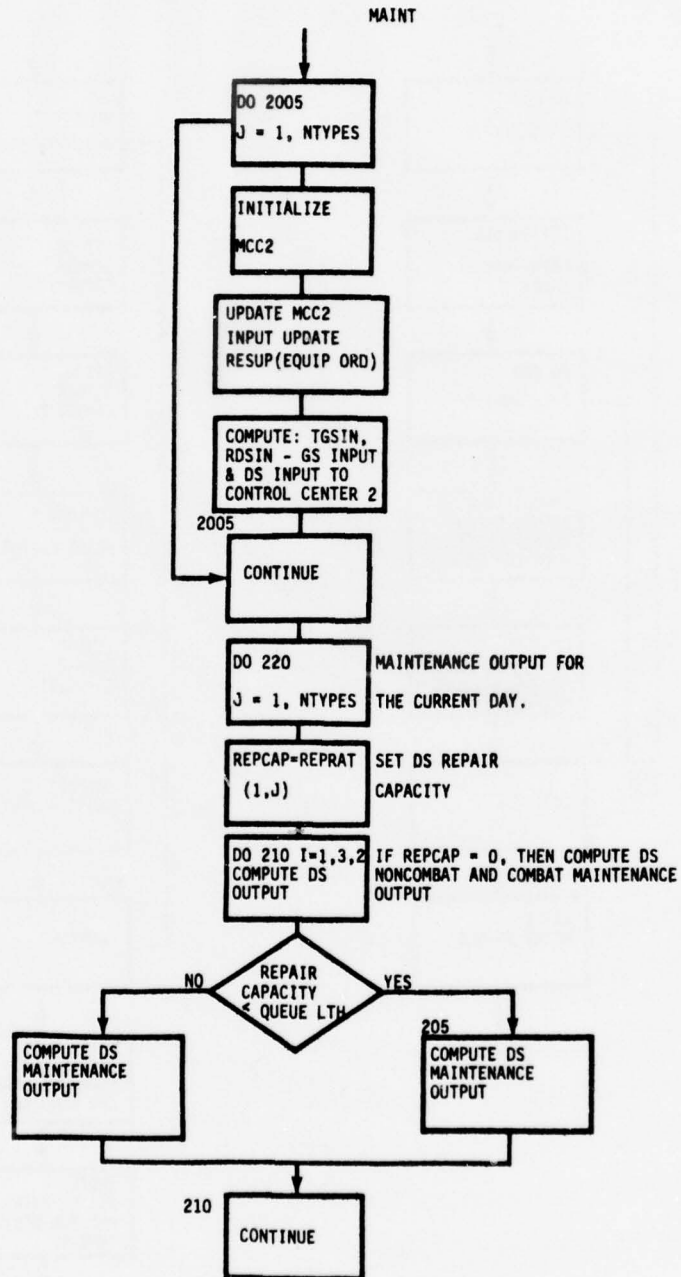


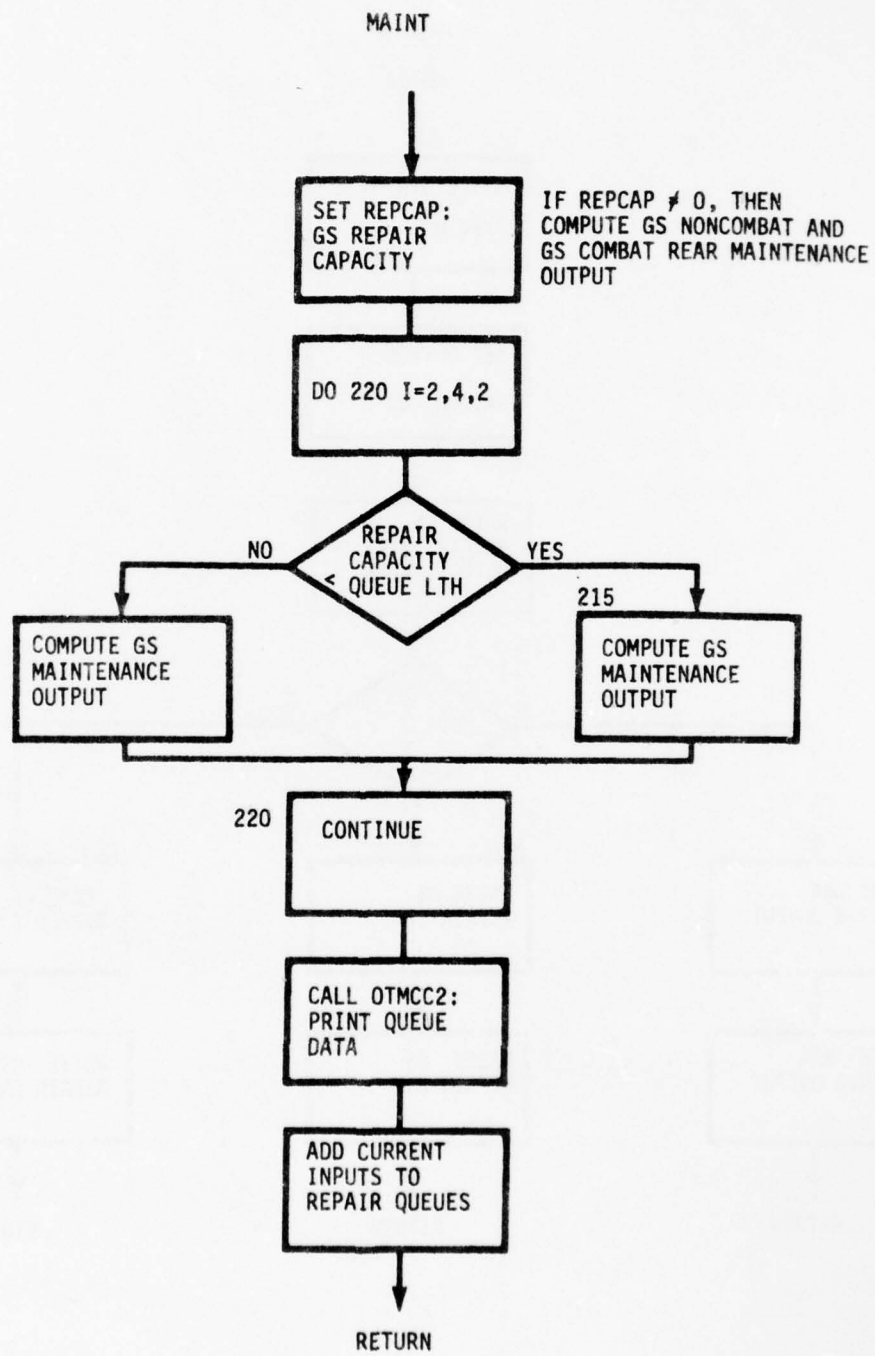
EVNTS

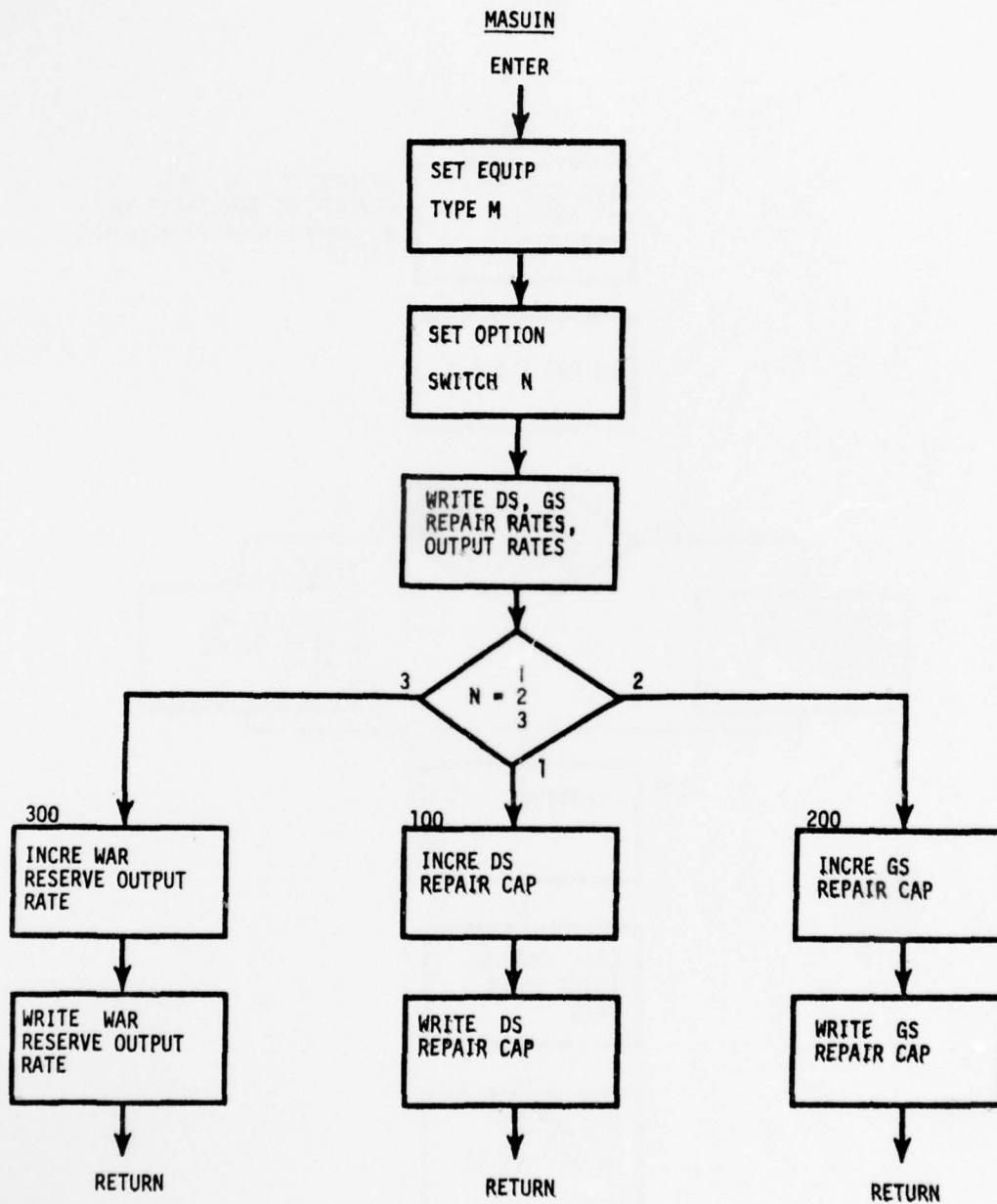


MAINT

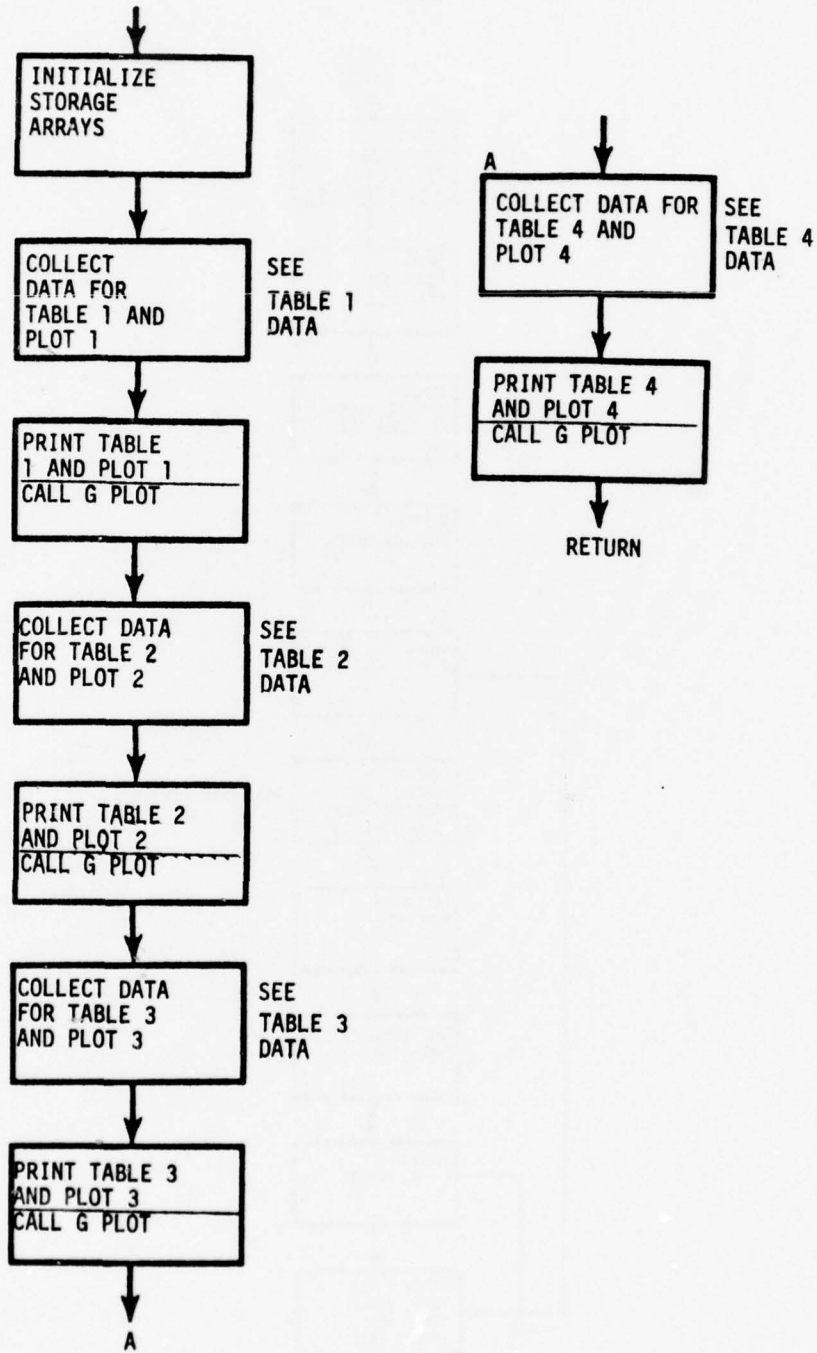


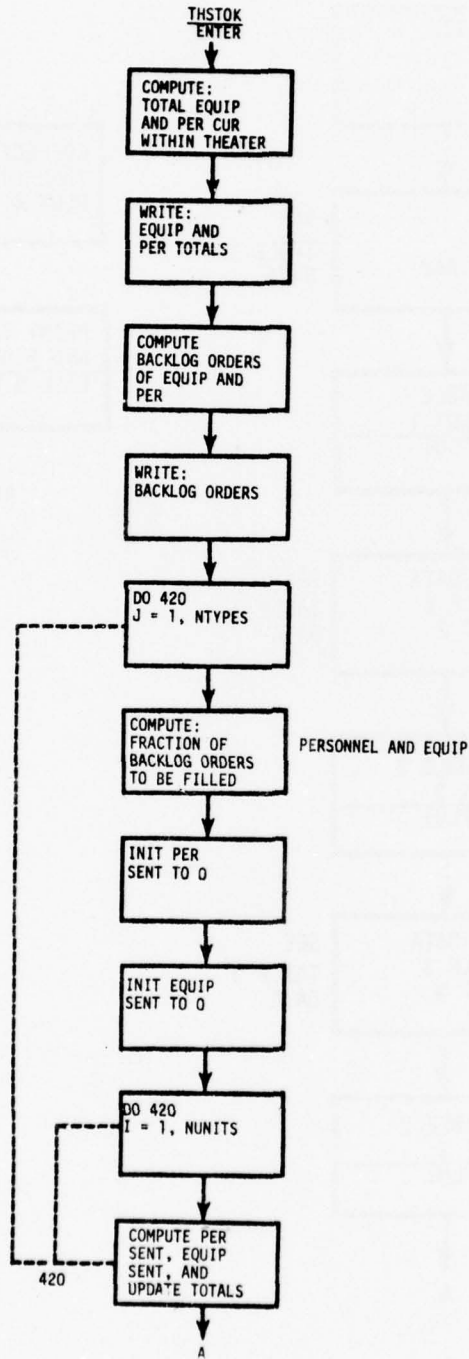


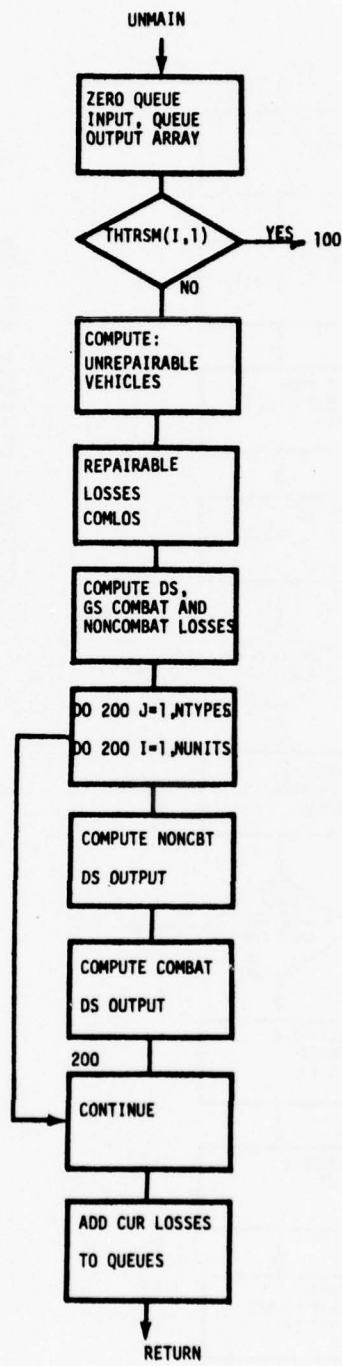


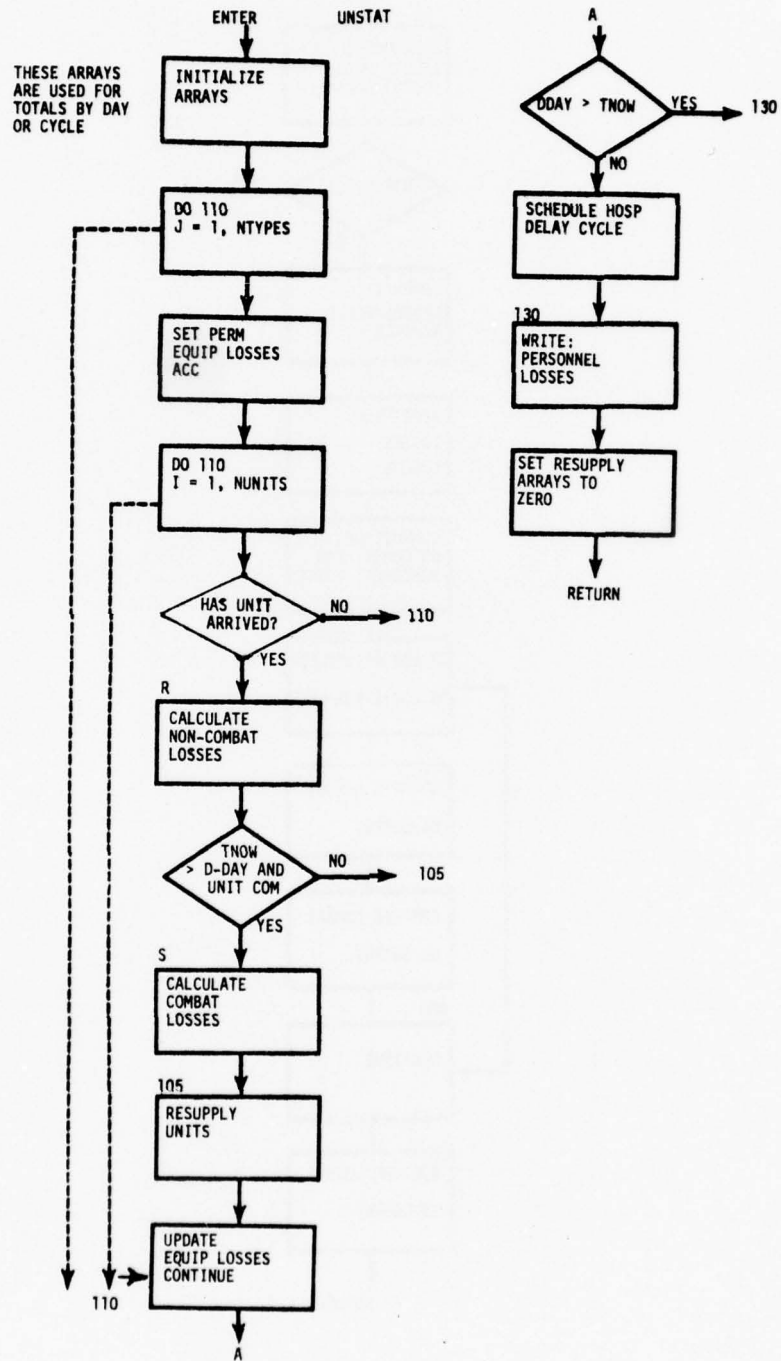


SSAVE

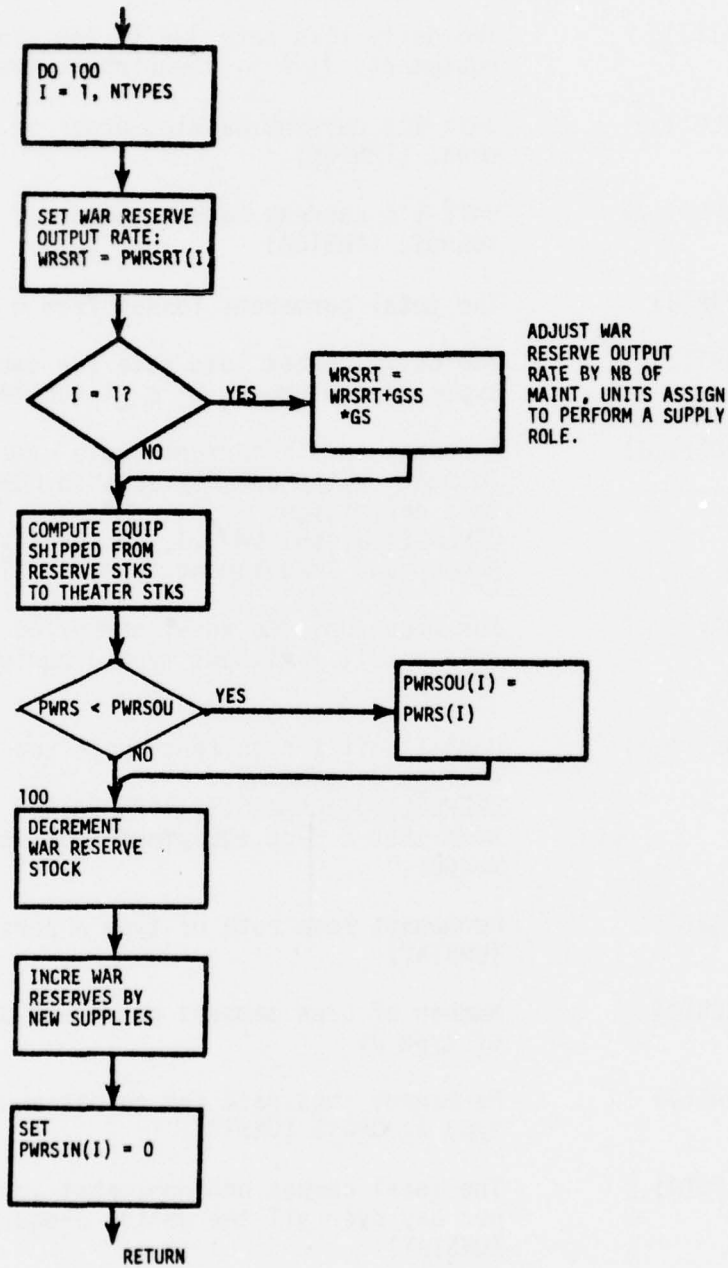








WARES



Section III. COMMON/ARRAY 1

ABRAT(J) The daily loss rate due to the abandonment of equipment, $0 \leq A \leq 1$. J=equipment type. (UNSTAT)

BACKLG(I,J) Unit I's current backlog order of type J equipment. (THSTOK)

BACKPL(I,J) Unit I's current backlog order of type J personnel. (THSTOK)

BUFPRM(J) The total permanent losses from 0 to (TNOW-1).

COMRAT(J) The daily combat loss rate for each of the J types of equipment. $0 \leq c \leq 1$ (UNSTAT)

COMLOS(I,J) A combat unit's current cycle combat equipment losses. Later computations on COMLOS alter this definition.
 $COMLOS(I,J) = UNITOH(I,J,1) * COMRAT(J)$ I=unit number and J=equipment type. (UNSTAT, MAINT)

CREWAV(I,J) For each run, the total number of crew personnel in unit I without type J equipment. (UNSTAT)

CREWLS(I,J) Combat unit I's current cycle personnel losses of type J. (UNSTAT)
 $CREWLS(I,J) = COMLOS(I,J) * PERRAT(J)$
 Note that J type equipment implies J type personnel.

CRWLSR(J) Permanent loss rate of type J personnel. $0 \leq C \leq 1$ (UNSTAT)

CRWPER(J) Number of crew members per piece of equipment of type J.

DAMRAT(J) Permanent loss rate for combat equipment of type J. $0 \leq D \leq 1$ (UNSTAT)

DAYLOS(J) The total combat and noncombat losses summed per day over all the units, J=equipment type. (UNSTAT)

DSCOM(J)	The fraction of repairable combat losses which requires direct support maintenance. J=equipment type. $0 \leq D \leq 1$ (MAINT)
DSNCM(J)	The fraction of repairable noncombat losses which requires direct support maintenance. J=equipment. $0 \leq D \leq 1$ (MAINT)
DSREPBJ)	DS maintenance (combat and noncombat) needed for equipment awaiting repair J=equipment type. (MAINT)
DSC (I,J)	(L-9 $DSC(I,J) = R_c(I,J) - GSC(I,J)$, where $R_c(I,J)$ is the repairable combat losses)
DSN(I,J)	(L-9 $DSN(I,J) = R_n(I,J) - GSN(I,J)$, where $R_n(I,J)$ is the repairable noncombat losses)
GSCOM(J)	The fraction of repairable combat losses which require general support maintenance. J=equipment type $0 < G < 1$. (MAINT) $GSCOM(I) = 1.0 - DSCOM(I)$
PSNCM(J)	The fraction of repairable noncombat losses which require general support maintenance. J=equipment type $0 < G < 1$ $GS NCM(I) = 1 - DSNCM(I)$
GSREPBJ)	GS maintenance (combat and noncombat) needed for equipment awaiting repair. J=equipment type. (MAINT)
GSC(I,J)	(L-9 $GSC(I,J) = GSCOM(J) * R_c(I,J)$, where R_c is the repairable combat losses.
(L-9 GSN(I,J)	(L-9 $GSN(I,J) = GSNCM(J) * R_n(I,J)$, where R_n is the repairable noncombat losses.
HOSPER(J)	The number of personnel of type J to enter the hospital delay route on the current cycle. (UNSTAT)
HOSPING(J)	Number of personnel of type J arriving in the theater personnel pool from the hospital on this cycle. (HOSPTL)

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MACAPI(I,J)
(I,1) An index number used to associate maintenance capacity with a given unit.
(I,2) Total maintenance capacity of a unit.
(I,J>3) The fraction of the unit's total maintenance capacity which is devoted to DS maintenance, [0,1] for this type of equipment

MAFACT(1,J) average DS noncombat loss maintenance required.
(2,J) average GS noncombat loss maintenance required.
(3,J) average DS combat loss maintenance required.
(4,J) average GS combat loss maintenance required.

Units are manhours/vehicle J=equipment type

MCC1 (K,J,1,1) - queue length, noncombat
(I,J,1,2) - queue length, combat
(I,J,2,1) - queue output, noncombat
(I,J,2,2) - queue output, combat
(I,J,3,1) - queue input, noncombat
(I,J,3,2) - queue input, combat

Maintenance control center number 1 indicating for each unit I, by equipment type J, the DS maintenance input and output by the unit (numbers of vehicles).

input waiting repairs output

$MCC1(I,J,3,L) = MCC1(I,J,1,L) + MCC1(I,J,2,L)$

MC1(I,J,K,L)

I	J	K	L
Unit nb	Equip type	1 queue length 2 queue output 3 queue input	1 noncombat 2 combat

MCC2(L,K,J) Maintenance control center number 2. The DS and GS maintenance output by rear maintenance units (numbers of vehicles).

	L	K	J
1 DS noncombat		1 queue length	equipment
2 GS noncombat		2 queue length	type
3 DS combat		3 queue output	
4 GS combat			

input waiting repairs output

$$MCC2(L,2,J)=MCC2(L,1,J)+MCC2(L,3,J)$$

Note that the subscript for queue input and output is reversed for MCC1 and MCC2.

NCMLOS(I,J)

A unit's noncombat losses for a specific type of equipment.

NCMRAT(J)

The noncombat loss rates (a percentage) for a specific type of equipment J=type of equipment.
(UNSTAT)

COMMON/ARRAY 2/

PERFAC(J) The fraction of backlogged personnel orders which will be filled on this cycle, $0 \leq P \leq 1$ J= personnel type. (THSTOK)

PERLOS(J) The total number of personnel of type J permanently lost in a run. (UNSTAT)

PERRAT(J) The combat personnel loss rate for type equipment. (UNSTAT)
Personnel loss rate = $\frac{\text{number of people lost}}{\text{combat loss}}$

PERSEN(K,J) The number of personnel, of type J, sent to unit I on the current cycle. (THSTOK)

PERSIN(J) The number of personnel, of type J, arriving from CONUS on this cycle. (RESERV)

PRMLOS(J) The cumulative number of permanent losses of equipment of type, J, from 0 to TNOW. (UNSTAT)

PRS(J) The quantity of equipment, of type J, currently in war reserve stocks. (WARES)

PWRSHR(J) The number of manhours of work required to output a piece of equipment of type J. (WARES)

PWRSIN(J) The number of combat vehicles of type J, which have entered war reserve stocks on the current cycle. (WARES)

PWRSOU(J) The number of combat vehicles, of type J, which have been shipped from war reserve stocks to theater stocks on the current cycle. (WARES) (THSTOK)

PWRSRT(J) The war reserve output rate for each type of equipment. The output rate is specified in manhours/day. (WARES)

REPAIR (1,J) The expected DS noncombat maintenance for the current cycle, equipment type J.

REPAIR (2,J)	The expected GS noncombat maintenance for the current cycle, equipment type J.
REPAIR (3,J)	The expected DS combat maintenance for the current cycle, equipment type J.
REPAIR(4,J)	The expected GS combat maintenance for the current cycle, equipment type J. (MAINT)
	Units are manhours of work.
REPIN(1,J)	The total DS noncombat maintenance required, for equipment of type J, for the vehicles awaiting repair.
REPIN(2,J)	The total GS noncombat maintenance required, for equipment of type J, for the vehicles awaiting repair.
REPIN(3,J)	The total DS combat maintenance required, for equipment of type J, for the vehicles awaiting repair.
REPIN(4,J)	The total GS combat maintenance required, for equipment of type J, for the vehicles awaiting repair. (MAINT)
	Units are manhours of work.
REPOUT(J)	The number of vehicles, of type J, repaired by maintenance in this cycle. (MAINT)
REPRAT(1,J)	The DS repair capacity of each type of equipment.
REPRAT(2,J)	The GS repair capacity for each type of equipment. (MAINT)
	Units are manhours of work/day
RESUP(I,J,K)	The quantity of equipment or personnel, by type and unit ordered on the current cycle; I=unit number; J=equipment type for K=1, and J=personnel type for K=2. (UNSTAT)

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RESUPA(I,J,K) The quantity of equipment or personnel, by type, arriving in unit I on the current cycle. K=1 implies equipment, K=2 implies personnel. (UNSTAT)

RESUPO(I,J,K) The total quantity of equipment or personnel, by type currently on order by unit I. K=1 implies equipment, K=2 implies personnel. (UNSTAT)

SUPFAC(J) The fraction of backlogged equipment orders of types J, which will be filled on the current cycle. (THSTOK)

SUPSEN(I,J) The quantity of equipment, of type J, sent to unit I on the current cycle. (THSTOK)

TCKLG(J) The total backlog orders of type J equipment. (THSTOK)

TCKPL(J) The total backlog orders of type J personnel. (THSTOK)

TCOM(J) The total combat equipment losses, by type, for the current cycle. (THSTOK)

THTRSM(I,K) Unit status matrix.

THTRSM(I,1) I=0 Unit I has not arrived
I=1 Unit I has arrived
I=2 Unit I is committed

THTRSM(I,2) I=1 Unit I, on station unit
I=2 Unit I, POMCUS unit
I=3 Unit I, CONUS unit

THTRSM(I,3) An index number for unit I. The index number is used to perform a table look-up in the array MACAPT to obtain maintenance capacity.

THTRSM(I,4) Arrival time of the unit.

TLOS(J) The total combat and noncombat equipment losses, by type, for a run. (UNSTAT)

TNCM(J)	The total noncombat equipment losses, by type, for the current cycle. (USNTAT)
TOTLOS(I,J)	The total combat and noncombat equipment losses for the current cycle, unit I, and equipment type J. (UNSTAT)
TOTPER(J)	The total supply of type J personnel currently available within theater personnel pools. (THSTOK)
TOTSTK(J)	The quantity of equipment, of type J, currently available within theater stock. (THSTOK)
TPERLS(J)	The total personnel losses, by type, for the current cycle. (UNSTAT)
TPERS(I,J)	The quantity of personnel, of type J, currently in theater stocks. I=1, implies replacement personnel; I=2, implies hospital returned personnel. (THSTOK)
TPRSEN(J)	The total number of personnel of type J, sent to all the units on the current cycle. (THSTOK)
TSPNOT(J)	The quantity of equipment, of type J, not sent to units due to a lack of personnel, current cycle. (THSTOK)
TSPSEN(J)	The quantity of equipment, of type J, sent on the current cycle. (THSTOK)
TSTOCK(I,J)	The quantity of equipment, of type J, currently in theater stocks. I=1, implies war reserves; I=2, implies repaired equipment. (THSTOK)
TRANST(J)	The quantity of equipment, of type J, in transit from theater stocks to units (THSTOSK).
UNECON(J)	The total uneconomically repairable combat equipment, of type J, in a run. (MAINT)
UNECRT(J)	The uneconomically repairable rate for equipment type J. (See equations) (MAINT) [0,1].

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UNITAU(I,J,K) The authorized equipment level and personnel level for unit I. K=1, implies J=equipment type; K=2, implies J=personnel type.

UNITOH(I,J,K) The onhand equipment level and personnel level for unit I. K=1, implies J=equipment type; K=2, personnel type. (UNSTAT)

UNREP(J) The unrepairable rate for noncombat damaged equipment of type J. [0,1], (UNSTAT)

UNTMAC(I,J) DS unit repair capacity by equipment type. (manhours of work/day).

COMMON/CHECK/

HOSP(J) The number of personnel entered into the hospital delay cycle. (UNSTAT)
 $HOSP(J) = HOSP(J) + HOSPER(J)$

OTGS(J) Cumulative GS maintenance output from control center two. (MAINT)
 $OTGS(J) = OTGS(J) + MCC2(I,3,J)$,
where I equals 2 or 4 and J is equipment type.

OTRDS(J) Cumulative DS maintenance output from control center two. (MAINT)
 $OTRDS(J) = OTRDS(J) + MCC2(I,3,J)$.
where I equals 1 or 3 and J is equipment type.

OTUNDS(J) Cumulative DS maintenance output from control center one. (UNMAIN)
 $OTUNDS(J) = OTUNDS(J) + MCC1(I,J,2,K)$,
where K=1 or 2 and I and J indicates unit and equipment type respectively.

PERARR(J) The number of arrived replacement personnel. (THSTOK)
 $PERARR(J) = PERARR(J) + PERSIN(J)$

PTRANS(J) The personnel in transit. (THSTOK) and (UNSTAT)
 $PTRANS(J) = PTRANS(J) + TPRSEN(J)$
 $PTRANS(J) = PTRANS(J) - RESUPA(I,J,2)$
Personnel in transit from theater stocks to units.

RSIN(J) Total DS input to control center two. (MAINT)
 $RDSIN(J)=RDSIN(J)+MCC2(1,2J)+MCC2(3,2,J)$

SUPTOT(J) The number of combat vehicles which have been
 added to war reserve stocks for all cycles.
 (WARES) (WRARR). $SUPTOT(I)=SUPTOT(I)+PWR SIN(I)$

TGSIN(J) Total GS input to control center two. (MAINT)
 $TSIN(J)=TGSIN(J)+MCC2(2,2,J)+MCC2(4,2,J)$

UNDSIN(J) Cumulative DS maintenance input to control
 center one. (UNMAIN)
 $UNDSIN(J)=UNDSIN(J)+MCC1(I,J,3,1)+MCC1(I,J,3,2)$

WARRES(J) The initial war reserve stocks. (INTLC)
 $WARRES(J)=PWR S(J)$.

IN(11,D,T)-Summary Report Array.

$IN(1, IDAY, J)=IN(1, IDAY, J)+UNITAU(I, J, 1)$

$IN(2, IDAY, J)=SUPTOT(J)$

$IN(3, IDAY, J)=WARRES(J)$

$IN(4, IDAY, J)=UNDSIN(J)$

$IN(5, IDAY, J)=RDSIN(J)$

$IN(6, IDAY, J)=TGSIN(J)$

$IN(7, IDAY, J)=IN(7, IDAY, J)+UNITAU(I, J, 2)$

$IN(8, IDAY, J)=PERARR(J)$

$IN(9, IDAY, J)=IN(1)+IN(2)+IN(3)$

$IN(10, IDAY, J)=IN(4)+IN(5)+IN(6)$

$IN(11, IDAY, J)=IN(7)+IN(8)$

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OUT(21,D,T)-Summary report array

```
OUT(1, IDAY, J)=PWRS(J)
  OUT(2, IDAY, J)=TSTOCK(1, J)+TSTOCK(2, J)
  OUT(3, IDAY, J)=OUT(3, IDAY, J)+UNITOH(I, J, 1) THTRSM(I, 1)=1.0

OUT(4, IDAY, J)=OUT(4, IDAY, J)+UNITOH(I, J, 1) THTRSM(I, 1)=2.0

OUT(5, IDAY, J)=PRMLOS(J)
  OUT(6, IDAY, J)=UNECON(J)
  OUT(7, IDAY, J)=TRANST(J)
  OUT(8, IDAY, J)=OUT(8, IDAY, J)+MCC1(I, J, 1, 1)+MCC1(I, J, 1, 2)

OUT(9, IDAY, J)=MCC2(1, 1, J)+MCC2(3, 1, J)
OUT(10, IDAY, J)=MCC2(2, 1, J)+MCC2(4, 1, J)
OUT(11, IDAY, J)=OTUNDS(J)
OUT(12, IDAY, J)=OTRDS(J)
OUT(13, IDAY, J)=OTGS(J)
OUT(14, IDAY, J)=(14, IDAY, J)+UNITOH(I, J, 2)THTRSM(I, 1)=1.0
OUT(15, IDAY, J)=PERLOS(J)
OUT(16, IDAY, J)=HOSP(J)
OUT(17, IDAY, J)=TPERS(1, J)+TPERS(2, J)
OUT(18, IDAY, J)=PTRANS(J)
OUT(19, IDAY, J)=OUT(19, IDAY, J)+OUT(L, IDAY, J)L=1, 10
OUT(20, IDAY, J)=OUT(19, IDAY, J)+OUT(O, IDAY, J)L=8, 13
OUT(21, IDAY, J)=OUT(21, IDAY, J)+OUT(L, IDAY, J)
  L=14, 18
```


DELTA(3,D,T)-Summary report array

DELTA(1,J,KTYPE)=ABS[IN(9,J,KTYPE)-OUT(19,J,KTYPE)]

DELTA(2,J,KTYPE)=ABS[IN(10,J,KTYPE)-OUT(20,J,KTYPE)]

DELTA(3,J,KTYPE)=ABS[IN(11,J,KTYPE)-OUT(21,J,KTYPE)]

QCAP(3,D,T)-Summary report array.

QCAP(1,IDAY,J)=REPRAT(1,J)
DS repair capacity.

QCAP(2,IDAY,J)=REPRAT(2,J)
GS repair capacity

QCAP(3,IDAY,J)=PWRVRT(J)
War reserve output rate.

COMMON/NONARR/

DAYPRM	See subroutine UNSTAT.
DLYSTA	The number of days of delay prior to the commitment to the FEBA of an on-station combat unit.
DLYPOM	The number of days of delay prior to the commitment to the FEBA of a newly arrived POMCUS unit.
DLYCON	The number of days of delay prior to the commitment to the FEBA of a newly arrived CONUS unit.
DDAY	The day combat computations are commenced.
DLYHOS	The number of days of delay prior to the return of hospitalized personnel to the theater personnel pool.
DLYSUP	The number of days of delay prior to the arrival of any resupply equipment from theater stocks to the combat units.

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DLYPER The number of days of delay prior to the arrival of replacement personnel from the theater personnel pool to the combat units.

DLYMAI The number of days of delay prior to the arrival of any combat unit associated direct support maintenance.

KDAY The number of days for each run.

NMATE The number of rows in the array MACAPT.

PERMS See Subroutine UNSTAT.

COMMON/SSAVE/

See tables in subroutine SSAVE

COMMON/TANKS/

TANK The total number of days vehicles of type 1 are committed.
Let C_i be the number of tanks committed on day i , then

$$TANK = KDAY \sum_{i=0} C_i$$
 , where KDAY
is the number of days for each run.

GS The initial strength, in theater, of a GS maintenance unit in manhours per day.

GSS The number of GS maintenance units assigned to perform a supply role during the current cycle.

COMMON/TOTS/

NUNITS	The number of units in the computational procedure
NTYPES	The number of types of equipment for each and every unit. Also the number of types of personnel.
NMAINT	not used(?)
NMATYP	not used(?)
NSPUNT	not used(?)
NSPTYP	not used(?)
RELOC	The time in the computational procedure when all GS maintenance units performing a supply role are reassigned to perform a maintenance role.
GSUS	The number of GS maintenance units performing a supply role.

INTLC INPUT CONSTANTS

NARRS	---
NRESUP	The number of war reserve supply events.
NRPEL	The number of reserve replacement personnel events.
NARRMS	The number of type eight events input.

APPENDIX H
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GLOSSARY OF TERMS

1. ABBREVIATIONS, ACRONYMS, AND SHORT TITLES

CEGE	Combat Equipment Group, Europe
CODAM	Combat Damage Assessment Model
CS	combat support
CSS	combat service support
D-day	deployment day
DPPG	Defense Policy and Planning Guidance Memorandum
DS	direct support
FAS	ODCSOPS Force Accounting System
FPE	firepower equivalent
FPP	firepower potential
GER	Germany
GS	general support
GRSA	Germeschein Storage Activity
KAD	Kaiserslautern Army Depot
MMC	materiel management center
MOE	measures of effectiveness
NORTHAG	Northern Army Group, Europe
Pact	Warsaw Pact
POMCUS	prepositioning of materiel configured to unit sets
PWRMS	prepositioned war reserve materiel stocks
RDD	required delivery date

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REFORGER	Reinforcement Force Germany
RFI	ready for issue
PMDL	Post Mobilization Day Deployment List
SRC	standard requirements code
TAA	Total Army Analysis Study
TPFDL	Time Phased Force Deployment List

2. MODELS, ROUTINES, AND SIMULATIONS

CEM	Concepts Evaluation Model. A fully automated, deterministic computer simulation model which portrays theater-level, nonnuclear warfare between two opposing forces along a continuous FEBA.
FASTALS	Force Analysis Simulation of Theater Administrative and Logistics Support. A model which computes time phased administrative and logistic workloads for an active theater and rounds out the force structure with the minimum number of doctrinally required support units to perform the workload.
TRANSMO III	Transportation Model III. A model which simulates the movement of units into a theater of operations. Model characteristics include the capability to simulate attrition of personnel and equipment enroute to the theater. TRANSMO III includes explicit convoy simulation.
BALFOR	Balanced Force Model.
GASP IV	A FORTRAN simulation language for discrete and continuous simulations.