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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NPRDC TR 83-23	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) MINIFAST: AN INTERACTIVE ENLISTED PERSONNEL PLANNING MODEL		5. TYPE OF REPORT & PERIOD COVERED Technical Report Oct 1981-Feb 1982 6. PERFORMING ORG. REPORT NUMBER 11-83-2
7. AUTHOR(s) Robert Stephan David Campbell		8. CONTRACT OR GRANT NUMBER(s) N00123-78-D-1114
9. PERFORMING ORGANIZATION NAME AND ADDRESS Systems Exploration, Inc. Monterey, CA 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS FAST/FAIM Reimbursable of FY82 (P074318)
11. CONTROLLING OFFICE NAME AND ADDRESS Navy Personnel Research and Development Center San Diego, California 92152		12. REPORT DATE June 1983 13. NUMBER OF PAGES 74
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Manpower planning
Enlisted personnel
Personnel force projection
Manpower models

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

A model of the enlisted personnel system (MINIFAST) is described in terms of stocks and flows. The model describes system behavior for some given policy scenario under a fixed set of mathematical assumptions. MINIFAST has been installed in an interactive computer environment. The user can interactively input personnel objectives and then determine the effect of changes in policy in satisfying those objectives. The model can operate at the ALNAV or rating level, but not both

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S/N 0102-LF-014-6601

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simultaneously. Although its methodology resembles that of FAST, the "mainframe" enlisted personnel projection model, it sacrifices some detail and makes some assumptions in order to operate interactively.

NPRDC TR 83-23

JUNE 1983

MINIFAST: AN INTERACTIVE ENLISTED PERSONNEL PLANNING MODEL

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NPRDC TR 83-23

June 1983

MINIFAST: AN INTERACTIVE ENLISTED PERSONNEL PLANNING MODEL

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FOREWORD

This report describes the methodology underlying MINIFAST, an interactive computer model for projecting the effects of enlisted personnel policies on the attainment of force objectives by rating. In addition, it provides a terminal guide for users and documentation on data base maintenance procedures.

Most of the design and all of the software development was accomplished by Systems Exploration, Inc. under contract to the Navy Personnel Research and Development Center. Funding support for this effort originated with the Deputy Chief of Naval Operations (Manpower, Personnel, and Training) and the Decision Systems Support Office (NMPC-164).

MINIFAST has been installed on the Harris 800 in OP-01, primarily for use by enlisted community managers in OP-132 and OP-135. User accounts and user access procedures should be obtained from NMPC-164 (DSS).

JAMES F. KELLY, JR.
Commanding Officer

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Technical Director

SUMMARY

Problem

To determine quckly the effect of actual or proposed changes in personnel policies on enlisted rating populations, it was necessary to design an interactive personnel model that could be used as an extension of a personnel planner's thought process. In order to be consistent with the established mechanism for enlisted personnel inventory projection, the basic methodology must follow the dimensions and basic design of the Navy's "mainframe" projection model--FAST. The resultant interactive model is called MINIFAST.

Purpose

The purpose of this report is to describe the methodology underlying MINIFAST and the data base supporting the model. In addition, a user's guide is provided to assist users in operating the model.

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INTRODUCTION

Problem and Background

To quickly determine the effects of actual or proposed changes in personnel policies on enlisted rating populations, it was necessary to design an interactive personnel projection model consistent with the mainframe system called FAST. The resultant interactive model is called MINIFAST.

Using the methodology of FAST as a guide, computational procedures were simplified to arrive at tradeoffs that would permit interactive processing. This involved some sacrifice of detail and policy-testing capability. In addition, because the model is intended for use by enlisted rating planners, some of the interactions between Total Navy considerations (e.g., budget constraints, end strength authorizations) and rating management could not be accommodated. Nevertheless, the essential features of FAST methodology are captured by MINIFAST. In addition, MINIFAST employs the FAST data base as the basis for its forecasts.

Purposes

The purposes of this report were (1) to describe the general formulation of MINIFAST and the precise mathematical statements used, and (2) to provide a user's guide for operation of the model.

METHODOLOGY DESCRIPTION

Overview

For purposes of this report, the Navy's personnel system is defined as a set of enlisted personnel in the Navy along with the rules and decisions that govern their entry into, advancement in grade, and exit from the Navy. The primary concern is how the personnel system operates on an aggregate level, described by the pay grade (PG), rating (job skill), and length of service (LOS) of personnel. Other considerations, such as duty location, assignment and rotation, training, etc., are not explicitly considered.

The central feature of the enlisted personnel system is a force structure matrix; that is, a categorization of personnel by LOS and PG (e.g., the (i, j) entry is the number of personnel with LOS = i and PG = j). Force structure matrices are used to represent personnel inventories, personnel losses (such as attrition or retirement), personnel gains (such as prior service gains), and other variables that describe the behavior of the personnel system. In modelling this system, individuals are not considered as entities, except to the extent that they are "counted" in the various force structure matrices used.

MINIFAST, the model of the enlisted personnel system described herein, is a flow model; that is, a model that calculates what the personnel system will do for some given policy scenario under a fixed set of mathematical assumptions. The general chain of events, or flow of personnel, begins with a statement of the current inventory in a force structure matrix. External losses and gains to the force are estimated, and the user can specify a policy scenario that affects these variables. The number of advancements in pay grade (a form of internal movement) is calculated based on the authorizations for personnel and other variables, all of which the user can control. Finally, the number of recruits to bring into the force may be computed or prescribed by the user. The model's time step is 1 year (12 months), and the user can continue the model as far into the future as desired in 1-year steps.

The intended purpose of MINIFAST is to calculate the effects on the personnel system of multiyear authorizations and changes in policy that affect losses or gains to the force, the availability of personnel for promotion, or levels of recruitment. Some of the effects quantified are (1) the resulting force structure matrix of inventory on board in future time periods (including statistics such as average LOS, career ratios, top six ratios, etc.), (2) losses and gains in future periods, (3) promotions required, and (4) force structure matrices of promoted personnel. Since the personnel system cannot always respond to all requirements asked of it, the model reveals potential shortages and excesses of personnel, as well as distortions of the advancement system beyond its normal limits of flexibility. MINIFAST is an interactive model, but the dialogue necessary to define a scenario is kept to a minimum so that the user does not experience delays. Thus, MINIFAST is intended for use in situations where policies need rapid evaluation, sorting out those that justify more intensive analysis. For this reason, ratings are treated separately, not jointly, in order to preserve the model's quick reaction capability. Nevertheless, there are ways to simulate some interrating effects, which are described later. The user specifies a rating to address from a data base containing all possible ratings, one of which is the pseudo-rating "All Navy." As such, MINIFAST is a multiyear planning model of the personnel system and, to reiterate, does not model the recruitment, assignment, detailing, reenlistment, or promotion of individuals.

MINIFAST is very similar to FAST in problem formulation. FAST is a noninteractive model of the personnel system, developed at NAVPERSRANDCEN (Boller, 1974; Boller, Lehto, Offir, & Silverman, 1978). The FAST model is the "mainframe" model used in the Chief of Naval Operations (OP-01) for management of the enlisted force. Its output is used as input to a variety of other, more specialized models. Because of the level of detail and comprehensiveness of FAST, the set-up of input files is time-consuming and the turnaround time is often overnight. Consequently, the use of FAST in quick reaction drills is often impossible and always difficult. MINIFAST was specifically designed to have, as nearly as possible, the same problem formulation and mathematical assumptions. Thus, the joint rating capability of FAST is specified to allow an interactive approach. Nevertheless, the difference between their formulations is minor.

The academic literature is replete with descriptions of personnel models (Charnes, Cooper, & Neihaus, 1972; Price, Martel, & Lewis, 1980). MINIFAST does not fit the usual classifications, since it is not a goal programming, queuing, or linear programming model. Further, it is not a renewal model or Markov model, although it has superficial similarities to both. It uses various mathematical techniques, including smoothing, regression, and linear equation solving, but only in a limited way.

The model duplicates or simulates (in a nonstatistical way) the behavior of the personnel system, taking as input those quantities that the decision maker directly controls or influences, and calculates their impact throughout the system in terms of the inventory force structure, advancements, and other personnel flows. Any "optimization" of the system is accomplished by the user, who tests proposed policies by simulating their effects, readjusts expectations of what is feasible, and avoids costly errors wherever possible. This user is expected to be someone who is conversant with the personnel system.

Problem Formulation

This section deals with the formulation of the personnel system, defining the various terms for later use. Instructions regarding hands-on use of the model are provided in Appendix A. Data base maintenance and creation are described in Appendices B and C.

Personnel are categorized in MINIFAST by their (1) rating, a Navy job skill category (of which there are about 97), (2) pay grade, expressed as E-1, E-2, . . . E-9 from lowest to highest, and (3) length of service (LOS), measured in years of active service from date of entry to the present. The model is focused on a single rating selected from those resident in the data base. This data base currently includes the 73 general ratings, where service ratings are combined with their parent general rating and "All Navy." Many of the personnel in pay grades E-1, E-2, and E-3 are unrated (i.e., they do not possess a specialized skill). These personnel constitute the pool of available personnel from which entry to one of the ratings occurs. Since their advancement from E-1 to E-2 to E-3 is decentralized and not explicitly controlled, E-1s and E-2s were included with E-3s. For modelling purposes then, personnel in E-1 and E-2 are not distinguished from those in E-3, and the set of feasible pay grades becomes E-3, E-4, E-5, E-6, E-7, E-8, and E-9. The same convention is used in FAST. Finally, LOS is discretized by years with LOS cell m referring to those personnel with m-1 but less than m years of service.

The primary statement of personnel needs in the future is made with requirements and authorizations. Requirements are determined by examining workload and statements of job positions and are aggregated to the level of ratings and pay grades for budgeting and programming. The programming process results in authorizations, which are funded billets or job requirements categorized by rating and pay grade. The personnel system is then managed to supply persons in these numbers.

Losses from and prior service gains to the Navy account for all yearly changes to the size of the force structure, except for new recruits. Taking account of the losses and prior service gains to a beginning inventory results in a net inventory of personnel. This net inventory is assumed to be the limiting population available to the promotion process (a subset of this population representing resources for advancement). Although the net inventory never really exists at any point in time, it conceptually represents the internal supply of personnel prior to advancement.

The promotion process is vacancy-driven. The net E-9 inventory is subtracted from E-9 authorizations to get vacancies at E-9. Promotions from E-8 are made to fill these vacancies, subject to the availability of E-8 personnel qualified for promotion by a variety of criteria. These promotions out of E-8, together with external losses, create vacancies at E-8 that are then filled from E-7, again subject to personnel available for promotion in E-7. This process is repeated until, finally, vacancies at E-4 are filled from E-3. When vacancies in some pay grade cannot be filled entirely, the shortfall is carried down to the vacancies at the next lower pay grade. This practice is consistent with assignment policies that permit grade substitution as necessary to fill billets.

Recruits are brought into the Navy with the usual intention of filling the supply of personnel up to the total end strength authorized by Congress and the Office of the Secretary of Defense (OSD). Their entry into individual ratings is influenced by various factors, such as the capacity of schools, aptitude and interest of the personnel, etc.

Authorizations and the Beginning Inventory

This section presents an annotated terminal session with MINIFAST. It begins as a display of future authorizations by pay grade for seven consecutive time periods for the chosen rating, as illustrated by Figure 1. These numbers are end fiscal year targets and

can be modified for evaluating changes in authorization levels or any conjectured future manpower targets for a rating.

```
      GOFAST 100
ENTER FORECAST TITLE.
SAMPLE OUTPUT
SAMPLE OUTPUT
BOATSWAINS MATE FY82
RUN ON  7/27/1982    9:51


AUTH STRENGTH       E3     E4     E5     E6     E7     E8     E9
FISCAL YEAR 82    2340   2842   2635   1980   1178    335    160

FISCAL YEAR 83    2700   3030   2730   2025   1205    350    160

FISCAL YEAR 84    2800   3125   2825   2050   1230    360    160

FISCAL YEAR 85    3000   3263   2900   2075   1235    365    162

FISCAL YEAR 86    3050   3236   2940   2080   1240    367    162

FISCAL YEAR 87    3050   3236   2940   2080   1240    367    162

FISCAL YEAR 88    3050   3236   2940   2080   1240    367    162


          BEGINNING FORCE, FISCAL YEAR  82
              E3     E4     E5     E6     E7     E8     E9  E4-E9  TOTAL
INV        12890   2696   2243   2009   1136    295    149   8528  21418
MEAN LOS    1.43   4.09   7.06  12.32  17.40  20.24  23.98   9.49   4.64
CR RATIO    5.00  39.69  91.93  99.65  99.82 100.00 100.00  78.71  34.34
CR FORCE     644   1070   2062   2002   1134    295    149   6712   7356
TOP SIX RATIO 39.82 PERCENT
```

Figure 1. Beginning a MINIFAST run.

Note that the E-3 authorizations are substantially less than the E-3 beginning inventory. The authorizations reflect only the manpower requirements for personnel at the apprentice skill level, while the inventory reflects the much larger population needed to satisfy future requirements at E-4 and above (i.e., the base needed to "grow" the force).

Some statistics on the beginning inventory are displayed; namely, average LOS, career force, and top six ratio. Defining

I = Force Structure Matrix of beginning inventory, so
I(i,j) = Number of personnel with length of service = i, pay grade = j, i = 1, 2, ... 31, j = 1, ... 7 (for E-3, ... E-9, respectively).

Then, the average LOS shown for any given pay grade j is

$$\text{Average LOS in PG } j = \sum_{i=i}^{31} (i-0.5)I(i,j) \div \sum_{i=1}^{31} I(i,j).$$

The career force is those personnel with 4 or more years in the service, or

$$\text{Career force in PG } j = \sum_{i=5}^{31} I(i,j).$$

The career ratio for the pay grade is the ratio of career force to total inventory for that pay grade, expressed as percent.

The top six ratio is the petty officer to total force ratio, or

$$\text{Top Six Ratio} = \sum_{j=2}^{7} \sum_{i=1}^{31} I(i,j) \div \sum_{j=1}^{7} \sum_{i=1}^{31} I(i,j).$$

These statistics are particularly useful for personnel managers in monitoring the cost and experience level of the force.

Loss and Gain Prediction and Modification

Losses are predicted next, based on the beginning inventory. Letting

L = any specific loss prediction matrix, so
L(i,j) = number of losses from beginning inventory with LOS = i, pay grade = j,

then

$L(i,j) = \alpha(i,j) \cdot I(i,j)$
where α = fractional rate derived historically.

The data base contains forecast data for every type of loss and gain used, for every pay grade and rating. These data are derived from the FAST data base. Except for Laterals and Miscellaneous Gains, MINIFAST data are in the form of rate matrices (α) as described above. The exceptions take the form of smoothed constant prediction matrices taken directly from the FAST data without conversion to rates. These variables form a partition of losses and gains as follows:

Losses:	Gains:
Attrition	Demotions In
Expiration of Active Obligated Service (EAOS)	*Laterals In
Contract Loss	*Miscellaneous Gains
Demotions Out	Retention
*Laterals Out	
Retirement	
*Constant prediction values (integer arrays), vice fractional rates	

Some discussion of these variables is helpful at this point. Attrition is defined as losses from the service for reasons other than contract expiration and retirement (e.g., disability or death, dishonorable discharge, health or hardship discharge, failure to adjust to military life, desertion, separation for "convenience of the government," etc.). Demotions Out and Demotions In account for internal changes due to reduction in grade. Both are necessary since demotions often cross several pay grades. Laterals Out and In represent changes external to the rating but internal to the Navy. This is an example of an interrating effect that can be simulated, even as ratings are treated individually. Retirement is self-explanatory. Personnel leaving the Navy and reenlisting within 90 days are accounted for by the Retention variable. Broken Service gains are those allowed to return after an extended departure and are included in the Miscellaneous Gains category.

The largest external change is usually Contract Loss, those personnel whose expired contract is not renewed. The larger set, EAOS, are those who will have their contract expire during the year. The complement of Contract Loss is called Retention, by definition. The following is called the retention equation and will be referred to later:

EAOS = Contract Loss + Retention.

Any of the variables listed above can be displayed or modified at the user's request. Figure 2 provides an example of attrition being displayed and then modified. This capability permits the evaluation of policies that are presumed to have some effect on specific flows but cannot be historically predicted. For example, a specific bonus policy for a rating, aimed at decreasing Contract Losses from E-4, can be evaluated for its effect by simulating the decrease. As another example, lateral flow from a rating could be postulated and entered as a modification to the usual lateral changes. The amount of change necessary to solve a specific problem at hand can be determined in this manner.

When a user wishes to modify a loss or gain prediction for some reason, it is infeasible to modify the predicted force structure matrix cell by cell. The following method is used (see Figure 2 for an example). New values can be given to any subset of the pay grade totals, LOS totals, or grand total, and are applied according to the following algorithm:

Let

L = matrix prediction of the variable prior to modification,

then

$$L'(i,j) = L(i,j) \cdot B_j \div \sum_{k=1}^{31} L(K,j) \qquad i = 1,\ldots,31; \quad j = 1,\ldots,7$$

where

B = the modified jth pay grade total entered or the existing total if no new value was entered.

$$L''(i,j) = L'(i,j) \cdot C_i \div \sum_{k=1}^{7} L'(i,k) \qquad i = 1,\ldots 31; \quad j = 1,\ldots 7$$

```
LOSSES AND GAINS IN FISCAL YEAR 82
BASELINE RATES USED.
?>?
THE LOSS/GAIN VARIABLES ARE:
  1 ATTR    ATTRITION
  2 CLOSS   CONTRACT LOSS
  3 DEMOUT  DEMOTIONS OUT
  4 EAOS    EAOS
  5 LATOUT  LATERALS OUT
  6 RETIR   RETIREMENT
 10 DEMIN   DEMOTIONS IN
 11 LATIN   LATERALS IN
 12 MISCG   MISC GAINS
 13 RETEN   RETENTION

YOU MAY SELECT BY ABBREVIATION OR NUMBER.
D=DISP;U=UP-DATE;R=RESTORE;S=SUMMARY;P=PROCEED[,VARB[,ELEMENTS]] >DISP
WHICH VARB ,WHICH ELEMENTS
ATTR
ATTRITION NOW HAS VALUES :

     PAY GRADES :
        3       4       5       6       7       8       9
     2329     129      63      33      27       6       3

     LOS :
        1       2       3       4       5       6       7       8
     1027     725     351     164     108      44      33      25

        9      10      11      12      13      14      15      16
       15      21      15      10       6       5       7       4

       17      18      19      20      21      22      23      24
        5       5       4       6       4       2       1       1

       25      26      27      28      29      30      31      32
                                                       1    2590


 ?>U ATTR E4
 ATTRITION NOW HAS VALUES :

     PAY GRADES :
        4
      129
 INPUT 1 NEW VALUE FOR ATTRITION
 100
 OVERRIDE ACCEPTED
```

a. Display of attrition.

Figure 2. Example of attrition modification.

```
?>D ATTR
ATTRITION NOW HAS VALUES :

    PAY GRADES :
       3        4        5        6        7        8        9
    2329      100       63       33       27        6        3

    LOS :
       1        2        3        4        5        6        7        8
    1027      722      343      158      103       42       31       24

       9       10       11       12       13       14       15       16
      15       21       15       10        6        5        7        4

      17       18       19       20       21       22       23       24
       5        5        4        6        4        2        1        1

      25       26       27       28       29       30       31       32
                                                          1     2561
```

b. Modified attrition.

Figure 2. Example of attrition modification (continued).

where

C = the modified ith LOS total entered, or the existing (from L') total if no new value given.

$$L'''(i,j) = L''(i,j) \cdot D \div \sum_{k=1}^{7} \sum_{i=1}^{31} L''(l,k) \quad i = 1,....,31; \quad j = 1,...,7$$

where

D = the modified grand total entered, or the existing (from L") grand total if no new value was given.

L''' = final modified matrix for the variable.

Note that this method of updating or modifying predictions attempts to preserve as nearly as possible the linearity between predictions and inventory, as well as the relative proportions in the likelihood matrix. If pay grade totals (but no other total) are modified, the new variable has these totals. However, if even one LOS total or the grand total is also modified, the new variable will not have the exact modified pay grade totals that were entered. This method discourages severe distrotions in the prediction matrix.

When any one of the three variables--Contract Losses, EAOS, or Retention--are modified, the retention equation (E = C + R) is violated. The model then automatically recomputes the two remaining variables, making the equation valid once again. Figure 3 shows an example in which EAOS is modified in response to, perhaps, an early-out policy

```
CONTRACT LOSS NOW HAS VALUES :

    LOS :
      32
    2356


?>U EAOS 32
EAOS NOW HAS VALUES :

    LOS :
      32
    3723


INPUT 1 NEW VALUE FOR EAOS
4000
EAOS EQUATION RE-ESTIMATED.
RE-ESTIMATE MADE OF CONTRACT LOSS
RE-ESTIMATE MADE OF RETENTION
OVERRIDE ACCEPTED
?>D CLOSS 32
CONTRACT LOSS NOW HAS VALUES :

    LOS :
      32
    2532


?>PROCEED
```

Figure 3. EAOS modification.

or an accumulation of the EAOS due to former extensions. Then, a recomputation of Contract Loss automatically modifies it as if it were predicted in proportion to the new EAOS. Specifically,

$$C = E\ A\ B$$

where C = Recomputed EAOS matrix,
E = Modified EAOS matrix,
A = Prediction matrix (α) for contract loss,
B = Prediction matrix (α) for EAOS,

and the multiplication and division indicated is performed on a cell by cell basis. Retention (R) is recomputed by the equation

$$R = E - C.$$

If Retention itself were modified, then a recomputation of Contract Losses would be

$$C = E - R$$

and EAOS (E) would remain unchanged. Since so many of the policies considered affect Contract Losses in some way, the above procedures are indispensable to real applications. When all losses and gains are used to calculate the net inventory, only Contract Loss is included (i.e., EAOS and Retention are ignored).

To guard against input errors or possible abuses, every modification is examined for its feasibility. Any change that would produce a negative cell value in the net inventory matrix is disallowed. Any increase in Contract Loss or Retention that exceeds EAOS in some cells is also disallowed.

Net Inventory

Upon determination of a feasible set of losses and gains, a net inventory is calculated by subtracting the following variables to the beginning inventory:

1. Attrition
2. Retirement
3. Contract Loss
4. Demotions Out
5. Laterals Out

and adding

1. Demotions In
2. Laterals In
3. Miscellaneous Gains.

The net inventory is not displayed during an on-line session but can be examined in the off-line report.

Promotions

When a set of losses and gains has been derived, the model then computes promotions. First, promotion resources for the petty officer force are estimated. This is an estimate of the number of personnel who will have taken the advancement test for the next higher rate and who have sufficient time in grade (accumulated as time in service) to qualify for promotion during the year in question. Estimates are made according to the formulas:

$$AR(j) = \sum_{i=a(j)}^{c(j)} \text{Min}((UB(i,j-1) - NA(i,j), TT(i,j-1))$$

where

AR(j) = Advancement resources for promotion to PG j
j = E-4, E-5, ..., E-9

UB = Upper bound on advancements, calculated as beginning inventory-attrition-retirement-contract loss.

$a(j)$ = Youngest LOS cell allowed for promotion to j

$C(j)$ = Oldest LOS cell allowed for promotion to j

$NA(i,j)$ = Nonexamined advancements (automatic and miscellaneous) from LOS cell i, to pay grade j

$TT(i,j-1)$ = Test takers in LOS cell i, pay grade j-1.

This estimate of advancement resources is seen to include all test takers, after accounting for losses and nonexamined advancements. These advancement resources are therefore "examined" advancement resources, to which the "controlled" advancement system applies.

A portion of the nonexamined advancements, called automatic advancements (AA), are estimated by the model and displayed to the user for possible revisions. Some AAs originate as recruits in the year of interest and, therefore, end up in the petty officer force, LOS cell 1, at the beginning of next year. For this reason, AA(i,j) is defined for LOS cell i = 0 to be the nonprior service personnel who will enter this year and finish in the top-six pay grade j, j = E-4, ..., E-9. This variable is zero for j = E-3, by definition (the analogous quantity is really the nonprior service recruits, treated separately). Note that last year's net AAs in LOS cell 0 are this year's LOS cell 1 inventory.

The model uses historically derived estimates of automatic advancements and miscellaneous advancements. These data values are stored along with each rating's data and are distinct by rating. The user can enter modified values for the total AA over LOS, and MINIFAST will use the modified value by proportionately scaling the above estimate, limited by the net inventory less miscellaneous advancements when LOS cell i is ≥ 1. That is,

$AA'(i,j)$ = $AA(i,j) \times AA'(\bullet,j) \div AA(\bullet,j)$, with the provision that it not exceed the upper bound $\leq NET(i,j-1) - MA(i,j)$ for $i \geq 1$

where

$AA'(i,j)$ = The AAs as subsequently used by MINIFAST

$AA(i,j)$ = AAs as estimated above.

$AA'(.,j)$ = The AA to pay grade j, as requested by the user

$AA(.,j)$ = $\sum_{i=0}^{31} AA(i,j)$

$NET(i,j-1)$ = Net inventory for LOS i and pay grade j-1.

$MA(i,j)$ = Miscellaneous advancements to pay grade j with LOS i.

After MINIFAST has estimated automatic advancements, allowed the user to override that estimate, and replaced its estimate by the user's, it then estimates the test takers (TT). The TT variable used in the estimate of advancement resources is derived from:

$TT(i,j) = TR(i,j) \times I(i,j)$

where

TR = Test taker rate fractions

I = Beginning inventory.

The data fractions TR are stored in each rating's data base and, at this time, are distinct by rating. Although the TTs cannot be directly modified by the user, the advancement resources (AR) can be modified, but subject to limitations. Just as for AAs, the ARs can be adjusted upwards or downwards by pay grade. Upward movement is constrained by the net inventory less nonexamined advancements; the downward movement by zero. All modifications to the pay grade value are rescaled to LOS, in proportion to the default forecast, just as for automatic advancements.

Figure 4 illustrates the user's review of automatic advancements and advancement resources.

PROMOTIONS IN FISCAL YEAR 82
KEEP SAME P/W ZONE ? YES

	E4	E5	E6	E7	E8	E9
AUTOMATIC ADV 50	4	2				
AUTOMATIC ADV 50 10	50	2				
AUTOMATIC ADV	50	10				
ADV RESOURCES WZ	52	13	20	52	48	9
ADV RESOURCES PZ	1589	1194	643	826	519	100
APPORTIONMENT	100	100	100	100	100	100

Figure 4. Promotions.

While authorizations are specified for each rating, it is possible that some ratings cannot reach their authorization levels because of lack of sufficient resources for promotion. In this situation, other ratings are allowed to oversubscribe their authorizations (but not beyond requirements) such that the sum over all ratings achieves Total Navy authorizations at each pay grade. The process for accomplishing this overall balance is called apportionment. Because apportionment is an interrating process, it cannot be treated explicitly by MINIFAST. The model does, however, accept a value reflecting apportionment in each of the top six pay grades. This apportioned authorization is actually viewed as the new target population, replacing authorizations, and is expressed as a percentage of the original authorizations. Its default value in each pay grade is 100 percent (essentially no apportioned authorization) and can be revised to any other value by the user. This is another example of interrating effects that can be accounted for in the model.

When advancement resources, automatic advancements, and apportionment have been interactively set or reset, the promotion computations begin. A printed table shows what the advancement system will do to meet its goals. Figure 5 is a sample of the output.

	E4	E5	E6	E7	E8	E9
AUTH STRENGTH	2842	2635	1980	1178	335	160
PROMOTIONS TO WZ	52	13	7	4	2	2
PROMOTIONS TO PZ	1589	1130	525	343	125	39
PROMOTIONS EXAM	1641	1143	531	347	127	41
AUTOMATIC ADV	50	10	0	0	0	0
MISC ADV	162	62	21	0	0	0
PROMOTIONS TOTAL	1853	1215	552	347	127	41
END STRENGTH	2285	2635	1981	1182	335	158
PERCENT WAIVER	2.44	.78	.72	.70	1.22	1.85
MEAN LOS OF ADV	2.92	4.80	8.89	14.86	18.88	21.36
ADV RES ADVANCED	100.00	94.71	80.09	39.50	22.42	37.53
PERCENT OF AUTH	80	100	100	100	100	99

CONTINUE ? YES

Figure 5. Advancement output table (examined advancements).

The computed output begins with authorized strength and apportionment. The word apportionment is used two ways here: (1) as a percentage of authorizations, and (2) as the actual number of billets required.

The promotion algorithm is vacancy-driven with promotions to E-9 made first, followed by E8, ..., E-4. End strength is the population following promotion and should be equal to the apportionment target if the advancement system is able to supply all the needed personnel. The percent of personnel in the waiver zone relates to a DoD restriction on the maximum allowable fraction of personnel in each petty officer pay grade with less than the nominally required years of service. This consideration can restrict promotions to avoid violating set limits. In Figure 5, it can be seen that constraints on advancements have kept end strengths to 80 percent in E-4, even though 100 percent of advancement resources were advanced. The mean LOS of advancing personnel indicates the experience level, mean time in service, and, in general, the promotion opportunities for personnel.

A mathematical formulation of the promotion algorithm is given below for one pay grade. In application, the algorithm is applied first to E-9, then E-8, ..., lastly to E-4. The vacancies (V) to fill are computed by

$$V = AP + CD - N - NA + PT'$$

where

AP = Apportioned billets

CD = Carry down to this pay grade from above of unfilled vacancies (= 0 for E-9).

N = Net inventory in this pay grade before any promotions are made.

NA = Nonexamined advancements into this pay grade (automatic and miscellaneous).

PT' = Promotions from this pay grade into the next higher (= 0 for E-9).

If there were no binding constraints, promotions to this pay grade, PT, would simply be V, as calculated above. To understand the first constraint, it is necessary to discuss waiver and promotion zones.

For each pay grade, there is a waiver zone and a promotion zone. These are LOS zones of the form (a,b-1) = waiver zone and (b,c) = promotion zone. For example, in E-7, 8-9 years can be specified as the waiver zone and 10-30 years as the promotion zone. DoD policies seek an ideal where all personnel in a pay grade have their LOS within the promotion zone before being promoted. In practice, exceptions can occur for personnel whose LOS lies outside the promotion zone (i.e., within waiver zone) but those exceptions must observe certain limits. The limit is a maximum on the fraction of personnel serving in their pay grade's waiver zone out of all personnel serving in that pay grade. In other words, the limit is not on promotions per se, but on the resulting population in the end inventory in these zones.

$$AR_j(W) = \sum_{i=a}^{b-1} AR(i,j)$$

$$AR_j(P) = \sum_{i=b}^{c} AR(i,j)$$

$$AR(j) = AR_j(w) + AR_j(P)$$

where

AR(i,j) = Advancement resources from LOS i into pay grade j.

$AR_j(W)$ = Advancement resources in waiver zone for pay grade j.

$AR_j(P)$ = Advancement resources in promotion zone for pay grade j.

j = Assumed index of pay grade in question.

Given this breakdown of resources, the number of promotions to the pay grade are found in the waiver zone and promotion zone by the following method:

$$PT_j(P) = MIN(\alpha_j \cdot Max(V,\beta_j \cdot AR(j)), AR_j(P))$$

$$PT_j(W) = MIN((1-\alpha_j) \cdot MAX(V,\beta_j\ AR(j)),AR_j(W))$$

where

α_j = $AR_j(P) \div AR(j)$

β_j = Token advancement fraction (from data base) for pay grade j.

Thus, the model attempts to fill all vacancies or token vacancies (if these are greater than vacancies) but is constrained by advancement resources. In making the promotions ($PT_j(P)$, $PT_j(W)$ would violate the waiver zone limit if

$$\left(\sum_{i=a}^{b-1} ADV(i,j) \div \sum_{j=1}^{31} ADV(i,j) \right) \geq w_j$$

where

w = Waiver limit from data base,

ADV = Advanced inventory.

The advanced inventory is the inventory after advancements have been applied. Then, $PT_j(W)$ is reduced by an amount X and $PT_j(P)$ increased by X until either the waiver limit is met or resources exhausted (i.e., $PT_j(P) + X = AR_j(P)$). If the waiver limit is met first, calculation stops with these values. If resources are exhausted first, then $PT_j(P)$ remains equal to $AR_j(P)$, and $AR_j(W)$ is reduced to zero, if necessary, until the waiver zone limit is met. Note that losses, such as those due to retirement, can result in violation of a grade's waiver limit even if no waiver zone promotions ($PT_j(W) = 0$) are made. Also notice that automatic advancements are automatically "counted" among the waiver zone personnel.

Next, the model estimates the LOS cells from which the advancements will come. The current method assumes the likelihood for advancement to be in equal proportion to the historically derived examined advancements in the data base.

Selection is constrained so as not to exceed the advancement resources, LOS cell by cell, and the waiver and promotion zone are done separately.

Once promotions by LOS have been calculated, they are used to calculate the advanced inventory:

$$ADV(i,j) = NET(i,j) + A(i) - A'(i)$$

$$i = 1,\ldots, 31$$

$$j = 2,\ldots, 7 \quad (E\text{-}4,\ldots, E\text{-}9)$$

where

ADV = Advanced inventory

A = LOS vector of promotions to PG j

A' = LOS vector of promotions from PG j.

Notice that

$$PT(W) = \sum_{i=a}^{b-1} A(i)$$

$$PT(P) = \sum_{i=b}^{c} A(i).$$

Finally, if there are unfilled or overfilled vacancies, the model "carries down" these vacancies to the next lower pay grade. The carry down, however, is based on authorizations as its goal. This is because apportioned authorizations are not intended to create a surplus of personnel in the rating receiving the apportionment but are added after normal promotions in the pay grade. Thus, the equation for carry down from this pay grade to the next lower, CD' is

$$CD' = V - PT + (AU - AP)$$

where

PT = PT(P) + PT(W)
= Total promotions to the pay grade

AU = Authorizations for this pay grade

AP = Apportionment for this pay grade.

As the algorithm continues on to the next lower pay grade, the new carry down becomes CD = CD' and the new promotions from becomes PT' = PT. Recall that the carry down, CD, is used in determining vacancies, V. Output options for the MINIFAST model can provide a detailed printout of the advancements and advanced inventories, and carry down, in addition to the information in Figure 5.

Recruit Input and End Strength

After the effects of the promotion process have been calculated, the recruits being brought into the lower three pay grades (combined into a single grade, "E-3") comprise the only remaining change to consider. In the real-world situation, recruits are not generally identified with any specific rating. However, MINIFAST assumes the existence of an E-3 population in the beginning inventory matrix of each rating. This is, in part, a "phantom" inventory established by the FAST model, which allocates the nonrated population to ratings based on training plans and historical flow rates. For the pseudo-rating "All Navy," the E-3 inventory is an exact representation of the Navy's total population in grades E-1, E-2, and E-3.

The MINIFAST model computes the number of recruits assumed to enter a rating's E-3 population during the year. The value is derived by estimating the number of promotions to E-4 expected next period and the total number of E-3s needed now to make just enough personnel available. The total number of recruits to bring aboard is then estimated after taking into account recruit losses during the year. The equations used are:

$$P_j = A_j - S_j \cdot \gamma_j + P_{j+1} - RA' \qquad j = E\text{-}4,\ldots, E\text{-}9.$$

where

P_j = Next period's estimated promotions to j ($P_8 = 0$).

A_j = Next period's authorizations in j.

S_j = Next period's beginning inventory in j.

γ_j = Estimated continuation rate from beginning to NET inventory, in j, next period.

RA'_j = Next period's recruit advancement into j.

= NA(i=0,j), nonprior service nonexamined advancements.

Solving for P_{E-4} gives the equation

$$P_{E-4} = \sum_{j=E-4}^{E-9} (A_j - S_j \cdot \gamma_j - RA_j')$$

and desired E-3 end strength (ES) is

$$ES = P_{E-4} \div \gamma_{E-4}$$

and the number of recruits in E-3 remaining at period's end should be

$$RC = ES - S_{E-3}$$

so that the total of E-3 recruits to bring aboard before losses is

$$RC = (1 - \alpha_1)$$

where

α_1 = E_3 recruit loss rate.

The number of recruits is then split between USN and USNR new input according to historically determined rates.

Actually, the total number of recruits to bring aboard also includes this period's recruit advancements, (RA_j), before losses or

$$RC \div (1-\alpha_1) + \sum_{j=E-4}^{E-9} RA_j \div (1 - \alpha_j).$$

This value for total recruits is prescriptive and can be overridden by the user with some other value. The minimum value accepted by the model, however, is that necessary to supply the recruit advancements, since they were previously committed by the user. See Figure 6 for an example of the recruit projection display.

The data fractions (α_j) representing the recruit loss rates are defined to be the fraction of all recruits joining during the year who have left before the year's end. This represents boot camp attrition as well as other attrition occurring in the first 12 months of service. For ratings, this rate is set to zero so that net recruits = gross recruits. For the pseudo-rating "All Navy," recruit loss rates are historically derived and reside in the rating's data base.

The recruit algorithm described thus far is for ratings. For "All Navy," the rationale for recruits is slightly different. The Navy is authorized a total end strength in addition to the petty officer end strengths discussed above. In this case, the number of recruits necessary to meet this total end strength is calculated and used as a prescribed value.

```
        RECRUIT PROJECTION IN FISCAL YEAR 82
                                        USN   USNR
TOTAL RECRUIT INPUT PROJECTED IS       3732   1313
FROM WHICH ESTIMATED LOSSES ARE           0      0
LEAVING NET RECRUITS OF                3732   1313
AND A TOTAL END STRENGTH OF              23163


ARE THESE NEW INPUT TOTALS OK?         3732   1313



        FINAL END STRENGTH, FISCAL YEAR 82
            E3     E4     E5     E6     E7     E8     E9   E4-E9  TOTAL
INV      14587   2285   2635   1981   1182    335    158   8576  23163
MEAN LOS  1.99   4.32   6.89  11.72  16.99  20.33  23.98   9.55   4.79
CR RATIO 10.82  36.72  87.70  99.70  99.83 100.00 100.00  79.27  36.17
CR FORCE  1579    839   2311   1975   1180    335    158   6798   8377
TOP SIX RATIO 37.02 PERCENT


OPTIONS ARE: F = FS MAT,O=OFFLINE, U=UP-DATE, R=RESTART, C=CONTINUE, S=STO
S
ENDING COMPUTATION FOR
SAMPLE OUTPUT
BOATSWAINS MATE FY82
RUN ON  7/27/1982    9:51

THE FOLLOWING COMMANDS ARE AVAILABLE:
    GOFAST RATING YEAR SEQUENCE
    RATINGS
    COMBINE
    RECAP
    TRIM RATING
    DROP RATING
    NEWINV RATING
    PWZONE RATING
    DUMP RATING
    DUPLICATE RATING
    WHEREIS RATING
    HELP
    CREATE
    LOGOFF
```

Figure 6. Recruit projection and final end strength.

The last step in arriving at the final force structure matrix is to age the advanced matrix by one LOS cell and put recruits into the first LOS row.

$$F(i,j) = ADV(i-1,j) \qquad i = 2,\ldots,31;\ j = 1,\ldots,7$$
$$F(1,1) = RC$$
$$F(1,j) = RA_j \qquad j = 2,\ldots7$$

where F = Final force structure inventory matrix.

The model displays statistics for this final inventory (Figure 6) just as those displayed for the period's beginning inventory. Continuing into the next planning period, the model simply replaces its beginning inventory by this final one and user control resumes once again at the start.

COMPUTER IMPLEMENTATION

This section gives some general information on the computer aspects of the model. For details of the hands-on use of MINIFAST, see Appendix A.

Language and Host Computer Considerations

MINIFAST is written in the APL language, which enjoys a reasonable degree of commonality among the various APL interpreters and host computers. The various APL implementations differ primarily in their file storage and retrieval systems. Currently, MINIFAST is supported operationally on the Harris 800 within OP-01, where a current data base on all ratings is maintained. It can be accessed via user accounts.

Data Base Organization

The data base is organized along the rating dimension for each file. That is, each rating is supported by a file whose records are the data necessary to use MINIFAST for that rating. Each file is therefore organized identically with variable length records. This approach facilitates the addition and subtraction of ratings to the data base. Figure B-1 in Appendix B shows the record contents for a rating's file. The actual record format depends upon the file system being used.

REFERENCES

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APPENDIX A

TERMINAL USER'S GUIDE

Host Computer Considerations

1. APL Considerations. The MINIFAST program is coded in APL and can operate on any computer supporting commercial grade APL. To use the MINIFAST model, an APL terminal is not needed and any ASCII terminal is satisfactory.

Interaction with the MINIFAST model is explained in detail in the remaining sections of this guide. Since all operation of the model takes place in APL, any legitimate APL expression can be used when input is requested. Character and numerical input requests can be distinguished by the APL quad prompt, which is given for numerical input only. In particular, an input line can be edited by the standard APL conventions; namely, by back-spacing to the left most character in error, hitting line feed, and then proceeding with the new characters. By becoming familiar with the various APL variables used internally, the experienced user can extract more details than would normally be printed. These variables are presented in a later section and are further explained in program listings.

2. Sign-on Procedure. The MINIFAST model is currently operational on the Harris 800 within OP-01. User accounts and user access procedures should be obtained from the NMPC-164 (DSS) organization.

Figure A-1 illustrates the sign-on and sign-off procedures. Authorized accounts are set up to begin execution automatically. After loading the MINIFAST workspace, the system releases the terminal's keyboard. The user is in APL, ready to execute GOFAST or any other function, load another workspace, etc.

```
** GOOD MORNING MINIFAST,IT'S 27 JUL 82  8:20:44
WELCOME TO MAI*APL
VERSION 10.1
SAVED 15 JUN 82 17:07:56 - START
SAVED 26 JUL 82 13:43:16 - MINIFAST

100  RATINGS AVAILABLE.  SEE THE LIST ? NO

THE FOLLOWING COMMANDS ARE AVAILABLE:
     GOFAST RATING YEAR SEQUENCE
     RATINGS
     COMBINE
     RECAP
     TRIM RATING
     DROP RATING
     NEWINV RATING
     PWZONE RATING
     DUMP RATING
     DUPLICATE RATING
     WHEREIS RATING
     HELP
     CREATE
     LOGOFF

       LOGOFF

** GOOD DAY MINIFAST,IT'S 27 JUL 82  8:21:30
CPU TIME=        0MINS     7.91SECS
```

Figure A-1. Sign-on and sign-off procedures.

Overview of MINIFAST Program Flow

An overview of the MINIFAST program flow is presented below:

1. Authorized strength.

    a. Strength figures from file displayed.
    b. Change allowed for policy testing.

2. Beginning strength statistics output.

3. Losses/gains forecast.

    a. Select loss/gain rates from baseline or updated if available.
    b. Display any variable, pay grade totals, or LOS totals.
    c. Update any variable, pay grade totals, or LOS totals.
    d. Reforecast any variable, all elements only.
    e. Use EAOS equation to reestimate contract loss, by first updating EAOS.

4. Advancements projected.

    a. Auto-advances displayed/override possible.
    b. Advancement resources projected/override possible.
    c. Apportionment % displayed/override possible.
    d. Advancement statistics output:
        (1) Promotions made.
        (2) End strength.
        (3) % (of end strength) in waiver zone.
        (4) % of authorized strength met by end strength.
        (5) Average LOS of those promoted.
        (6) % advancement resources promoted.

5. Recruits projected.

    a. If E-3 authorizations = 0, recruits calculated to meet total force authorizations (all Navy cases)

    b. If E-3 authorizations = 0, recruits calculated to meet next year's E-4 promotion requirements.

    c. Override from terminal possible.

    d. Recruit attrition accounted for.

6. Final end strength statistics output.

7. Program management options.

    a. Produce off-line reports?
    b. Rerun this period?
    c. Retain any changes made to authorized strength?
    d. Define the update rates?
    e. Next planning period?

Syntax for Responses to MINIFAST

1. Starting the Model. If the model has not been automatically loaded, type

)LOAD 1301035D*MINIFAST.

After the introduction has been completed, type GOFAST RT where RT is the rating number against which you wish to run MINIFAST. For ratings that have a data base starting in another year, follow RT by the year; e.g.,

GOFAST 1500 (means rating 1500, radioman, in current year)
GOFAST 0 (means All Navy, in current year)
GOFAST 0 1983 (means All Navy, beginning 1983)

(Note. "O" in GOFAST is alpha, "0" in RT is numerical zero.)

If the rating chosen is not available on-line at this time, the GOFAST function will terminate with a message.

2. Inputting a Title. GOFAST will prompt for a heading. Enter any line desired, up to 80 characters.

GOFAST will augment the heading with the rating name and the date; e.g.,

Input: TESTING EARLY RETIREMENT POLICY
Heading: TESTING EARLY RETIREMENT POLICY
ELECTRONICS TECHNICIAN
RUN ON 2/28/81 16:30

3. Override of Strength Goals (Authorized Strength). GOFAST will display a row of values for strength by pay grade and there await input.

Enter OK to accept the strength shown, or simply a carriage return.

Enter any number of new values, starting from the left, to override, e.g., Authorized Strength

	E-3[1]	E-4	E-5	E-6	E-7	E-8	E-9
Period 1		1763	1637	1506	687	191	118
0 1600 1400 (user enters this line)							
Period 1		1600	1400	1506	687	191	118
OK (user accepts new strength)							

This method of overriding numerical values is used throughout MINIFAST and must be employed whenever values are offered for approval in the prompt.

[1]Blank = 0 and means no strength given for E-3; must enter 0 when overriding to keep blank.

4. Loss/Gain Forecast--Updating. Loss/gain prediction rates can be selected by the user from either the baseline data or the latest updated rates, if updates are available. An 80-character title will be printed to identify the source of the updated rates when they are present.

D = Display, U = Update, R = Restore, P = Proceed, and S = Summary. To see a list of the loss/gain variables, enter a question mark. To see a full prompt, enter carriage return. The loss/gain variables are listed in Table 1.

Table A-1

LOS/Gain Variables

Name	Code Word	Alternate #
Attrition	ATTR	1
Contract Loss	CLOSS	2
Demotions Out	DEMOUT	3
EAOS	EAOS	4
Laterals Out	LATOUT	5
Retirement	RETIR	6
--	--	7
--	--	8
--	--	9
Demotions In	DEMIN	10
Laterals In	LATIN	11
Misc Gains	MISCG	12
Retention	RETEN	13
--	--	14
--	--	15
--	--	16

Element Code	APL Variables
-3 = E-1--E-3	APG = -3 -4 -5 -6 -7 -8 -9
-4 = E-4	TOT = LOS 32 = GRAND TOTAL
-5 = E-5	
-6 = E-6	
-7 = E-7	
-8 = E-8	
-9 = E-9	
1 = LOS 1	
2 = LOS 2	
.	
.	
.	
31 = LOS 31	
31 = Grand Total = TOT	

To choose a variable and its elements, enter in one of the following formats.

a. Variable code ^ element code (^ indicates a space)
e.g., 2 4 contract loss, in E-4 (or CLOSS, -4).

b. Variable code element code element code ...
e.g., 4 3 5 4 EAOS, in E-3, E-5, and LOS4 or (EAOS,-3,-5,-4).

c. Variable code
e.g., 12 <-> misc gains, in all elements or MISCG <-> misc gains, in all elements
so 12 is equivalent input to
12 -3 -4 ... -9 1 2 ... 31 32

d. -1, this provides an escape, returning user to options.

e. Variable code, APG. This provides all pay grades for a given variable.

f. Variable code, TOT. This provides the grand total for the given variable.

g. Combinations of these entries are acceptable; for example, variable code TOT APG will provide all pay grades and the grand total for the requested variable.

5. Promotion/Waiver Zones. The following apply to promotion/waiver zones:

a. Questions that do not provide numbers for approval are answered with YES or NO responses. In general, Y or OK can be substituted for YES and N for NO. If you are working at an APL terminal, a carriage return will be interpreted as YES and a space followed by a carriage return as NO.

b. No response will initiate entry of new LOS values for promotion and waiver zones. Enter values as described in 3 above.

c. Enter OLDARWZ or OLDARPZ to get the period 1 adv. resources used in the last section.

d. For advancement resources, new values are constrained not to exceed the eligible population determined internally.

e. The "L = Logoff" option is useful when you are finished with the terminal session. After performing all operations in connection with stop and off-line report, an automatic logoff will be performed.

6. Override of Auto Advancements and Advancement Resources. New values can be entered exactly as described for strength (see 3 above). Values can be given for any of the top six pay grades. For auto advancements, enter OLDAA to get the auto advancements used in the last period.

7. Override of Apportionment. Apportionment, expressed as a % of end strength, can be changed (see 3 above).

8. Recruit Projection. If E-3 strength is not equal to 0, then recruits necessary to bring total end strength up to total requirements is calculated. If E-3 strength is equal to 0, then recruits necessary to bring E-3 end strength up to meeting future E-4

advancement requirements in steady state is calculated. The calculated recruits can be overridden by the usual procedure described in 3 above.

9. Program Management Options. Program management options are listed below:

a. F = FS MAT. This option will print the final inventory force structure matrix at the terminal.

b. 0 = Off-line. This option will commence production of an off-line report, to be sent from the data center to the user. Once initiated, there will be a delay at the end of each 1 year period while the report for that year is prepared.

c. R = Restart. This option will begin at the current fiscal year. This is useful during multiyear scenarios to correct input errors without starting over.

d. C = Continue. This option is to begin the next fiscal year.

e. S = Stop. This option is necessary to terminate this planning scenario.

f. L = Logoff.

g. RETAIN CHANGES TO AUTHORIZED STRENGTH? Answer yes or no. A yes will make your change permanent in the rating's data base. A no will make the changes effective during the current planning run only.

Multiple options can be entered at once. For example, to print the final inventory force structure matrix, request an off-line report, and terminate this scenario, enter FOS as an option.

```
      GOFAST 8000
ENTER FORECAST TITLE.
SAMPLE OUTPUT
SAMPLE OUTPUT
HOSPITAL CORPSMAN FY82
RUN ON  7/27/1982    9:37
```

AUTH STRENGTH	E3	E4	E5	E6	E7	E8	E9
FISCAL YEAR 82	8300	5500	4425	3035	1825	406	179
FISCAL YEAR 83	8950	5700	4600	3200	1900	415	185
FISCAL YEAR 84	9150	5940	4720	3275	1950	425	190
FISCAL YEAR 85	9250	6033	4810	3350	1980	435	192
FISCAL YEAR 86	9350	6100	4875	3390	2000	440	195
FISCAL YEAR 87	9350	6100	4875	3390	2000	440	195
FISCAL YEAR 88	9350	6100	4875	3390	2000	440	195

BEGINNING FORCE, FISCAL YEAR 82

	E3	E4	E5	E6	E7	E8	E9	E4-E9	TOTAL
INV	7435	6308	3924	2978	1668	387	158	15423	22858
MEAN LOS	1.61	3.28	6.06	11.49	16.36	20.67	24.23	7.64	5.68
CR RATIO	3.36	24.21	84.89	99.80	99.88	100.00	100.00	65.10	45.02
CR FORCE	250	1527	3331	2972	1666	387	158	10041	10291

TOP SIX RATIO 67.47 PERCENT

```
LOSSES AND GAINS IN FISCAL YEAR 82
BASELINE RATES USED.
?>?
THE LOSS/GAIN VARIABLES ARE:
  1 ATTR   ATTRITION
  2 CLOSS  CONTRACT LOSS
  3 DEMOUT DEMOTIONS OUT
  4 EAOS   EAOS
  5 LATOUT LATERALS OUT
  6 RETIR  RETIREMENT
 10 DEMIN  DEMOTIONS IN
 11 LATIN  LATERALS IN
 12 MISCG  MISC GAINS
 13 RETEN  RETENTION
```

```
YOU MAY SELECT BY ABBREVIATION OR NUMBER.
D=DISP;U=UP-DATE;R=RESTORE;S=SUMMARY;P=PROCEEDC,VARBC,ELEMENTSJJ >DISP
WHICH VARB ,WHICH ELEMENTS
EAOS
EAOS NOW HAS VALUES :

    PAY GRADES :
      3       4       5       6       7       8       9
    427    1838    1356     663     309      68      25

    LOS :
      1       2       3       4       5       6       7       8
     46      87     280    1784     610     350     176     270

      9      10      11      12      13      14      15      16
    191     163     102      99     101      80      53      65

     17      18      19      20      21      22      23      24
     39      27      26      34      31      26      10      10

     25      26      27      28      29      30      31      32
      8       4       4       4       2       2       2    4686


?>UP
WHICH VARB ,WHICH ELEMENTS
EAOS APG
EAOS NOW HAS VALUES :

    PAY GRADES :
      3       4       5       6       7       8       9
    427    1838    1356     663     309      68      25
INPUT 7 NEW VALUES FOR EAOS
400 2000 1600 800 300 60 20
EAOS EQUATION RE-ESTIMATED.
RE-ESTIMATE MADE OF CONTRACT LOSS
RE-ESTIMATE MADE OF RETENTION
OVERRIDE ACCEPTED
?>DISP CLOSS APG TOT
CONTRACT LOSS NOW HAS VALUES :

    PAY GRADES :
      3       4       5       6       7       8       9
    349    1498     895     180       8       3       4

    LOS :
     32
   2937
```

```
?>D EAOS APG TOT
EAOS NOW HAS VALUES :

    PAY GRADES :
       3        4        5        6        7        8        9
     400     2000     1600      800      300       60       20

    LOS :
      32
    5180


?>D RETEN APG TOT
RETENTION NOW HAS VALUES :

    PAY GRADES :
       3        4        5        6        7        8        9
      51      502      705      620      292       57       16

    LOS :
      32
    2243


?>R
WHICH VARB
CLOSS
EAOS EQUATION RE-ESTIMATED.
RE-ESTIMATE MADE OF RETENTION
OVERRIDE ACCEPTED
?>PROC.
```

PROMOTIONS IN FISCAL YEAR 82
KEEP SAME P/W ZONE ?

	E4	E5	E6	E7	E8	E9
AUTOMATIC ADV	497	12	1			
ADV RESOURCES WZ	333	650	82	111	141	15
ADV RESOURCES PZ	3002	3150	978	1348	772	171
APPORTIONMENT	100	100	100	100	100	100
	E4	E5	E6	E7	E8	E9
AUTH STRENGTH	5500	4425	3035	1825	406	179
PROMOTIONS TO WZ	220	161	42	19	4	4
PROMOTIONS TO PZ	2179	1921	790	510	138	54
PROMOTIONS EXAM	2399	2082	833	529	141	58
AUTOMATIC ADV	497	12	1	0	0	0
MISC ADV	26	42	9	0	0	0
PROMOTIONS TOTAL	2922	2136	843	529	141	58
END STRENGTH	5502	4425	3034	1826	406	179
PERCENT WAIVER	15.99	4.23	1.86	1.21	1.16	2.68
MEAN LOS OF ADV	2.21	4.16	8.04	13.47	18.86	21.59
ADV RES ADVANCED	71.92	54.78	78.56	36.24	15.47	31.41
PERCENT OF AUTH	100	100	100	100	100	100

CONTINUE ? YES

RECRUIT PROJECTION IN FISCAL YEAR 82

	USN	USNR
TOTAL RECRUIT INPUT PROJECTED IS	1435	480
FROM WHICH ESTIMATED LOSSES ARE	0	0
LEAVING NET RECRUITS OF	1435	480
AND A TOTAL END STRENGTH OF	21104	

ARE THESE NEW INPUT TOTALS OK? 1435 480

FINAL END STRENGTH, FISCAL YEAR 82

	E3	E4	E5	E6	E7	E8	E9	E4-E9	TOTAL
INV	5732	5502	4425	3034	1826	406	179	15372	21104
MEAN LOS	1.86	3.18	5.79	11.09	15.86	20.65	23.82	7.70	6.11
CR RATIO	3.21	17.56	80.20	99.80	99.89	100.00	100.00	64.74	48.03
CR FORCE	184	966	3549	3028	1824	406	179	9952	10136

TOP SIX RATIO 72.84 PERCENT

OPTIONS ARE: F = FS MAT,O=OFFLINE, U=UP-DATE, R=RESTART, C=CONTINUE, S=STOP
CUF

FORCE STRUCTURE MATRIX ENDING FISCAL YEAR 82

E3	E4	E5	E6	E7	E8	E9	TOTAL	LOS
1699	229	2	0	0	0	0	1930	1
1587	651	24	1	1	0	0	2264	2
1560	1991	161	2	0	0	0	3714	3
702	1665	689	3	1	0	0	3060	4
63	363	934	8	1	0	0	1369	5
52	323	796	48	2	0	0	1221	6
44	152	752	108	0	0	0	1056	7
7	41	505	306	2	0	0	861	8
3	37	247	362	3	0	0	652	9
6	23	154	445	18	0	2	648	10
3	8	52	312	66	0	0	441	11
2	7	37	325	148	0	1	520	12
3	2	36	333	182	2	0	558	13
1	2	21	331	220	3	0	578	14
0	4	8	173	232	9	0	426	15
0	2	5	71	165	13	0	256	16
0	2	1	70	166	26	0	265	17
0	0	1	50	118	29	5	203	18
0	0	0	25	135	32	6	198	19
0	0	0	22	115	50	12	199	20
0	0	0	18	80	64	12	174	21
0	0	0	9	65	54	19	147	22
0	0	0	6	38	43	20	107	23
0	0	0	2	21	27	17	67	24
0	0	0	3	16	18	14	51	25
0	0	0	1	13	15	15	44	26
0	0	0	0	6	8	15	29	27
0	0	0	0	2	3	13	18	28
0	0	0	0	3	6	16	25	29
0	0	0	0	6	2	5	13	30
0	0	0	0	1	2	7	10	31
5732	5502	4425	3034	1826	406	179	21104	32

```
UP-DATED RATES REQUESTED
ENTER KEY
@@@@
ENTER AN IDENTIFICATION PHRASE FOR THE NEW RATES.
SAMPLE RATES FOR DEMONSTRATION
NEW ID PHRASE : SAMPLE RATES FOR DEMONSTRATION
NEW UP-DATED RATES WRITTEN ON THE FILE.
NEXT FISCAL YEAR BEGINS...



LOSSES AND GAINS IN FISCAL YEAR 83
UP-DATED RATES IDENTIFIED BY :
1 FOR SAMPLE RATES FOR DEMONSTRATION
CR FOR BASELINE
1
NUMBER 1 ACCEPTED.
?>P


          PROMOTIONS IN FISCAL YEAR 83
KEEP SAME P/W ZONE ? NO@
```

	E4	E5	E6	E7	E8	E9
P.Z. LOWER LIMIT	2	3	6	10	14	18
P.Z. UPPER LIMIT	31	31	31	31	31	31
W.Z. LOWER LIMIT		1	4	7	9	14
WAIVER ALLOWANCE	20.00	10.00	10.00	10.00	10.00	10.00

```
15 5  5
```

WAIVER ALLOWANCE	15.00	5.00	5.00	10.00	10.00	10.00
TOKEN ALLOWANCE	5.00	5.00	5.00	0.00	0.00	0.00

	E4	E5	E6	E7	E8	E9
AUTOMATIC ADV	497	12	1			
ADV RESOURCES WZ	251	565	113	127	160	17
ADV RESOURCES PZ	2038	2751	967	1284	840	177
APPORTIONMENT	100	100	100	100	100	100

	E4	E5	E6	E7	E8	E9
AUTH STRENGTH	5700	4600	3200	1900	415	185
PROMOTIONS TO WZ	90	151	42	14	3	3
PROMOTIONS TO PZ	2038	1803	779	391	115	42
PROMOTIONS EXAM	2128	1953	820	406	119	45
AUTOMATIC ADV	497	12	1	0	0	0
MISC ADV	26	42	9	0	0	0
PROMOTIONS TOTAL	2651	2007	830	406	119	45
END STRENGTH	4810	4599	3200	1899	416	185
PERCENT WAIVER	15.00	3.93	1.70	.98	1.24	1.60
MEAN LOS OF ADV	2.42	4.10	8.01	13.36	18.86	21.59
ADV RES ADVANCED	92.96	58.91	75.98	28.74	11.86	23.26
PERCENT OF AUTH	84	100	100	100	100	100

```
CONTINUE ? YES


        RECRUIT PROJECTION IN FISCAL YEAR 83
                                          USN  USNR
TOTAL RECRUIT INPUT PROJECTED IS         1148   354
FROM WHICH ESTIMATED LOSSES ARE             0     0
LEAVING NET RECRUITS OF                  1148   354
AND A TOTAL END STRENGTH OF                19002


ARE THESE NEW INPUT TOTALS OK?           1148   354
1500
ARE THESE NEW INPUT TOTALS OK?           1500   354

                                          USN  USNR
TOTAL RECRUIT INPUT PROJECTED IS         1500   354
FROM WHICH ESTIMATED LOSSES ARE             0     0
LEAVING NET RECRUITS OF                  1500   354
AND A TOTAL END STRENGTH OF                19354


ARE THESE NEW INPUT TOTALS OK?           1500   354


        FINAL END STRENGTH, FISCAL YEAR 83
             E3     E4     E5     E6     E7     E8     E9  E4-E9  TOTAL
INV        4245   4810   4599   3200   1899    416    185  15109  19354
MEAN LOS   1.78   3.17   5.73  10.97  15.74  20.80  23.80   7.92   6.57
CR RATIO   4.55  15.43  80.43  99.84  99.95 100.00 100.00  67.08  53.36
CR FORCE    193    742   3699   3195   1898    416    185  10135  10328
TOP SIX RATIO 78.07 PERCENT


OPTIONS ARE: F = FS MAT,O=OFFLINE, R=RESTART, C=CONTINUE, S=STOP.
FS
```

FORCE STRUCTURE MATRIX ENDING FISCAL YEAR 83

E3	E4	E5	E6	E7	E8	E9	TOTAL	LOS
1638	229	2	0	0	0	0	1869	1
1224	492	21	0	0	0	0	1737	2
367	1568	158	2	1	0	0	2096	3
823	1779	719	3	0	0	0	3324	4
108	428	1030	9	2	0	0	1577	5
23	71	869	45	1	0	0	1009	6
35	110	743	117	2	0	0	1007	7
14	77	551	313	1	0	0	956	8
1	8	235	473	3	0	0	720	9
2	15	107	433	15	0	0	572	10
4	11	61	435	58	0	2	571	11
2	6	26	244	135	0	0	413	12
1	4	22	259	200	1	1	488	13
3	1	29	289	211	5	0	538	14
0	3	16	288	242	7	0	556	15
0	4	6	139	249	14	0	412	16
0	2	3	50	173	21	0	249	17
0	2	0	52	168	35	3	260	18
0	0	1	26	125	40	8	200	19
0	0	0	5	113	44	12	174	20
0	0	0	2	60	53	15	130	21
0	0	0	6	42	57	17	122	22
0	0	0	4	38	43	22	107	23
0	0	0	3	22	35	19	79	24
0	0	0	1	13	20	18	52	25
0	0	0	2	10	16	12	40	26
0	0	0	0	6	11	14	31	27
0	0	0	0	3	5	15	23	28
0	0	0	0	0	2	12	14	29
0	0	0	0	2	4	9	15	30
0	0	0	0	4	3	6	13	31
4245	4810	4599	3200	1899	416	185	19354	32

```
ENDING COMPUTATION FOR
SAMPLE OUTPUT
HOSPITAL CORPSMAN FY82
RUN ON  7/27/1982    9:37

THE FOLLOWING COMMANDS ARE AVAILABLE:
     GOFAST RATING YEAR SEQUENCE
     RATINGS
     COMBINE
     RECAP
     TRIM RATING
     DROP RATING
     NEWINV RATING
     PWZONE RATING
     DUMP RATING
     DUPLICATE RATING
     WHEREIS RATING
     HELP
     CREATE
     LOGOFF

     LOGOFF

     ** GOOD DAY MINIFAST,IT'S 27 JUL 82  9:47:03
     CPU TIME=       1MINS   34.02SECS
     CONNECT TIME=     38MINS    9SECS
     USER #?
```

APPENDIX B

DATA BASE MAINTENANCE

DATA BASE MAINTENANCE

Data Base Utilities

General Overview--The Workspace DATAMGNT

The MINIFAST model is assumed to project the inventory of a rating. This rating may be one of the Navy's actual enlisted ratings or a pseudo-rating created conceptually by the user or by the ADSTAP system, such as, in the case of ALL NAVY, rating 0. The data necessary to execute GOFAST for any of these ratings are contained in a disk file, with one file representing exactly one rating. This section describes and rates some utility functions for altering, creating, and dropping these data base files. All functions documented here are resident in the workspace MINIFAST. These functions can be initiated by typing the name of the function as a command along with any required arguments.

Updated Forecast Rates

When the MINIFAST model is forecasting gains and losses to the force, a choice of forecast rates may be available. The baseline rates, those used in the FAST default predictions, are always available. If, however, the user has ever created updated rates for this rating, every such set of updated rates will also be made available, and the user must indicate the ones he wants.

Updated rates are simply those that are inferred from the losses and gains used by the model. Their use is intended to facilitate experiments in which loss and gain variables have been "forced" by management overrides. By creating updated rates at the conclusion of these planning periods, an option offered by the GOFAST function, the "forces" are, in effect, renumbered. Then, when rerunning becomes necessary, by selecting the updated rates, one is using his prior "forced" values as the default, instead of the baseline predictions. Hence, the forced values need not be reentered. Further, by using these updated rates for other planning periods, alternate predictions are also possible. Any updated rates created can be used only for the rating they were created with; however, they are available in any time period. They apply to predictions of the external gains and losses only.

When the GOFAST function reaches the end of each planning period, the user is given the option of creating updated rates from that period's gains and losses. If the user accepts this option, he is prompted for a title to identify the updated rates. The title is displayed later whenever the updated rates are made available.

Creating updated rates uses additional storage because the new rates are simply appended to the rating's data file. Each set of updated rates uses approximately as much space as a rating without any updated rates. Hence, it follows that some care should be taken to avoid excessive use of updated rates to conserve online disk space. For this reason, and due to timely obsolesence of updated rates, a function to remove them from a rating's data file is available. The syntax is:

```
TRIM RT
```

where the right argument RT is the rating's number, optionally followed by fiscal year and sequence number. Typing the name of this function will engage the user in an interactive dialogue that will, if directed, remove updated rates from the file beginning

with those most recently appended. New updated rates can later be appended by GOFAST or the added spaced used for more ratings, etc.

Utility Functions

The utility functions are described below.

1. DROP. When a rating's data file is no longer needed online, it can be dropped from the disk. This will not affect the tape data base on which the rating may also be stored. The syntax is

DROP RT

where RT is the rating's number. This function will interactively verify the rating being deleted before actually removing it.

2. NEWINV. This function allows the user to edit the beginning inventory of a rating's data base interactively. This is useful for exercises in which the rating is being studied in some future periods and is "beginning" with a projected inventory from some other model. This function will replace the beginning inventory by a new inventory, which is entered at the terminal. The program prompts for each new row, shows the current row of inventory, and assumes the left to right replacement rule used throughout. The title, an 80-character string describing the data file, is also revised, since it is assumed to be inappropriate with the new inventory. The new title should be carefully chosen to indicate what rating, in what circumstances, is represented by the data. The syntax is

NEWINV RT.

3. PWZONE. This function changes the promotion and waiver zone definitions for a rating, which includes the years of service in the waiver zone and promotion zone, the limit imposed on those in the waiver zone, and the token advancement policy. The zones shown are expressed as years of service, inclusive, and hence differ from LOS cells by 1. The constraint is applied to the final inventory, by advancement module. The syntax is

PWZONE RT.

Note that this function makes the change permanent in the rating's data base. Temporary changes in each period while running GOFAST are also possible.

4. DUMP. This function will print out the data of a rating's file, allowing documentation of work and verification of data entries. The syntax is

DUMP RT.

5. DUPLICATE. This function will duplicate an existing rating. This is useful when several policy scenarios are being investigated simultaneously for a particular rating, or when a pseudo-rating such as ALL NAVY in 1983 is being created with a projected beginning inventory. The program prompts for a new rating number and year. All other data remain the same and can subsequently be changed via NEWINV, PWZONE, or GOFAST. The syntax is

DUPLICATE RT

where RT is the rating's number.

6. COMBINE. This function allows combination of ratings into composite pseudo-ratings. It is especially useful in the case of families of split ratings in which not all of the ratings contain all pay grades. The syntax is

COMBINE

where no argument is to be provided. Typing this command will initiate an interactive procedure that prompts the user for all of the required input.

7. RECAP. This function will display a summary of the most recent loss/gain variables used. The syntax is

RECAP

where no argument is to be provided.

8. RATINGS. Typing this command will initiate a search of the file library to determine which rating files are available online. The syntax is

RATINGS

where no argument is to be provided. The response will be a report of the number of rating data files available online and, optionally, by interactive request, a display of all the rating numbers available.

9. WHEREIS. This function searches the file library to determine whether a specific rating data file is available online. The syntax is

WHEREIS RT.

10. HELP. Typing the single word HELP will produce the display of a list of all available interactive commands.

11. CREATE. This function is used to create a new MINIFAST data base from an input data file. Its use is described in detail in Appendix C.

12. LOGOFF. Typing this command will cause the user's account to be logged off the system.

Examples of the use of these functions are provided in pages B-4 through B-14.

```
      TRIM 8000
ENTER KEY
0000
THIS RATING IDENTIFIED BY :
HOSPITAL CORPSMAN FY81
1 UP-DATED RATES EXIST
NUMBER IDENTIFICATION
     1 SAMPLE RATES FOR DEMONSTRATION
ENTER THE VECTOR OF UP-DATED RATE NUMBERS TO DROP.
0:
      1
SHOULD I DROP THE UP-DATED RATES NUMBERED 1 ? YES

FILE ALTERED
```

Use TRIM to reduce file storage by removal of un-needed up-date rates.

```
DUPLICATE 8000
ENTER KEY
0000
KEY WRONG, TRY AGAIN
0000
TO DUPLICATE    4919091 RT800081000 HOSPITAL CORPSMAN FY81
ENTER NEW RATING NUMBER ,YEAR,SEQ NUMBER
0:
      8000 81 1
VERIFY RATING 8000 YR 81 SEQ 1YES
EDIT THE FOLLOWING TITLE :
HOSPITAL CORPSMAN FY81
                          - SEQ 1 FOR DEMONSTRATION
NEW TITLE READS :
HOSPITAL CORPSMAN FY81 - SEQ 1 FOR DEMONSTRATION

FILE DUPLICATED
```

Duplicate to create variations on other ratings.

```
      NEWINV 8000 82 1
ENTER KEY
0000
THIS PROGRAM WILL ENTER A NEW BEGINNING INVENTORY AND TITLE FOR:
HOSPITAL CORPSMAN FY82  - SEQ 1 FOR DEMO
TYPE 0 TO STOP OR LOS INDEX OF ROW IN INVENTORY YOU WISH TO ALTER
0:
       1
LOS  1    2249     264       4       1       1
2500 200 10 10
LOS  1    2500     200      10      10       1

TYPE 0 TO STOP OR LOS INDEX OF ROW IN INVENTORY YOU WISH TO ALTER
0:
       0
EDIT THE FOLLOWING TITLE :
HOSPITAL CORPSMAN FY82  - SEQ 1 FOR DEMO

NEW TITLE READS :
HOSPITAL CORPSMAN FY82  - SEQ 1 FOR DEMO
OK ?

BEGINNING INVENTORY UPDATED
```

Use NEWINV to alter the beginning inventory.

```
      DUMP 8000 82 1
RATING 8000  FISCAL YEAR 82  SEQUENCE 1  FILE LIBRARY 1301035D
HOSPITAL CORPSMAN FY82  - SEQ 1 FOR DEMO

   BEGINNING INVENTORY, FISCAL YEAR 82
             E3     E4     E5     E6     E7     E8     E9   E4-E9  TOTAL
INV        7686   6244   3930   2987   1668    387    158  15374  23060
MEAN LOS   1.58   3.31   6.05  11.46  16.36  20.67  24.23   7.66   5.63
CR RATIO   3.25  24.46  84.76  99.50  99.88 100.00 100.00  65.31  44.63
CR FORCE    250   1527   3331   2972   1666    387    158  10041  10291
TOP SIX RATIO 66.67 PERCENT

DISPLAY BEGINNING INVENTORY FORCE STRUCTURE MATRIX ? YES
```

E3	E4	E5	E6	E7	E8	E9	TOTAL	LOS
2500	200	10	10	1	0	0	2721	1
3252	749	18	2	0	0	0	4021	2
1314	1972	122	2	1	0	0	3411	3
370	1796	449	1	0	0	0	2616	4
130	844	700	12	2	0	0	1688	5
61	373	806	35	0	0	0	1275	6
21	128	698	102	1	0	0	950	7
13	96	498	172	1	0	0	780	8
12	42	324	359	2	0	2	741	9
4	19	125	337	13	0	0	498	10
3	9	78	407	57	0	1	555	11
4	5	51	423	105	1	0	589	12
1	3	27	389	180	0	0	600	13
0	4	13	222	200	4	0	443	14
1	2	7	112	137	7	0	266	15
0	2	2	98	154	16	0	272	16
0	0	2	72	113	18	1	206	17
0	0	0	57	125	18	2	202	18
0	0	0	63	124	37	4	228	19
0	0	0	64	150	62	7	283	20
0	0	0	25	118	60	12	215	21
0	0	0	13	66	54	15	148	22
0	0	0	4	37	34	15	90	23
0	0	0	4	26	25	11	66	24
0	0	0	1	21	16	17	55	25
0	0	0	1	13	12	16	42	26
0	0	0	0	4	7	12	23	27
0	0	0	0	7	8	17	32	28
0	0	0	0	8	4	8	20	29
0	0	0	0	1	3	12	16	30
0	0	0	0	1	1	6	8	31
7686	6244	3930	2987	1668	387	158	23060	32

(DUMP continued)

FUTURE AUTHORIZATIONS STORED ON FILE

	E3	E4	E5	E6	E7	E8	E9	TOTAL
FY 82	8300	5500	4425	3035	1825	406	179	23670
FY 83	8950	5700	4600	3200	1900	415	185	24950
FY 84	9150	5940	4720	3275	1950	425	190	25650
FY 85	9250	6033	4810	3350	1980	435	192	26050
FY 86	9350	6100	4875	3390	2000	440	195	26350
FY 87	9350	6100	4875	3390	2000	440	195	26350
FY 88	9350	6100	4875	3390	2000	440	195	26350

TEST TAKERS PROJECTED IN FY 82

E4	E5	E6	E7	E8	E9
3375	4033	1063	1479	915	186

VALUES OF PROMOTION VARIABLES AND CONTROLS LAST USED

	E3	E4	E5	E6	E7	E8	E9
AUTO ADVANCES	0	497	12	1	0	0	0
ADV RESOURCES,WZ	0	333	650	82	111	141	15
ADV RESOURCES,PZ	0	3002	3150	978	1348	772	171
PZ LOWER LIMIT	0	2	3	6	10	14	18
PZ UPPER LIMIT	0	31	31	31	31	31	31
WZ LOWER LIMIT	0	0	1	4	7	9	14
WAIVERABLE LIMIT	0	20	10	10	10	10	10
TOKEN ADVANCE	0	5	5	5	0	0	0
	USN	USNR					
RECRUIT LOSS RATE	.00	.00					

SEE LOSS VARIABLE ? YES

UP-DATED RATES IDENTIFIED BY :
1 FOR SAMPLE RATES FOR DEMONSTRATION
CR FOR BASELINE
1
NUMBER 1 ACCEPTED.

(DUMP continued)

	ATTRITION	CONTRACT LOSS	DEMOTIONS OUT	EAOS	LATERALS OUT	RETIREMENT	DEMOTIONS IN	LATERALS IN	MISC GAINS	RETENTION
PG E3	679	376	498	404	0	0	678	0	149	28
PG E4	227	1375	183	1998	25	0	33	20	171	623
PG E5	97	759	33	1600	15	1	14	9	89	841
PG E6	63	150	11	800	4	63	0	0	33	650
PG E7	57	8	0	300	0	173	0	0	8	292
PG E8	5	3	0	60	0	57	0	0	1	57
PG E9	2	5	0	20	0	30	0	0	0	15
LOS 1	274	37	189	47	1	0	180	3	56	9
LOS 2	280	64	215	87	1	0	204	5	44	23
LOS 3	203	201	144	297	4	0	142	6	52	95
LOS 4	83	1313	68	1952	12	0	67	3	159	639
LOS 5	64	448	47	680	11	1	54	5	46	232
LOS 6	37	216	26	401	3	0	38	3	21	185
LOS 7	28	76	8	206	2	0	8	2	16	129
LOS 8	23	123	5	317	4	0	7	1	19	194
LOS 9	26	77	7	226	3	0	7	1	12	149
LOS 10	19	48	2	193	1	0	2	0	10	145
LOS 11	16	23	5	119	1	0	6	0	4	98
LOS 12	17	17	6	114	1	0	6	0	4	97
LOS 13	11	11	2	114	0	1	2	0	1	101
LOS 14	14	5	2	85	0	0	2	0	1	81
LOS 15	7	2	1	56	0	1	1	0	1	54
LOS 16	5	1	0	68	0	1	0	0	0	65
LOS 17	2	1	0	40	0	0	0	0	0	37
LOS 18	1	0	0	27	0	2	0	0	0	27
LOS 19	1	0	0	26	0	30	0	0	1	26
LOS 20	6	1	0	33	0	103	0	0	2	31
LOS 21	3	1	0	30	0	64	0	0	1	29
LOS 22	3	1	0	24	0	38	0	0	1	22
LOS 23	1	1	0	9	0	22	0	0	0	9
LOS 24	1	1	0	9	0	13	0	0	0	8
LOS 25	0	1	0	7	0	11	0	0	0	7
LOS 26	1	1	0	3	0	10	0	0	0	3
LOS 27	0	0	0	3	0	4	0	0	0	3
LOS 28	1	1	0	3	0	5	0	0	0	2
LOS 29	1	1	0	2	0	4	0	0	0	1
LOS 30	0	1	0	1	0	10	0	0	0	10
LOS 31	1	0	0	1	0	2	0	0	0	0
TOTAL	1129	2676	726	5182	44	325	726	29	451	2506

```
      PWZONE 8000
ENTER KEY
0000
HOSPITAL CORPSMAN FY82
                          E4      E5      E6      E7      E8      E9
P.Z. LOWER LIMIT           2       3       6      10      14      18

P.Z. UPPER LIMIT          31      31      31      31      31      31
10 15 20 25
P.Z. UPPER LIMIT          10      15      20      25      31      31

W.Z. LOWER LIMIT                   1       4       7       9      14

WAIVER ALLOWANCE       20.00   10.00   10.00   10.00   10.00   10.00

TOKEN ALLOWANCE         5.00    5.00    5.00    0.00    0.00    0.00

EDIT THE FOLLOWING TITLE :
HOSPITAL CORPSMAN FY82
                              - MODIFIED PZ UL
NEW TITLE READS :
HOSPITAL CORPSMAN FY82        - MODIFIED PZ UL
OK ?

PROMOTION/WAIVER ZONE DATA UP-DATED FOR HOSPITAL CORPSMAN FY82    - MODIFIED PZ UL
```

MODIFY PWZONE TO CHANGE NAVY POLICY.

```
      PWZONE 8000
ENTER KEY
@@@@
HOSPITAL CORPSMAN FY82    - MODIFIED PZ UL
                        E4      E5      E6      E7      E8      E9
P.Z. LOWER LIMIT         2       3       6      10      14      18

P.Z. UPPER LIMIT        10      15      20      25      31      31
31 31 31 31
P.Z. UPPER LIMIT        31      31      31      31      31      31

W.Z. LOWER LIMIT                 1       4       7       9      14

WAIVER ALLOWANCE     20.00   10.00   10.00   10.00   10.00   10.00

TOKEN ALLOWANCE       5.00    5.00    5.00    0.00    0.00    0.00

EDIT THE FOLLOWING TITLE :
HOSPITAL CORPSMAN FY82    - MODIFIED PZ UL
                          ////////////////
NEW TITLE READS :
HOSPITAL CORPSMAN FY82
OK ?


PROMOTION/WAIVER ZONE DATA UP-DATED FOR HOSPITAL CORPSMAN FY82
```

Restore PWZONE to original values.

```
      RATINGS
190 RATINGS AVAILABLE.  SEE THE LIST ? NO
```

Check number of ratings available.

```
      DROP 8000 82 1
ENTER KEY
WWW
RATING 8000  FISCAL YEAR 82  SEQUENCE 1  FILE LIBRARY 1301035D HOSPITAL CORPSMAN FY82

ABOVE RATING DROPPED
```

Unused data can be removed from the disk.

DATA BASE MAINTENANCE

```
      HELP
THE FOLLOWING COMMANDS ARE AVAILABLE:
    GOFAST RATING YEAR SEQUENCE
    RATINGS
    COMBINE
    RECAP
    TRIM RATING
    DROP RATING
    NEWINV RATING
    PWZONE RATING
    DUMP RATING
    DUPLICATE RATING
    WHEREIS RATING
    HELP
    CREATE
    LOGOFF
```

```
      RECAP
```

	E3	E4	E5	E6	E7	E8	E9	TOTAL
ATTRITION	27082	3824	1852	975	915	209	41	34898
EAOS	12568	29710	31777	17544	5854	1373	540	99366
CONTRACT LOSS	11043	19661	16583	5564	312	17	8	53188
RETENTION	1525	10049	15194	11980	5542	1355	531	46177
RETIREMENT	12	17	124	2253	3185	1391	746	7728
DEMOTIONS OUT	0	0	0	0	0	0	0	0
DEMOTIONS IN	0	0	0	0	0	0	0	0
LATERALS OUT	0	1085	816	558	143	32	12	2646
LATERALS IN	0	1085	816	558	143	32	12	2646
MISC GAINS	15129	3254	2104	710	165	35	18	21415

```
      WHEREIS 150 82 0
RATING 150  YEAR 82   SEQ 0
MASTER AT ARMS FY82
 HAS NO INVENTORY IN PG'S E 3 4 5
THIS SPLIT RATING MUST FIRST BE COMBINED IN A SUPPORTING RATING FAMILY.
USE <COMBINE> IN THIS WORKSPACE TO FORM RATING FAMILIES.

      WHEREIS 300 82
RATING 300  YEAR 82   SEQ 0
OPERATIONS SPECIALIST FY82
 IS AVAILABLE ON FILE LIBRARY 1301035D

      WHEREIS 121 82
RATING 121  YEAR 82   SEQ 0
IS NOT CURRENTLY ON LINE ... CONSULT A MINIFAST PROGRAMMER.
```

```
      COMBINE
THIS FUNCTION COMBINES INPUT RATINGS INTO A COMPOSITE RATING
REPRESENTING A RATING FAMILY.  INVENTORY IS SUBTOTALLED, AND RATES OF CHANGE
ENTER AN INPUT RATING ID (EG. 150), OR <DONE> TO TERMINATE INPUT       ARE PO
150 82 0
USING AS AN INPUT RATING :1301035D*R0150820
100 82 0
USING AS AN INPUT RATING :1301035D*R0100820
DONE
DEFINITION OF INPUT RATINGS TERMINATES HERE.
NOW SPECIFY A RATING DESIGNATION FOR THE COMPOSITE.
ENTER COMPOSITE RATING ID (EG.150 81 1)
151 82 0
PLEASE ENTER A TITLE FOR THE COMPOSITE RATING.
EDIT THE FOLLOWING TITLE :

SAMPLE COMBINE OF BMAND MA
NEW TITLE READS :
SAMPLE COMBINE OF BMAND MA
OK ?

BEGINNING TO ADD IN RATING :
MASTER AT ARMS FY82
BEGINNING TO ADD IN RATING :
BOATSWAINS MATE FY82
THIS RATING COMPOSITE IS FINISHED, AND THE NEW RATING IS ESTABLISHED ON FILE
FOLLOWING IS A DUMP OF THE DATA BASE.
RATING 0151  FISCAL YEAR 82  SEQUENCE 0  FILE LIBRARY 1301035D
SAMPLE COMBINE OF BMAND MA


THIS RATING IS A COMBINATION OF THE FOLLOWING :
1301035D*R0150820
1301035D*R0100820


   BEGINNING INVENTORY, FISCAL YEAR 82
             E3     E4     E5     E6     E7     E8     E9  E4-E9  TOTAL
INV       12890   2696   2243   2749   1452    363    180   9683  22573
MEAN LOS   1.43   4.09   7.06  12.63  17.39  20.16  23.99  10.17   5.18
CR RATIO   5.00  39.69  91.93  99.71  99.79 100.00 100.00  81.22  37.70
CR FORCE    644   1070   2062   2741   1449    363    180   7865   8509
TOP SIX RATIO 42.90 PERCENT


DISPLAY BEGINNING INVENTORY FORCE STRUCTURE MATRIX ? NO

FUTURE AUTHORIZATIONS STORED ON FILE
          E3     E4     E5     E6     E7     E8     E9  TOTAL
FY 82   2340   2842   2635   2724   1576    447    226  12790
FY 83   2700   3030   2730   2835   1645    465    230  13635
FY 84   2800   3125   2825   2900   1685    475    230  14040
FY 85   3000   3263   2900   2932   1715    480    235  14525
FY 86   3050   3236   2940   2942   1725    482    235  14610
FY 87   3050   3236   2940   2942   1725    482    235  14610
FY 88   3050   3236   2940   2942   1725    482    235  14610
```

TEST TAKERS PROJECTED IN FY 82

E4	E5	E6	E7	E8	E9
1930	1361	665	1379	754	144

VALUES OF PROMOTION VARIABLES AND CONTROLS LAST USED

	E3	E4	E5	E6	E7	E8	E9
AUTO ADVANCES	0	4	2	1	0	0	0
ADV RESOURCES,WZ	0	0	0	0	0	0	0
ADV RESOURCES,PZ	0	0	0	0	0	0	0
PZ LOWER LIMIT	0	2	3	7	11	16	19
PZ UPPER LIMIT	0	31	31	31	31	31	31
WZ LOWER LIMIT	0	0	1	5	8	9	14
WAIVERABLE LIMIT	0	20	10	10	10	10	10
TOKEN ADVANCE	0	5	5	5	0	0	0
	USN	USNR					
RECRUIT LOSS RATE	.00	.00					

SEE LOSS VARIABLE ? NO

LOGOFF

** GOOD DAY MINIFAST,IT'S 27 JUL 82 8:34:26
CPU TIME= 0MINS 34.82SECS
CONNECT TIME= 12MINS 3SECS

File Structure and Global Variables

Baseline Files

Figure B-1 describes the baseline file structure. A disk file with this structure exists for every rating available online. Also, the initial creation of all ratings results in a tape file of each rating with this structure (see next section for details).

REC. NO.	APL SHAPE	APL TYPE	RECORD CONTENTS
1	80	CHAR	Rating Title and Fical Year
2	31 7	INTEGER	Beginning Inventory
3	7 7	INTEGER	Authorizations (Requirements)
4	31 6	INTEGER	Unique Test Taker Rate - Parts Per Million
5	31 6	INTEGER	Automatic Advancements In
6	6	INTEGER	Apportionment Rate (Percent)
7	2 6	INTEGER	Last Advancement Resources Used - WZ/PZ
8	31 7	INTEGER	USNR New Input Rate - Parts Per Million
9	2	REAL	Recruit Loss Rates - USN/USNR
10	6	INTEGER	Last Automatic Advancements Used
11	6 5	INTEGER	Promotion, Waiver Zone/Limit, Token %
12	VARIABLE	CHAR	List of Component Ratings for Combined Ratings
13	31 6	INTEGER	Examined Advancement in Rate - Parts Per Million
14	31 6	INTEGER	Miscellaneous Advancements In
15	31 7	INTEGER	Attrition Loss Rate - Parts Per Million
16	31 7	INTEGER	Contract Loss Rate - Parts Per Million
17	31 7	INTEGER	Demotions Out Rate - Parts Per Million
18	31 7	INTEGER	EAOS Rate - Parts Per Million
19	31 6	INTEGER	Laterals Out
20	31 7	INTEGER	Retirement Rate - Parts Per Million
21	31 7	INTEGER	Any Additional Loss (Zero Now)
22	31 7	INTEGER	Any Additional Loss (Zero Now)
23	31 7	INTEGER	Any Additional Loss (Zero Now)
24	31 7	INTEGER	Demotions In Rate - Parts Per Million
25	31 6	INTEGER	Laterals In
26	31 7	INTEGER	Miscellaneous Gains
27	31 7	INTEGER	Retention Rate - Parts Per Million
28	31 7	INTEGER	Any Additional Gain (Zero Now)
29	31 7	INTEGER	Any Additional Gain (Zero Now)
30	31 7	INTEGER	Any Additional Gain (Zero Now)

Figure B-1. Data base file structure.

The MINIFAST disk file conventions require a filename to identify, locate, process, etc. any disk file. The conventions for MINIFAST baseline files are as follows:

Filename = RXXXXYYZ

where

XXXX = Rating number, no blanks, with leading zeros
YY = Year
Z = Sequence Number

e.g.,

R0000820 = ALL NAV, beginning 1982 sequence number 0
R0100820 = BM, beginning 1982 sequence number 0
R8000830 = HM, beginning 1983 sequence number 0.

Note that the year identifier is a two-digit number that usually denotes the fiscal year of the beginning inventory. This allows the same rating to be stored multiple times, by using different years of different sequence numbers. Various MINIFAST programs rewrite some of the records to update or change the entries. The beginning inventory, title, promotion zone, . . ., etc. can all be altered by the various utility programs described earlier. Thus, there is a need to distinguish various "versions" of a rating's data base; hence, the use of the year identifier and sequence number.

Files with Updated Rates

A user can request that updated rates be appended to the data base for a particular rating. The first section describes this from the model's point of view. To the data base file, updated rates are simply 16 records that can be used in lieu of record numbers 15, 16, . . ., 30 of the baseline (see Figure B-1). Each request to add updated rates causes the program to append 17 records to the file. The first of these records is an 80-byte character vector with descriptive information for the user to identify the rates. The following 16 records are 31x7 integer arrays with an interpretation identical to records 15 through 30. Any number of updated rates can be appended to a rating's disk file, the only limitation being SPACE. The number of records in these files, N, will always satisfy

$$N - 30 = 0 \text{ modulo } 17.$$

That is, $N - 30 = k \times 17$, for some nonnegative integer k. Then k is the number of updated rates present.

Note that most of the file length is due to the 16-rate matrices; hence, each set of updated rates takes almost as much disk space as one baseline file with no updates. To conserve disk space, one should append updated rates sparingly. TRIM, a utility function described on page B-1, removes unwanted updated rates.

MINIFAST Global Variables

1. Data Base Quantities. When a user calls the GOFAST function, or any other function that requires access to a rating's data file, the function LOC is called to access the file. At this time, certain data base quantities are read into core and given global names. A list of these names is given in Figure B-2.

Most of these names are self-explanatory; however, several require more explanation. OLDARWZ, OLDARAPZ, and OLDAA are updated each time the end of period 1 is reached. These variables are a convenient variable for recalling values from the prior exercise. The variable PZ contains promotion and waiver zone information in the following format. Row indices correspond to pay grades E-4 to E-9. The meanings of column indices are presented in Figure B-3.

The LOS cell definitions of columns 1, 2, and 3 are inclusive and are applied literally to the net inventory. This makes their values correspond to actual years of service in the final inventory, which is how the zone is usually stated in DoD instructions.

GLOBAL NAME	APL SHAPE	APL TYPE	MINIFAST INTERPRETATION
TITLE	80	CHAR	Identification - should include Rating name
INV	31 7	INTEGER	Beginning Inventory, LOS x PG
RO	5 7	INTEGER	Default Authorizations, period x PG
APR	6	REAL	Apportionment Rate, in %, x PG
OLDARWZ	6	INTEGER	WZ Advance Resources used in period 1
OLDARPZ	6	INTEGER	PZ Advance Resources used in period 1
OLDAA	6	INTEGER	Auto Advancements used in period 1
PZ	6 5	INTEGER	Promotion, Waiver Zone, Token %
TTR	31 7	INTEGER	Test Taker Rates, in fractions of beginning inventory
RLR	2	REAL	Recruit Loss Rates for USN and USNR

Figure B-2. Table of baseline global variables.

Column	Meaning for PZ
1	LOS cell Lower Limit of Promotion Zone
2	LOS cell Upper Limit of Promotion Zone
3	LOS cell Lower Limit of Waiver Zone
4	Waiver Percentage Limit
5	Token Advancemet Percentage

Figure B-3. Interpretation for PZ.

The variable INV is replaced at the beginning of each period beyond the first by the end inventory of the period preceeding, in core only (i.e., not in the data base). Note that the above variables will pertain to the rating last called by LOC, which is called each time any of the following functions are called: GOFAST, NEWINV, PWZONE, DUMP, TRIM, DROP. Thus, a call to DUMP, which types the values of the variables in Figure B-2 of the terminal, also leaves these behind as global variables. An experienced APL user can then manipulate them interactively from his terminal.

2. GOFAST Global Variables. The GOFAST function creates many variables in the course of execution, some of which are documented here. An experienced APL user can interrupt GOFAST in execution and then resume computation. Since the variables are global, they can also be viewed when GOFAST execution terminates. Figure B-4 summarizes these variables.

The variables AO and LOSS require further explanation. AO is produced by the call to ADVANCE, which does all advancements. The six rows correspond to pay grades E-4--E-9 respectively. Meanings of columns are presented in Figure B-5.

This variable is used by RECRUIT to project recruit needs and is used by the off-line report writing function REPORT.

NAME	SHAPE	TYPE	INTERPRETATION
NPP	SCALAR	INTEGER	Number of Planning Periods in RQ, usually 5
PPI	SCALAR	INTEGER	Planning Period Index; which period now
RQ	7	INTEGER	This period's authorized strength, by PG
RQ	7	INTEGER	Next period's authorized strength, by PG
STOCK	39	INTEGER	Beginning Inventory by PG (7), LOS (31), Total (1)
NINV	31 7	INTEGER	Net Inventory, LOS x PG
NET	39	INTEGER	Net Inventory, PG (7), LOS (31), Total (1)
TP	6	INTEGER	Test Passers, PG E4-E5
AA	6	INTEGER	Auto Advancements into E4-E9
MA	6	INTEGER	Miscellaneous Advancements into E4-E9
AINV	31 7	INTEGER	Advanced Inventory, LOS x PG
RC	2 7	INTEGER	Recruits Total into E3-E9
FINV	31 7	INTEGER	Final Inventory, LOS x PG
AO	6 35	REAL	Advancement Output (see text)
LOSS	16 39	INTEGER	Loss/Gain Estimate (see text)

Figure B-4. GOFAST global variables.

Column	Interpretation of AO
1	% of Final Inv in waiver zone
2	Promotions in waiver zone, not including recruits
3	Promotions in promotion zone
4	Carry down
5-35	Number of Advances, by LOS (before aging)

Figure B-5. Interpretation for AO.

The variable LOSS is created by the call to FGL (Forecast Gains and Losses) and is used by FORCE. The 16 rows correspond to the losses and gains forecast by the data base. These are the 16 quantities predicted by rate matrices in record positions 15 to 30 (see Figure B-6). The column indices correspond to the margin totals of each prediction, in the order PG (7), LOS (31), Total (1), leading to 39 values in all. The entire 31 x 7 prediction for each loss and gain is stored out of core in a scratch file (see 3 below). All management overrides, reforecasts, etc. are carried out on the full 31 x 7 matrix. The LOSS variable keeps a consistent copy of the margin totals in core for display to the user. A convenient method of displaying a summary of values in LOSS is to use the RECAP function.

RECORD	SHAPE	TYPE	VARIABLE PREDICTION
1	31 7	REAL	Attrition
2	31 7	REAL	Contract Loss
3	31 7	REAL	Demotions Out
4	31 7	REAL	EAOS
5	31 7	REAL	Laterals Out
6	31 7	REAL	Retirements
7	31 7	REAL	Any Additional Loss (zero now)
8	31 7	REAL	Any Additional Loss (zero now)
9	31 7	REAL	Any Additional Loss (zero now)
10	31 7	REAL	Demotions In
11	31 7	REAL	Laterals In
12	31 7	REAL	Miscellaneous Gains
13	31 7	REAL	Retention (=EAOS-Contract Loss)
14	31 7	REAL	Any Additional Gain (zero now)
15	31 7	REAL	Any Additional Gain (zero now)
16	31 7	REAL	Any Additional Gain (zero now)

Figure B-6. LOSSGAIN file contents.

3. Loss/Gain Scratch File. Since the full 31 x 7 (type real) prediction of each loss and gain (16 in all) would require extreme quantities of core, they are kept out of core in a temporary disk file. The identifiers of this file are not rating-specific, since it is simply reused each time. The file identifier is system-dependent and is determined by the names available for temporary work files. The name currently being used is U1.

As in the data base files, this file is created by the file subsystem. The file always has 16 records, each one being a 31 x 7 type real array. These arrays correspond to the actual prediction of losses and gains used. Figure B-6 lists these variables.

Again, for an experienced APL user, the contents of this file can be read so that the detail loss and gain variables can be retrieved interactively from the terminal. The function LOC can be used as a standalone to give access to any rating's data file allowing ad hoc alteration, as well as the common LOSSGAIN file. This should only be undertaken by an experienced APL user, since damage can easily befall the data file.

APPENDIX C

DATA BASE CREATION

DATA BASE CREATION

The Creation Procedure

Overview

The procedure for data base creation consists of several specialized operations. These operations are best described in terms of two phases.

The first phase is the extraction of the required data from current FAST input files. These input files are in ADSTAP format of card images. The data are extracted by a job that is prepared and run on the FAST host system, currently at Argonne National Laboratories (ANL). The running of this job is described in the next section.

The extraction phase results in a data file of ADSTAP card images sorted in rating major, matrix minor order. The correspondence between these matrix IDs and certain MINIFAST quantities is shown in Table C-1. This data file can be transferred from the FAST host system to the MINIFAST host system via any appropriate medium. Currently, the best medium appears to be magnetic tape, but future enhancements may permit a more direct link, such as an RJE link.

The second phase of the data base creation procedure is conversion of the previously created data file from the ADSTAP format into a format ready for GOFAST. This conversion is handled by a specialized program on the MINIFAST host system, currently the HARRIS 800 at the Navy Military Personnel Command (NMPC) in Washington, DC. The procedure for running this job is described on page C-3.

Upon the successful completion of the second phase, the new data base is available and ready to be used by GOFAST.

Extraction

The extraction phase is currently performed on the FAST host system, the ANL computer system. The procedure consists of preparing input file data and JCL for a batch job and submitting it to the computer system. This will produce a data file for input to the MINIFAST data creation program. The data file is currently produced on magnetic tape and must be shipped from ANL to NMPC.

A working knowledge of IBM JCL is required to use the extraction program effectively. All data sets needed to run this job reside as members in a partitioned data set at ANL, named B89846.MINEXT.LIB. Included are JCL, source code, and input data sets. The two members that require the attention of the user are JCL and MINITAPE.

The member, JCL, contains the JCL necessary to run the job. Before submission of the job, the three input files listed below must be correctly specified. In addition, the desired tape output information, such as data set name (DSN) and volume serial number (VOLSER) in COPY.SYSUT2, must be included.

1. FT11F001 is an in-stream file that contains the title card for the job to be used as a page label.

2. FT10F001 contains the names of the FAST.MASTER and FAST.CONTROL data sets that are to be used for the data extraction for the MINIFAST data base.

Table C-1

The Data Creation Workspace

ADSTAP Matrix ID	# of Cards	MINIFAST Rec #	MINIFAST Interpretation
101	1	1	TITLE, all 72 columns are available, must be first matrix ID for each rating.
110	32	15	ATTRITION prediction rate.
117/119	2	9	RECRUIT LOSS prediction rate, USN/USNR.
190	32	20	RETIREMENT prediction rate.
260	32	27	Eligible nonreenlistment used in calculating. RETENTION prediction rate = EAOS-Contract+ Loss.
300	32	18	EAOS prediction rate, to be multiplied times beginning inventory. Includes FAST ineligibles, nonreenlistment, and bonus extensions.
320	32	16	Eligible EAOS prediction rate, including bonus extensions. To be multiplied times MID 300. Used in calculating contract loss and retention.
433	32	29	RESERVE prediction rate--use ALL-NAV matrix for each rating.
495	32	26	MISC GAIN prediction.
728	32	13	Examined advancements in rate.
748	32	5/10	AUTOMATIC ADVANCEMENTS IN.
768	32	14	MISCELLANEOUS ADVANCEMENTS IN.
800	32	24	DEMOTIONS IN prediction rate.
810	32	17	DEMOTIONS OUT prediction rate.
870	32	25	LATERALS IN prediction.
875	32	19	LATERALS OUT prediction.
897	31	4	TEST TAKER rates.
950	7	3	AUTHORIZATIONS, by PG only for ratings.
960	7	3	AUTHORIZATIONS, by PG only for ALL NAVY.
999	32	2	INVENTORY.

3. FT09F001 contains the specifications as to which variable IDs, ratings, and fiscal years are to be extracted for the output file. This file resides in member MINITAPE in PDS MINEXT.LIB. The records of this file may contain entries in columns one through eight as follows:

COL 1-3 variable ID (VID)
COL 4 relative fixed year (RFY)
COL 5-8 RATING.

Examples:

a. Enter 950 in COLS 1-3 to get all cards with VID950.

b. Enter 960 in COLS 1-3 and 0000 in COLS 5-8 to get all cards with VID950 for rating 0000 only.

c. Enter 0100 in COLS 5-8 to get all cards for rating 0100. If this card is included, then any VID selection card will apply only to rating 0100 even though the rating columns are blank.

d. Enter 1 in COL 4 to get all cards for RFY. If this card is included, then all other selections will apply only to RFY 1 also.

The input file must be in ADSTAP format of card images similar to the input file for FAST. It must be sorted in rating number major, matrix ID minor order. The relative year index is ignored. A correspondence between certain MINIFAST quantities and matrix IDs has been established, as shown in Table C-1, which lists all matrix IDs that the processing function, described below, can recognize. If an ID not in Table C-1 is encountered, it is reported and processing continues, essentially ignoring the data in that matrix ID. If any one of the above matrix IDs is absent, except 101 and 999, the function implicitly assumes a matrix of all zeros. Since the list of matrix IDs used is subject to change quite readily, it is highly recommended that a programmer be contacted to list the processing function and verify what matrix IDs are currently being used.

Conversion

The command CREATE has been made available in the MINIFAST workspace and may be entered at the terminal like the other MINIFAST data base maintenance commands. It requires no arguments and will interactively query the user for all necessary information. The result of running the CREATE procedure in MINIFAST is the preparation of a "batch" (or "background") job, which is then submitted to perform the actual reading and conversion of the data. This section contains instructions for performing these procedures.

Before running the CREATE function, it is necessary to have the extract for a new data base available, as described above. The MINIFAST data base of rating data files should also be examined and all unnecessary files dropped to minimize the possibility of interference between the old and the new data base names. It is advisable to have no existing rating data files for the same ratings and years that are to be created in the new data base. If any conflicts are found during the running of the batch job, a new sequence number is assigned to the new file.

Entering the CREATE command begins an interactive procedure to prepare the batch job for submission. The following information is expected:

1. INPUT FILE IDENTIFICATION (disk file name or tape name identification).

2. PROMOTION/WAIVER ZONE DATA (if different from the default).

3. FISCAL YEAR FOR BEGINNING INVENTORIES.

All of the remaining information necessary for the submission of the job is provided automatically by the CREATE function and the job is automatically submitted at logoff upon completion of the terminal session. Note that the tape name should be an alphabetic identification label and not an all-numeric volume serial number. If an all-numeric identifier is provided, only the first five digits will be used and they are prefixed with the letter "T."

Examples

Examples of using the CREATE function are provided in pages C-5 through C-11.

```
      CREATE
THIS PROGRAM WILL CREATE A JOB STREAM WHICH CAN BE SUBMITTED FOR THE
CREATION OF A NEW MINIFAST DATA BASE.
PLEASE ENTER:
     0 TO EXIT
     1 TO READ DATA FROM TAPE
     2 TO READ DATA FROM A DISK FILE
□:
      1
ENTER TAPE IDENTIFICATION
MINIFAST
EDIT THE FOLLOWING PROMOTION/WAIVER ZONE DATA TO BE USED UNIFORMLY FOR
ALL RATINGS.  IF YOU DON'T KNOW THIS DATA, ANSWER NO, AND GO GET THE DATA.
DO YOU WANT TO CONTINUE? YES

                        E4      E5      E6      E7      E8      E9
P.Z. LOWER LIMIT         2       3       6      10      14      18

P.Z. UPPER LIMIT        31      31      31      31      31      31

W.Z. LOWER LIMIT                 1       4       7       9      14

WAIVER ALLOWANCE     20.00   10.00   10.00   10.00   10.00   10.00

TOKEN ALLOWANCE       5.00    5.00    5.00    0.00    0.00    0.00

ARE YOU SATISFIED WITH THE PROMOTION/WAIVER ZONE DATA ?YES

BEGINNING INVENTORIES ARE FOR WHICH FISCAL YEAR? (E.G. 82)
□:
      82
JOB <MINICREATE> WILL BE AUTOMATICALLY SUBMITTED WHEN YOU LOG OFF.
HAVE A NICE DAY.


      LOGOFF


** GOOD DAY MINIFAST,IT'S 27 JUL 82  8:47:30
CPU TIME=        0MINS    27.71SECS
CONNECT TIME=       9MINS     6SECS
```

```
1$JOB MINICREATE 1301035D MINIFAST OUT=O:CREATE P=8          4 AUG 82  8:29:13
===> $RS 20=MINIDD 16008 WA
===> $AS 90=*20
===> $AS 6=W1
WELCOME TO MAI*APL
VERSION 10.1
CLEAR WS
      )LOAD CREATE
SAVED  4 AUG 82  8:19:31 - CREATE

6 RATINGS AVAILABLE.  SEE THE LIST ? YES


RATING  YEAR SEQUENCE
  0000    82     9
  0100    82     9
  0150    82     1
  0150    82     9
  0151    82     0
  0200    82     9
      CREATE
ENTER INPUT FILE NAME OR LFN TO READ DIRECTLY FROM TAPE
20
EDIT THE FOLLOWING PROMOTION/WAIVER ZONE DATA TO BE USED UNIFORMLY FOR
ALL RATINGS.  IF YOU DON'T KNOW THIS DATA, ANSWER NO, AND GO GET THE DATA.
DO YOU WANT TO CONTINUE? YES


                          E4     E5     E6     E7     E8     E9
P.Z. LOWER LIMIT           2      3      6     10     14     18
  2  3  6 10 14 18
P.Z. LOWER LIMIT           2      3      6     10     14     18

P.Z. UPPER LIMIT          31     31     31     31     31     31
 31 31 31 31 31 31
P.Z. UPPER LIMIT          31     31     31     31     31     31

W.Z. LOWER LIMIT                  1      4      7      9     14
  0  1  4  7  9 14
W.Z. LOWER LIMIT                  1      4      7      9     14

WAIVER ALLOWANCE       20.00  10.00  10.00  10.00  10.00  10.00
 20 10 10 10 10 10
WAIVER ALLOWANCE       20.00  10.00  10.00  10.00  10.00  10.00

TOKEN ALLOWANCE         5.00   5.00   5.00   0.00   0.00   0.00
  5  5  5  0  0  0
TOKEN ALLOWANCE         5.00   5.00   5.00   0.00   0.00   0.00

ARE YOU SATISFIED WITH THE PROMOTION/WAIVER ZONE DATA ?YES
```

```
BEGINNING INVENTORIES ARE FOR WHICH FISCAL YEAR? (E.G. 82)
?QD:
      82
DO YOU WANT THIS PROGRAM TO RUN UNATTENDED? NO

CREATION OF MINIFAST DATA BASE BEGINS WITH ALL NAV.
ALL NAV MUST HAVE A COMPLETE FILE.
EXECUTION WILL TERMINATE IF NOT.
***** MID 897 MISSING FOR THIS RATING *****
***** MID 810 MISSING FOR THIS RATING *****
***** DEFAULT USED FOR MID 810 *****
CREATION OF RATING 0000 ALL NAVY FY82 ACCEPTED
CREATION OF RATING 0100 BOATSWAINS MATE FY82 ACCEPTED
****SPLIT RATING 0150  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 0150 MASTER AT ARMS FY82 ACCEPTED
CREATION OF RATING 0200 QUARTERMASTER FY82 ACCEPTED
CREATION OF RATING 0250 SIGNALMAN FY82 ACCEPTED
CREATION OF RATING 0300 OPERATIONS SPECIALIST FY82 ACCEPTED
CREATION OF RATING 0350 ELECTRONICS WARFARE TECHNICIAN FY82 ACCEPTED
CREATION OF RATING 0401 SONAR TECHNICIAN (SURFACE) FY82 ACCEPTED
CREATION OF RATING 0404 SONAR TECHNICIAN (SUBMARINE) FY82 ACCEPTED
CREATION OF RATING 0450 OCEAN SYSTEMS TECHNICIAN FY82 ACCEPTED
CREATION OF RATING 0500 TORPEDOMANS MATE FY82 ACCEPTED
****SPLIT RATING 0600  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 0600 GUNNERS MATE FY82 ACCEPTED
****SPLIT RATING 0601  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 0601 GUNNERS MATE (MISSILES) FY82 ACCEPTED
CREATION OF RATING 0602 GUNNERS MATE (TECHNICIAN) FY82 ACCEPTED
****SPLIT RATING 0604  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 0604 GUNNERS MATE (GUNS) FY82 ACCEPTED
****SPLIT RATING 0800  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 0800 FIRE CONTROL TECHNICIAN FY82 ACCEPTED
****SPLIT RATING 0801  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 0801 FIRE CONTROL TECH. (GUN) FY82 ACCEPTED
****SPLIT RATING 0802  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 0802 FIRE CONTROL TECH. (SURFACE) FY82 ACCEPTED
****SPLIT RATING 0803  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 0803 FIRE CONTROL TECH. (BALLISTIC) FY82 ACCEPTED
CREATION OF RATING 0810 MISSILE TECHNICIAN FY82 ACCEPTED
CREATION OF RATING 0900 MINEMAN FY82 ACCEPTED
CREATION OF RATING 1000 ELECTRONICS TECHNICIAN FY82 ACCEPTED
CREATION OF RATING 1010 DATA SYSTEMS TECHNICIAN FY82 ACCEPTED
CREATION OF RATING 1100 INSTRUMENTMAN FY82 ACCEPTED
****SPLIT RATING 1111  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 1200 OPTICALMAN FY82 ACCEPTED
****SPLIT RATING 1400  PARTIAL DATA BASE CREATED*****
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CREATION OF RATING 1400 NAVY COUNSELLOR FY82 ACCEPTED
CREATION OF RATING 1500 RADIOMAN FY82 ACCEPTED
CREATION OF RATING 1611 COMMUNICATIONS TECH. (TECHNICAL) FY82 ACCEPTED
CREATION OF RATING 1622 COMMUNICATIONS TECH. (ADMIN.) FY82 ACCEPTED
CREATION OF RATING 1633 COMMUNICATIONS TECH. (MAINT.) FY82 ACCEPTED
CREATION OF RATING 1644 COMMUNICATIONS TECH. (COMM.) FY82 ACCEPTED
CREATION OF RATING 1655 COMMUNICATIONS TECH. (COLLECT.) FY82 ACCEPTED
CREATION OF RATING 1666 COMMUNICATIONS TECH. (INTERP.) FY82 ACCEPTED
CREATION OF RATING 1700 YEOMAN FY82 ACCEPTED
****SPLIT RATING 1750  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 1750 LEGALMAN FY82 ACCEPTED
CREATION OF RATING 1800 PERSONNELMAN FY82 ACCEPTED
CREATION OF RATING 1900 DATA PROCESSING TECHNICIAN FY82 ACCEPTED
CREATION OF RATING 2000 STOREKEEPER FY82 ACCEPTED
CREATION OF RATING 2100 DISBURSING CLERK FY82 ACCEPTED
CREATION OF RATING 2200 MESS MANAGEMENT SPECIALIST FY82 ACCEPTED
CREATION OF RATING 2300 INTELLIGENCE SPECIALIST FY82 ACCEPTED
CREATION OF RATING 2490 SHIPS SERVICEMAN FY82 ACCEPTED
CREATION OF RATING 2500 RELIGIOUS PROGRAM SPECIALIST FY82 ACCEPTED
CREATION OF RATING 2600 JOURNALIST FY82 ACCEPTED
CREATION OF RATING 2700 POSTAL CLERK FY32 ACCEPTED
CREATION OF RATING 3100 LITHOGRAPHER FY32 ACCEPTED
CREATION OF RATING 3200 ILLUSTRATOR DRAFTSMAN FY82 ACCEPTED
CREATION OF RATING 3300 MUSICIAN FY82 ACCEPTED
****SPLIT RATING 3333  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 3700 MACHINISTS MATE FY82 ACCEPTED
CREATION OF RATING 3800 ENGINEMAN FY82 ACCEPTED
CREATION OF RATING 3900 MACHINERY REPAIRMAN FY82 ACCEPTED
CREATION OF RATING 4000 BOILERMAN FY82 ACCEPTED
CREATION OF RATING 4100 ELECTRICIANS MATE FY82 ACCEPTED
CREATION OF RATING 4200 INTERIOR COMMUNICATION ELEC. FY82 ACCEPTED
CREATION OF RATING 4300 HULL TECHNICIAN FY82 ACCEPTED
****SPLIT RATING 4400  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 4400 GAS TURBINE SYS. TECHNICIAN FY82 ACCEPTED
****SPLIT RATING 4401  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 4401 GAS TURBINE SYS. (ELEC.) FY82 ACCEPTED
****SPLIT RATING 4402  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 4402 GAS TURBINE SYS. (MECH.) FY82 ACCEPTED
****SPLIT RATING 4600  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 4600 PATTERNMAKER FY82 ACCEPTED
CREATION OF RATING 4700 MOULDER FY82 ACCEPTED
CREATION OF RATING 5100 ENGINEERING AID FY82 ACCEPTED
CREATION OF RATING 5300 CONSTRUCTION ELECTRICIAN FY82 ACCEPTED
CREATION OF RATING 5410 EQUIPMENT OPERATOR FY82 ACCEPTED
CREATION OF RATING 5500 CONSTRUCTION MECHANIC FY82 ACCEPTED
CREATION OF RATING 5600 BUILDER FY82 ACCEPTED
CREATION OF RATING 5700 STEEL WORKER FY82 ACCEPTED
CREATION OF RATING 5800 UTILITIESMAN FY82 ACCEPTED
CREATION OF RATING 6200 AVIATION MACHINISTS MATE FY82 ACCEPTED
CREATION OF RATING 6300 AVIATION ELECTRONICS TECH. FY82 ACCEPTED
CREATION OF RATING 6310 AV. ANTISUB. WARFARE TECH. FY82 ACCEPTED
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CREATION OF RATING 6400 AV. ANTISUB. WARFARE OPERATOR FY82 ACCEPTED
CREATION OF RATING 6500 AVIATION ORDANCEMAN FY82 ACCEPTED
CREATION OF RATING 6520 AV. FIRE CONTROL TECHNICIAN FY82 ACCEPTED
CREATION OF RATING 6600 AIR CONTROLMAN FY82 ACCEPTED
****SPLIT RATING 6700  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 6700 AVIATION BOATSWAINS MATE FY82 ACCEPTED
****SPLIT RATING 6704  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 6704 AV. BOATS MATE (LAUNCH/RECOVER) FY82 ACCEPTED
****SPLIT RATING 6705  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 6705 AV. BOATS MATE (FUELS) FY82 ACCEPTED
****SPLIT RATING 6706  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 6706 AV. BOATS MATE (HANDLING) FY82 ACCEPTED
CREATION OF RATING 6800 AVIATION ELECTRICIANS MATE FY82 ACCEPTED
****SPLIT RATING 6900  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 6900 AVIATION STRUCTURAL MECHANIC FY82 ACCEPTED
****SPLIT RATING 6901  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 6901 AV. STRUCT. MECH. (STRUCTURES) FY82 ACCEPTED
****SPLIT RATING 6902  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 6902 AV. STRUCT. MECH. (HYDRAULICS) FY82 ACCEPTED
****SPLIT RATING 6903  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 6903 AV. STRUCT. MECH. (SAFTEY EQP.) FY82 ACCEPTED
CREATION OF RATING 7000 AIRCREW SURVIVAL EQUIPMENTMAN FY82 ACCEPTED
CREATION OF RATING 7100 AEROGRAPHERS MATE FY82 ACCEPTED
CREATION OF RATING 7200 TRADEVMAN FY82 ACCEPTED
CREATION OF RATING 7300 AVIATION STOREKEEPER FY82 ACCEPTED
CREATION OF RATING 7400 AV. MAINT. ADMINISTRATIONMAN FY82 ACCEPTED
****SPLIT RATING 7500  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 7500 AV. SUPPORT EQUIP. TECHNICIAN FY82 ACCEPTED
****SPLIT RATING 7501  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 7501 AV. SUP. EQ. TECH. (ELECTRICAL) FY82 ACCEPTED
****SPLIT RATING 7503  PARTIAL DATA BASE CREATED*****
CREATION OF RATING 7503 AV. SUP. EQ. TECH. (MECHANICAL) FY82 ACCEPTED
CREATION OF RATING 7600 PHOTOGRAPHERS MATE FY82 ACCEPTED
CREATION OF RATING 3000 HOSPITAL CORPSMAN FY82 ACCEPTED
END OF FILE ON FILE 20
END OF FILE ON FILE 90
CREATION OF RATING 8300 DENTAL TECHNICIAN FY82 ACCEPTED
END OF FILE ON FILE 20
DONE *** WE ESTABLISHED A DATA BASE FOR 94 RATINGS.
R0000820
R0100820
R0150820
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R0200320
R0250320
R0300820
R0350820
R0401320
R0404820
R0450820
R0500320
R0600320
R0601320
R0602320
R0604820
R0800320
R0801320
R0802820
R0803320
R0810820
R0900320
R1000320
R1010820
R1100320
R1200320
R1400820
R1500320
R1611320
R1622320
R1633320
R1644320
R1655320
R1666820
R1700820
R1750820
R1800320
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R3300320
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R4000320
R4100320
R4200820
R4300320
R4400320

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R7100520
R7200820
R7300820
R7400820
R7500820
R7501820
R7503220
R7600820
R8000820
R8300820
      )WSID LASTCRAT
WAS CREATE
      )SAVE
SAVED  4 AUG 82 10:00:38 - LASTCRAT
      )OFF HOLD
APL OFF -  4 AUG 82 10:00:42
```

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