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13. ABSTRACT

This report documents the Fleet Readiness Training (FRT) Planning model developed as part of the third phase of the Integrated Facilities Requirements Study (IFRS).

In Phase I, two analytic submodels were developed. The first, a Logistics Support Requirements Generator, estimates personnel, aircraft, and fuel requirements for each phase of undergraduate pilot training at the Naval Air Training Command (NATRACOM). The second, a Pacing Facilities Requirements submodel, calculates facility requirements for each phase of training.

The purpose of the Phase II study was to develop a preliminary total systems IFRS management planning tool (including the two submodels developed in Phase I, as well as Base Loading, Facilities Excess/Deficiency, and Total Cost submodels), and automate the model so that it provides quick, accurate, and relevant information for use in the decision-making process. This Static IFRS model has been in continuous operation since March 1970.

The purpose of the Phase III study was to refine the Static IFRS model and to expand the IFRS concept by developing three additional planning tools for use by Navy decision-makers as follows:

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Pilot						
Simulation						
Programming						
Management						
Planning						
Static						
Air						
Readiness						
Model						

Item #13 (Abstract) continued

- Dynamic planning tool
- Optimization model
- Fleet Readiness Training Squadron planning tool.

The Dynamic planning tool simulates the undergraduate pilot training program on a weekly basis whereas the Static IFRS assumes an even annual flow of students. The Optimization model has two segments - a PTR Maximizer that calculates the maximum annual pilot training rate (PTR) possible for a given facilities inventory and a MCON Minimizer that calculates the minimum facility cost phase-to-base assignment for a desired PTR. The Fleet Readiness Training (FRT) model provides planning information for the readiness training squadrons and is designed similarly to the Static IFRS model. The Phase III documentation consists of the following four reports:

- The Integrated Facilities Requirements Study (IFRS) Phase III, ORI TR 645
- Development of the Automated Dynamic Model for the Integrated Facilities Requirements Study (IFRS) Phase III, ORI TR 646
- Development of the Optimization Model for the Integrated Facilities Requirements Study (IFRS) Phase III, ORI TR 647
- Development of the Fleet Air Readiness Training Model for the Integrated Facilities Requirements Study (IFRS) Phase III, ORI TR 648.

This report documents the Fleet Readiness Training (FRT) Model. Volume I contains a Summary of the FRT model and the functional relationships. Appendix B contains the present squadron planning factors and is under separate cover in Volume II. Volume III contains the User's Manual stating how to use the planning tool. The Programmer's Manual is contained in Volume IV.

OPERATIONS RESEARCH, Inc.

SILVER SPRING, MARYLAND

Development of the Fleet Air Readiness Training Model for the Integrated Facilities Requirements Study (IFRS) Phase III

Volume III - FRT User's Manual

31 March 1971

Prepared under Contract N00025-67-C-0031 (NBy-78672)
for the Naval Facilities Engineering Command
Department of the Navy
Washington, D.C.

FOREWORD

This report documents the Fleet Readiness Training (FRT) planning model developed as part of the third phase of the Integrated Facilities Requirements Study (IFRS). It has been prepared for the Systems Analysis Division of the Office of the Assistant Commander for Facilities Planning (Code 20), Naval Facilities Engineering Command (NAVFAC), Department of the Navy, as part of Contract N00025-67-C-0031 (NBy-78672) awarded to Operations Research, Inc., in June 1970.

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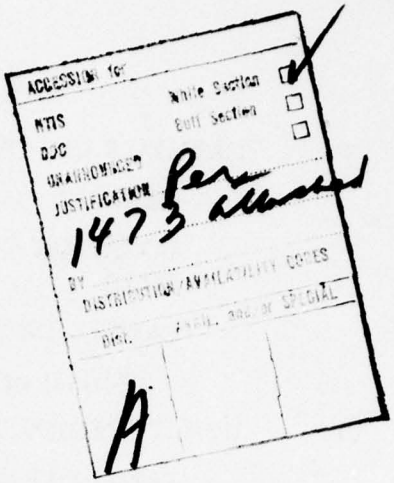
These IFRS models were developed and programmed by the staff members of the Economic Analysis Division of Operations Research, Inc., under the direction of Dr. William J. Leininger, vice president and division director and Thomas N. Kyle, program director. The project team members included R. J. Craig, M. C. Fisk, W. Liggett, F. McCoy, R. Messalle, and R. Yockman.

Mr. Dennis Whang of the Systems Analysis Division of Facilities Planning was contract monitor for NAVFAC. In addition, valuable assistance was provided by many other Navy personnel including, in particular, those in the Office of the Staff Civil Engineer and the Training/Plans Division of the Naval Operations, and in the Systems Analysis Division of NAVFAC. The authors gratefully acknowledge the contributions made by all of these people to the development of the IFRS models.



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I. INTRODUCTION

GENERAL

1.1 The purpose of this manual is to provide the decision-maker with detailed instructions on the use of the Fleet Readiness Training (FRT) model. The overall flow of control within the FRT model appears in Figure 1. Initially, the user selects the squadron. Next, the planning factor data that are stored in data files in the computer are read for each category in the squadron. The user can modify these planning factors if he desires. Finally the throughput specification is entered. Then student, aircraft and instructor information is calculated and printed. The resource requirements for each category are totaled and a summary for the squadron including support personnel is printed. A discussion of the model development and the methodology employed is contained in Volume I of this report.

1.2 The FRT model can be run at three levels of complexity. The level of complexity refers to both the print level details and the questions the computer asks the user. Level 1 contains a very limited set of questions and provides limited flexibility. Level 2 provides a few additional printout options and should be used until the user is familiar with the model. Level 3 provides the user with the option to list and modify the various planning factors.

1.3 The user should familiarize himself with this manual to attain the greatest effectiveness and flexibility in the use of the FRT model. The model is programmed in General Electric's MARK II FORTRAN language. Therefore, it is recommended that he become familiar with the standard operating procedures for the computer on which the FRT model is programmed, i.e., the GE Mark II time-sharing system. (See Appendix A for a brief introduction.)

1.4 Section II of this manual discusses the general operating procedures for the FRT model for levels 1 and 2. Section III discusses level 3. Section IV describes the error messages and program constraints of the FRT model. Section V describes the data files. Section VI discusses the utility program developed to aid the user in changing the data files. Section VII describes the file updating procedures.

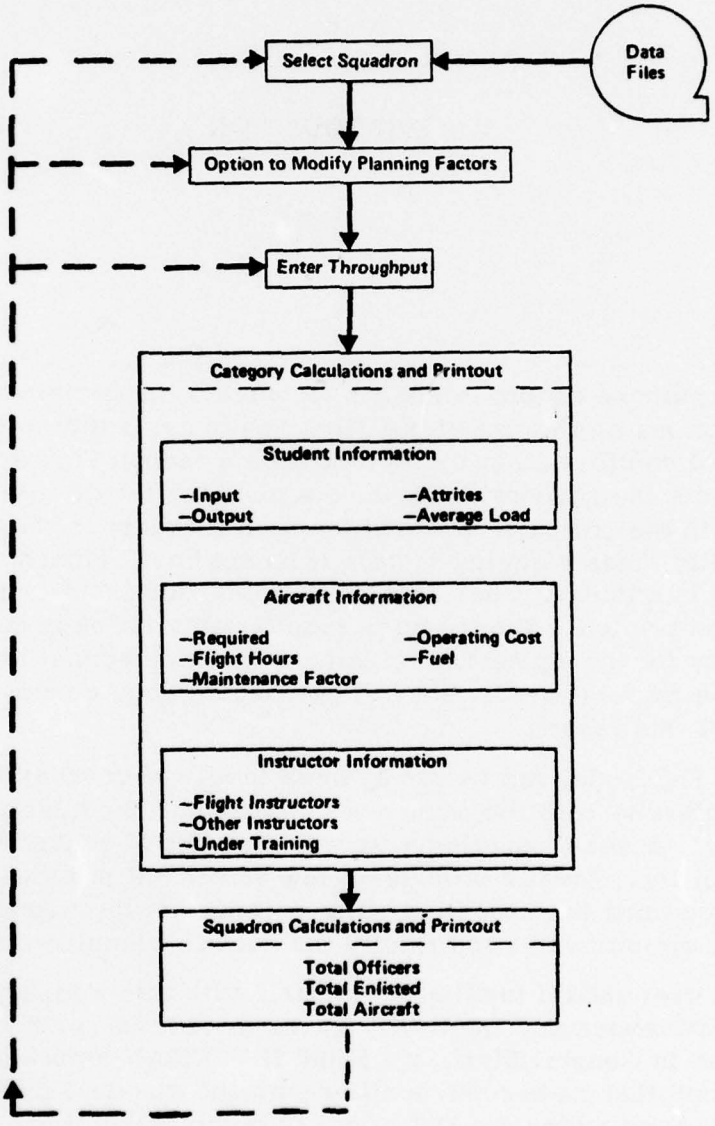

FIGURE 1. USER'S OVERVIEW OF FRT MODEL

II. GENERAL OPERATING PROCEDURES

INTRODUCTION

2.1 This section presents a sample run of the FRT program for levels 1 and 2. Each question and the results of the responses are explained in detail. The questions asked under level 1 are a subset of the questions asked in level 2. Level 2 is discussed in detail. The questions not asked in level 1 will be noted.

2.2 In the following descriptions of the use of the FRT system, it is assumed that the user supplies the correct responses to instructions or questions. Affirmative and negative responses are indicated by typing Y for "yes," or N for "no." For these and other forms of response, formats are always given with the indicated computer instruction, or question. Wherever possible, formats are free, meaning that the user can type his response, when it consists of a sequence of items, by merely typing a comma between each item. When alphabetic character information is required, the format is generally strict. The notation used in the question from the computer to indicate the format for the appropriate response is as follows: II, or XX, or XX.XX, etc., which indicates that a numeric response is expected, the decimal often indicates that the input need not be in whole numbers; AA indicates that an alphanumeric response is expected and the number of letters appearing in the question indicates the number expected in the response. Responses are generally checked for validity. The diagnostic messages returned to the user are discussed in Section IV of this manual.

GENERAL OPERATING PROCEDURE[1/]

2.3 The automated FRT model is entered by running program CRAWM*, the compiled version of program CRAWM. To highlight the sample user responses, all responses to the questions posed by the computer are underlined in this manual. The questions are also numbered for easy reference. The computer system begins by printing a title and question 1.

```
        FLEET READINESS TRAINING (FRT)

Q-1.  ENTER LEVEL ØF CØMPLEXITY                          (Q-1)
   1 LIMITED SET ØF QUESTIØNS
   2 DETAILED SET ØF QUESTIØNS
   3 LIST AND MØDIFY PLANNING FACTORS?2
```

The sample response is 2.

2.4 After the level of complexity has been entered, question 2 is asked.

```
Q-2.  ENTER TRAINING WEEKS PER YEAR
  AND ANNUAL FLY-DAYS (XX.,XXX.)?50,271          (Q-2)
```

At this point, the user must enter the number of weeks and training days scheduled annually for training. Note that an input format (XX,XXX) is provided as an aid to the user.

2.5 Next, question 3 is asked.

```
Q-3.  PRINT NAMES ØF ALL SQUADRONS(Y,N)?Y

   VA-43          VA-45          VF-126
   VA-127         VA-125         VA-122
   HS-10          HS-1*          VS-41
   VS-30          VF-124         VA-42
   VA-128         VA-174         VP-30          (Q-3)
   VP-31          VF-101         VF-121
   VAH-123        RVAW110A       RVAW110B
   RVAW-120       RVAH-3         HC-5*
   F-14*          VAQ-129        TESTSQD1
   TESTSQD2
```

1/ For information concerning the GE system and its operation, see Appendix A.

The user must respond with a yes (Y) or no (N). A yes response will print a list of all the squadron names stored in the data files. The program actually reads through the data files to get the names. Thus, if a new squadron has been added to the data files, its name will appear on the list—the program will read a maximum of 30 squadron names. This yes response produces the printout shown with question 3.

2.6 A no response takes the user to question 4. For level 1 run or on a return from question 8, question 3 is omitted, since it assumes that the user knows the names of all squadrons in the data file. Question 4 asks the user to enter the name of the squadron he wants to analyze. The name must be entered exactly as it appears in the list of squadrons printed from question 3. In the sample question TESTSQD2 is chosen. Note the input format (AAAAAAAA).

```
Q-4.  ENTER SQUADRON NAME (AAAAAAAA)?TESTSQD2          (Q-4)
```

2.7 The computer then prints the number of categories in the squadron and asks question 5. (Question 5 is omitted with level 1 and question 6 is then then asked.)

```
READINESS SQUADRON: TESTSQD2 HAS  5 CATEGORIES

Q-5.  DO YOU WANT A LIST OF CATEGORIES                 (Q-5)
   AND THEIR NUMBER(Y,N)?Y
```

A yes response to question 5 causes the computer to print out the name of each category and the number that must be used to reference each category in question 7. The following is the result of a yes response.

```
      READINESS SQUADRON: TESTSQD2
CAT. NO.     CAT. NAME
    1        FRP CAT 1
    2        FRP CAT 2
    3        FRP CAT 3
    4        FRNFG CAT 1
    5        FRNFG CAT 2
```

A no response takes the user directly to the next question.

2.8 Question 6 provides the user with flexibility to answer four types of "what if" questions.

```
Q-6.  ENTER DATA INPUT ØPTIØN
  1   STUDENT INPUT TØ CAT
  2   STUDENT ØUTPUT
  3   THØUS S FØR FLYING                    (Q-6)
  4   NUMBER ØF AIRCRAFT  ?1
```

The same printout format will be used regardless of the data input option chosen.

2.9 Input option 1 enables the user to enter the number of students entering (i.e., student input) training for each category. The FRT model will then calculate the number of graduates (i.e., student output) and the aircraft and instructors required to train these students.

2.10 Input option 2 enables the user to enter the required number of graduates for each category. Then the FRT model will calculate the required student input and resource data.

2.11 Input option 3 allows the user to specify the money available for aircraft flight time for each category in thousands of dollars available for flying (i.e., if $220,000 is available, the user will enter 220). If the category has more than one aircraft, this cost is split among the various aircraft in proportion to the student time required on each aircraft type. The results are the number of students that can be trained and the other resource data.

2.12 Input option 4 allows the user to specify the number of available aircraft for each category. If a category has two or three aircraft types, this option allows the user to constrain only the first aircraft type. The number of students that can be trained (i.e., both student input and output) and resource requirements are then calculated.

2.13 Next the following instruction is printed for level 2 and the user goes directly to question 7. The instruction is not printed for level 1 or on a return from question 8.

```
FØR NØ FURTHER DATA ENTER:
0,0 TØ GET SQUADRØN SUMMARY PRINTED
0,1 TØ SKIP SQUADRØN SUMMARY
```

This explains how the user indicates to the computer that he has no further data to enter, and how he selects or skips the squadron summary printout. This printout option can be very useful if the user wants to analyze several different category resource configurations. Once he is satisfied with the category information, he can then get the squadron summary to assess the total impact on the squadron. Question 7 is then asked.

```
Q-7.  ENTER CAT. NO. AND STUDENT INPUT TO CAT (XX,XXX)?2,50
NEXT?2,35
NEXT?1,50
NEXT?4,30
NEXT?5,20
NEXT?0,1
```
(Q-7)

When entering the above data the following features should be noted:

- A pair of numbers must be entered.
- The first value is the reference number of the category (see Q-5) and must be an integer, i.e., no decimal point permitted.
- The second number is the data input value.
- The category numbers can be specified in any order.
- If a category is not specified, the program assumes that the input value is zero.
- By entering a duplicate category number the second entry replaces the first value.

The preceding sample responses indicate all the above features. The last entry is 0,1 which indicates the squadron summary printout is to be skipped.

2.14 Next the program prints out Table 1. Note that the model prints the date of the run and squadron name at the top for reference purposes. Further note that in the aircraft and instructor statistics those categories which have no students are not printed.

2.15 Then question 8 is asked.

```
Q-8.  RETURN TO QUESTION 1, 4, OR 6.
ENTER 0 TO STOP (X)?6
```
(Q-8)

This question provides the user with alternative ways of returning to parts of the FRT model. An entry of 1 takes the user back to question 1 to rerun the entire program. A response of 4 returns the user to question 4 and permits him to enter a new squadron. A 6 response returns him to question 6 where a new data input option is to be chosen for the same squadron.

2.16 Table 2 illustrates the following analysis. The user returns to question 6 and decides to specify the aircraft for each category. They are entered in response to question 7 which tells the user the new option. The 0,0 indicates a squadron summary is to be printed. The new category summary is given in Table 3, and the squadron summary is given in Table 4. Then question 8 is asked again.

A zero reply to question 8 tells the computer that no more runs are required at this time. The computer then prints out the information in Table 5. These data represent the amount of computer time used in this analysis.

TABLE 1

FIRST CATEGORY SUMMARY

* *
02/18/71
READINESS SQUADRØN: TESTSQD2

STUDENT STATISTICS

CAT. NAME	INPUT	ØUTPUT	ATTRITES	LOAD
FRP CAT 1	50.00	49.00	1.00	24.95
FRP CAT 2	35.00	35.00	0.	14.70
FRP CAT 3	0.	0.	0.	0.
FRNFØ CAT 1	30.00	28.20	1.80	14.31
FRNFØ CAT 2	20.00	20.00	0.	8.00
**TOTAL			2.80	61.96

AIRCRAFT STATISTICS

CAT. NAME	TYPE	NUM.	FLT.HRS.	COST (X1000)	GALLONS	FUEL	40
FRP CAT 1	F-4	12.65	7.46	2423.79	745.78	JP-4	20.00
	TA-4	0.45	0.22	22.05	16.54	JP-4	10.00
FRP CAT 2	F-4	7.12	4.20	1365.00	420.00	JP-4	20.00
	TA-4	0.19	0.09	9.10	6.82	JP-4	10.00
FRNFØ CAT 1	F-4	4.82	1.96	636.97	195.99	JP-4	20.00
FRNFØ CAT 2	F-4	2.58	1.05	341.25	105.00	JP-4	20.00

INSTRUCTØR STATISTICS

CAT. NAME	A/C TYPE	* INSTRUCTØRS IP	INFØ	IC/N	** UNDER TRAINING ** IP	INFØ	IC/N	ACD/LSO/NFT IP	INFØ	IC/N
FRP CAT 1	F-4	3.77	5.71	0.	0.31	0.48	0.	6.09	0.	0.
	TA-4	0.	0.	0.	0.	0.	0.	0.	0.	0.
FRP CAT 2	F-4	2.12	2.85	0.	0.18	0.24	0.	3.59	0.	0.
	TA-4	0.	0.	0.	0.	0.	0.	0.	0.	0.
FRNFØ CAT 1	F-4	2.93	0.	0.	0.24	0.	0.	0.	4.34	0.
FRNFØ CAT 2	F-4	1.57	0.	0.	0.13	0.	0.	0.	2.42	0.

* *

TABLE 2

RETURN TO QUESTION 6

```
Q-6.  ENTER DATA INPUT OPTION
  1  STUDENT INPUT TO CAT
  2  STUDENT OUTPUT
  3  THOUS $ FOR FLYING
  4  NUMBER OF AIRCRAFT  ?4

Q-7.  ENTER CAT. NO. AND NUMBER OF AIRCRAFT   (XX,XXX)?1,10
NEXT?2,6
NEXT?4,5
NEXT?5,2
NEXT?0,0
```

TABLE 3

NEW CATEGORY SUMMARY

```
* * * * * * * * * * * * * * * * * * * *
02/13/71
    READINESS SQUADRON: TESTSQD2

          STUDENT STATISTICS
CAT. NAME        INPUT   OUTPUT   ATTRITES   LOAD
FRP CAT 1        39.53    38.74      0.79    19.72
FRP CAT 2        29.48    29.48      0.      12.38
FRP CAT 3         0.       0.        0.       0.
FRNFO CAT 1      31.13    29.26      1.87    14.85
FRNFO CAT 2      15.50    15.50      0.       6.20
**TOTAL                              2.66    53.16

          AIRCRAFT STATISTICS
CAT. NAME    TYPE    NUM.  FLT.HRS.     COST   GALLONS  FUEL     MC
                           - - - - -  (X1000)- - - - -
FRP CAT 1    F-4     10.00     5.90  1916.07    539.56 JP-4    20.00
             TA-4     0.36     0.17    17.43     13.07 JP-4    10.00
FRP CAT 2    F-4      6.00     3.54  1149.64    353.74 JP-4    20.00
             TA-4     0.16     0.08     7.66      5.75 JP-4    10.00
FRNFO CAT 1  F-4      5.00     2.03   661.00    203.39 JP-4    20.00
FRNFO CAT 2  F-4      2.00     0.81   264.40     81.35 JP-4    20.00

          INSTRUCTOR STATISTICS
CAT. NAME    A/C *  INSTRUCTORS    ** UNDER TRAINING **   ACD/LSO/OST   *
             TYPE   IP     INFO  IC/N  IP     INFO  IC/N  IP     INFO  IC/N
FRP CAT 1    F-4    2.98   4.51  0.    0.25   0.38  0.    4.81   0.    0.
             TA-4   0.     0.    0.    0.     0.    0.    0.     0.    0.
FRP CAT 2    F-4    1.78   2.40  0.    0.15   0.20  0.    3.02   0.    0.
             TA-4   0.     0.    0.    0.     0.    0.    0.     0.    0.
FRNFO CAT 1  F-4    3.04   0.    0.    0.25   0.    0.    0.     4.50  0.
FRNFO CAT 2  F-4    1.22   0.    0.    0.10   0.    0.    0.     1.88  0.
```

TABLE 4

SQUADRON SUMMARY

SQUADRON SUMMARY

ØFFICERS			
AVIATORS	IP	INFØ	IC/N
INST.	9.02	6.91	0.
IUT	0.75	0.53	0.
ACD/LSØ/WST	7.83	6.33	0.
ADMIN.	4.00	1.00	
**SUBTØTAL	21.60	14.37	0.
NON-AVIATORS			
GRD.ADMIN.	3.00		
MAINT.GRD.	11.00		
ØTHER	1.00		
**TØTAL ØFFICERS:	51.47		

AIRCRAFT		
TYPE	F-4	TA-4
NUM.	23.00	0.51
HRS.(1000)	12.28	0.25
CØST(1000)	3991.12	25.10
FUEL	JP-4	JP-4
GALS(1000)	1228.04	18.82
MAIN.ENL.	460.00	5.12

ENLISTED	
MAINT.	465.12
ADMIN.	46.51
TRNG.SUPP.	49.00
DET. SUPP.	19.00
SITE SUPP.	24.00
ADMN.SUPP.	94.00
CREWS	0.
***TØTAL	697.63

* *

TABLE 5

USER SIGNS OFF

```
Ø-8. RETURN TØ QUESTIØN 1, 4, ØR 6.
ENTER 0 TØ STØP (X)?0

- - - - - - - - - - - - - - - - - - - - - - -

PRØGRAM STØP AT 1263

USED   12.81 UNITS

BYE
0012.85  CRU     0000.31  TCH     0006.84  KC

ØFF AT 13:04 N  02/18/71
```

III. LEVEL OF COMPLEXITY NUMBER 3

INTRODUCTION

3.1 This section explains the options available to the user under level 3. Essentially, this level permits the user to modify all the planning factors in the squadron and each category on a temporary basis. Thus the user can assess the impact of a syllabus change, aircraft change, weather factor change, etc. Also the user can create new categories. However, any changes made are not permanently saved in the data files. These modifications are lost when the user asks for a new squadron, the same squadron at question 4, or signs off the computer. For permanent data file changes the user is referred to the Section VII which gives instructions for updating the permanent files.

3.2 The questions for level 3 start with question 21.[1/] After responding with a 3 to question 1 (i.e., level 3) the user proceeds with the questions and answers, as described previously under level 2, until he chooses a squadron in question 4. TESTSQD2 was also selected for these examples. Then question 21 is asked.

SQUADRON PERSONNEL FACTORS

3.3 Question 21 and the results of a yes response follow:

[1/] Questions numbered 9 through 20 inclusive are reserved for future use.

```
Q-21.  DO YOU WANT A LIST OF SQUADRON
   PERSONNEL FACTORS(Y,N)?Y


  ADMIN. OFFICERS

1 IP        4.00
2 INFO      1.00
3 GROUND    3.00                                    (Q-21)
4 MAINT.GD 11.00
5 OTHER     1.00

  ENLISTED SUPPORT
6 TRAIN.  49.00
7 DET.    19.00
8 SITE    24.00
9 ADM.    94.00
10 CREW    0.
```

This is a list of squadron support personnel currently used by the squadron. (Note that these are the same as those printed in the squadron summary in Table 4 in Section II.) A no response skips the personnel printout.

3.4 Next question 22, which permits the user to change the number of support personnel, is asked.

```
Q-22.  TO CHANGE A PERSONNEL FACTOR ENTER
   ELEMENT NO. AND NEW VALUE(XX,XX.)
   (ENTER 0,0 FOR NO FURTHER CHANGES)?9,50          (Q-22)
NEXT?10,4
NEXT?4,12
NEXT?0,0
```

In the above sample the number of administrative enlisted men (item number 9) was changed to 50, and the number of enlisted crew (item number 10), was changed to 4. The entry 0,0 implies no further changes. The user may type 0,0 as the first entry indicating no change. After the 0,0 is entered, question 23A is printed.

LIST CATEGORY PLANNING FACTORS

3.5 Table 6 shows question 23A and the sample response, 2, indicates that all planning factors will be printed for category number 2 (i.e., FRP CAT 2). The numbers on the left are reference numbers that must be used in order to

change the planning factor. Table 6 also shows Q-23B at the bottom and the response 0 (zero) indicates that no further categories are to be listed. If the user replies with a zero to question 23A, question 23B is skipped. A zero reply to question 23A or 23B leads to question 24A.

TABLE 6

SAMPLE DETAILED LISTING OF CATEGORY PLANNING FACTORS

```
Q-23A. FOR DETAILED LIST OF ALL CATEGORY PLANNING FACTORS
   ENTER THE CAT. NO. (XX)
   (ENTER 0 FOR NO FURTHER DETAIL) ?2

 1 CATEGORY NAME - - - - - - -FRP CAT 2
 2 NUM. OF TYPES OF AIRCRAFT    2
 3 WEEKS TO COMPLETE TRAINING  21.0
 4 ATTRITION RATE(100%=1.)      0.
 5 ATTRITION POINT              0.900
 6 TOUR OF DUTY FOR - - - - -  IP     INFO    IC/N
     (MONTHS)                  24.    24.      0.
 7 TRAINING PERIOD FOR- - - -  IP     INFO    IC/N
     (MONTHS)                   2.     2.      0.

 8 AIRCRAFT TYPE              F-4      TA-4
 9 MO FACTOR                  20.00    10.00
10 WEATHER(100%=1.)            0.950    0.900          (Q.23A)
11 FUEL TYPE                  JP-4     JP-4
12 FUEL CONSUMPTION          100.00    75.00
13 $ PER FLIGHT HOUR         325.00   100.00
14 A/C FLT. HRS/DAY            2.29     2.01
15 A/C HOURS/STUDENT         120.00     2.60
16 INSTRUCTION TYPES
  (1=IP,2=INFO,3=IC/N)         1,2,0    0,0,0
17 IP   UTILIZ.(FLY.DAY)       2.22     0.
18 INFO UTILIZ.(FLY.DAY)       2.22     0.
19 IC/N UTILIZ.(FLY.DAY)       0.       0.
20 IP   INSTR HRS/STUD.       34.60     0.
21 INFO INSTR HRS/STUD.       46.50     0.
22 IC/N INSTR HRS/STUD.        0.       0.
23 IP   ACD/LSO/WST RATIO      4.10     0.
24 INFO ACD/LSO/WST RATIO      0.       0.
25 IC/N ACD/LSO/WST RATIO      0.       0.

Q-23B.  TO LIST PLANNING FACTORS FOR ANOTHER CATEGORY  (Q.23B)
   ENTER CAT. NO.(OR 0) ?0
```

3.6 Questions 24A and 24B permit the user to list single planning factors in a category. The questions and sample responses are shown in Table 7. Note that the category number and the planning factor (i.e., reference) number must be entered. The computer then prints the planning factor number, name, and value(s) (i.e., two or three values are printed if the category has two or three aircraft types). When 0,0 is entered, question 25A is asked.

TABLE 7

LISTING OF INDIVIDUAL PLANNING FACTORS

```
Q-24A.  TO LIST A SPECIFIC PLANNING FACTOR
   ENTER THE CAT. NO. AND THE PLANNING FACTOR NO.(XX,XX)
   ENTER 0,0 FOR NO FURTHER DETAIL  ?1,15

15 A/C HOURS/STUDENT          152.20      4.50

Q-24B.  NEXT PLANNING FACTOR(XX,XX)?2,15

15 A/C HOURS/STUDENT          120.00      2.60

Q-24B.  NEXT PLANNING FACTOR(XX,XX)?3,15

15 A/C HOURS/STUDENT           79.30      1.20          (Q-24A)

Q-24B.  NEXT PLANNING FACTOR(XX,XX)?4,15

15 A/C HOURS/STUDENT           69.50

Q-24B.  NEXT PLANNING FACTOR(XX,XX)?5,15

15 A/C HOURS/STUDENT           52.50

Q-24B.  NEXT PLANNING FACTOR(XX,XX)?0,0
```

MODIFY PLANNING FACTORS

3.7 Questions 25A and 25B allow the user to temporarily change planning factors. In Table 8 the computer's questions and sample responses are printed. In this example, the user is modifying two planning factors—the flight hours required to train a student and the MO factor. The entry 0,0 indicates no further changes are to be made. Then question 26A is asked.

TABLE 8

PROCEDURE FOR MODIFYING INDIVIDUAL PLANNING FACTORS

```
Q-25A. TO MODIFY A PLANNING FACTOR
  ENTER THE CAT. NO. AND THE PLANNING FACTOR NO. (XX,XX)
  (ENTER 0,0 FOR NO MODIFICATIONS) ?1,15                    (Q-25A)

15 ENTER: A/C HOURS/STUDENT FOR EACH ( 2) AIRCRAFT
?137,4.5


Q-25B. NEXT MODIFICATION(XX,XX)?2,15

15 ENTER: A/C HOURS/STUDENT FOR EACH ( 2) AIRCRAFT          (Q-25B)
?108,2.6


Q-25B. NEXT MODIFICATION(XX,XX)?3,15

15 ENTER: A/C HOURS/STUDENT FOR EACH ( 2) AIRCRAFT
?72,1.2


Q-25B. NEXT MODIFICATION(XX,XX)?2,9

 9 ENTER: THE MO FACTOR FOR THE 2 AIRCRAFT TYPE
?15,5


Q-25B. NEXT MODIFICATION(XX,XX)?0,0
```

3.8 If the user increases the number of aircraft types, he must then modify all appropriate planning factors to include this new aircraft, otherwise the results may be invalid. If the user decreases the number of aircraft and makes no further changes, the last aircraft type will not be used in the calculations. The program will stop if there are no aircraft in a category. Also, there is no check made on the new data (i.e., no test for negative values or percentages greater than 100%). The user is responsible for its correctness and is given several opportunities to correct errors.

ADDING A NEW CATEGORY

3.9 Table 9 shows question 25A and the results of a yes reply. It is important to point out that new categories added by this means are not permanently saved in the data files. To define a new category, the user must enter all 25 planning factors as shown.

TABLE 9

PROCEDURE FOR ADDING A NEW CATEGORY

```
Q-26A.  DO YOU WANT TO ADD A CATEGORY(Y,N)?Y

 1 ENTER: NEW CATEGORY NAME
   (MAX OF 12 CHARACTERS) ?FRP CAT X

 2 ENTER: NUM. OF TYPES OF AIRCRAFT
   (MAX OF 3) ?1

 3 ENTER: WEEKS TO COMPLETE TRAINING?16

 4 ENTER: ATTRITION RATE?0.1

 5 ENTER: ATTRITION POINT?0.9

 6 ENTER: FLIGHT INSTRUCTOR TOUR OF DUTY(MONTHS)
   ENTER VALUES FOR IP,INFO,IC/N ?24,24,24

 7 ENTER: MONTHS TO TRAIN EACH TYPE FLT INSTR.          (Q-26A)
   ENTER VALUES FOR IP,INFO,IC/N ?2,2,2

 8 ENTER: NAMES FOR THE 1 AIRCRAFT TYPE
   (4 CHARACTERS PER NAME)?F-4X

 9 ENTER: THE MO FACTOR FOR THE 1 AIRCRAFT TYPE
?12.5

10 ENTER: THE WEATHER FACTOR(100%=1.) FOR
   THE 1 AIRCRAFT TYPE ?0.95

11 ENTER: FUEL TYPE FOR EACH ( 1) AIRCRAFT
?JP-4

12 ENTER: FUEL CONSUMPTION FOR EACH ( 1) AIRCRAFT
?50

13 ENTER: $ PER FLIGHT HOUR FOR EACH ( 1) AIRCRAFT
?200

14 ENTER: A/C FLT. HRS/DAY FOR EACH ( 1) AIRCRAFT
?4.1

15 ENTER: A/C HOURS/STUDENT FOR EACH ( 1) AIRCRAFT
?100
```

TABLE 9 (Cont)

```
16 ENTER: INSTRUCTION TYPES FOR EACH ( 1) AIRCRAFT
   USE 1 FOR IP,2 FOR INFO,3 FOR IC/N, 0 FOR NONE
   USE 3 INTEGERS PER AIRCRAFT (E.G. 1,3,0)
?2,3,1

17 ENTER:  IP   UTILIZATION(FLY.DAY) FOR EACH ( 1) AIRCRAFT
?3.

18 ENTER:  INFO UTILIZATION(FLY.DAY) FOR EACH ( 1) AIRCRAFT
?3.

19 ENTER:  IC/N UTILIZATION(FLY.DAY) FOR EACH ( 1) AIRCRAFT
?3.

20 ENTER:  IP   HOURS/STUDENT FOR EACH ( 1) AIRCRAFT
?30

21 ENTER:  INFO HOURS/STUDENT FOR EACH ( 1) AIRCRAFT
?25

22 ENTER:  IC/N HOURS/STUDENT FOR EACH ( 1) AIRCRAFT
?15.

23 ENTER:  IP   ACD/LSO/WST RATIO FOR EACH ( 1) AIRCRAFT
?5

24 ENTER:  INFO ACD/LSO/WST RATIO FOR EACH ( 1) AIRCRAFT
?4

25 ENTER:  IC/N ACD/LSO/WST RATIO FOR EACH ( 1) AIRCRAFT
?3
```

3.10 Table 10 shows Q-27, Q-28A, Q-28B, and the results of sample responses. This table also shows question 26B which allows the user to add new categories. If the response is yes to question 26B, the dialogue that follows is the same as for question 26A. Again, note that the values entered are not checked. The user is responsible for correct entries.

3.11 When a no response is given to question 26A or 26B, the program prints out the number of categories in the squadron and then asks question 5. From this point further questions are the same as for level 2.

3.12 Tables 11, 12, and 13 show the user continuing the run to assess the effects of the changed planning factors with data similar to that shown in Table 2. To see the effects of the planning factor changes and new categories, the user should compare Table 11 with Table 2, Table 12 with Table 3 and Table 13 with Table 4. (Tables 2, 3, and 4 appear in Section II of this manual.)

3.13 Finally question 8 is asked, and the user may return to question 21 for further changes. However, he must remember that in returning to question 1 or 4 all modifications are lost.

TABLE 10

LISTING OF NEW CATEGORY PLANNING FACTORS

```
Q-27. DO YOU WANT A LISTING OF ALL PLANNING FACTORS
   FOR THE NEW CATEGORY(Y,N)?Y

 1 CATEGORY NAME - - - - - - -FRP CAT X
 2 NUM. OF TYPES OF AIRCRAFT     1
 3 WEEKS TO COMPLETE TRAINING   16.0
 4 ATTRITION RATE(100%=1.)       0.100
 5 ATTRITION POINT               0.900
 6 TOUR OF DUTY FOR - - - - -   IP     INFO    IC/N
     (MONTHS)                   24.     24.     24.
 7 TRAINING PERIOD FOR- - - -   IP     INFO    IC/N
     (MONTHS)                    2.      2.      2.

 8 AIRCRAFT TYPE               F-4X
 9 MO FACTOR                   12.50
10 WEATHER(100%=1.)             0.950
11 FUEL TYPE                   JP-4
12 FUEL CONSUMPTION            50.00
13 $ PER FLIGHT HOUR          200.00                    (Q-27)
14 A/C FLT. HRS/DAY             4.10
15 A/C HOURS/STUDENT          100.00
16 INSTRUCTION TYPES
  (1=IP,2=INFO,3=IC/N)          2,3,1
17 IP   UTILIZ.(FLY.DAY)        3.00
18 INFO UTILIZ.(FLY.DAY)        3.00
19 IC/N UTILIZ.(FLY.DAY)        3.00
20 IP   INSTR HRS/STUD.        30.00
21 INFO INSTR HRS/STUD.        25.00
22 IC/N INSTR HRS/STUD.        15.00
23 IP   ACD/LSO/WST RATIO       5.00
24 INFO ACD/LSO/WST RATIO       4.00
25 IC/N ACD/LSO/WST RATIO       3.00

Q-28A. TO CHANGE OR CORRECT A PLANNING FACTOR          (Q-28A)
   FOR THE NEW CAT. ENTER THE PLANNING FACTOR NUMBER
   ENTER 0 FOR NO FURTHER CHANGES ?25

25 ENTER:  IC/N ACD/LSO/WST RATIO FOR EACH ( 1) AIRCRAFT
?4.5

Q-28B. NEXT PLANNING FACTOR (XX)?0                     (Q-28B)

Q-26B.  ADD ANOTHER CATEGORY(Y,N)?N                    (Q-26B)
```

TABLE 11

INPUT DATA REQUIRED TO RUN MODIFIED TESTSQD2

```
READINESS SQUADRON: TESTSQD2 HAS  6 CATEGORIES

Q-5.  DO YOU WANT A LIST OF CATEGORIES
   AND THEIR NUMBER(Y,N)?Y

    READINESS SQUADRON: TESTSQD2
CAT. NO.     CAT. NAME
    1        FRP CAT 1
    2        FRP CAT 2
    3        FRP CAT 3
    4        FRNFO CAT 1
    5        FRNFO CAT 2
    6        FRP CAT X

Q-6.  ENTER DATA INPUT OPTION
  1  STUDENT INPUT TO CAT
  2  STUDENT OUTPUT
  3  THOUS $ FOR FLYING
  4  NUMBER OF AIRCRAFT  ?4


FOR NO FURTHER DATA ENTER:
0,0 TO GET SQUADRON SUMMARY PRINTED
0,1 TO SKIP SQUADRON SUMMARY

Q-7.  ENTER CAT. NO. AND NUMBER OF AIRCRAFT    (XX,XXX)?1,10
NEXT?2,6
NEXT?4,5
NEXT?5,2
NEXT?6,10
NEXT?0,0
```

TABLE 12

PRINTOUT OF MODIFIED TESTSQD2
(Category Information)

02/22/71
READINESS SQUADRON: TESTSQD2

STUDENT STATISTICS

CAT. NAME	INPUT	OUTPUT	ATTRITES	LOAD
FRP CAT 1	43.91	43.03	0.88	21.91
FRP CAT 2	32.75	32.75	0.	13.76
FRP CAT 3	0.	0.	0.	0.
FRNFO CAT 1	31.13	29.26	1.87	14.85
FRNFO CAT 2	15.50	15.50	0.	6.20
FRP CAT X	117.28	105.55	11.73	37.16
**TOTAL			14.47	93.88

AIRCRAFT STATISTICS

CAT. NAME	TYPE	NUM.	FLT.HRS.	COST (X1000)	GALLONS	FUEL	MO
FRP CAT 1	F-4	10.00	5.90	1916.07	589.56	JP-4	20.00
	TA-4	0.40	0.19	19.37	14.52	JP-4	10.00
FRP CAT 2	F-4	6.00	3.54	1149.64	353.74	JP-4	15.00
	TA-4	0.17	0.09	8.52	6.39	JP-4	5.00
FRNFO CAT 1	F-4	5.00	2.03	661.00	203.39	JP-4	20.00
FRNFO CAT 2	F-4	2.00	0.81	264.40	81.35	JP-4	20.00
FRP CAT X	F-4X	10.00	10.56	2111.09	527.77	JP-4	12.50

INSTRUCTOR STATISTICS

CAT. NAME	A/C TYPE	* INSTRUCTORS IP	INFO	IC/N	** UNDER TRAINING ** IP	INFO	IC/N	ACD/LSO/WST * IP	INFO	IC/N
FRP CAT 1	F-4	3.31	5.01	0.	0.28	0.42	0.	5.34	0.	0.
	TA-4	0.	0.	0.	0.	0.	0.	0.	0.	0.
FRP CAT 2	F-4	1.98	2.66	0.	0.17	0.22	0.	3.36	0.	0.
	TA-4	0.	0.	0.	0.	0.	0.	0.	0.	0.
FRNFO CAT 1	F-4	3.04	0.	0.	0.25	0.	0.	0.	4.50	0.
FRNFO CAT 2	F-4	1.22	0.	0.	0.10	0.	0.	0.	1.88	0.
FRP CAT X	F-4X	4.10	3.42	2.05	0.34	0.28	0.17	7.43	9.29	8.26

TABLE 13

PRINTOUT OF MODIFIED TESTSQD2
(Summary Information)

SQUADRON SUMMARY

OFFICERS			
AVIATORS	IP	INFO	IC/N
INST.	13.65	11.10	2.05
IUT	1.14	0.92	0.17
ACD/LSO/WST	16.13	15.67	8.26
ADMIN.	4.00	1.00	
**SUBTOTAL	34.92	28.69	10.48
NON-AVIATORS			
GRD.ADMIN.	3.00		
MAINT.GRD.	12.00		
OTHER	1.00		
**TOTAL OFFICERS:	90.08		

AIRCRAFT			
TYPE	F-4	TA-4	F-4X
NUM.	23.00	0.57	10.00
HRS.(1000)	12.28	0.28	10.56
COST(1000)	3991.12	27.88	2111.09
FUEL	JP-4	JP-4	JP-4
GALS(1000)	1228.04	20.91	527.77
MAIN.ENL.	430.00	4.82	125.00

ENLISTED	
MAINT.	559.82
ADMIN.	55.98
TRNG.SUPP.	49.00
DET. SUPP.	19.00
SITE SUPP.	24.00
ADMN.SUPP.	50.00
CREWS	4.00
***TOTAL	761.80

IV. ERROR MESSAGES AND PROGRAM CONSTRAINTS

PROGRAM AND MODEL CONSTRAINTS

4.1 Certain maximum values are permitted by the FRT model as shown below. If these values are exceeded, they cause an error message to be printed, and in many cases the program will stop.

- A maximum of 30 squadrons is permitted.
- Each squadron can have a maximum of 25 categories.
- Each squadron must have at least one category.
- Each category can have a maximum of three different aircraft and fuel types. It is assumed that a student must fly all aircraft in that category to graduate.
- The entire squadron can have a maximum of three different aircraft and fuel types must be the same for each aircraft type in the squadron.

ERROR MESSAGES

4.2 There are two possible types of error messages:

- Those built into the computer programs.
- Those printed by the time-share computer system.

FRT Model Error Messages

4.3 The error messages built into the FRT model are contained in Table 14. These are the result of programmed checks on the user input. In most cases the input values are checked for being positive or within a given range, e.g., valid category number or weeks or days per year. In most cases the error is obvious and the error message is just "INVALID REPLY—RETYPE."

4.4 When a new category is added or planning factors modified, these data are not checked—the user is responsible for their accuracy.

Computer System Error Messages

4.5 This type of error message is printed by the computer system, and it is caused if, for example, one enters a character not expected by the computer in response to a question, e.g., letter A typed when a number is expected, or a dash instead of a comma, or a number with a decimal point when a number without a decimal point is expected. The computer explains the illegal character and asks the user to retype the entire entry. If other system errors are printed, the program stops. The user must then refer to the computer system manual.

TABLE 14

FRT MODEL ERROR MESSAGES

ERROR MESSAGE	MEANING/RESULT
1. INVALID REPLY—RETYPE	The response given is invalid; a quick check should reveal what is wrong. Retype correct values.
2. SQUADRON DOES NOT EXIST—RETYPE	User has misspelled the squadron name he wants to work with. Retype name correctly.
3. ERROR IN "category name" A FOURTH AIRCRAFT TYPE FOR THE SQUADRON: BBBB *CORRECT DATA FILE AND RERUN	If a squadron has more than three different aircraft types, the program will stop. User must check the data file for that category for aircraft name BBBB and correct it.
4. ERROR IN "category name" FUEL TYPE FFFF FOR AIRCRAFT BBBB DOES NOT MATCH FUEL ASSIGNMENTS FOR THIS AIRCRAFT IN PREVIOUS CATEGORIES *CORRECT DATA FILE AND RERUN	Program stops after this message. This means that aircraft type BBBB has a different fuel type associated with it than it does in other categories. Possibly caused by typing error. Check the data file for the category and correct.
5. NO SPACE FOR AN ADDITIONAL CATEGORY ONLY 25 CATEGORIES IN A SQUADRON *PROGRAM CONTINUES*	There are now 25 categories in this squadron User cannot enter any more. A new squadron must be defined or categories deleted from the permanent file.
6. MACHINE ERROR IN CRAW3/GENLSR RERUN PROGRAM	This indicates a machine failure in file CRAW3, subroutine GENLSR. The program will stop. User must rerun program.

V. DATA FILE DESCRIPTION

GENERAL

5.1 Two data files, SQUAD*1 and SQUAD*2, are used by the FRT model. These files contain all planning factor data for each squadron and the categories in the squadron. Both files are ASCII files (i.e., character files) and each currently contains about 38,000 characters. Character files were used because they can be easily and quickly changed by the user in an off-line mode.[1/] The data in the file are grouped by squadron. Within each squadron, the data are grouped by category. The computer reads the data files sequentially to identify a particular squadron. The sequential reading is time-consuming and thus two separate data files were used. The same format is used in both files. Both SQUAD*1 and SQUAD*2 are listed in their entirety in Volume II of this report.

LOCATION OF PLANNING FACTORS IN DATA FILES

5.2 The planning factors in the data file are grouped by squadron. Three lines of data are required to define the squadron planning factors and 20 lines are required to define each category within a squadron. The description of the data contained in each line and relevant comments concerning the format instructions, character locations, etc., appear in Table 15 (squadron data) and in Table 16 (category data). In these tables, the line numbers are relative to the first line of the squadron or category data and should not be confused with the actual line number of the data file. Data description refers to the name of the

---

[1/] The term "off-line" means that these files can be changed without the aid of separate utility programs. The user must call the file and enter each line of data affected by the change.

planning factor. The alphabetic characters identify the different factors that appear in the same line. All entries are free format unless otherwise noted, i.e., each data item (name or number) is separated by a comma. The data referring to the aircraft type in a category are applied to the aircraft in the order in which the aircraft appear. If there is only one or two aircraft (or instructor types), zeros must be supplied to fill out the data group.

SAMPLE DATA FILE FOR TESTSQD2

5.3 A computer listing of that part of data file SQUAD*2 containing all the planning factors for squadron TESTSQD2 appears in Table 17. A planning factor sheet containing all these factors appears in Table 18 for comparative purposes. The user responses required to list this part of SQUAD*2 appear at the top. The four-digit numbers along the left side of the page are data file line numbers that the computer uses to identify the proper planning factors. These line numbers are an integral part of the data file. The first three lines of Table 17, (i.e., file line number 7399,7400,7401[2/]) contain the squadron planning factor data in the order described in Table 15. The next 20-line numbers (i.e., lines 7408 to 7465) contain those data required for the first category of TESTSQD2 as explained in Table 16. Each category requires an additional 20 lines of data.

Format of Data File

5.4 The following data file formats are required and must be followed in order for the FRT model to operate correctly:

- File line numbers must have four digits and be in ascending order.
- A blank character must follow each line number.
- Each line must have the required number of values or characters on it; e.g., if a category has only one aircraft type, blanks must be provided in the file where the data for the other aircraft types would have appeared.
- Each file must have an end of file label in the last line. The format for the last line of a file is XXXXbENDbFILE-999 (i.e., the XXXX is a line number and b is a blank.)
- The number of categories in each squadron must correspond to the number of category data sections following the squadron name.

2/ These numbers are high since TESTSQD2 is at the end of SQUAD*2.

TABLE 15

SQUADRON PLANNING FACTOR FORMAT
(3 lines per squadron)

Line	Data Description	Comment
1	a. Squadron name	Format 2A4 Characters 6-13 (i.e., counting the data file line number)
	b. Number of categories (minimum 1, maximum 25)	Format I4 Characters 14-17 Entry must be right adjusted
2	Squadron support personnel a. Administrative IPs b. Administrative INFOs c. Ground administrative d. Maintenance ground e. Other	Free format—this line must have 5 numbers separated by commas
3	Enlisted support personnel a. Training b. Detachment c. Site d. Administrative e. Crew	Free format—this line must have 5 numbers separated by commas

TABLE 16

CATEGORY PLANNING FACTOR FORMAT
(20 lines per category)

Line	Data Description	Comments*
1	a. Category name	Format 3A4 (characters 6-17
	b. Aircraft type	Format 3A4 (characters 18-29) —must have 12 characters total, i.e., 4 for each aircraft type
	c. Fuel type for each aircraft type	Format 3A4 (characters 30-41) Refer to aircraft type Note: This line must contain 41 characters
2	a. Number of aircraft types	Enter either 1, 2, or 3
	b. Define instructor types required for each aircraft type	Enter 3 numbers for each aircraft type in the following order—IP, INFO, IC/N. A 1 implies IP, a 2 implies an INFO, and a 3 implies an IC/N, e.g., 2,1,3,1, 2,0,0,0,0
3	a. MO factor for each aircraft type	3 values
	b. Percent flyable weather for each aircraft type	3 values
4	a. Category duration (weeks)	1 value
	b. Attrition rate (100% = 1.0)	1 value
	c. Attrition point (between 0 and 1.0)	1 value
5	a. Fuel consumption per hour for each aircraft	3 values
	b. Dollar cost per flight hour for each aircraft	3 values

TABLE 16 (Cont)

Line	Data Description	Comments*
6	a. Tour of duty for each instructor type (IP,INFO,IC/N)(month)	3 values
	b. Time to train each instructor type (IP,INFO,IC/N)(month)	3 values
7	a. Aircraft flight hours per day for each aircraft type	3 values
	b. Aircraft flight hours required per student to graduate (for each aircraft type)	3 values
8	a. Instructor pilot (IP) utilization per aircraft type (hr/day)	3 values
	b. Instructor NFO (INFO) utilization per aircraft type	3 values
	c. Instructor crewman navigator (IC/N) utilization per aircraft type	3 values
11	IP hours required per student for each aircraft type	3 values
12	INFO hours required per student by aircraft type	3 values
13	ICN hours required per student by aircraft type	3 values
14	IP academic/landing signal/weapons systems (ACD/LSO/WST) ratio by aircraft type	3 values
15	INFO ACD/LSO/WST ratio by aircraft type	3 values
16	IC/N ACD/LSO/WST ratio by aircraft type	3 values
17-20	Spare lines for future planning factors. Zero entries are not required; however, a data file line number and a blank are necessary.	

* All entries are free format unless otherwise noted.

TABLE 17

DATA FILE SQUAD*2
(Lines 7399-7708)

```
OLD SQUAD*2
READY
EDIT LIST 7399-7708

7399 TESTSQD2    5
7402 4,1,3,11,1
7405 49,19,24,94,0
7408 FRP CAT 1    F-4 TA-4      JP-4JP-4
7411 2,1,2,0,0,0,0,0,0,0
7414 20,10,0,.95,.9,0
7417 25,.02,.9
7420 100,75,0,325,100,0
7423 24,24,0,2,2,0
7426 2.29,2.01,0,152.2,4.5,0
7429 2.22,0,0
7432 2.22,0,0
7435 0,0,0
7438 44,0,0
7441 66.6,0,0
7444 0,0,0
7447 4.1,0,0
7450 0,0,0
7453 0,0,0
7456 0,0,0
7459 0,0,0
7462 0,0,0
7465 0,0,0
7468 FRP CAT 2    F-4 TA-4      JP-4JP-4
7471 2,1,2,0,0,0,0,0,0,0
7474 20,10,0,.95,.9,0
7477 21,0,.9
7480 100,75,0,325,100,0
7483 24,24,0,2,2,0
7486 2.29,2.01,0,120,2.6,0
7489 2.22,0,0
7492 2.22,0,0
7495 0,0,0
7498 34.6,0,0
7501 46.5,0,0
7504 0,0,0
7507 4.1,0,0
7510 0,0,0
```

User Responses

Squadron Data

Data for First Category

TABLE 17 (Cont)

```
7513 0,0,0
7516 0,0,0
7519 0,0,0
7522 0,0,0
7525 0,0,0
7528 FRP CAT 3   F-4 TA-4     JP-4JP-4
7531 2,1,2,0,0,0,0,0,0,0
7534 20,10,0,.95,.9,0
7537 12,0,.9
7540 100,75,0,325,100,0
7543 24,24,0,2,2,0
7546 2.29,2.01,0,79.3,1.2,0
7549 2.22,0,0
7552 2.22,0,0
7555 0,0,0
7558 19.4,0,0
7561 26,0,0
7564 0,0,0
7567 4.1,0,0
7570 0,0,0
7573 0,0,0
7576 0,0,0
7579 0,0,0
7582 0,0,0
7585 0,0,0
7588 FRNFO CAT 1 F-4          JP-4
7591 1,1,2,0,0,0,0,0,0,0
7594 20,0,0,.95,0,0
7597 24,.06,.9
7600 100,0,0,325,0,0
7603 24,0,0,2,0,0
7606 1.58,0,0,69.5,0,0
7609 2.6,0,0
7612 0,0,0
7615 0,0,0
7618 69.5,0,0
7621 0,0,0
7624 0,0,0
7627 0,0,0
7630 3.3,0,0
7633 0,0,0
7636 0,0,0
7639 0,0,0
7642 0,0,0
7645 0,0,0
7648 FRNFO CAT 2 F-4          JP-4
7651 1,1,2,0,0,0,0,0,0,0
7654 20,0,0,.95,0,0
7657 20,0,.9
```

TABLE 17 (Cont)

```
7660 100,0,0,325,0,0
7663 24,0,0,2,0,0
7666 1.58,0,0,52.5,0,0
7669 2.6,0,0
7672 0,0,0
7675 0,0,0
7678 52.5,0,0
7681 0,0,0
7684 0,0,0
7687 0,0,0
7690 3.3,0,0
7693 0,0,0
7696 0,0,0
7699 0,0,0
7702 0,0,0
7705 0,0,0
7708 END FILE-999
```

TABLE 18

PLANNING FACTORS REQUIRED FOR SAMPLE SQUADRON (TESTSQD2)

Planning Factors	FRP CAT 1		FRP CAT 2		FRP CAT 3		NFO CAT 1	NFO CAT 2			
AC type	F-4	TA-4	F-4	TA-4	F-4	TA-4	F-4	F-4			
Fuel type	JP-4	JP-4	JP-4	JP-4	JP-4	JP-4	JP-4	JP-4			
Fuel consumpt rate	100.0	75.0	100.0	75.0	100.0	75.0	100.0	100.0			
% flyable weather	0.95	0.90	0.95	0.90	0.95	0.90	0.95	0.95			
Maint men, MO factor	20.0	10.0	20.0	10.0	20.0	10.0	20.0	20.0			
AC $/flight hr	325.0	100.0	325.0	100.0	325.0	100.0	325.0	325.0			
AC util, hr/day	2.29	2.01	2.29	2.01	2.29	2.01	1.58	1.58			
AC hr/student out	152.2	4.5	120.0	2.6	79.3	1.2	69.5	52.5			
CAT duration, wk	25.0		21.0		12.0		24.0	20.0			
Attrition rate	0.02		0		0		0.06	0			
Attrition point	0.9		0.9		0.9		0.9	0.9			
Tour of duty, mo											
IP	24.0	—	24.0	—	24.0	—	24.0	24.0			
INFO	24.0	—	24.0	—	24.0	—	—	—			
ICN											
Time to train instr, mo											
IP	2.0	—	2.0	—	2.0	—	2.0	2.0			
INFO	2.0	—	2.0	—	2.0	—	—	—			
ICN											
Instr util, hr/fly day											
IP	2.22*	—	2.22*	—	2.22*	—	2.22	2.22			
INFO	2.22*	—	2.22*	—	2.22*	—	—	—			
ICN											
Instr hr/student out											
IP	44.0	—	34.6*	—	19.4*	—	69.5	52.5			
INFO	66.6*	—	46.5*	—	26.0*	—	—	—			
ICN											
LSO/WST ratio											
IP	4.1	—	4.1	—	4.1	—	—	—			
INFO	—	—	—	—	—	—	3.3	3.3			
ICN											

	IP	INFO	Ground	Maint Ground	Other
Administrative	4	1	3	11	1

	Trg	Det	Site	Admin	Crews
Enlisted Support	49	19	24	04	0

* Includes both F-4 and TA-4 instructor requirements.

VI. UTILITY PROGRAM

6.1 This section discusses the utility program XHUNT*, the compiled version of XHUNT. This program provides the user with the capability to list specific planning factor lines in the data files. The user can choose from among the three following print options.

- Option 1—The names of each squadron and the number of categories in each (i.e., the first line number of each squadron).
- Option 2—The same as in option 1 plus the names of each category, the type aircraft required, and the fuel type required (i.e., option 1 plus those planning factors in the first line of each category).
- Option 3—The same as in option 1 plus select any line number in the category planning factors.

Note that the utility program does not find a particular planning factor in the file, but it does print all the data of the same type that are contained in the data file.

6.2 This utility program is extremely useful to locate data file line numbers when making changes to these data files. Thus the user will know the precise line numbers of each planning factor. Section VII discusses how to make changes to the data files. It should be noted that this utility program cannot be used to list the squadron personnel data. This is not a serious limitation since the line numbers for each squadron are identified and then the next two lines can be listed by using the standard edit commands.

6.3 When the utility program is run, the data file name can be any file that has a structure (i.e., format) exactly like that described in Section V for SQUAD*1 and SQUAD*2. This means that modified copies of the data files can also be examined by the utility program.

6.4 Another important feature is that since category data lines can be listed, the user has a rapid means of comparing planning factors in categories in different squadrons.

SAMPLE RUN NUMBER 1

6.5 In this example, it is assumed that the user wants to see the names and locations by line number of all the squadrons stored in the data file. He runs the program and selects option 1. Next the data file name (i.e., SQUAD*2 in this case) is entered and all the squadron names located in SQUAD*2 are printed. Table 19 is a sample run showing the above example. At the top of Table 19 the responses required to get and run this program are shown. This option also prints the last line number of the file and the CRU or the cost of running the program.

SAMPLE RUN NUMBER 2

6.6 The results of print option 3 appear in this sample (shown in Table 20). Thus it is assumed that the user wants to see the MO factor and weather category information by data line number. Next the file name is entered. In this example only the last two squadrons of SQUAD*2 were desired. Consequently MODSQD2 which is a copy of the last two squadrons in SQUAD*2 was created by the EDIT EXTRACT command as shown at the top of Table 20, (i.e., a modified data file was used). Next the user enters the data line number he wants examined. The data line number refers to the line numbers in the category data explained in Table 15 in Section V. Three was entered in this case indicating that the MO factor for each aircraft type and the percent flyable weather are to be printed for each category. For example, if the user entered eight, then IP utilization would be printed for each category. Again note that the data file line numbers are printed. The reader can compare the results of TESTSQD2 with the values in Table 17 (Section V) which includes the data for the entire squadron.

PRINT OPTION 2

6.7 If print option 2 is chosen, the squadron and category names are printed. The result is the same as print option 3 with data line number one selected.

TABLE 19

UTILITY PROGRAM XHUNT*
(Sample of Option 1)

```
OLD
ENTER FILE NAME-XHUNT*
READY
RUN

XHUNT*        09:58 N      02/24/71


ENTER PRINT OPTION:
  1 SQUAD NAME ONLY
  2 SQUAD AND CAT NAME
  3 SQUAD NAME AND CAT DATA LINE NO. ?1

ENTER FILE NAME ?SQUAD*2

1000 VF-101       6
1369 VF-121       6
1738 VAH-123     13
2527 RVAW110A    15
3436 RVAW110B    15
4345 RVAW-120    20
5554 RVAH-3      17
6583 HC-5*        3
6772 F-14*        2
6901 VAQ-129      6
7270 TESTSQD1     2
7399 TESTSQD2     5
7708 END FILE-999


PROGRAM STOP AT 450

USED     4.00 UNITS
```

Select Program and Run

Select Option

Select Data File

TABLE 20

UTILITY PROGRAM XHUNT*
(Sample of Option 3)

```
OLD SQUAD*2
READY
EDIT EXTRACT 7270-7708

READY
RENAME MODSQD2
READY
SAVE
READY


OLD XHUNT*
READY
RUN


XHUNT*       11:07 N      02/24/71


ENTER PRINT OPTION:
  1 SQUAD NAME ONLY
  2 SQUAD AND CAT NAME
  3 SQUAD NAME AND CAT DATA LINE NO. ?3

ENTER FILE NAME ?MODSQD2

ENTER DATA LINE NO. ?3


7270 TESTSQD1    2
7285 10,15,20,.9,.9,.9
7345 15,20,30,.85,.80,.99

7399 TESTSQD2    5
7414 20,10,0,.95,.9,0
7474 20,10,0,.95,.9,0
7534 20,10,0,.95,.9,0
7594 20,0,0,.95,0,0
7654 20,0,0,.95,0,0

7708 END FILE-999


PROGRAM STOP AT 450

USED      .44 UNITS
```

Create Data File MODSQD2

VII. CHANGES TO DATA FILES

INTRODUCTION

7.1 This section includes the instructions that must be followed in order to make permanent changes to the data files. Once the user is familiar with the GE system and its EDIT and SYSTEM commands, it is very easy to make a change. Although a utility program could be written to aid the user, it would be expensive to run because of the large size of the sequential files and the amount of reading and writing required by the machine. The EDIT and SYSTEM commands provide the equivalent capability at a fraction of the cost in running and programming.

7.2 This section contains a brief introduction to the important EDIT and SYSTEM commands, a discussion of single line changes and a description of large block changes in the data file.

EDIT AND SYSTEM COMMANDS

7.3 The relevant EDIT and SYSTEM commands the user should know appear in Table 21. For additional information see the appropriate GE time-share manual.

7.4 The user must have a thorough understanding of these commands. Otherwise the files could be accidently destroyed or altered. Prior to making any changes, it is recommended that a copy of the file be made and stored in the machine under a different name. Also connect time can be kept to a minimum if the user prepares the changes on paper tape in the local mode before calling the computer.

TABLE 21

SYSTEM AND EDIT COMMANDS

System Command	Definition
• OLD	Get an old file
• SAVE	Save a new file
• REPLACE	Save an old file with new changes
• RENAME	Rename a file
• LENGTH	Get character length of file
• PURGE	Delete file
• CATALOG	Lists files in user library
EDIT Commands	(Prefaced by EDIT, followed by line number)
• LIST	List part of file
• EXTRACT	Get part of a file to create a new file
• DELETE	Delete parts of a file
• RESEQUENCE	Change line numbers in data file
• WEAVE	Join two files together

SINGLE LINE CHANGES

7.5 The single line changes are the easiest and most frequently made changes (see Table 22). To make changes to a file first call the file (e.g., SQUAD*1). Initially it is a good practice to use the EDIT LIST command to be sure the lines to be changed are there as shown at the top of Table 22. Then retype the desired line over with the correct values. Finally type "REPLACE" to save the changes permanently. Once these changes are made the lines can be listed again to verify the changes as shown.

LARGE BLOCK CHANGES

7.6 A large block change is when the user wants to add or delete a squadron or category. This involves a large number of sequential data file line numbers.

Squadron Category Deletion

7.7 To delete a squadron or category the user must first determine the data file line numbers involved. Then he uses the EDIT DELETE XXXX—YYYY, command which deletes all the data lines between lines numbered XXXX and YYYY inclusive. He then types REPLACE and the data file is permanently changed. If a category has been deleted, then the number of categories in the squadron (line 1 in the squadron data) must be changed. Before typing REPLACE, the user could also resequence the data file line numbers if he desires.

TABLE 22

PROCEDURE TO MAKE CHANGES IN EXISTING DATA FILES

```
OLD SQUAD*2
READY
EDIT LIST 7402,7417,7432

7402 4,1,3,11,1

7417 25,.02,.9

7432 2.22,0,0

READY

7402 4,10,5,10,2
7417 15,0.05,.75
7432 3.10,0,0
REPLACE
READY
```

List Lines to be Changed

Type in New Data

```
EDI LIS 7399-7435

7399 TESTSOD2    5
7402 4,10,5,10,2
7405 49,19,24,94,0
7408 FRP CAT 1    F-4 TA-4     JP-4JP-4
7411 2,1,2,0,0,0,0,0,0,0
7414 20,10,0,.95,.9,0
7417 15,0.05,.75
7420 100,75,0,325,100,0
7423 24,24,0,2,2,0
7426 2.29,2.01,0,152.2,4.5,0
7429 2.22,0,0
7432 3.10,0,0
7435 0,0,0

READY
```

List of New Data

Add New Squadron or Category

7.8 Adding a new squadron or category requires more steps than deleting them. Initially, the user determines the number of lines of data (i.e., 3 lines per squadron plus 20 lines per category) to be added, and their actual data file line numbers in the final data file. If those new line numbers are to be inserted into the center of the existing data file, a space must be created for them in the large data file by resequencing that part of the data file to be moved. Then the new data are inserted. These steps are outlined below:

- Punch the new data onto a paper tape (terminal in local mode).
- Call the computer and read the paper tape into a new new temporary file.
- Correct any errors. Resequence the temporary file so that the line numbers will match their new location.
- Use a SAVE or REPLACE command to save the temporary data file for later use.
- Determine the number of data file line numbers required in the large permanent file from the small temporary data file.
- Provide room for the new data lines in the large data file by resequencing part of the file.
- Use a REPLACE command to save the new line numbers.
- Use an EDIT WEAVE command to combine the large file and the small file.
- Use a REPLACE command to save the new combined file.
- PURGE (i.e., UNSAVE) the small file to avoid paying unnecessary data storage costs.

7.9 After some practice with the EDIT and SYSTEM commands, the user can rapidly and easily change the data files. It is recommended that he first work with several small files to learn the results and hazards of the commands.

APPENDIX A

TIME-SHARE COMPUTER SYSTEM PROCEDURES

A.1 This is a brief explanation about signing on and off the GE system. Table 23 is a sample run that also shows several important features of the GE time-sharing system. All user responses are underlined.

A.2 First is the sign-on procedure by which the user identifies himself, i.e., gives his account number to the computer. Then the project ID is given. Next the user types in "FOR" indicating the FORTRAN system is to be used.

A.3 The computer then prints "NEW" or "OLD," asking the user if he wants an old file in his user number library or if he wants to create a new file. The user types "OLD" and "CRAWM*" indicating the stored program CRAWM* is wanted. Then typing "RUN" causes the program to execute.

A.4 If the user has made a mistake typing in data and sees it before the carriage return is hit, the error can be corrected. This is shown in Table 23 in response to question 2. Another feature is the "BREAK" key on the terminal. If the user hits this key at any time while the program is running, the program is stopped and all calculations are lost. The program must then be rerun from the beginning again. In Table 23 the BREAK key was hit while question 3 was being printed.

A.5 Next in Table 23 the user wants to run XHUNT*. The BREAK key was hit again in response to the question for a file name. Again the program stops. Finally the user types "BYE" to sign off. The total CRU units are then printed. This is the normal way to sign off, but the terminal also may be shut off.

TABLE 23

ILLUSTRATIONS OF VARIOUS FEATURES OF THE TIME-SHARE SYSTEM

```
NETWORK    N-713    13:00 EST    24 FEB 71
USER NO.--CN012345,XXX
PROJECT ID--TESTSQD2 FY 72
SYSTEM--FOR
NEW OR OLD--OLD CRAWM*
READY
RUN


CRAWM*        13:01 N       02/24/71


     FLEET READINESS TRAINING (FRT)

Q-1.  ENTER LEVEL OF COMPLEXITY
   1 LIMITED SET OF QUESTIONS
   2 DETAILED SET OF QUESTIONS
   3 LIST AND MODIFY PLANNING FACTORS?2

Q-2.  ENTER TRAINING WEEKS PER YEAR
  AND ANNUAL FLY-DAYS (XX.,XXX.)?50.371---271

Q-3.  PRINT NAMES OF ALL 0

USED       .12 UNITS

OLD XHUNT*
READY
RUN


XHUNT*        13:03 N       02/24/71


ENTER PRINT OPTION:
  1 SQUAD NAME ONLY
  2 SQUAD AND CAT NAME
  3 SQUAD NAME AND CAT DATA LINE NO. ?1

ENTER FILE NAME ?__

USED       .04 UNITS

BYE
0000.21  CRU     0000.06  TCH     0000.76  KC

OFF AT 13:04 N  02/24/71
```