This report documents the second phase of the multi-phase 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 sub-model, estimates personnel and aircraft requirements for each phase of integrated facilities requirements.
model, 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. The present IFRS model is working to provide useful information to the decision-maker. Refinement and expansion of the present Phase II model will be completed in Phase III.

This report is composed of four volumes. Volume I contains a summary of the IFRS management planning tool. A detailed discussion of each of the five submodels and associated data files is contained in Volume II. A manual discussing the use of the automated model is provided in Volume III and the programmer's manual is contained in Volume IV.
DEVELOPMENT OF A PRELIMINARY AUTOMATED TOTAL SYSTEMS MODEL FOR THE INTEGRATED FACILITIES REQUIREMENTS STUDY (IFRS) PHASE II

VOLUME III—USER'S MANUAL

9 February 1970

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 second phase of the multi-phase 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 1969.

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The IFRS model was developed and programmed by 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, Project Manager. The project team members were Richard D. Heilbron, John H. Avila, Frederick L. McCoy, Thomas L. Shaffer, and Dr. Joan L. Turek.

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 Air Training Command 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 model.
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I. INTRODUCTION

PURPOSE OF THE USER'S MANUAL

1.1 The purpose of this manual is to provide the decision maker with detailed instructions for the use of the Integrated Facilities Requirements Study (IFRS) model. The overall flow of control within the IFRS model appears in Figure 1. This figure illustrates the various data files, inputs required, outputs received, and the following major system submodels.

- Logistics Support Requirements (LSR) Generator
- Base Loading Submodel
- Facilities Requirements Submodel
- Excess/Deficiency Submodel
- Total Systems Cost (TSC) Submodel.

As discussed in Volumes I and II of this report, these submodels are sequentially related, and the output of each is printed by the time-sharing terminal as well as automatically entered as input data to one or more successive models. The Pilot Training Rate (PTR) and the assignment of training phases to particular Naval Air Stations (NASs) are entered through the terminal by the decision maker.

1.2 The user should familiarize himself with the following sections of this manual to realize the greatest effectiveness and flexibility in the use of the IFRS model. It is also recommended that he become familiar with the standard operating procedures for the computer on which the IFRS model is programmed, the General Electric GE 635 time-sharing computer.
ORGANIZATION OF THE MANUAL

1.3 The IFRS system can be entered at three points. The LSR Generator is entered by running program XLSRM*. From this program the entire IFRS system can be run. The Base Loading Submodel and subsequent submodels can be entered directly, if desired, by running program PART2*. The IFRS system can also be entered at the Excess/Deficiency Submodel by running program PART6*. If the IFRS system is entered at PART2* or PART6*, the data generated in the previous LSR Generator run are used as input to the following submodels. The availability of entry after the LSR Generator can save the user valuable time. If he wants to analyze one PTR in various phase to base assignments, he runs the LSR Generator once and re-enters at PART2* for new phase assignments. If he wants to change the facility substandard option in the Excess/Deficiency program, he re-enters PART6*.

1.4 Section II of this manual discusses the general operating procedures and extended operations of the IFRS model. Section III contains a description of the diagnostic messages provided for the assistance of the user. Section IV describes data file updating procedures, and Section V contains instructions for operation of the IFRS utility programs.
II. GENERAL OPERATING PROCEDURES
AND EXTENDED OPERATIONS

INTRODUCTION

2.1 This section on general operating procedures for using the IFRS system is divided into three subsections. The first describes the normal operation of the LSR Generator Submodel. The second describes the use of the remaining system submodels. The third describes the extended capabilities of the LSR Generator submodel.

2.2 An important distinction exists between the LSR Generator and the combined Base Loading, Excess/Deficiency, Facilities Requirements, and Total Systems Cost Submodels. Both of these parts can be run separately, but the LSR Generator offers the added capability of operation in an extended mode. For example, the user can generate several LSRs without ever allocating phases to bases. Similarly, for one given set of LSR data output, the user can run several phase allocation schemes, alter options on acceptance of substandard facilities, or select other options described below without re-entering the LSR Generator. In the most straightforward case, of course, the user enters the LSR Generator and continues directly through the Base Loading and Total Systems Cost Submodels without leaving the IFRS system.

2.3 The LSR Generator may be used in both normal and the extended modes. A description of the former permits the user to gain an initial understanding of the operation of the LSR Generator with unmodified data and unconstrained resources. The user can then master the extended operations described subsequently in this section. The data modifications allowed in the extended operation of the LSR Generator can be completed on-line, i.e., during the actual running of the program.
2.4 It is assumed in the following descriptions of the use of the IFRS system 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. indicate that a numeric response is expected, the decimal often indicating that the input need not be in whole numbers; AA indicates that an alphabetic character response is expected, the number of letters appearing in the question indicating the number expected in the response. Responses are generally checked for validity. The diagnostic messages returned to the user are discussed in Section III of this volume.

GENERAL OPERATING PROCEDURES

LSR Generator

2.5 The automated IFRS model is entered by running program XLSRM*, the compiled version of LSRM. After the computer system begins running, question 1 is printed.

```
ENTER LEVEL OF COMPLEXITY
1 NO ADJUSTMENTS OR MODIFICATIONS
2 CONSTRAIN LSR OUTPUT
3 MODIFY PHASE DATA
4 COMBINE OPTIONS 2 AND 3
```

(1)

This and the following samples of the conversational mode will show, underlined, a sample user’s response to a question posed by the computer. If the user does not wish to modify the LSR data base or constrain the output from the LSR Generator, a response of 1 is given. (For levels of complexity 2, 3, and 4, refer to the subsection below on Extended Operations.)

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

```
ENTER TRAINING WEEKS PER YEAR AND ANNUAL FLY-DAYS (XX., XXX.) ? 50, 245
```

(2)

The user must enter the number of weeks and training days to be scheduled annually for pilot training. Note that an input format, (XX., XXX.), is provided as an aid to the user.
2.7  Next, question 3 is asked.

PRINT LIST OF TRAINING PHASES (Y,N)? Y (3)

The user must respond Yes or No. A Yes response produces a list of the training phase names and numbers contained in the LSR data base (see Table 1).

2.8  With a No response or after the training phase list has been printed, the user is asked question 4.

PRINT ALL PIPELINES (Y,N)? Y (4)

Following a Yes response, the computer produces a complete list of all training phases in each training pipeline along with their sequence and attrition rates (see Table 2).

2.9  When a No response is given or upon completion of the printing of pipeline data, the automated system in question 5 requests the user to enter the PTR for the training pipeline.

FØR PIPELINE NAVY OFFICER
ENTER PHASE NUMBER AND STUDENT OUTPUT (XX,XXXX.*)
PHASE 0.0 IMPLIES NO FURTHER ASSIGNMENTS?
NEXT?8,172
NEXT?11,410
NEXT?14,100
NEXT?0,0 (5)

In his response the user may enter as many PTRs as he desires, so long as there is sufficient information for the automated system to compute the PTR for the remaining phases. (See LSR diagnostic message 2067 for a further explanation of invalid PTR entries.) Note that after the user has entered the desired phase PTRs, he must type 0,0 to tell the system he has finished. When all phase - PTR data have been entered, the training pipeline student statistics are printed (see Table 3).

2.10  Generally the user selects the terminal training phases in the training pipeline for PTR assignments (response to question 5). However, the user may wish to constrain the terminal training phases or other phases by assigning a PTR to a training phase early in the pilot training program. For example, he may desire to respond to question 5 in the following way:
<table>
<thead>
<tr>
<th>№</th>
<th>PHASE NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRIMARY</td>
</tr>
<tr>
<td>2</td>
<td>AOC SCHOOL</td>
</tr>
<tr>
<td>3</td>
<td>FLIGHT SYS.</td>
</tr>
<tr>
<td>4</td>
<td>BASIC JET-A</td>
</tr>
<tr>
<td>5</td>
<td>BASIC JET-B</td>
</tr>
<tr>
<td>6</td>
<td>B-JET G/CQ</td>
</tr>
<tr>
<td>7</td>
<td>ADV JET-TF</td>
</tr>
<tr>
<td>8</td>
<td>ADV JET-TA</td>
</tr>
<tr>
<td>9</td>
<td>BASIC PROP</td>
</tr>
<tr>
<td>10</td>
<td>B-PROP CO</td>
</tr>
<tr>
<td>11</td>
<td>ADV PROP</td>
</tr>
<tr>
<td>12</td>
<td>PRE HELØ</td>
</tr>
<tr>
<td>13</td>
<td>HELØ PRIM</td>
</tr>
<tr>
<td>14</td>
<td>HELØ ADV</td>
</tr>
</tbody>
</table>
### Table 2

**Training Phases in a Training Pipeline**

<table>
<thead>
<tr>
<th>No.</th>
<th>Phase Name</th>
<th>Attrition Rate</th>
<th>Phases Following</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Primary</td>
<td>0.0900</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Flight Sys.</td>
<td>0.0270</td>
<td>4, 9</td>
</tr>
<tr>
<td>4</td>
<td>Basic Jet-A</td>
<td>0.0500</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Basic Jet-B</td>
<td>0.0200</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>B-Jet G/CQ</td>
<td>0.0200</td>
<td>7, 8</td>
</tr>
<tr>
<td>7</td>
<td>Adv Jet-TF</td>
<td>0.0400</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Adv Jet-TA</td>
<td>0.0400</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Basic Prop</td>
<td>0.1400</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>B-Prop CQ</td>
<td>0.0040</td>
<td>11, 12</td>
</tr>
<tr>
<td>11</td>
<td>Adv Prop</td>
<td>0.0080</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Pre Helo</td>
<td>0.0500</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>Helo Prim</td>
<td>0.0020</td>
<td>14</td>
</tr>
<tr>
<td>14</td>
<td>Helo Adv</td>
<td>0.0020</td>
<td></td>
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### Table 3

**Training Pipeline Student Statistics**

<table>
<thead>
<tr>
<th>Student Type</th>
<th>Navy Officer</th>
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<tr>
<td>Training Phase</td>
<td>Input</td>
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<tr>
<td>Primary</td>
<td>1123</td>
</tr>
<tr>
<td>Flight Sys.</td>
<td>1022</td>
</tr>
<tr>
<td>Basic Jet-A</td>
<td>394</td>
</tr>
<tr>
<td>Basic Jet-B</td>
<td>374</td>
</tr>
<tr>
<td>B-Jet G/CQ</td>
<td>367</td>
</tr>
<tr>
<td>Adv Jet-TF</td>
<td>179</td>
</tr>
<tr>
<td>Adv Jet-TA</td>
<td>180</td>
</tr>
<tr>
<td>Basic Prop</td>
<td>600</td>
</tr>
<tr>
<td>B-Prop CQ</td>
<td>516</td>
</tr>
<tr>
<td>Adv Prop</td>
<td>413</td>
</tr>
<tr>
<td>Pre Helo</td>
<td>101</td>
</tr>
<tr>
<td>Helo Prim</td>
<td>100</td>
</tr>
<tr>
<td>Helo Adv</td>
<td>100</td>
</tr>
</tbody>
</table>
The automated system could compute the PTR of Flight Systems, since this training phase is the only phase following primary training. However, the determination of the PTR mix of Basic Jet A and Basic Prop would require a user decision. Responding to question 5a permits the user to make such a decision.

RESIDUAL OUTPUT FROM PHASE 3 IS 994 STUDENTS
DIVIDE AMONG THE FOLLOWING PHASES 4, 9
ENTER APPROPRIATE MIX (XXXXX,XXXXX,XXXXX)
?394,600

The automated system continues to ask the user to allocate the PTR among other sequential phases (see Table 4) until the student statistics can be computed (see Table 5). Note that the student statistics presented in Tables 3 and 5 are almost identical since the PTRs selected for the example were similar. Differences in final digits in the two tables arise from variability in computer rounding.

2.11 After the student statistics have been printed for the first training pipeline in the LSR data base, the following situation occurs for the remaining training pipelines (see Tables 6, 7, and 8).

- A list of each training phase, its sequence, and its attrition rate is printed. Note that this only occurs when question 4 receives a Yes response.
- The user must enter the training phase PTRs, i.e., respond to question 5 and also to 5a, when appropriate.
- Student statistics for each training phase are printed.

When all training phase PTRs have been computed for all training pipelines, an aggregate of the student statistics is printed (see Table 9). Next the LSR summary output is printed (see Table 10).

2.12 When the LSR summary statement has been printed, the user is asked in question 6 whether he desires a detailed LSR output.
TABLE 4
RESPONSES TO QUESTION 5a

RESIDUAL OUTPUT FROM PHASE 6 IS 360. STUDENTS DIVIDE AMONG THE FOLLOWING PHASES 7, 8 ENTER APROPIATE MIX (XXXXX.*, XXXXX.*, XXXXX.*).
180, 180

RESIDUAL OUTPUT FROM PHASE 10 IS 514. STUDENTS DIVIDE AMONG THE FOLLOWING PHASES 11, 12 ENTER APROPIATE MIX (XXXXX.*, XXXXX.*, XXXXX.*).
413, 101

TABLE 5
TRAINING PIPELINE STUDENT STATISTICS

<table>
<thead>
<tr>
<th>STUDENT TYPE</th>
<th>NAVY OFFICER</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TRAINING PHASE</th>
<th>STUDENT STATISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY</td>
<td>1123.* 1022.* 101.*</td>
</tr>
<tr>
<td>FLIGHT SYS.*</td>
<td>1022.* 994.* 28.*</td>
</tr>
<tr>
<td>BASIC JET-A</td>
<td>394.* 374.* 20.*</td>
</tr>
<tr>
<td>BASIC JET-B</td>
<td>374.* 367.* 7.*</td>
</tr>
<tr>
<td>B-JET G/CQ</td>
<td>367.* 360.* 7.*</td>
</tr>
<tr>
<td>ADV JET-TF</td>
<td>180.* 173.* 7.*</td>
</tr>
<tr>
<td>ADV JET-TA</td>
<td>180.* 173.* 7.*</td>
</tr>
<tr>
<td>BASIC PROP</td>
<td>600.* 516.* 84.*</td>
</tr>
<tr>
<td>B-PROP CQ</td>
<td>516.* 514.* 2.*</td>
</tr>
<tr>
<td>ADV PROP</td>
<td>413.* 410.* 3.*</td>
</tr>
<tr>
<td>PRE HELO</td>
<td>101.* 101.* 1.*</td>
</tr>
<tr>
<td>HELO PRIM</td>
<td>101.* 100.* 0.*</td>
</tr>
<tr>
<td>HELO ADV</td>
<td>100.* 100.* 0.*</td>
</tr>
<tr>
<td>PHASE NO.</td>
<td>PHASE NAME</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------</td>
</tr>
<tr>
<td>1</td>
<td>PRIMARY</td>
</tr>
<tr>
<td>2</td>
<td>AOC SCHØOL</td>
</tr>
<tr>
<td>3</td>
<td>FLIGHT SYS.</td>
</tr>
<tr>
<td>4</td>
<td>BASIC JET-A</td>
</tr>
<tr>
<td>5</td>
<td>BASIC JET-B</td>
</tr>
<tr>
<td>6</td>
<td>B-JET G/CQ</td>
</tr>
<tr>
<td>7</td>
<td>ADV JET-TF</td>
</tr>
<tr>
<td>8</td>
<td>ADV JET-TA</td>
</tr>
<tr>
<td>9</td>
<td>BASIC PROP</td>
</tr>
<tr>
<td>10</td>
<td>B-PROP CQ</td>
</tr>
<tr>
<td>11</td>
<td>ADV PROP</td>
</tr>
<tr>
<td>12</td>
<td>PRE HELØ</td>
</tr>
<tr>
<td>13</td>
<td>HELØ PRIM</td>
</tr>
<tr>
<td>14</td>
<td>HELØ ADV</td>
</tr>
</tbody>
</table>

TABLE 6
TOTAL PIPELINE INFORMATION FOR NAVAL AOC's

TRAINING PIPELINE FOR NAVY - AOC

STUDENT TYPE NAVY - AOC

INPUT OUTPUT ATTRITES

<table>
<thead>
<tr>
<th>TRAINING PHASE</th>
<th>STUDENT STATISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY</td>
<td>1667. 1434. 233.</td>
</tr>
<tr>
<td>AOC SCHØOL</td>
<td>1434. 1329. 105.</td>
</tr>
<tr>
<td>FLIGHT SYS.</td>
<td>1329. 1287. 43.</td>
</tr>
<tr>
<td>BASIC JET-A</td>
<td>415. 382. 33.</td>
</tr>
<tr>
<td>BASIC JET-B</td>
<td>382. 370. 12.</td>
</tr>
<tr>
<td>B-JET G/CQ</td>
<td>370. 364. 6.</td>
</tr>
<tr>
<td>ADV JET-TF</td>
<td>182. 173. 9.</td>
</tr>
<tr>
<td>ADV JET-TA</td>
<td>181. 172. 9.</td>
</tr>
<tr>
<td>BASIC PROP</td>
<td>872. 662. 209.</td>
</tr>
<tr>
<td>B-PROP CQ</td>
<td>662. 658. 4.</td>
</tr>
<tr>
<td>ADV PROP</td>
<td>506. 500. 6.</td>
</tr>
<tr>
<td>PRE HELØ</td>
<td>152. 152. 1.</td>
</tr>
<tr>
<td>HELØ PRIM</td>
<td>152. 151. 1.</td>
</tr>
<tr>
<td>HELØ ADV</td>
<td>151. 150. 1.</td>
</tr>
</tbody>
</table>
### Table 7

**Total Pipeline Information for Marines**

**Training Pipeline for Marine**

<table>
<thead>
<tr>
<th>PHASE</th>
<th>PHASE NAME</th>
<th>RATE</th>
<th>PHASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRIMARY</td>
<td>0.0500</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>FLIGHT SYS.</td>
<td>0.0150</td>
<td>4, 9</td>
</tr>
<tr>
<td>4</td>
<td>BASIC JET-A</td>
<td>0.0400</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>BASIC JET-B</td>
<td>0.0100</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>B-JET G/CQ</td>
<td>0.0100</td>
<td>7, 8</td>
</tr>
<tr>
<td>7</td>
<td>ADV JET-TF</td>
<td>0.0300</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>ADV JET-TA</td>
<td>0.0300</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>BASIC PRP</td>
<td>0.0900</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>B-PRP G/CQ</td>
<td>0.0050</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>PRE HEL0</td>
<td>0.0040</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>HEL0 PRIM</td>
<td>0.0020</td>
<td>14</td>
</tr>
<tr>
<td>14</td>
<td>HEL0 ADV</td>
<td>0.0020</td>
<td></td>
</tr>
</tbody>
</table>

**For Pipeline Marine**

Enter phase number and student output (XX, XXXX.)

Phase 0.0 implies no further assignments

Next? 8.138
Next? 142.285
Next? 0.0

**Student Type: Marine**

<table>
<thead>
<tr>
<th>Training Phase</th>
<th>Student Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY</td>
<td>661</td>
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<tr>
<td>FLIGHT SYS.</td>
<td>628</td>
</tr>
<tr>
<td>BASIC JET-A</td>
<td>301</td>
</tr>
<tr>
<td>BASIC JET-B</td>
<td>289</td>
</tr>
<tr>
<td>B-JET G/CQ</td>
<td>286</td>
</tr>
<tr>
<td>ADV JET-TF</td>
<td>141</td>
</tr>
<tr>
<td>ADV JET-TA</td>
<td>142</td>
</tr>
<tr>
<td>BASIC PRP</td>
<td>317</td>
</tr>
<tr>
<td>B-PRP G/CQ</td>
<td>289</td>
</tr>
<tr>
<td>PRE HEL0</td>
<td>287</td>
</tr>
<tr>
<td>HEL0 PRIM</td>
<td>286</td>
</tr>
<tr>
<td>HEL0 ADV</td>
<td>286</td>
</tr>
</tbody>
</table>
### Table 8

Total Pipeline Information for Coast Guard and Foreign

<table>
<thead>
<tr>
<th>Phase No.</th>
<th>Phase Name</th>
<th>Attrition Rate</th>
<th>Phases Following</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Primary</td>
<td>0.0500</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Flight Sys.</td>
<td>0.0200</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>Basic Prop</td>
<td>0.0500</td>
<td>11,12</td>
</tr>
<tr>
<td>11</td>
<td>Adv Prop</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Pre Helo</td>
<td>0.0000</td>
<td>13</td>
</tr>
<tr>
<td>13</td>
<td>Helo Prim</td>
<td>0.0000</td>
<td>14</td>
</tr>
<tr>
<td>14</td>
<td>Helo Adv</td>
<td>0.0100</td>
<td></td>
</tr>
</tbody>
</table>

For pipeline C-GRD & FOR.

Enter phase number and student output (XX, XXXX.)

Phase 0,0 implies no further assignments?

Next? 14, 60

Next? 0, 0

Student Type C-GRD & FOR.

<table>
<thead>
<tr>
<th>Training Phase</th>
<th>Input Attrites</th>
<th>Output Attrites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>114.</td>
<td>108.</td>
</tr>
<tr>
<td>Flight Sys.</td>
<td>108.</td>
<td>106.</td>
</tr>
<tr>
<td>Basic Prop</td>
<td>106.</td>
<td>101.</td>
</tr>
<tr>
<td>Adv Prop</td>
<td>40.</td>
<td>40.</td>
</tr>
<tr>
<td>Pre Helo</td>
<td>61.</td>
<td>61.</td>
</tr>
<tr>
<td>Helo Prim</td>
<td>61.</td>
<td>61.</td>
</tr>
<tr>
<td>Helo Adv</td>
<td>61.</td>
<td>60.</td>
</tr>
</tbody>
</table>
### TABLE 9

**AGGREGATE STUDENT STATISTICS**

**TOTAL FOR ALL STUDENT TYPES**

<table>
<thead>
<tr>
<th>TRAINING PHASE</th>
<th>STUDENT STATISTICS</th>
<th>INPUT</th>
<th>OUTPUT</th>
<th>ATTRIBUTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY</td>
<td>3565</td>
<td>3192</td>
<td>373</td>
<td></td>
</tr>
<tr>
<td>AOC SCHOOL</td>
<td>1434</td>
<td>1329</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>FLIGHT SYS.</td>
<td>3087</td>
<td>3005</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>BASIC JET-A</td>
<td>1110</td>
<td>1045</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>BASIC JET-B</td>
<td>1045</td>
<td>1023</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>B-JET G/CQ</td>
<td>1023</td>
<td>1007</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>ADV JET-TF</td>
<td>503</td>
<td>482</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>ADV JET-TA</td>
<td>504</td>
<td>483</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>BASIC PROP</td>
<td>1895</td>
<td>1568</td>
<td>327</td>
<td></td>
</tr>
<tr>
<td>B-PROP CO</td>
<td>1467</td>
<td>1460</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>ADV PROP</td>
<td>959</td>
<td>950</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>PRE HELO</td>
<td>601</td>
<td>599</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>HELO PRIM</td>
<td>599</td>
<td>597</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>HELO ADV</td>
<td>597</td>
<td>595</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 10

**LSR SUMMARY STATEMENT**

<table>
<thead>
<tr>
<th>TRAINING PHASE</th>
<th>STUDENT TYPE</th>
<th>AIRCRAFT TYPE</th>
<th>FUEL CONSUMED</th>
<th>TOTAL</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY</td>
<td>405</td>
<td>T34B</td>
<td>AGAS</td>
<td>199</td>
<td>379</td>
</tr>
<tr>
<td>AOC SCHOOL</td>
<td>276</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>FLIGHT SYS.</td>
<td>305</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>BASIC JET-A</td>
<td>237</td>
<td>T-2A</td>
<td>JP-4</td>
<td>159</td>
<td>585</td>
</tr>
<tr>
<td>BASIC JET-B</td>
<td>186</td>
<td>T2BC</td>
<td>JP-4</td>
<td>133</td>
<td>795</td>
</tr>
<tr>
<td>B-JET G/CQ</td>
<td>142</td>
<td>T2BC</td>
<td>JP-4</td>
<td>76</td>
<td>493</td>
</tr>
<tr>
<td>ADV JET-TF</td>
<td>197</td>
<td>TF9J</td>
<td>JP-4</td>
<td>214</td>
<td>1378</td>
</tr>
<tr>
<td>ADV JET-TA</td>
<td>197</td>
<td>TA4J</td>
<td>JP-4</td>
<td>210</td>
<td>1264</td>
</tr>
<tr>
<td>BASIC PROP</td>
<td>658</td>
<td>T28C</td>
<td>AGAS</td>
<td>323</td>
<td>1347</td>
</tr>
<tr>
<td>B-PROP CO</td>
<td>117</td>
<td>T28C</td>
<td>AGAS</td>
<td>45</td>
<td>238</td>
</tr>
<tr>
<td>ADV PROP</td>
<td>325</td>
<td>TS2A</td>
<td>AS1L</td>
<td>257</td>
<td>1599</td>
</tr>
<tr>
<td>PRE HELO</td>
<td>60</td>
<td>T28C</td>
<td>AGAS</td>
<td>29</td>
<td>102</td>
</tr>
<tr>
<td>HELO PRIM</td>
<td>48</td>
<td>TH57</td>
<td>AGAS</td>
<td>31</td>
<td>77</td>
</tr>
<tr>
<td>HELO ADV</td>
<td>95</td>
<td>THIL</td>
<td>JP-4</td>
<td>82</td>
<td>372</td>
</tr>
</tbody>
</table>
Following a Yes response, all LSR data are printed for each training phase. Tables 11 and 12 provide, respectively, a sample detailed LSR output for Primary and Basic Prop CQ phases of training.

2.13 Next the user is asked in question 7 whether he wishes to generate another LSR output.

\[ \text{GENERATE ANOTHER LSR (Y,N)?N} \] (7)

If he answers Yes, question 3 is again asked and the questioning sequence continues from that point.

2.14 When no further LSR outputs are desired, the automated system prints the runway requirements based on the last LSR (see Table 13). The last LSR generated then enters the Base Loading Submodel.

**TABLE 11**
DETAILED LSR OUTPUT FOR PRIMARY TRAINING

<table>
<thead>
<tr>
<th>NAME OF PHASE PRIMARY</th>
<th>STUDENT INPUT 3565.</th>
<th>STUDENT OUTPUT 3192.</th>
<th>AVERAGE STUDENT LOAD 405.</th>
<th>ADMINISTRATIVE OFFICERS 24.</th>
<th>TOTAL OFFICERS 199.</th>
<th>TOTAL ENLISTED 379.</th>
<th>AIRCRAFT TYPES T34B</th>
<th>NUMBER REQUIRED 129.</th>
<th>FUEL TYPES AGAS</th>
<th>GALLONS CONSUMED 0.131E+07</th>
<th>FLIGHT INSTRUCTORS 162.</th>
<th>UNDER TRAINING 13.</th>
<th>LSO REQUIREMENTS 5.</th>
<th>ENLISTED SUPPORT 379.</th>
</tr>
</thead>
</table>

**TABLE 12**
DETAILED LSR OUTPUT FOR BASIC PROP CQ

| NAME OF PHASE B-PROP CQ | STUDENT INPUT 1467. | STUDENT OUTPUT 1460. | AVERAGE STUDENT LOAD 117. | ADMINISTRATIVE OFFICERS 12. | TOTAL OFFICERS 45. | TOTAL ENLISTED 238. | AIRCRAFT TYPES T28C | NUMBER REQUIRED 36. | FUEL TYPES AGAS | GALLONS CONSUMED 0.111E+07 | FLIGHT INSTRUCTORS 20. | UNDER TRAINING 2. | LSO REQUIREMENTS 12. | ENLISTED SUPPORT 16 238. |
### Table 13

#### Runway Requirements

<table>
<thead>
<tr>
<th>Training Phase</th>
<th>A/C Effective Runways</th>
<th>Airspace Saturation</th>
<th>Target Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>T34B</td>
<td>0.649</td>
<td>0.497</td>
</tr>
<tr>
<td>Basic Jet-A</td>
<td>T-2A</td>
<td>0.823</td>
<td>0.369</td>
</tr>
<tr>
<td>Basic Jet-B</td>
<td>T2BC</td>
<td>0.644</td>
<td>0.289</td>
</tr>
<tr>
<td>Basic Jet-C</td>
<td>T2BC</td>
<td>0.514</td>
<td>0.198</td>
</tr>
<tr>
<td>Advanced Jet-TF</td>
<td>TF9J</td>
<td>1.520</td>
<td>0.524</td>
</tr>
<tr>
<td>Advanced Jet-TA</td>
<td>TA4J</td>
<td>1.524</td>
<td>0.525</td>
</tr>
<tr>
<td>Basic Propeller</td>
<td>T28C</td>
<td>1.313</td>
<td>0.685</td>
</tr>
<tr>
<td>Basic Propeller</td>
<td>T28C</td>
<td>0.389</td>
<td>0.280</td>
</tr>
<tr>
<td>Pre Helicopter</td>
<td>TS2A</td>
<td>0.144</td>
<td>0.064</td>
</tr>
<tr>
<td>Helicopter</td>
<td>TH57</td>
<td>0.452</td>
<td>0.114</td>
</tr>
<tr>
<td>Helicopter</td>
<td>THIL</td>
<td>0.508</td>
<td>0.113</td>
</tr>
</tbody>
</table>

Base Loading Through Total Systems Cost Submodels

2.15 Having entered the Base Loading Submodel either from the LSR Generator or directly (by running program PART2*) the program asks for the first phase to base allocation (i.e., assignment) in question 8.

**Phase Allocation:** Assign each phase as--

II,AAAA,XX

WHERE: II = PHASE (2 DIGITS); AAAA = BASE CODE;

XX = PERCENT AT BASE (1.0 = 100%)

**Base Codes:**

- CHAS
- C3RP
- ELLY
- KING
- MERI
- PENS
- SAUF
- WHIT
- PHAN

II = 0 TO TERMINATE: ?01,SAUF,1.

The user supplies the first assignment, and dialogue 9 follows.
The system then responds with question 10.

**DO YOU WANT DETAILED BASE LOADING DATA (Y,N)? N** (10)

A No response produces the information appearing in Table 14. A Yes response produces a detailed base loading analysis for each base. An example of one such detailed breakdown for NAS Pensacola appears in Table 15.

### TABLE 14

**BASE LOADING SUMMARY**

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Std.</th>
<th>Base</th>
<th>Totals</th>
<th>Type</th>
<th>No.</th>
<th>Type</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAS LOAD</td>
<td>PHASE</td>
<td>NAS</td>
<td>DFF</td>
<td>ENL</td>
<td>CIV</td>
<td>TOTAL</td>
<td>TYPE</td>
</tr>
<tr>
<td>CHAS</td>
<td>197.</td>
<td>1672.</td>
<td>351.</td>
<td>267.</td>
<td>1829.</td>
<td>330.</td>
<td>2623.</td>
</tr>
<tr>
<td>CORP</td>
<td>325.</td>
<td>2150.</td>
<td>2565.</td>
<td>602.</td>
<td>3639.</td>
<td>5900.</td>
<td>10466.</td>
</tr>
<tr>
<td>ELLY</td>
<td>143.</td>
<td>705.</td>
<td>701.</td>
<td>152.</td>
<td>923.</td>
<td>138.</td>
<td>1406.</td>
</tr>
<tr>
<td>KING</td>
<td>197.</td>
<td>1739.</td>
<td>932.</td>
<td>271.</td>
<td>1954.</td>
<td>349.</td>
<td>2771.</td>
</tr>
<tr>
<td>MERI</td>
<td>423.</td>
<td>2096.</td>
<td>1065.</td>
<td>370.</td>
<td>1996.</td>
<td>337.</td>
<td>3176.</td>
</tr>
<tr>
<td>PENS</td>
<td>783.</td>
<td>1501.</td>
<td>2902.</td>
<td>736.</td>
<td>2822.</td>
<td>7716.</td>
<td>12106.</td>
</tr>
<tr>
<td>SAUF</td>
<td>522.</td>
<td>1383.</td>
<td>877.</td>
<td>307.</td>
<td>1155.</td>
<td>277.</td>
<td>2260.</td>
</tr>
</tbody>
</table>
**TABLE 15**

**DETAILED BASE LOADING PRINTOUT**

<table>
<thead>
<tr>
<th>NAS--PENS PERSONNEL</th>
<th>STD LOAD OFFICERS</th>
<th>ENLISTED CIVILIAN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOC SCHOOL</td>
<td>276</td>
<td>8</td>
<td>285</td>
</tr>
<tr>
<td>FLIGHT SYS.</td>
<td>305</td>
<td>9</td>
<td>314</td>
</tr>
<tr>
<td>B-JET G/CQ</td>
<td>142</td>
<td>76</td>
<td>493</td>
</tr>
<tr>
<td>PRE HELØ</td>
<td>60</td>
<td>29</td>
<td>191</td>
</tr>
<tr>
<td>ALL PHASES</td>
<td>783</td>
<td>122</td>
<td>595</td>
</tr>
<tr>
<td>TENANTS</td>
<td>529</td>
<td>954</td>
<td>6220</td>
</tr>
<tr>
<td>NAS PERS.</td>
<td>134</td>
<td>1272</td>
<td>1496</td>
</tr>
<tr>
<td>TOTAL BASE</td>
<td>786</td>
<td>2822</td>
<td>7716</td>
</tr>
</tbody>
</table>

**AIRCRAFT DATA**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2BC</td>
<td>58</td>
</tr>
<tr>
<td>T2BC</td>
<td>18</td>
</tr>
<tr>
<td>VF</td>
<td>2</td>
</tr>
<tr>
<td>VT</td>
<td>19</td>
</tr>
<tr>
<td>VR</td>
<td>8</td>
</tr>
<tr>
<td>VØ</td>
<td>1</td>
</tr>
<tr>
<td>VW</td>
<td>1</td>
</tr>
<tr>
<td>H</td>
<td>5</td>
</tr>
</tbody>
</table>

**FUEL DATA**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>GALLÕNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>JET</td>
<td>0.114E+08</td>
</tr>
<tr>
<td>AGAS</td>
<td>0.610E+07</td>
</tr>
<tr>
<td>HELØ</td>
<td>0.</td>
</tr>
</tbody>
</table>

Note that personnel are broken down by phase of training and that, in addition to the data in the summary display, tenant aircraft and fuel are included in the detailed display. For the Yes option, no summary is given.

2.16 The computer next asks question 11.

**DO YOU WISH TO RE-ALLOCATE PHASES (Y,N)? N**  

This option allows the user to reallocate if he wishes to change the loading data displayed in Tables 14 or 15. A Yes response produces question 12.

**TYPE FIRST BASE ASSIGNMENT? KING,1.**  

19
Following the response the dialogue proceeds as in dialogue 9.

2.17 Following a No response to question 11, the system proceeds to the airspace factors and OLF requirements, now aggregated by base, and asks question 13.

AIRSPACE FACTORS & OLF REQUIREMENTS:
SKIP PRINTOUT (Y,N)? Y

Since these data were displayed by phase in the LSR Generator printout, the user may not wish to see them here. For the Yes response, no further printout occurs until the program reaches the runway computations and the program asks question 16 described below. A No response produces the printout by base shown in Table 16. Following the printout shown in Table 16, the program asks question 14.

DO YOU WISH TO RE-ALLOCATE PHASES TO BASES (Y,N)? Y

A Yes response sends the user back to question 12 and then to dialogue 9. A No response sends the user to question 16.

2.18 If for any base the airspace, as indicated in Table 16, is oversaturated, the following message, question 15, is printed immediately following the printout for that base.

NOTE: AIRSPACE IS OVER-SATURATED
DO YOU WISH TO CONSTRAINT LSR OUTPUT (Y,N)? N

A Yes response would result in a transfer to the LSR Generator and the user would then return to question 3.

2.19 Assuming the user chooses not to return to the LSR Generator, after the OLF and airspace printouts, if any, the system asks question 16.

DO YOU WANT TO SKIP RUNWAY REQUIREMENTS OUTPUT (Y,N)? N

If the answer, as shown, is No, then the system responds in the following manner with the total runway investment cost for all bases for both upgrading existing runways and building new ones.

TOTAL RUNWAY INVESTMENT FOR CURRENT YEAR (THOUS.): 424.
<table>
<thead>
<tr>
<th>Area</th>
<th>Type</th>
<th>Airspace Factor Required</th>
<th>OLF's Factor Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAS-CHAS</td>
<td>TAAJ</td>
<td>0.17</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>TS2A</td>
<td>0.33</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>TH57</td>
<td>0.45</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>TH1L</td>
<td>0.51</td>
<td>0.11</td>
</tr>
<tr>
<td>NAS-CORP</td>
<td>T2A</td>
<td>0.82</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>T2BC</td>
<td>0.64</td>
<td>0.29</td>
</tr>
<tr>
<td>NAS-ELLY</td>
<td>TF9J</td>
<td>0.17</td>
<td>0.52</td>
</tr>
<tr>
<td>NAS-KING</td>
<td>T2A</td>
<td>0.51</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>T2BC</td>
<td>0.01</td>
<td>0.06</td>
</tr>
<tr>
<td>NAS-MERI</td>
<td>T34AB</td>
<td>0.65</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>T28C</td>
<td>0.01</td>
<td>0.22</td>
</tr>
<tr>
<td>NAS-PENS</td>
<td>T2BC</td>
<td>0.51</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>T28C</td>
<td>0.01</td>
<td>0.06</td>
</tr>
<tr>
<td>NAS-SAUF</td>
<td>T28C</td>
<td>0.44</td>
<td>0.68</td>
</tr>
<tr>
<td>NAS-WHIT</td>
<td>T28C</td>
<td>0.44</td>
<td>0.68</td>
</tr>
</tbody>
</table>

Do you wish to re-allocate phases to bases (Y/N)? N
2.20 If the choice made in response to question 16 is to obtain printout, then the data shown in Table 17 (shown only for the first four bases) is produced. Note that for Corpus Christi, an additional printout and choice (question 17) is given as a result of the runway deficit. The response shown indicates that the deficit is to be corrected. The alternate response, not to make up the deficit, is shown in the following dialogue.

WILL THESE DEFICITS BE MADE UP (Y,N)?
WHICH RUNWAYS WON'T BE BUILT OR UPGRADED
ENTER A NUMBER FROM PRECEDING TABLE--
TYPE 0 (ZERO) WHEN FINISHED
NEXT--

Following this dialogue, the printout for the remaining bases would continue as shown in Table 17.

2.21 Next, by answering question 18, the user specifies the level of print detail he wishes to maintain for the remainder of the run for the particular year being analyzed.

WHICH LEVEL OF PRINT DETAIL
TYPE 1 FOR TOTAL SYSTEMS COST (TSC) ONLY
2 FOR TSC & DETAILED FACILITIES EXCESS-DEFICIENCY
3 FOR TSC & NAS COST SUMMARIES ONLY
4 FOR TSC & FACILITIES DEFICITS & NAS COST SUMM.
5 FOR CHOICE OF DETAILS (IF DESIRED)?

By typing 5, the user has the option to select only the printouts he desires. On the other hand, a lower level of print detail will speed up the run somewhat when limited printouts are desired. Although the subsequent descriptions deal with the options available under print level 5, a comprehensive picture of what printouts and options are available under the other print levels is given in Figure 2.

2.22 The next questions, 19 and 20, occur at the Excess/Deficiency portion of the program. This section of the IFRS is entered from the previous submodel or directly by running program PART6*. The user must decide whether or not to accept substandard facilities. A No response means no acceptance of substandard facilities for any base. A Yes response allows the user to further modify his choice from base to base and causes question 20 to be printed.

EXCESS DEFICIENCY PROGRAM
ACCEPT SUBSTANDARD FACILITIES (Y,N)?
SAME OPTION FOR ALL BASES (Y,N)

22
## TABLE 17

### RUNWAY REQUIREMENT BY BASE

**NAS--CHAS**

**AVAILABLE:**

<table>
<thead>
<tr>
<th>AMOUNT LENGTH THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.84 8000. 9</td>
</tr>
<tr>
<td>0.84 8000. 9</td>
</tr>
<tr>
<td>0.09 6000. 9</td>
</tr>
</tbody>
</table>

**REQUIRED:**

<table>
<thead>
<tr>
<th>AMOUNT LENGTH THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.52 8000. 2</td>
</tr>
</tbody>
</table>

N0 RUNWAY DEFICITS

**NAS--CORP**

**AVAILABLE:**

<table>
<thead>
<tr>
<th>AMOUNT LENGTH THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.84 8000. 9</td>
</tr>
<tr>
<td>0.84 5000. 2</td>
</tr>
<tr>
<td>0.82 5000. 2</td>
</tr>
<tr>
<td>0.62 5000. 2</td>
</tr>
<tr>
<td>0.64 5000. 2</td>
</tr>
</tbody>
</table>

**REQUIRED:**

<table>
<thead>
<tr>
<th>AMOUNT LENGTH THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.36 8000. 2</td>
</tr>
</tbody>
</table>

UPGRADE: LENGTH: 5000. TO 8000.
THICKNESS: 2 TO 2
COST: 424. (THOUS.)

**SUMMARY OF RUNWAY UPGRADE/CONSTRUCTION**

<table>
<thead>
<tr>
<th>NO. LENGTH THICKNESS COST (THOUS.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 8000. 2 424.</td>
</tr>
</tbody>
</table>

WILL THESE DEFICITS BE MADE UP (Y,N)? Y

**NAS--ELLY**

**AVAILABLE:**

<table>
<thead>
<tr>
<th>AMOUNT LENGTH THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.90 3350. 1</td>
</tr>
<tr>
<td>0.10 3185. 1</td>
</tr>
<tr>
<td>0.90 3125. 1</td>
</tr>
<tr>
<td>0.90 3025. 1</td>
</tr>
</tbody>
</table>

**REQUIRED:**

<table>
<thead>
<tr>
<th>AMOUNT LENGTH THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.45 200. 1</td>
</tr>
<tr>
<td>0.51 200. 1</td>
</tr>
</tbody>
</table>

N0 RUNWAY DEFICITS

**NAS--KING**

**AVAILABLE:**

<table>
<thead>
<tr>
<th>AMOUNT LENGTH THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.92 8000. 9</td>
</tr>
<tr>
<td>0.92 8000. 9</td>
</tr>
<tr>
<td>0.08 8000. 9</td>
</tr>
<tr>
<td>0.08 8000. 9</td>
</tr>
</tbody>
</table>

**REQUIRED:**

<table>
<thead>
<tr>
<th>AMOUNT LENGTH THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.52 8000. 3</td>
</tr>
</tbody>
</table>

N0 RUNWAY DEFICITS
FIGURE 2. PRINT LEVEL QUESTIONS
AND ANSWERS

24
FIGURE 2 (Cont)
FIGURE 2 (Cont)
A decision to accept substandard facilities, but not for all bases, means that question 21, which asks for acceptance of substandard facilities, is repeated for each base, as shown for NAS Chase.

**EXCESS DEFICIENCY PROGRAM**

ACCEPT SUBSTANDARD FACILITIES (Y,N)?Y
SAME OPTION FOR ALL BASES (Y,N)?N
ACCEPT SUBSTANDARD FOR CHAS (Y,N)?Y

(21)

2.23 The user then chooses in question 22, base by base, whether or not he wishes to see a detailed analysis of facility requirements, asset position, and excess/deficiency data. Both the Yes response and its results are shown in Table 18 for NAS Corpus Christi.

**NAS--MERI**

DETAILED EXCESS-DEFICIENCY (Y,N)?N

(22)

2.24 At the end of the excess/deficiency computations, the user can decide in question 23 that he would like to change the substandard option. A negative choice is indicated in the following example.

**DO YOU WISH TO MODIFY THE SUBSTANDARD OPTION (Y,N) ?N**

(23)

A Yes response sends the user back to question 19.

2.25 Next investment costs are displayed as desired. The user has the option in question 24 to obtain for each base a printout of a detailed cost breakdown or simply the total, as shown in Table 19 for four bases. Questions 24 and 25 are included in the example. Note that when a detailed breakdown is requested the user has the option in question 25 of not meeting all deficits. In the example shown in Table 20, it was decided to make up only 80 percent of the maintenance hangar deficit and 75 percent of the family housing deficit. The new base total reflects these changes.

2.26 After all bases have been considered, the total facilities investment cost (excluding runway investment printed earlier) is displayed as follows:

**NAS TOTAL**

YEAR 1970 59922.7
<table>
<thead>
<tr>
<th>CODE</th>
<th>DESCRIPTION</th>
<th>AMOUNT</th>
<th>UNIT</th>
<th>STAND. SUB-STAND. EXCESS DEFICIENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1320</td>
<td>A/C PKNG APN</td>
<td>115000</td>
<td>SY</td>
<td>0.                      0.          0.</td>
</tr>
<tr>
<td>1320</td>
<td>PER TAXIWAY</td>
<td>87500</td>
<td>SY</td>
<td>0.                      0.          0.</td>
</tr>
<tr>
<td>11320</td>
<td>TOT PKNG APN</td>
<td>202500</td>
<td>SY</td>
<td>427700.               0.          225200.    0.</td>
</tr>
<tr>
<td>12540</td>
<td>DIST PIPELIN</td>
<td>11.</td>
<td>MI</td>
<td>9.                      0.          0.          2.</td>
</tr>
<tr>
<td>14140</td>
<td>A/C OP BLDG</td>
<td>16956</td>
<td>SF</td>
<td>61573.                7692.       52309.     0.</td>
</tr>
<tr>
<td>17110</td>
<td>ACADEMC BLDG</td>
<td>5145</td>
<td>SF</td>
<td>0.                     37661.     32516.     0.</td>
</tr>
<tr>
<td>21110</td>
<td>MAINT HANGAR</td>
<td>317174</td>
<td>SF</td>
<td>0.                     72210.     0.          244964.</td>
</tr>
<tr>
<td>21910</td>
<td>PW MAINT SHP</td>
<td>20455</td>
<td>SF</td>
<td>53273.                20053.     52871.     0.</td>
</tr>
<tr>
<td>4210</td>
<td>GEN WAREHOUSE</td>
<td>175282</td>
<td>SF</td>
<td>0.                     0.          0.          0.</td>
</tr>
<tr>
<td>4210</td>
<td>SHED SPACE</td>
<td>13711</td>
<td>SF</td>
<td>0.                     0.          0.          0.</td>
</tr>
<tr>
<td>44210</td>
<td>TOT WAREHOUSE</td>
<td>188993</td>
<td>SF</td>
<td>414794.               518226.   744027.    0.</td>
</tr>
<tr>
<td>55010</td>
<td>DISPENSARY</td>
<td>27013</td>
<td>SF</td>
<td>0.                     21100.     0.          5913.</td>
</tr>
<tr>
<td>61010</td>
<td>ADMIN OFFICE</td>
<td>203463</td>
<td>SF</td>
<td>77693.                196794.   71024.     0.</td>
</tr>
<tr>
<td>71110</td>
<td>FAM HOUSING</td>
<td>2154</td>
<td>UN</td>
<td>1383.                428.       0.          343.</td>
</tr>
<tr>
<td>0</td>
<td>INELIG HOUSE</td>
<td>399</td>
<td>UN</td>
<td>294.                 127.       22.         0.</td>
</tr>
<tr>
<td>72210</td>
<td>EM BARRACKS</td>
<td>1752</td>
<td>MN</td>
<td>1251.                195.       0.          306.</td>
</tr>
<tr>
<td>72310</td>
<td>EM MESS HALL</td>
<td>16385</td>
<td>SF</td>
<td>0.                     33290.    16905.     0.</td>
</tr>
<tr>
<td>72415</td>
<td>BQW</td>
<td>261</td>
<td>MN</td>
<td>76.                  100.       0.          85.</td>
</tr>
<tr>
<td>74014</td>
<td>EXCHANGE</td>
<td>16694</td>
<td>SF</td>
<td>0.                     27329.    10635.     0.</td>
</tr>
<tr>
<td>74063</td>
<td>SERVICE CLUB</td>
<td>18518</td>
<td>SF</td>
<td>0.                     23334.    4816.      0.</td>
</tr>
<tr>
<td>81230</td>
<td>ELEC DIST LN</td>
<td>433785</td>
<td>LF</td>
<td>340069.              0.          0.          93716.</td>
</tr>
<tr>
<td>84210</td>
<td>WATER DIS LN</td>
<td>277652</td>
<td>LF</td>
<td>251642.              0.          0.          26010.</td>
</tr>
<tr>
<td>85110</td>
<td>ROADS</td>
<td>44.</td>
<td>MI</td>
<td>44.                  0.          0.          0.</td>
</tr>
<tr>
<td>85210</td>
<td>PARKING AREA</td>
<td>242499</td>
<td>SY</td>
<td>369800.              0.          127301.    0.</td>
</tr>
</tbody>
</table>

**TAXIWAYS & RUNWAY LIGHTING**

**TAXIWAY DEFICIT**: 12083. SY

**RUNWAY LIGHTING DEFICIT**: 3000. LF

**READY FUEL STORAGE**

**REQUIRED**: (THOUSANDS OF GALS)

| JET   | 16.8   |
| AVGAS | 457.1  |

**AVAILABLE**:

| JET   | 0.     |
| AVGAS | 1300.0 |

**DEFICIENT**

<table>
<thead>
<tr>
<th>NO.</th>
<th>SIZE</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>JET</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>JET</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>JET</td>
</tr>
<tr>
<td>FACILITIES</td>
<td>BASE TOTAL</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>NAS--MERI</td>
<td>14131.3</td>
<td></td>
</tr>
<tr>
<td>DETAILED BREAKDOWN (Y,N)?N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BASE TOTAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAS--PENS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DETAILED BREAKDOWN (Y,N)?Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17110 ACADEMIC BLDG</td>
<td>971.0</td>
<td></td>
</tr>
<tr>
<td>55010 DISPENSARY</td>
<td>255.4</td>
<td></td>
</tr>
<tr>
<td>61010 ADMIN OFFICE</td>
<td>502.6</td>
<td></td>
</tr>
<tr>
<td>74063 SERVICE CLUB</td>
<td>10.9</td>
<td></td>
</tr>
<tr>
<td>BASE TOTAL</td>
<td>1739.9</td>
<td></td>
</tr>
<tr>
<td>WILL ALL DEFICITS BE MET (Y,N)?Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAS--SAUF</td>
<td>4480.1</td>
<td></td>
</tr>
<tr>
<td>DETAILED BREAKDOWN (Y,N)?N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BASE TOTAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAS--WHIT</td>
<td>9180.1</td>
<td></td>
</tr>
<tr>
<td>DETAILED BREAKDOWN (Y,N)?N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BASE TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 20

TOTAL FACILITIES COST WITH DEFICITS PARTIALLY MADE UP

<table>
<thead>
<tr>
<th>NAS--WHIT FACILITIES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DETAILED BREAKDOWN (Y,N)?</td>
<td>Y</td>
</tr>
<tr>
<td>TOT PKNG APN</td>
<td>274.7</td>
</tr>
<tr>
<td>A/C ØP BLDG</td>
<td>550.9</td>
</tr>
<tr>
<td>MAINT HANGAR</td>
<td>2935.0</td>
</tr>
<tr>
<td>TOT WAREHSE</td>
<td>679.7</td>
</tr>
<tr>
<td>DISPENSARY</td>
<td>341.0</td>
</tr>
<tr>
<td>ADMIN OFFICE</td>
<td>831.7</td>
</tr>
<tr>
<td>FAM HØUSING</td>
<td>1245.3</td>
</tr>
<tr>
<td>BOQ</td>
<td>1838.3</td>
</tr>
<tr>
<td>SERVICE CLUB</td>
<td>105.3</td>
</tr>
<tr>
<td>ELEC DIST LN</td>
<td>378.1</td>
</tr>
</tbody>
</table>

BASE TOTAL 9180.1

WILL ALL DEFICITS BE MET (Y,N)?N

WRITE CATEGORY CODE AND PERCENT OF DEFICIT TO BE MADE UP AS--NNNNN.XX

(NEED ONLY ENTER CASES WHERE PERCENT IS LESS THAN 1.0)

USE CATEGORY CODES GIVEN ABOVE.

ZERO CATEGORY CODE INDICATES END OF INPUT?21110.8

NEXT--?71110.75
NEXT--?0

NEW BASE TOTAL 8281.7
2.27 Aircraft investment is computed next, and the user can obtain either a detailed asset position and investment cost or a summary, but not both, by answering question 26.

DETAILED A/C ASSET POSITION & INVESTMENT (Y,N)?N  

The summary option is printed out in the following manner:

A/C INVESTMENT (CNATRA)----SUMMARY
TOTAL A/C TOTAL
DEFICIENT COST (THOUS.)
152. 148792.

The result of requesting a detailed printout is shown in Table 21, part a.

2.28 The final computations produced are O&M costs and total systems cost. Question 27 gives the user the choice of detailed cost breakdowns or a summary statement. The summary option is shown in Table 21, part b.

DO YOU WANT DETAILED O & M COSTS (Y,N)?N  

A request in response to question 27 for detailed O&M costs produces a list for each base like the one shown in Table 22 for NAS Whiting.

2.29 Finally, the total systems cost is displayed in the following manner.

TOTAL SYSTEMS COST =
FACILITY INVESTMENT COSTS
+ A/C INVESTMENT
+ O & M COSTS (LESS NON ADD ITEMS)
+ CNATRA, CNABATA, CNAVANTRA ---- FIXED COSTS
-----------
464461.7

Following this output, the user can indicate whether he wishes to return to the excess/deficiency portion of the program in question 28 (possibly with a different print option according to his answer to question 30). If No is the response, then he decides whether or not to run for another year (question 29).

DO YOU WISH TO RETURN TO EXCESS-DEFICIENCY PROGRAM (Y,N)?N  

DO YOU WISH TO RUN FOR ANOTHER YEAR (Y,N)?N  

31
### TABLE 21

**DETAILED AIRCRAFT INVESTMENT AND ASSET POSITION AND SUMMARY O&M COST PRINTOUTS**

#### Part a.

<table>
<thead>
<tr>
<th>A/C INVESTMENT &amp; ASSET POSITION</th>
<th>---</th>
<th>---</th>
<th>---</th>
<th>---</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C AVAILABLE 8/30 DESD</td>
<td>8/30</td>
<td>DEFICIT</td>
<td>FLYAWAY</td>
<td>SUPPORT</td>
<td>TOTAL</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----</td>
<td>-------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>P-3A</td>
<td>159</td>
<td>149</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>T-28C</td>
<td>468</td>
<td>388</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>T-2A</td>
<td>114</td>
<td>112</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>T-28C</td>
<td>178</td>
<td>183</td>
<td>5</td>
<td>2740</td>
<td>411</td>
</tr>
<tr>
<td>T-2A</td>
<td>399</td>
<td>196</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>F-4J</td>
<td>100</td>
<td>176</td>
<td>76</td>
<td>83609</td>
<td>12571</td>
</tr>
<tr>
<td>T-33A</td>
<td>179</td>
<td>188</td>
<td>5</td>
<td>18103</td>
<td>2715</td>
</tr>
<tr>
<td>TH1L</td>
<td>0</td>
<td>62</td>
<td>62</td>
<td>24732</td>
<td>3710</td>
</tr>
<tr>
<td>TH37</td>
<td>34</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Part b.

**SUMMARY O & M COSTS**

<table>
<thead>
<tr>
<th>NAS</th>
<th>MILITARY</th>
<th>A/C FUEL</th>
<th>A/C O&amp;M</th>
<th>BASE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P-3A</td>
<td>TOTAL</td>
<td>TOTAL</td>
<td>SUPPORT</td>
</tr>
<tr>
<td>CHAS</td>
<td>16459.5</td>
<td>6009.5</td>
<td>3750.9</td>
<td>3630.3</td>
</tr>
<tr>
<td>CORP</td>
<td>28110.4</td>
<td>2625.3</td>
<td>1919.5</td>
<td>12514.4</td>
</tr>
<tr>
<td>ELLY</td>
<td>6921.8</td>
<td>522.9</td>
<td>372.6</td>
<td>2251.1</td>
</tr>
<tr>
<td>KING</td>
<td>17285.3</td>
<td>7547.1</td>
<td>2651.8</td>
<td>3797.5</td>
</tr>
<tr>
<td>WEN</td>
<td>20878.3</td>
<td>5808.5</td>
<td>1972.8</td>
<td>4256.2</td>
</tr>
<tr>
<td>PENN</td>
<td>29650.4</td>
<td>2482.7</td>
<td>591.6</td>
<td>14372.0</td>
</tr>
<tr>
<td>SAOF</td>
<td>15666.8</td>
<td>472.1</td>
<td>394.0</td>
<td>3219.1</td>
</tr>
<tr>
<td>WHIT</td>
<td>23284.6</td>
<td>1747.0</td>
<td>1155.8</td>
<td>4628.3</td>
</tr>
</tbody>
</table>

**TOTAL O & M COST**

ALL BASES: 249122.9
### Table 22
**Detailed O&M Cost Printout**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOT PKNG APN</td>
<td>10.6</td>
</tr>
<tr>
<td>DIST PIPELIN</td>
<td>2.4</td>
</tr>
<tr>
<td>A/C 0P BLDG</td>
<td>4.5</td>
</tr>
<tr>
<td>ACADEMC BLDG</td>
<td>9.5</td>
</tr>
<tr>
<td>MAINT HANGAR</td>
<td>67.1</td>
</tr>
<tr>
<td>PW MAINT SHP</td>
<td>6.2</td>
</tr>
<tr>
<td>TOT WAREHSE</td>
<td>9.5</td>
</tr>
<tr>
<td>DISPENSARY</td>
<td>7.0</td>
</tr>
<tr>
<td>ADMIN OFFICE</td>
<td>17.6</td>
</tr>
<tr>
<td>EM BARRACKS</td>
<td>44.7</td>
</tr>
<tr>
<td>EM MESS HALL</td>
<td>4.1</td>
</tr>
<tr>
<td>B00</td>
<td>60.8</td>
</tr>
<tr>
<td>EXCHANGE</td>
<td>3.6</td>
</tr>
<tr>
<td>SERVICE CLUB</td>
<td>2.9</td>
</tr>
<tr>
<td>ELEC DIST LN</td>
<td>14.7</td>
</tr>
<tr>
<td>WATER DIS LN</td>
<td>10.0</td>
</tr>
<tr>
<td>ROADS</td>
<td>38.8</td>
</tr>
<tr>
<td>PARKING AREA</td>
<td>5.9</td>
</tr>
<tr>
<td>RUNWAYS</td>
<td>10.7</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>330.3</td>
</tr>
<tr>
<td>CIVILIAN WAGES</td>
<td>2978.7</td>
</tr>
<tr>
<td>PAY &amp; ALLOWANCES</td>
<td></td>
</tr>
<tr>
<td>PHASE OFFICERS</td>
<td>5118.8</td>
</tr>
<tr>
<td>PHASE ENLISTED</td>
<td>7878.4</td>
</tr>
<tr>
<td>STUDENTS</td>
<td>5534.6</td>
</tr>
<tr>
<td>NAS OFFICERS</td>
<td>1064.4</td>
</tr>
<tr>
<td>NAS ENLISTED</td>
<td>3688.3</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>23284.6</td>
</tr>
<tr>
<td>A/C FUEL</td>
<td>1747.0</td>
</tr>
<tr>
<td>A/C 0 &amp; M</td>
<td>1155.6</td>
</tr>
<tr>
<td>BASE SUPPORT</td>
<td>4628.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30815.5</td>
</tr>
</tbody>
</table>

**Total O&M Cost**

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Bases</td>
<td>249122.9</td>
</tr>
</tbody>
</table>

*Non-Add Items*
If the user decides to return to the excess/deficiency program, the computer then returns to question 19, described above. Question 30 is then asked.

**DO YOU WISH TO RETURN TO EXCESS-DEFICIENCY PROGRAM (Y,N)?**

**TYPE LEVEL OF PRINTING DETAIL (1-5)?**

A return to the LSR Generator to run for another year brings the user to question 3 and the questions and printouts following it.

**EXTENDED OPERATIONS**

2.30 Extended capabilities were programmed into the LSR Generator to permit the user to perform on-line modifications to the LSR data base and to measure the impact of limited training resources on the pilot training program. The extended LSR Generator is entered when the user selects an LSR level of complexity other than level 1. Level 2 complexity enables the user to determine the effect of limited aircraft, flight instructors, enlisted maintenance personnel and/or academic instructors on each training phase in the pilot training system; level 3 complexity allows him to modify the LSR data base.

2.31 The following discussion outlines the computerized logic with respect to the automated LSR Generator in the extended form. It is assumed in the following examples that the user has first selected level 3 complexity and then reruns the model at level 2 complexity. The primary reason for rerunning the model and not continuing through the LSR Generator at level 4 complexity is that, throughout the other volumes of this report, a 2510 total PTR is used in illustrative examples utilizing current NATRACOM planning factors. Consequently, the examples provided in this discussion are designed to be consistent with foregoing examples.

**Level 3 Complexity — Modify Phase Data**

2.32 With level 3 complexity (response to question 1 above), the user is permitted to modify the LSR data base. The automated LSR Generator follows the responses to questions 2 and 3 and then deviates from the normal operation procedure by presenting question 3a.

**ANY DELETIONS OR ADDITIONS (Y,N)?**

(3a)

This question asks the user whether he wants to add or delete training phases to or from the current pilot training program (LSR data base). Following a No response, question 3 is immediately presented. Following a Yes response, question 3b is printed.
ANY DELETIONS (Y,N)?Y

If one or more of the current training phases are to be removed from the data base, a Yes response is given. If a No response is given, question 3d is printed.

2.33 The user is then asked question 3c.

ENTER PHASE NUMBERS (XX,XX,...)
TWO DIGITS ARE REQUIRED FOR EACH PHASE?07,08

Assuming that the two advanced jet phases, Adv Jet-TA and Adv Jet-TF, are to be dropped in the future, possibly to be replaced later by another phase, the above response would be given to question 3c. Table 23 shows the deletion of the two training phases. Note that in Table 23 all training phase numbers have been revised to preserve sequential training phase numbers.

TABLE 23

DELETED TRAINING PHASES AND RENUMBERED PHASES

<table>
<thead>
<tr>
<th>DELETE PHASE</th>
<th>8 ADV JET-TA</th>
</tr>
</thead>
<tbody>
<tr>
<td>DELETE PHASE</td>
<td>7 ADV JET-TF</td>
</tr>
</tbody>
</table>

TRAINING PHASES

<table>
<thead>
<tr>
<th>NO.</th>
<th>PHASE NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRIMARY</td>
</tr>
<tr>
<td>2</td>
<td>AOC SCHOOL</td>
</tr>
<tr>
<td>3</td>
<td>FLIGHT SYS.</td>
</tr>
<tr>
<td>4</td>
<td>BASIC JET-A</td>
</tr>
<tr>
<td>5</td>
<td>BASIC JET-B</td>
</tr>
<tr>
<td>6</td>
<td>B-JET G/CQ</td>
</tr>
<tr>
<td>7</td>
<td>BASIC PROP</td>
</tr>
<tr>
<td>8</td>
<td>B-PROP CO</td>
</tr>
<tr>
<td>9</td>
<td>ADV PROP</td>
</tr>
<tr>
<td>10</td>
<td>PRE HELO</td>
</tr>
<tr>
<td>11</td>
<td>HELO PRIM</td>
</tr>
<tr>
<td>12</td>
<td>HELO ADV</td>
</tr>
</tbody>
</table>

2.34 Question 3d immediately follows.

ADD A NEW PHASE (Y,N)?Y

If the user does not wish to add one or more new training phases to the LSR data base, question 3f follows. A Yes response to question 3d requires the user to enter all data associated with the training phase in question. This is accomplished through a series of responses given in dialogue 3e. See Table 24 for a complete description of dialogue 3e.

1/ Renumbering is done to minimize computer storage requirements, thus enabling the user to exercise more program options within a limited amount of computer memory.
TABLE 24
DATA FIELDS REQUIRED TO DEFINE A TRAINING PHASE

<table>
<thead>
<tr>
<th>Data Field-(Element)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name of training phase - 12 alphanumeric characters</td>
</tr>
<tr>
<td>2</td>
<td>Attrition point - the average percentage of the training phase a student attrite is expected to complete</td>
</tr>
<tr>
<td>3</td>
<td>Phase duration in weeks</td>
</tr>
<tr>
<td>4</td>
<td>Flight and academic instruction tour of duty length in months</td>
</tr>
<tr>
<td>5</td>
<td>Number of aircraft instruction types</td>
</tr>
<tr>
<td>6</td>
<td>Number of academic instruction types</td>
</tr>
<tr>
<td>7-12/</td>
<td>Aircraft name - 4 alphanumeric characters</td>
</tr>
<tr>
<td>8-J</td>
<td>Fuel type - 4 alphanumeric characters</td>
</tr>
<tr>
<td>9-J</td>
<td>Percent annual flyable weather</td>
</tr>
<tr>
<td>10-J</td>
<td>Aircraft hourly fuel consumption in gallons</td>
</tr>
<tr>
<td>11-J</td>
<td>Hours per day an aircraft may be utilized for flight instruction</td>
</tr>
<tr>
<td>12-J</td>
<td>Hours per day a flight instructor may be utilized for flight instruction</td>
</tr>
<tr>
<td>13-J</td>
<td>Average aircraft flight hours for a successfully completed student</td>
</tr>
<tr>
<td>14-J</td>
<td>Average flight instructor hours for a successfully completed student</td>
</tr>
<tr>
<td>15-J</td>
<td>Flight instruction training period in months</td>
</tr>
<tr>
<td>16-J</td>
<td>Ratio of landing support officers to average student load</td>
</tr>
<tr>
<td>17-J</td>
<td>Ratio of direct maintenance personnel to aircraft</td>
</tr>
</tbody>
</table>

1/ Data fields 7-17 are not entered if no flight instruction exists, i.e., if data field 5 = 0.

2/ The particular element, J, is sequentially incremented from 1 to the number of aircraft types that exist for the training phase (the value of data field 5).
**TABLE 24 (Cont)**

<table>
<thead>
<tr>
<th>Data Field-(Element)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-1 (^3)/ (^4)</td>
<td>Name of academic instruction - 4 alphabetic characters</td>
</tr>
<tr>
<td>19-1</td>
<td>Number of academic instruction hours per student</td>
</tr>
<tr>
<td>20-1</td>
<td>Number of student hours an academic instruction can be utilized annually</td>
</tr>
<tr>
<td>21-1</td>
<td>Academic instruction training period</td>
</tr>
</tbody>
</table>

\(^3\)/ Data fields 18-21 are not entered if no academic instruction exists, i.e., if data field 6 = 0.

\(^4\)/ I is sequentially incremented from 1 to the number of academic instruction types that exist for the training phase (the value of data field 6).
In the user responses shown, only 17 data values are entered, as opposed to the 21 presented in Table 24, because academic instruction, data field 6, is not included in a training phase. When a training phase has been completely defined, the data in Table 25 are printed for user reference.

2.35 Question 3d and dialogue 3e are repeated until the user no longer wishes to add new phases, i.e., until he answers No to question 3d. Following a No response, the data in Table 26 is printed to provide a permanent list of the training phases contained in the modified LSR data base. Question 3f is then printed.

ANY LISTS OR MODIFICATIONS (Y,N)? Y

(3f)

If the user wishes to have a complete list of the current data in any training phase or desires to modify the data in any training phase, he gives a Yes response. Question 3f follows a No response.

2.36 The user must next respond to question 3g.

ANY DATA LISTS (Y,N)? Y

(3g)

This question enables the user to obtain a data list of one or more training phases. A No response causes question 3i to be printed. When a data list is asked for, question 3h follows.

ENTER PHASE NUMBERS (XX,XX, ...) (3h)

TWO DIGITS ARE REQUIRED FOR EACH PHASE? 01, 13

38
### TABLE 25

**DATA LIST FOR NEW TRAINING PHASE**

<table>
<thead>
<tr>
<th>DATA LIST FOR TRAINING PHASE 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 PHASE NAME NEW PHASE</td>
</tr>
<tr>
<td>02 ATTENTION POINT 0.5000</td>
</tr>
<tr>
<td>03 PHASE DURATION 10.00 WEEKS</td>
</tr>
<tr>
<td>04 TOUR OF DUTY 24.00 MONTHS</td>
</tr>
<tr>
<td>05 AIRCRAFT TYPES 1</td>
</tr>
<tr>
<td>06 INSTRUCTION TYPES 0</td>
</tr>
<tr>
<td>07 AIRCRAFT TYPES T34B</td>
</tr>
<tr>
<td>08 FUEL TYPE AGAS</td>
</tr>
<tr>
<td>09 FLYABLE WEATHER 0.800</td>
</tr>
<tr>
<td>10 FUEL CONSUMPTION 50.50</td>
</tr>
<tr>
<td>11 A/C UTILIZATION 2.81</td>
</tr>
<tr>
<td>12 INSTRUCTOR UTIL. 2.25</td>
</tr>
<tr>
<td>13 FLIGHT HOURS 55.00</td>
</tr>
<tr>
<td>14 FLIGHT INST. HOURS 25.00</td>
</tr>
<tr>
<td>15 INST. TR. PERIOD 2.00</td>
</tr>
<tr>
<td>16 LSO RATIO 15.00</td>
</tr>
<tr>
<td>17 MAINTAINENCE MEN 5.47</td>
</tr>
</tbody>
</table>

ADD A NEW PHASE (Y,N)? N

### TABLE 26

**LIST OF TRAINING PHASES IN LSR DATA BASE**

AFTER NEW PHASES HAVE BEEN ADDED

<table>
<thead>
<tr>
<th>TRAINING PHASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO.</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
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<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
</tbody>
</table>

39
The user must now enter the phase numbers of the training phases for which he desires data lists. The above response produces the data appearing in Table 27. Note that the data list for the training phase, New Phase, in Table 27 is identical to that shown in Table 25, the data entered by the user while developing a new training phase.

2.37 The user is next asked to respond to question 3i.

ANY MODIFICATIONS (Y, N)? Y

A No response recycles the automated LSR Generator to question 3f. A Yes response indicates that the user desires to modify particular data elements within the LSR data base. Question 3j is printed next.

ENTER PHASE, FIELD AND ELEMENT (XX,XX,X)
PHASE = 00 IMPLIES NO FURTHER MODIFICATIONS
NOTE THE DIGIT FIELDS MUST CONTAIN TWO DIGITS? 13,01

The user responds to question 3j by entering the number of the training phase, 13, and the data field and element to be modified, 01 (see Table 24 for a description of data fields and elements). In this example, the name of training phase 13 is to be changed.

2.38 Question 3k permits data modification.

ENTER NAME OF PHASE 13 (AAAAAAAAAAAA)? CHANGE NAME
01 PHASE NAME CHANGE NAME

After the particular datum point has been modified, a list of the revised element is displayed. The user must again respond to questions 3j and 3k.

NEXT? 13,07,1

ENTER DATA FIELD 7-1 (AAAA)? T28C
07 AIRCRAFT TYPES T28C

The sample response above changes the name of phase 13 aircraft and the following response modifies the number of enlisted maintenance personnel required to support an aircraft.
<table>
<thead>
<tr>
<th>DATA LIST FOR TRAINING PHASE 1</th>
<th>01 PHASE NAME PRIMARY</th>
<th>PRIMARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>02 ATTENTION POINT 0.5000</td>
<td>03 PHASE DURATION 6.00 WEEKS</td>
<td></td>
</tr>
<tr>
<td>04 TOUR OF DUTY 24.00 MONTHS</td>
<td>05 AIRCRAFT TYPES 1</td>
<td></td>
</tr>
<tr>
<td>06 INSTRUCTION TYPES 0</td>
<td>07 AIRCRAFT TYPES 1345</td>
<td></td>
</tr>
<tr>
<td>08 FUEL TYPE AGAS</td>
<td>09 FLYABLE WEATHER 0.782</td>
<td></td>
</tr>
<tr>
<td>10 FUEL CONSUMPTION 12.60</td>
<td>11 A/C UTILIZATION 4.20</td>
<td></td>
</tr>
<tr>
<td>12 INSTRUCTOR UTIL. 3.01</td>
<td>13 FLIGHT HOURS 32.60</td>
<td></td>
</tr>
<tr>
<td>14 FLIGHT INST. HOURS 29.20</td>
<td>15 INST. TR. PERIOD 2.00</td>
<td></td>
</tr>
<tr>
<td>16 LSO RATIO 0.0</td>
<td>17 MAINTAINENCE MEN 2.55</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DATA LIST FOR TRAINING PHASE 13</th>
<th>01 PHASE NAME NEW PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>02 ATTENTION POINT 0.5000</td>
<td>03 PHASE DURATION 10.00 WEEKS</td>
</tr>
<tr>
<td>04 TOUR OF DUTY 24.00 MONTHS</td>
<td>05 AIRCRAFT TYPES 1</td>
</tr>
<tr>
<td>06 INSTRUCTION TYPES 0</td>
<td>07 AIRCRAFT TYPES 1345</td>
</tr>
<tr>
<td>08 FUEL TYPE AGAS</td>
<td>09 FLYABLE WEATHER 0.800</td>
</tr>
<tr>
<td>10 FUEL CONSUMPTION 50.50</td>
<td>11 A/C UTILIZATION 2.81</td>
</tr>
<tr>
<td>12 INSTRUCTOR UTIL. 2.25</td>
<td>13 FLIGHT HOURS 55.00</td>
</tr>
<tr>
<td>14 FLIGHT INST. HOURS 25.00</td>
<td>15 INST. TR. PERIOD 2.00</td>
</tr>
<tr>
<td>16 LSO RATIO 15.00</td>
<td>17 MAINTAINENCE MEN 5.47</td>
</tr>
</tbody>
</table>
Note that in both examples a data element is required to define the aircraft being considered. The process continues until the response, 00, is given to the question "NEXT?" When 00 is entered as a phase number, the automated system returns to question 3f, and the process continues.

2.39 For purposes of clarity, the following responses were given to questions 3f, 3g, and 3h to produce the printout contained in Table 28. Note that this table incorporates the modifications to training phase 13 presented above in the data list in Table 25.

ANY LIST OF MODIFICATIONS (Y,N)? Y

ANY DATA LISTS (Y,N)? Y

ENTER PHASE NUMBERS (XX,XX, . . . )
16 DIGITS ARE REQUIRED FOR EACH PHASE 13

2.40 When a No response is given to question 3f, question 31 is printed.

SAVE MODIFIED DATA BASE (Y,N)? Y

This question, when answered Yes, generates the modified LSR data base on data file SAVBCS for future user reference. With a No response or when the data file has been generated, the automated LSR Generator returns to question 4 of its normal operation (see Normal Operating Procedures above).

2.41 After question 4 has been answered, question 4a is printed.

PRINT ALL PIPELINES (Y,N)? Y

SAVE MODIFIED PIPELINES (Y,N)? Y

This question asks the user whether the subsequent modifications to the training pipeline data should be preserved on a data file. With a Yes response, data file PIPES is generated containing the updated pipeline data. The data in Table 29 are developed after the response to question 4.
TABLE 28
MODIFICATIONS TO A TRAINING PHASE

<table>
<thead>
<tr>
<th>DATA LIST FOR TRAINING PHASE</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 PHASE NAME CHANGE NAME</td>
<td></td>
</tr>
<tr>
<td>02 ATTENTION POINT 0.0000</td>
<td></td>
</tr>
<tr>
<td>03 PHASE DURATION 10.00 WEEKS</td>
<td></td>
</tr>
<tr>
<td>04 TOUR OF DUTY 24.00 MONTHS</td>
<td></td>
</tr>
<tr>
<td>05 AIRCRAFT TYPES 1</td>
<td></td>
</tr>
<tr>
<td>06 INSTRUCTION TYPES 0</td>
<td></td>
</tr>
<tr>
<td>07 AIRCRAFT TYPES 728C</td>
<td></td>
</tr>
<tr>
<td>08 FUEL TYPE AGAS</td>
<td></td>
</tr>
<tr>
<td>09 FLYABLE WEATHER 0.5000</td>
<td></td>
</tr>
<tr>
<td>10 FUEL CONSUMPTION 50.50</td>
<td></td>
</tr>
<tr>
<td>11 AVG UTILIZATION 2.81</td>
<td></td>
</tr>
<tr>
<td>12 INSTRUCTOR UTIL. 2.25</td>
<td></td>
</tr>
<tr>
<td>13 FLIGHT HOURS 55.00</td>
<td></td>
</tr>
<tr>
<td>14 FLIGHT INST. HOURS 25.00</td>
<td></td>
</tr>
<tr>
<td>15 INST. TR. PERIOD 2.00</td>
<td></td>
</tr>
<tr>
<td>16 LSD RATIO 15.00</td>
<td></td>
</tr>
<tr>
<td>17 MAINTAINENCE MEN 6.42</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 29
TRAINING PIPELINE INFORMATION FOR NAVY OFFICERS

<table>
<thead>
<tr>
<th>PHASE NO.</th>
<th>PHASE NAME</th>
<th>ATTENTION RATE</th>
<th>FOLLOWING PHASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRIMARY</td>
<td>0.0900</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>FLIGHT SYS.</td>
<td>0.0270</td>
<td>4, 7</td>
</tr>
<tr>
<td>4</td>
<td>BASIC JET-A</td>
<td>0.0500</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>BASIC JET-B</td>
<td>0.0200</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>B-JET 6/20</td>
<td>0.0200</td>
<td>8</td>
</tr>
<tr>
<td>7</td>
<td>BASIC PROP</td>
<td>0.1400</td>
<td>9, 10</td>
</tr>
<tr>
<td>8</td>
<td>B-PROP 60</td>
<td>0.0040</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>ADV PROP</td>
<td>0.0080</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>PRE HELO</td>
<td>0.0050</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>HEL O PRIM</td>
<td>0.0020</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>HEL O ADV</td>
<td>0.0020</td>
<td></td>
</tr>
</tbody>
</table>
2.42 Note that Table 29 differs from Table 3 above. The training phases, Advanced Jet-TA and Advanced Jet-TF, are deleted in Table 29 and the remaining phases are renumbered to make the data consistent with Table 26.

2.43 When a list of the training phases in a particular training pipeline is printed, according to the user's affirmative response to question 4, question 4b is printed.

**PIPELINE NAVY OFFICER**

ANY DELETIONS, ADDITIONS, LISTS OR MODIFICATIONS (Y,N)? Y

This question asks the user whether any modification should occur in the training pipeline currently stored in the computer memory. With a No response, dialogue 5 is conducted, and the user enters the appropriate training phase PTRs (see question 5 above). The next training pipeline is entered and question 4b is repeated.

2.44 Question 4c follows a Yes response to question 4b.

DETERMINE ANY PHASES (Y,N)? Y

When the user wishes to delete a training phase from the training pipeline, he gives a Yes response; otherwise, question 4e follows. To delete a phase from the pipeline, the user need only enter the phase number, as shown in question 4d.

ENTER PHASE NUMBERS (XX)

ENTER 0, FOR NO FURTHER DELETIONS?

This response will cause Basic Jet G/CQ to be deleted from the training pipeline. The process of deletion continues until the user terminates it by giving the following response to question 4d.

NEXT?

When this response is given, question 4e is printed.

ADD A NEW PHASE (Y,N)? Y
If the user does not wish to add a training phase to the pipeline, he types a No, and question 4h follows. Otherwise, question 4f is printed, followed by 4g after 4f receives a response.

ENTER NUMBER OF NEW PHASE (XX)? 13  (4f)

ENTER FOLLOWING PHASES AND ATTRITION RATE (XX,XX,XX,XXX) ALL DATA FIELDS MUST BE ENTERED? 0,0,0,.01  (4g)

The above response to 4f indicates that training phase 13 is to be included in the pipeline. In addition, the response to question 4g instructs the computer that phase 13 is to be a terminal pipeline phase (the "0,0,0" response means that no phases follow) with an attrition rate of 1 percent (.01).

2.45 All the desired new training phases are added to the pipeline, and then a No response is given to question 4c. Question 4h follows.

LIST PIPELINE DATA (Y,N)?Y  (4h)

A No response will cause question 4i to be printed immediately. Otherwise, a list of pipeline data will be printed first (see Table 30). Note that the table includes the training phase, Change Name, which was added following question 4f.

2.46 Training phase data can be modified in the response to question 4i.

MODIFY A PHASE (Y,N)?Y  (4i)

Following a No response to question 4i, the automated LSR Generator returns to question 4b and continues. After a Yes response, question 4j is printed.

ENTER PHASE NUMBER AND SWITCH (XX,X)
SWITCH = 0 - MODIFY FOLLOWING PHASES
= 1 - MODIFY ATTRITION RATE
PHASE = 0,0 IMPLIES NO FURTHER MODIFICATIONS? 13,1  (4j)

This response directs the automated system to revise the attrition rate of phase 13. Question 4k follows.

ENTER ATTRITION RATE (.XXX)? .OR  (4k)
### TABLE 30
**TRAINING PIPELINE WHEN NEW PHASE IS ADDED**

**TRAINING PIPELINE FOR NAVY OFFICER**

<table>
<thead>
<tr>
<th>PHASE NO.</th>
<th>PHASE NAME</th>
<th>ATTRITION RATE</th>
<th>FOLLOWING PHASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRIMARY</td>
<td>0.0900</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>FLIGHT SYS.</td>
<td>0.0270</td>
<td>4, 7</td>
</tr>
<tr>
<td>4</td>
<td>BASIC JET-A</td>
<td>0.0500</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>BASIC JET-B</td>
<td>0.0200</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>BASIC PROP</td>
<td>0.1400</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>B-PROP CO</td>
<td>0.0040</td>
<td>9, 10</td>
</tr>
<tr>
<td>9</td>
<td>ADV PROP</td>
<td>0.0080</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>PRE HEL0</td>
<td>0.0050</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>HEL0 PRIM</td>
<td>0.0020</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>HEL0 ADV</td>
<td>0.0020</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>CHANGE NAME</td>
<td>0.0100</td>
<td></td>
</tr>
</tbody>
</table>
The attrition rate of 8 percent is entered. Question 4j is again partially entered, with the user making the appropriate responses.

\[ \text{NEXT?} \text{ OS}, 0 \] (4j)

\[ \text{ENTER FOLLOWING PHASES (XX,XX,XX)?13,0,0} \] (4k)

\[ \text{NEXT?} \text{ OS}, 0 \] (4j)

When the "0,0" response is given to question 4j, the program returns to question 4b and recycles.

2.47 As an example of how the foregoing modifications affects the Navy Officer training pipeline, the following responses were given to questions 4b, 4c, 4e, and 4h.

\[ \text{PIPELINE NAVY OFFICER} \] (4b)

\[ \text{ANY DELETIONS, ADDITIONS, LISTS OR MODIFICATIONS (Y,N)?Y} \] (4c)

\[ \text{DELETE ANY PHASES (Y,N)?N} \] (4e)

\[ \text{ADD A NEW PHASE (Y,N)?N} \] (4f)

\[ \text{LIST PIPELINE DATA (Y,N)?Y} \] (4h)

These responses produced the information shown in Table 31. Note that the phases following training phase 5 and the attrition rate of phase 13 have been modified according to user specifications.

2.48 When all training pipelines have been modified and their respective phase PTRs computed, question 4l is printed.

\[ \text{ADD A NEW PIPELINE (Y,N)?Y} \] (4l)

Following a No response, the LSR summary data are printed (see Table 10 above). If he responds Yes, the user must enter the name of the new training pipeline in response to question 4m.

\[ \text{ENTER NAME OF PIPELINE (AAADDDADAAA)\text{?NEW PIPELINE}} \] (4m)
<table>
<thead>
<tr>
<th>PHASE NO.</th>
<th>PHASE NAME</th>
<th>ATTRITION RATE</th>
<th>FOLLOWING PHASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRIMARY</td>
<td>0.0900</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>FLIGHT SYS.</td>
<td>0.0270</td>
<td>4, 7</td>
</tr>
<tr>
<td>4</td>
<td>BASIC JET-A</td>
<td>0.0500</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>BASIC JET-B</td>
<td>0.0200</td>
<td>13</td>
</tr>
<tr>
<td>7</td>
<td>BASIC PROP</td>
<td>0.1400</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>B-PROP CO</td>
<td>0.0040</td>
<td>9, 10</td>
</tr>
<tr>
<td>9</td>
<td>ADV PROP</td>
<td>0.0080</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>PRE HELO</td>
<td>0.0050</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>HELO PRIM</td>
<td>0.0020</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>HELO ADV</td>
<td>0.0020</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>CHANGE NAME</td>
<td>0.0800</td>
<td></td>
</tr>
</tbody>
</table>

TABLE 31
MODIFIED TRAINING PIPELINE

TRAINING PIPELINE FOR NAVY OFFICER
The system recycles to question 4f and continues with the training pipeline modification process.

**Level of Complexity of 2 — Constrain LSR Output**

With level 2 complexity, the user may measure the impact of limited training resources on each phase in the pilot training program. When this level of complexity is selected, the automated LSR Generator processes all normal dialogues through question 6 (see Normal Operating Procedures above). Instruction 6a is then printed.

**ANY LSR OUTPUT CONSTRAINTS (Y,N)?** 

(6a)

Receiving a No response to question 6a, the LSR Generator proceeds with question 7 above. A Yes response means the user wishes to determine the impact of scarce training resources on a training phase. Question 6b is then printed.

**WHICH PHASE (XX)? 10**

(6b)

In response to question 6b, the user selects the training phase to be constrained. He enters the phase number and a detailed LSR output for the training phase is then printed (see Table 32).

2.50 Question 6c is then printed.

**SELECT APPROPRIATE FIELD AND ELEMENT (X,X)**

1 AIRCRAFT
2 FLIGHT INSTRUCTORS
3 ENLISTED SUPPORT
4 ACADEMIC INSTRUCTORS?1,1

(6c)

The appropriate field is selected by specifying one of the four items listed in question 6c. The element number is the item in the data field to be constrained. In the above response, the number of aircraft in phase 10 are to be constrained. Element number 1 refers to the first aircraft type printed in the detailed LSR printout. After the field and element number have been entered, question 6d is printed.

**ENTER CONSTRAINING VALUE (XXXX.XXX)?**

(6d)

2/ Note that Basic Prop CQ contains only one aircraft type, the T-28C. If another aircraft type had existed in the phase, i.e., the T-34B, the user could constrain either aircraft type by selecting an element of 1 or 2.
TABLE 32
DETAILED LSR OUTPUT BASIC PROP CQ
(UNCONSTRAINED OUTPUT)

<table>
<thead>
<tr>
<th>NAME OF PHASE B-PROP CQ</th>
<th>STUDENT INPUT 1467</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUDENT OUTPUT 1460.</td>
<td></td>
</tr>
<tr>
<td>AVERAGE STUDENT LOAD 117</td>
<td></td>
</tr>
<tr>
<td>ADMINISTRATIVE OFFICERS 12</td>
<td></td>
</tr>
<tr>
<td>TOTAL OFFICERS 45.</td>
<td></td>
</tr>
<tr>
<td>TOTAL ENLISTED 238.</td>
<td></td>
</tr>
<tr>
<td>AIRCRAFT TYPES T28C</td>
<td></td>
</tr>
<tr>
<td>NUMBER REQUIRED 36.</td>
<td></td>
</tr>
<tr>
<td>FUEL TYPES AGAS</td>
<td></td>
</tr>
<tr>
<td>GALLONS CONSUMED 0.111E+07</td>
<td></td>
</tr>
<tr>
<td>FLIGHT INSTRUCTORS 20.</td>
<td></td>
</tr>
<tr>
<td>UNDER TRAINING 2.</td>
<td></td>
</tr>
<tr>
<td>LSO REQUIREMENTS 12.</td>
<td></td>
</tr>
<tr>
<td>ENLISTED SUPPORT 238.</td>
<td></td>
</tr>
</tbody>
</table>
The user is now required to enter the available amount of that particular training resource. The automated LSR Generator then computes the maximum phase PTR which could be obtained if the resource constraint specified by the user were the only constraint in effect. This PTR, as well as the computer PTR, are printed in question 6e.

OLD STUDENT OUTPUT 1460.
CONSTRAINED OUTPUT 1130.

ADDITIONAL CONSTRAINTS (Y,N)?Y

(6e)

Following a No response, the automated program prints instruction 6f. The following responses to questions 6c, 6d, and 6e show how the user may constrain flight instructors and enlisted support.

SELECT APPROPRIATE FIELD AND ELEMENT (X,X)?2,1 (6c)

ENTER CONSTRAINING VALUE (XXXX,XXX)?19 (6d)

OLD STUDENT OUTPUT 1460.
CONSTRAINED OUTPUT 1270.

ADDITIONAL CONSTRAINTS (Y,N)?Y (6e)

SELECT APPROPRIATE FIELD AND ELEMENT (X,X)?3,1 (6c)

ENTER CONSTRAINING VALUE (XXXX,XXX)?200 (6d)

OLD STUDENT OUTPUT 1460.
CONSTRAINED OUTPUT 1229.

ADDITIONAL CONSTRAINTS (Y,N)?N (6e)

2.51 Question 6f is printed when the user indicates that no further constraints will be observed.

NEW LSR SUMMARY FOR R-PROP CO (Y,N)?Y (6f)

A Yes response instructs the automated system to print a detailed LSR output which does not violate the most rigid constraint on a training resource (see
Table 33). Note that three constraints are imposed on Basic Prop CO, i.e., limitations on aircraft, flight instructors, and enlisted personnel. The detailed constrained output in Table 33 does not violate any of these resource limitations.

2.52 When the detailed LSR output has been printed or when a No response has been given to question 6f, question 6g is printed.

ANOTHER PHASE CONSTRAINED (Y,N)?N

(6g)

A Yes response instructs the automated system to return to question 6b and continue. Following a No response, question 6h is printed.

REVISE LSR TO INCLUDE CONSTRAINTS (Y,N)?N

(6h)

A No response to question 6h returns the automated LSR Generator to normal operations, and the computer prints normal operations question 7. A Yes response indicates that all training phase PTRs must be revised so that limited training resources are not exceeded. The automated LSR Generator returns to question 4 to permit the user to revise the pilot training rates for all training pipelines.
<table>
<thead>
<tr>
<th>NAME OF PHASE B-PROP CQ</th>
<th>STUDENT INPUT 1135.</th>
</tr>
</thead>
<tbody>
<tr>
<td>STUDENT OUTPUT 1130.</td>
<td></td>
</tr>
<tr>
<td>AVERAGE STUDENT LOAD</td>
<td>91.</td>
</tr>
<tr>
<td>ADMINISTRATIVE OFFICERS</td>
<td>9.</td>
</tr>
<tr>
<td>TOTAL OFFICERS</td>
<td>35.</td>
</tr>
<tr>
<td>TOTAL ENLISTED</td>
<td>184.</td>
</tr>
<tr>
<td>AIRCRAFT TYPES</td>
<td>T26C</td>
</tr>
<tr>
<td>NUMBER REQUIRED</td>
<td>28.</td>
</tr>
<tr>
<td>FUEL TYPES</td>
<td>AGAS</td>
</tr>
<tr>
<td>GALLONS CONSUMED</td>
<td>0.856E+06</td>
</tr>
<tr>
<td>FLIGHT INSTRUCTORS</td>
<td>16.</td>
</tr>
<tr>
<td>UNDER TRAINING</td>
<td>1.</td>
</tr>
<tr>
<td>LS0 REQUIREMENTS</td>
<td>9.</td>
</tr>
<tr>
<td>ENLISTED SUPPORT</td>
<td>184.</td>
</tr>
</tbody>
</table>
III. DIAGNOSTIC MESSAGES

3.1 The automated IFRS system is designed and programmed to provide the user with substantial on-line flexibility through numerous questions and operating instructions presented at critical points during system operation. For example, when the training phase resource requirements have been displayed (LSR summary), the user may wish to measure their impact on a particular training phase's PTR by limiting or constraining certain resources. In another case, after finding the required facility investments for an NAS, accepting only standard facilities, the user may wish to compare this investment with one for which substandard facilities are also acceptable.

3.2 When a system relies repeatedly on the man-machine interface (conversational mode), the likelihood of typographical, transmission, and other types of errors increases greatly. To partially alleviate the erroneous model outputs which result from interface errors, the automated IFRS system checks every response supplied by the user. Two types of checks are conducted: response data are absolutely tested for validity, i.e., should a Yes or No response be required and any other character be recognized, an absolute error exists; and response data are relatively checked for validity, i.e., should the user enter a tour of duty length of 60 months, the system detects that this tour length is longer than normal.

3.3 Table 34 presents all diagnostic messages (error conditions) which can arise during the operation of the automated IFRS system. Along with each diagnostic message is a brief description defining the error condition and the required user action. It should be noted that most diagnostic messages are self-explanatory.
**TABLE 34**

IFRS DIAGNOSTIC MESSAGES

<table>
<thead>
<tr>
<th>Diagnostic Message</th>
<th>Description</th>
<th>Required User Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVALID REPLY–REPEAT</td>
<td>The data value entered in response to the previous question is not correct or in bad format</td>
<td>Reply again to previous question</td>
</tr>
<tr>
<td>INVALID DATA–REPEAT</td>
<td>Either the LSR data base or the current training pipeline contain no training phases</td>
<td>New training phases must be added to LSR data base</td>
</tr>
<tr>
<td>INVALID DATA–TRY AGAIN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAD REPLY–RETYPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INVALID REPLY–RETYPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BAD FORMAT–TRY AGAIN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO PHASES IN PIPELINE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 PHASES IN PIPELINE</td>
<td>The LSR data base contains the maximum number of training phases. Phase deletions must occur before a new phase is added</td>
<td>Information only; program continues</td>
</tr>
<tr>
<td>PREVIOUS OPTION NOT PROCESSED</td>
<td>User did not enter any phase numbers to exercise the previously specified option</td>
<td>Information only; program continues</td>
</tr>
<tr>
<td>COMMA MISSING REPEAT</td>
<td>Data entered in bad format</td>
<td>Respond again to previous question</td>
</tr>
<tr>
<td>MAX. FOR FIELD IS 3–FIELD SET TO 0</td>
<td>A maximum of three aircraft or academic instruction types may exist for each training phase. A value greater than 3 was detected. The automated system assumes the correct value to be 0</td>
<td>Information only; program continues</td>
</tr>
<tr>
<td>DATA POINT XXXX.XXXX EXCEEDS RANGE OF 0.0–XXX. ACCEPT (Y,N)</td>
<td>The data value for the previously printed data field exceeds the expected range for this data point</td>
<td>Accept data value or enter new value</td>
</tr>
<tr>
<td>Diagnostic Message</td>
<td>Description</td>
<td>Required User Action</td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>MAXIMUM PHASES IN PIPELINE</td>
<td>The current training pipeline contains all training phases. No new phases may be added</td>
<td>Information only; program continues</td>
</tr>
<tr>
<td>PHASE IN PIPELINE</td>
<td>The training phase the user is attempting to enter currently exists in the training pipeline</td>
<td>Information only; program continues</td>
</tr>
<tr>
<td>PIPELINE LOGIC ERROR—ALL PHASES DELETED</td>
<td>A logic error exists in the current training pipeline</td>
<td>New training phases must be added to training pipeline</td>
</tr>
<tr>
<td>ALL PHASES DELETED</td>
<td>The training phase number exceeds the number of phases in the data base</td>
<td>Phase deleted; program continues</td>
</tr>
<tr>
<td>XX IS AN INVALID PHASE</td>
<td>The previous phase number entered does not exist in the training pipeline or in the ISR data base</td>
<td>Reply again to the previous question</td>
</tr>
<tr>
<td>PHASE NOT IN PIPELINE</td>
<td>The PTRs entered are not sufficient to compute the PTR for all training phases</td>
<td>Re-enter all PTR data</td>
</tr>
<tr>
<td>INSUFFICIENT DATA TO COMPUTE STUDENT STATISTICS</td>
<td>The training phase selected for ISR output constraints is not used for pilot training</td>
<td>Program recycles</td>
</tr>
<tr>
<td>RE-ENTER STUDENT ASSIGNMENTS OR RERUN</td>
<td>Inconsistency exists between runway data base and LSR data base</td>
<td>Program terminated</td>
</tr>
<tr>
<td>PHASE CONTAINS NO ACTIVITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RUNWAY PHASE NAME AAA DOES NOT MATCH PHASE NAME AAA .</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REVISE AND RERUN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RUNWAY AIRCRAFT TYPES OF XX DOES NOT MATCH PHASE TYPES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OF XX FOR PHASE AAA . REVISE AND RERUN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR PHASE AAA AIRCRAFT NAMES DO NOT MATCH PHASE AIRCRAFT NAME AAA , AAA . REVISE AND RERUN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic Message</td>
<td>Description</td>
<td>Required User Action</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>RUNWAY DATA FILE IS INCOMPLETE—UPDATE AND RERUN</td>
<td>No aircraft types exist for a training phase in the Runway Data File</td>
<td>Program terminated</td>
</tr>
<tr>
<td>MAX NO. OF RUNWAY TYPES EXCEEDED PROGRAM ABORT</td>
<td>More than the maximum of 10 runway types are required at a training base</td>
<td>Program terminated</td>
</tr>
<tr>
<td>RUNWAY REQUIREMENTS EXCEED AVAILABLE TABLE SPACE PROGRAM ABORT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERCENT MUST BE LESS THAN 1.0—TRY AGAIN THE VALUE XX GIVEN FOR PERCENT CANNOT EXCEED 1</td>
<td>Value entered must be less than 1.0</td>
<td>Reply again with correct value</td>
</tr>
<tr>
<td>FUEL IN PHASE XX IS OF UNKNOWN TYPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INCORRECT BASE CODE—TRY AGAIN</td>
<td>The name of the base previously entered is invalid</td>
<td>Program recycles</td>
</tr>
<tr>
<td>PHASE XX HAS BEEN OVERASSIGNED REALLOCATE THIS PHASE</td>
<td>More than 100 percent of the training phase printed has been allocated to the training base(s)</td>
<td>Allocation assumed to be zero. User must reallocate phase</td>
</tr>
<tr>
<td>PHASE XX HAS NOT BEEN ASSIGNED OR IS ONLY PARTLY ASSIGNED</td>
<td>Only partial assignment of the printed training phase has been made</td>
<td>Assign remainder of training phase</td>
</tr>
<tr>
<td>UNRECOGNIZED A/C TYPE IN RUNWAY COMPUTATIONS AAA</td>
<td>Aircraft does not appear in aircraft data base</td>
<td>Program terminated</td>
</tr>
</tbody>
</table>
IV. FILE UPDATE PROCEDURES

4.1 The automated IFRS system requires the use of eight data files during a normal computer run. The files have been assigned the following names and incorporate the following information:

- BASCAS—Training phase data used by LSR Generator
- PIPE—Pipeline data for each training pipeline
- RUNDAT—Runway data for each training phase
- RPIFI*—Inventory of facilities for all bases
- ACDAT*—Aircraft data
- BASED*—Base dependent parameters
- INVCO*—Cost data for facilities
- TABLE*—Various tables for computing facility requirements.

These data files were created in a manner which provides the user with maximum ease and flexibility in updating. To update most data files, the user selects the line number of the appropriate data element(s) to be updated, enters the line number and data element(s), and replaces the data file.

4.2 The following paragraphs describe each data file and the procedures required to update it. When the user may update a data file in more than one way, i.e., on-line as well as off-line, both procedures are presented. In off-line data file updates, it should be noted that “free format” is to be assumed unless otherwise specified. Thus, data entries need only be separated by a comma or a space, rather than follow strict FORTRAN format.1/

DATA FILE BASCAS

4.3 Data File BASCAS contains all data associated with each phase of pilot training. This data file may be updated in the course of a computer run by selecting an LSR of level 3 complexity (see Extended Operations above). After all modifications have been made, the user responds Yes to question 31 above. When the computer run has been completed, Data File SAVBCS is renamed BASCAS and the new file replaced. When a new phase is added, Data File RUNDAT must include the new phase.

Off-Line Update of BASCAS

4.4 Four types of data must be present in Data File BASCAS: alphabetic constants, expected maximum values for training phase data points, the number of training phases in the data base, and training phase description data.

4.5 Alphabetic Constants. Alphabetic constants are particular characters used for comparative purposes with user responses and for blanking print fields. Table 35 describes these characters and their associated formats.

<table>
<thead>
<tr>
<th>Character</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Line number (must be lowest four-digit number in data file)</td>
</tr>
<tr>
<td>6</td>
<td>A1</td>
<td>N - character &quot;N&quot;</td>
</tr>
<tr>
<td>7</td>
<td>A1</td>
<td>Y - character &quot;Y&quot;</td>
</tr>
<tr>
<td>8</td>
<td>A1</td>
<td>. - character &quot;,&quot;</td>
</tr>
<tr>
<td>9-12</td>
<td>A4</td>
<td>44444 - four blank spaces</td>
</tr>
</tbody>
</table>

4.6 Expected Maximum Values for Training Phase Data. These data values are the respective maximum values a user expects for the training phase data. If any training phase data point exceeds its respective maximum, a diagnostic message will be produced. Note that these maximum values are independent of training phases. A description of the data characters and their formats appears in Table 36.
### Table 36
DATA FILE BASCAS MAXIMUM VALUES FOR TRAINING PHASE DATA

<table>
<thead>
<tr>
<th>Character</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Line number (larger than previous line number)*</td>
</tr>
<tr>
<td>6-</td>
<td>FREE**</td>
<td>BMAX(1), Maximum attrition point</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(2), Maximum phase duration</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(3), Maximum tour of duty for academic and flight instructor in months</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(4), Maximum percentage flyable weather</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>BMAX(5), Maximum hourly fuel consumption rate</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(6), Maximum hours per day an aircraft may be utilized</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(7), Maximum hours per day a flight instructor may be utilized</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(8), Maximum number of flight hours to train a student</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>BMAX(9), Maximum number of flight instructor hours to train a student</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(10), Maximum number of months a flight instructor will be trained before he is assigned students</td>
</tr>
</tbody>
</table>

* Note that line number are restricted only in that they must be in ascending order.

** FREE format requires only that data fields must be separated by a comma or a space. Zero values must be typed as 0. In the above example, the line number is separated from the first data field by a space. A comma would have given identical results.
<table>
<thead>
<tr>
<th>Character</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(11), Maximum ratio of students to landing support officers</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(12), Maximum direct enlisted maintenance personnel per aircraft</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>BMAX(13), Maximum number of academic instruction hours required to train a student</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(14), Maximum annual student hours an academic instructor can instruct</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>BMAX(15), Maximum number of months an academic instructor will be trained before he is assigned students</td>
</tr>
</tbody>
</table>
4.7 **Number of Training Phase.** The training phase numbers kept in Data File BASCAS are described in Table 37.

**TABLE 37**

<table>
<thead>
<tr>
<th>Character</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>14</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Number of training phases to follow in this data file</td>
</tr>
</tbody>
</table>

4.8 **Training Phase Description Data.** Training phase description data are entered on a phase by phase basis, i.e., a complete description for the first phase is entered before data associated with the second phase are begun. Note in the description of these data in Table 38 that 15 lines of data are required to define a single training phase. All training phase description data must be entered for each training phase. Table 39 provides a list of the data currently contained in BASCAS.

**DATA FILE PIPE**

4.9 Data file PIPE contains the sequence of training phases and the attrition rates associated with each training pipeline. This data file may be updated in the course of a computer run by selecting an LSR level 3 complexity (see Extended Operations above). The user must also request that the modified pipeline data be saved (see instruction 4a above). When the computer run is complete, data file PIPES is renamed PIPE and replaced.

**Off-Line Update of PIPE**

4.10 Three types of data exist in this data file: the name of the training pipeline, phase sequences and attrition rates, and end of file data.
TABLE 38
DATA FILE BASCAS TRAINING PHASE DESCRIPTIONS

<table>
<thead>
<tr>
<th>Character</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>14</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-17</td>
<td>3A4</td>
<td>Name of training phase</td>
</tr>
<tr>
<td>18-21</td>
<td>A4</td>
<td>Name of first aircraft type</td>
</tr>
<tr>
<td>22-25</td>
<td>A4</td>
<td>Name of second aircraft type</td>
</tr>
<tr>
<td>26-29</td>
<td>A4</td>
<td>Name of third aircraft type</td>
</tr>
<tr>
<td>30-33</td>
<td>A4</td>
<td>Fuel consumed by first aircraft type</td>
</tr>
<tr>
<td>34-37</td>
<td>A4</td>
<td>Fuel consumed by second aircraft type</td>
</tr>
<tr>
<td>38-41</td>
<td>A4</td>
<td>Fuel consumed by third aircraft type</td>
</tr>
<tr>
<td>42-45</td>
<td>A4</td>
<td>Name of first type of academic instruction</td>
</tr>
<tr>
<td>46-49</td>
<td>A4</td>
<td>Name of second type of academic instruction</td>
</tr>
<tr>
<td>50-53</td>
<td>A4</td>
<td>Name of third type of academic instruction</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Number of aircraft types in training phase</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Number of academic instruction types in phase</td>
</tr>
<tr>
<td>1-4</td>
<td>14</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Average attrition point for a student attrite</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Phase duration in weeks</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Tour of duty for academic and flight instructors</td>
</tr>
<tr>
<td>1-4*</td>
<td>14</td>
<td>Next line number</td>
</tr>
</tbody>
</table>

* Note that for the remaining data fields, three values must be entered. Should less than the three values be required for phase definitions, enter zeros for the nonapplicable items.
<table>
<thead>
<tr>
<th>Character</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Percent flyable weather for each aircraft type (three values must be entered)</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Fuel consumption rate for each aircraft type in gallons per hour</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Hours per day each aircraft may be utilized</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Hours per day a flight instructor can be utilized for flight training for each aircraft type</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Average number of flight hours for a successfully trained student for each aircraft type</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Average number of flight instructor hours for a successfully trained student for each aircraft type</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Time in months required to train a flight instructor before he can instruct students</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Ratio of students on board to landing support officers for each aircraft type</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Number of direct enlisted maintenance personnel required to support one aircraft</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>Character</td>
<td>Format</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Number of academic hours per student for each academic instruction type</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Annual student hours an academic instructor can instruct for each academic instruction type</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Time in months an academic instructor must be trained before he can instruct students</td>
</tr>
</tbody>
</table>
### TABLE 39
**DATA FILE BSCAS**

| 1000 NY  | 1000 NY, |
| 0.100000E+01 | 0.100000E+01 |
| 0.156000E+03 | 0.480000E+02 |
| 0.100000E+01 | 0.100000E+01 |
| 0.240000E+02 | 0.240000E+02 |
| 1005 T34B AGAS ACAD | 1005 T34B AGAS ACAD |
| 10 | 1 |
| 0.500000E+00 | 0.600000E+01 |
| 0.782000E+00 | 0.782000E+00 |
| 0.126000E+02 | 0.126000E+02 |
| 0.420000E+01 | 0.420000E+01 |
| 0.301000E+01 | 0.301000E+01 |
| 0.326000E+02 | 0.326000E+02 |
| 0.292000E+02 | 0.292000E+02 |
| 0.200000E+01 | 0.200000E+01 |
| 0.100000E+01 | 0.100000E+01 |
| 0.255000E+01 | 0.255000E+01 |
| 0.500000E+02 | 0.500000E+02 |
| 0.700000E+03 | 0.700000E+03 |
| 0.300000E+01 | 0.300000E+01 |
| 0.546000E+01 | 0.546000E+01 |
| 0.489000E+03 | 0.489000E+03 |
| 0.700000E+03 | 0.700000E+03 |
| 0.300000E+01 | 0.300000E+01 |
| 0.716000E+01 | 0.716000E+01 |
| 0.200000E+03 | 0.200000E+03 |
| 0.700000E+03 | 0.700000E+03 |
| 0.300000E+01 | 0.300000E+01 |
| 1010 JP-4 ACAD | 1010 JP-4 ACAD |
| 0.100000E+04 | 0.100000E+04 |
| 0.100000E+04 | 0.100000E+04 |
| 0.500000E+02 | 0.500000E+02 |
| 0.500000E+02 | 0.500000E+02 |
| 0.100000E+04 | 0.100000E+04 |
| 0.480000E+02 | 0.480000E+02 |
| 1015 | 14 |
| 1020 | 14 |
| 1025 | 14 |
| 1030 PRIMARY T34B AGAS ACAD | 1030 PRIMARY T34B AGAS ACAD |
| 1035 | 10 |
| 1040 | 10 |
| 1045 | 10 |
| 1050 | 10 |
| 1055 | 10 |
| 1060 | 10 |
| 1065 | 10 |
| 1070 | 10 |
| 1075 | 10 |
| 1080 | 10 |
| 1085 | 10 |
| 1090 | 10 |
| 1095 | 10 |
| 1100 | 10 |
| 1105 AOC SCHOOL T-2A JP-4 ACAD | 1105 AOC SCHOOL T-2A JP-4 ACAD |
| 1110 | 10 |
| 1115 | 10 |
| 1120 | 10 |
| 1125 | 10 |
| 1130 | 10 |
| 1135 | 10 |
| 1140 | 10 |
| 1145 | 10 |
| 1150 | 10 |
| 1155 | 10 |
| 1160 | 10 |
| 1165 | 10 |
| 1170 | 10 |
| 1175 | 10 |
| 1180 FLIGHT SYS. T2BC JP-4 ACAD | 1180 FLIGHT SYS. T2BC JP-4 ACAD |
| 1185 | 10 |
| 1190 | 10 |
| 1195 | 10 |
| 1200 | 10 |
| 1205 | 10 |
| 1210 | 10 |
| 1215 | 10 |
| 1220 | 10 |
| 1225 | 10 |
| 1230 | 10 |
| 1235 | 10 |
| 1240 | 10 |
| 1245 | 10 |
| 1250 | 10 |
TABLE 39 (Cont)

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4.11 Name of Training Pipeline. These data are described in Table 40.

**TABLE 40**

DATA FILE PIPE PIPELINE NAME DATA

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<th>Description</th>
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<td>I4</td>
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<td>I3</td>
<td>Number of phases in the pipeline</td>
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<td>9-20</td>
<td>3A4</td>
<td>Name of training pipeline</td>
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</tbody>
</table>

4.12 Phase Sequence and Attrition Rates. These data are described in Table 41. One line is typed for each phase in the training pipeline. Note that the number of phases are specified on the previous line.

**TABLE 41**

DATA FILE PIPE PHASE SEQUENCE AND ATTRITION RATES

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<td>I4</td>
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<tr>
<td>6-</td>
<td>FREE</td>
<td>Number of the first following phase</td>
</tr>
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<td>Next</td>
<td>FREE</td>
<td>Number of the second following phase</td>
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<tr>
<td>Next</td>
<td>FREE</td>
<td>Number of the third following phase</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Number of the training phase in question. (The foregoing three entries are the numbers of the phases following the phase entered here.) The entered phase number must correspond to a phase in Data File BASCAS</td>
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<tr>
<td>Next</td>
<td>FREE</td>
<td>Attrition rate of this phase</td>
</tr>
</tbody>
</table>
4.13 **End of File.** When the user has completed entering all data for a particular training pipeline (i.e., has entered a line of pipeline name data and one or more lines of phase sequence and attrition data), other pipelines may be entered by the same procedure. There is no upper limit to the number of pipelines that may be entered. When all pipelines have been entered, an end of file line must be entered to indicate to the automated IFRS system that no additional pipelines exist. These data are described in Table 42.

<table>
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<tr>
<th>Character</th>
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*End of file designator*

4.14 Table 43 contains a list of the data currently stored in Data File PIPE.

**DATA FILE RUNDAT**

4.15 Data File RUNDAT contains all the data used in developing runway requirements. Since this data file may be lengthy for the amount of data contained in it, only off-line file update procedures are possible. Several program checks are made by the automated IFRS system to ensure compatibility between the Runway Data File and the LSR data base, and the user must be aware of the following conditions imposed on the Runway Data File:

a. Only training phases that provide flight instruction are included in Data File RUNDAT, e.g., AOC School and Flight Systems are not represented in this data file because flight instruction does not take place in either phase.

b. The sequence and names of training phases in the LSR data base (either Data File BASCAS or the internal on-line modifications) must be identical to those in the runway data base. This condition does not hold when the foregoing restriction applies, viz., for AOC School. In addition, when the user desires to add, delete, or change the names of training phases while running the automated IFRS system, an identical change must be made to the
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<th>Value3</th>
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74
Runway Data File before continuing operation. For example, if the user wishes to delete Advanced Jet-TA from the training syllabus, a prior, identical change must be made to the runway data base.

c. For each phase of training, the number of types of flight instruction and the associated aircraft names in the LSR data base must exactly correspond to those in the runway data base. For example, if an advanced jet phase utilizing two aircraft types, TA-4J and TF-9J, existed in the LSR data base, Data File RUNDAT must also contain two aircraft types, TA-4J and TF-9J.

If these conditions are not completely met, the automated IFRS system prints an appropriate error message and terminates.

4.16 To define totally the runway data for each training phase, 13 types of data are required. These data values are entered phase by phase following the sequence of the phases. The data described in Table 44 constitute Data File RUNDAT.

4.17 Data in the formats shown in Table 44 are entered for all training phases within the foregoing restrictions. Table 45 contains a list of the data currently stored in Data File RUNDAT.
### TABLE 44
DATA FILE RUNDAT ELEMENTS

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<thead>
<tr>
<th>Character</th>
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<tbody>
<tr>
<td><strong>Phase Designator</strong></td>
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</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Line number (any four-digit line number)</td>
</tr>
<tr>
<td>6-8</td>
<td>I3</td>
<td>Number of aircraft types in a certain phase of training (see condition c above)</td>
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<tr>
<td>9-20</td>
<td>3A4</td>
<td>Name of the training phase (see conditions a and b above)</td>
</tr>
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<td>21-24</td>
<td>A4</td>
<td>Name of first aircraft type</td>
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<td>25-28</td>
<td>A4</td>
<td>Name of second aircraft type</td>
</tr>
<tr>
<td>29-32</td>
<td>A4</td>
<td>Name of third aircraft type</td>
</tr>
<tr>
<td><strong>Daylight Flight Hours</strong></td>
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<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Monthly daylight hours for the first 6 months of the year (six values)</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Monthly daylight hours for the second 6 months of the year (six values)</td>
</tr>
<tr>
<td><strong>Runway Down Time</strong></td>
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</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Percent of flyable time the main runway is down due to repairs, missed approaches, nontraining flights, etc. Also included is the percent of time the main runway is being utilized for non-OLF touch-and-go sorties.</td>
</tr>
<tr>
<td><strong>Weather Factors by Aircraft Type</strong></td>
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<td>1-4</td>
<td>I4</td>
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<tr>
<td>6-</td>
<td>FREE</td>
<td>Percent monthly flyable weather for the first 6 months (six values)</td>
</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Percent monthly flyable weather for the second 6 months (six values)</td>
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</table>

* Monthly weather factors are entered by aircraft type. This data entry is repeated for all aircraft types specified in data for Phase Designator.
<table>
<thead>
<tr>
<th>Character</th>
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<tr>
<td><strong>Sorties per Student</strong></td>
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<td>1-4</td>
<td>I4</td>
<td>Next line</td>
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<tr>
<td>6-</td>
<td>FREE</td>
<td>Average number of sorties flown by each successful student**</td>
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<tr>
<td><strong>Sortie Length</strong></td>
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<td>1-4</td>
<td>I4</td>
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<tr>
<td>6-</td>
<td>FREE</td>
<td>Length of time in hours of the average sortie**</td>
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<td><strong>Launch time</strong></td>
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<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Average time in hours to launch an aircraft**</td>
</tr>
<tr>
<td><strong>Recovery time</strong></td>
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</tr>
<tr>
<td>1-4</td>
<td>I4</td>
<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Average time in hours to recover an aircraft**</td>
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<tr>
<td><strong>Airspace</strong></td>
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<td>1-4</td>
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<td>Next line number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Maximum number of aircraft which can simultaneously be aloft without saturating the airspace**</td>
</tr>
</tbody>
</table>

** Three data values must be entered. The first, second, and third values correspond to the first, second, and third aircraft types, respectively. When fewer than three aircraft types exist, the remaining data fields should contain single zeros. Incomplete entries will produce an error condition.
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<thead>
<tr>
<th>Character</th>
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<tr>
<td>6-</td>
<td>FREE</td>
<td>Average number of touch-and-go landings accomplished by each successful student**</td>
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<td><strong>Touch-and-Go Time</strong></td>
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<td>Average time in hours to perform a touch-and-go landing**</td>
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<td>Percent of all touch-and-go landings performed at the NAS**</td>
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<td>Average number of air-to-ground target approaches accomplished by a successfully trained student**</td>
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<td>Average time in hours a student spends over a target area**</td>
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| TABLE 45  
DATA FILE RUNDAT |
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| 1015 0.1500 0.5000 |
| 1020 0.6300 0.6500 0.6900 0.7500 0.8400 0.8300 |
| 1025 0.8700 0.8300 0.8600 0.8800 0.7500 0.6800 |
| 1030 0.27000E+02 0. |
| 1035 0.13000E+01 0. |
| 1040 0.76389E-02 0. |
| 1045 0.12152E-01 0. |
| 1050 0.10900E+03 0. |
| 1055 0.90000E+01 0. |
| 1060 0.14583E-01 0. |
| 1065 0.50000E-01 0. |
| 1070 0. |
| 1075 0.83333E-01 0. |
| 1080 1BASIC JET-A T2A |
| 1095 0.1500 0.5000 |
| 1100 0.5900 0.6300 0.7800 0.8200 0.8800 0.8500 |
| 1105 0.9000 0.9100 0.8100 0.8600 0.7500 0.7700 |
| 1110 0.48000E+02 0. |
| 1115 0.14300E+01 0. |
| 1120 0.82986E-02 0. |
| 1125 0.15833E-01 0. |
| 1130 0.56000E+02 0. |
| 1135 0.16000E+02 0. |
| 1140 0.19000E-01 0. |
| 1145 0.50000E-01 0. |
| 1150 0. |
| 1155 0.83333E-01 0. |
| 1160 1BASIC JET-B T2BC |
| 1175 0.1500 0.5000 |
| 1180 0.6000 0.6500 0.8000 0.8400 0.9000 0.8700 |
| 1185 0.9200 0.9400 0.8300 0.8900 0.7600 0.7900 |
| 1190 0.38000E+02 0. |
| 1195 0.14700E+01 0. |
| 1200 0.82986E-02 0. |
| 1205 0.15833E-01 0. |
| 1210 0.56000E+02 0. |
| 1215 0.13000E+02 0. |
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| 1230 0. |
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80
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<td>1945</td>
</tr>
<tr>
<td>1950</td>
</tr>
<tr>
<td>1955</td>
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</tbody>
</table>
ASSET POSITION DATA FILE

4.18 The Asset Position Data File, called "RPIFI*", contains four types of information: (a) the category code, description, and unit of measurement code for each of the 30 facilities as presented in Table 46; (b) the amount of each facility, classified as standard or substandard, available at each of the nine bases considered; (c) the effective amount, length, thickness, and composition of each runway at each of the nine bases; and (d) the amount of ready fuel storage for each of three fuel types available at each base.

4.19 Each of the foregoing items can only be updated off-line. Even when no amount of a certain facility is available, a zero must be present and the line cannot be omitted. In the case of runways, 10 lines must be provided for each base. If there are fewer than 10 runways, the remaining lines must contain the proper number of zeros.

4.20 Line numbers are not sequential. Each line number serves as a code for referencing the exact item desired. This coding is described in Table 47 for each type of item. The NAS code numbers stored in this data file are listed in Table 48, and the runway thickness factors used appear in Table 49.

4.21 Table 50 contains a list of the data currently stored in data file RPIFI*.

AIRCRAFT DATA FILE

4.22 The Aircraft Data File, called "ACDAT*", contains 18 items of information for each of the 21 aircraft types considered in the IFRS model. These items are broken down into the following lines of information for each aircraft type.

a. Aircraft name (1 item)
b. Parking apron data (4 items)
c. Hangar data (4 items)
d. Warehouse data (3 items)
e. Required runway data (3 items)
f. Cost data (2 items)
g. Inventory (1 item).

This list is modified slightly for aircraft types 16 through 21, which are generic types used for tenant aircraft at the various bases. The same number of items is required for these aircraft, but the items differ from those required for the
<table>
<thead>
<tr>
<th>Internal Facility Number</th>
<th>Category Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>01320</td>
<td>Aircraft Parking Apron</td>
</tr>
<tr>
<td>02</td>
<td>12540</td>
<td>Distribution Pipeline</td>
</tr>
<tr>
<td>03</td>
<td>14140</td>
<td>Aircraft Operations Building</td>
</tr>
<tr>
<td>04</td>
<td>17110</td>
<td>Academic Building</td>
</tr>
<tr>
<td>05</td>
<td>21110</td>
<td>Maintenance Hangar</td>
</tr>
<tr>
<td>06</td>
<td>21910</td>
<td>Public Works Maintenance Shop</td>
</tr>
<tr>
<td>07</td>
<td>04210</td>
<td>General Warehouse</td>
</tr>
<tr>
<td>08</td>
<td>55010</td>
<td>Dispensary</td>
</tr>
<tr>
<td>09</td>
<td>61010</td>
<td>Administrative Offices</td>
</tr>
<tr>
<td>10</td>
<td>71110</td>
<td>Family Housing</td>
</tr>
<tr>
<td>11</td>
<td>72210</td>
<td>Enlisted Men's Barracks</td>
</tr>
<tr>
<td>12</td>
<td>72310</td>
<td>Enlisted Mess</td>
</tr>
<tr>
<td>13</td>
<td>72415</td>
<td>BOQ</td>
</tr>
<tr>
<td>14</td>
<td>72416</td>
<td>BOQ Mess</td>
</tr>
<tr>
<td>15</td>
<td>74014</td>
<td>Exchange</td>
</tr>
<tr>
<td>16</td>
<td>74063</td>
<td>Service Club</td>
</tr>
<tr>
<td>17</td>
<td>81160</td>
<td>Stand-by Generator</td>
</tr>
<tr>
<td>18</td>
<td>81230</td>
<td>Electric Distribution Line</td>
</tr>
<tr>
<td>19</td>
<td>83210</td>
<td>Sanitary Sewer</td>
</tr>
<tr>
<td>20</td>
<td>84210</td>
<td>Water Distribution Line</td>
</tr>
<tr>
<td>21</td>
<td>85110</td>
<td>Road</td>
</tr>
<tr>
<td>22</td>
<td>85210</td>
<td>Parking Area</td>
</tr>
<tr>
<td>23</td>
<td>87110</td>
<td>Storm Sewer</td>
</tr>
<tr>
<td>24</td>
<td>84120</td>
<td>Drainage Ditch</td>
</tr>
<tr>
<td>Internal Facility Number</td>
<td>Category Code</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>25</td>
<td>87210</td>
<td>Security Fence</td>
</tr>
<tr>
<td>26</td>
<td>00000</td>
<td>Ineligible Housing</td>
</tr>
<tr>
<td>27</td>
<td>01320</td>
<td>Peripheral Taxiway</td>
</tr>
<tr>
<td>28</td>
<td>11320</td>
<td>Total Parking Apron</td>
</tr>
<tr>
<td>29</td>
<td>04210</td>
<td>Shed Space</td>
</tr>
<tr>
<td>30</td>
<td>44210</td>
<td>Total Warehouse</td>
</tr>
</tbody>
</table>
### TABLE 47
ASSET POSITION DATA FILE DESCRIPTION

<table>
<thead>
<tr>
<th>Character</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Category Codes, Descriptions, and Unit Codes</strong></td>
</tr>
<tr>
<td>1</td>
<td>II</td>
<td>The integer, 1, is always the first character for lines of this type</td>
</tr>
<tr>
<td>2-3</td>
<td>I2</td>
<td>Two-digit number between 01 and 30 representing the internal facility number (see Table 46)</td>
</tr>
<tr>
<td>5-9</td>
<td>I5</td>
<td>Five-digit Navy category code designator for the facility. Leading zero necessary or right adjust</td>
</tr>
<tr>
<td>11-22</td>
<td>A12</td>
<td>Twelve-character description of facility</td>
</tr>
<tr>
<td>24-25</td>
<td>A2</td>
<td>Two-character units code for facility</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th><strong>Amount of Available Facility</strong></th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>II</td>
<td>Base number between 1 and 9 (see Table 48)</td>
</tr>
<tr>
<td>2-3</td>
<td>I2</td>
<td>Internal facility number (see Table 46). Leading zero necessary for 01-09</td>
</tr>
<tr>
<td>4</td>
<td>II</td>
<td>Digit 0 added to make the line a four-digit number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Amount of facility available in standard condition</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Amount of substandard facility available</td>
</tr>
</tbody>
</table>

86
### TABLE 47 (Cont)

<table>
<thead>
<tr>
<th>Character</th>
<th>Format</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Runway Assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I1</td>
<td>Base number between 1 and 9</td>
</tr>
<tr>
<td>2-3</td>
<td>I1</td>
<td>51-60, one number per runway</td>
</tr>
<tr>
<td>4</td>
<td>I1</td>
<td>Digit 0 added to make line number a four-digit number</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Effective runway availability (wind rose data)</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Length of runway in feet</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Thickness factor (see Table 49)</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Composition factor (1 for concrete, 2 for asphalt)</td>
</tr>
<tr>
<td><strong>Ready Fuel Storage</strong></td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>I1</td>
<td>Base number between 1 and 9</td>
</tr>
<tr>
<td>2-3</td>
<td>I2</td>
<td>The number 61</td>
</tr>
<tr>
<td>4</td>
<td>I1</td>
<td>The digit 0</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Amount of ready jet fuel storage in gallons</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Amount of ready avgas fuel storage</td>
</tr>
<tr>
<td>Next</td>
<td>FREE</td>
<td>Amount of ready helo fuel storage</td>
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### TABLE 48

**NAVAL AIR STATION CODE NUMBERS**

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<th>Naval Air Station Code</th>
<th>Corresponding Base Number</th>
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<td>CHAS</td>
<td>1</td>
</tr>
<tr>
<td>CORP</td>
<td>2</td>
</tr>
<tr>
<td>ELLY</td>
<td>3</td>
</tr>
<tr>
<td>KING</td>
<td>4</td>
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<tr>
<td>MERI</td>
<td>5</td>
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<tr>
<td>PENS</td>
<td>6</td>
</tr>
<tr>
<td>SAUF</td>
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<tr>
<td>WHIT</td>
<td>8</td>
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<td>PHAN</td>
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### TABLE 49

**RUNWAY THICKNESS FACTORS**

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<th>Aircraft Weight Class</th>
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<tr>
<td>AA-15, AB-15</td>
<td>2</td>
</tr>
<tr>
<td>AA-20, AB-20</td>
<td>3</td>
</tr>
<tr>
<td>AA-25, AB-25</td>
<td>4</td>
</tr>
<tr>
<td>AA-30, AB-30</td>
<td>5</td>
</tr>
<tr>
<td>AA-35</td>
<td>6</td>
</tr>
<tr>
<td>AA-45</td>
<td>7</td>
</tr>
<tr>
<td>AD-70</td>
<td>8</td>
</tr>
<tr>
<td>AD-90</td>
<td>9</td>
</tr>
<tr>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>101</td>
<td>01320, A/C PKNG APN, SY</td>
</tr>
<tr>
<td>102</td>
<td>12540, DIST PIPELINE, MI</td>
</tr>
<tr>
<td>103</td>
<td>14140, A/C 0P BLDG, SF</td>
</tr>
<tr>
<td>104</td>
<td>17110, ACADEM BLDG, SF</td>
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<tr>
<td>105</td>
<td>21110, MAINT HANGAR, SF</td>
</tr>
<tr>
<td>106</td>
<td>21910, PW MAINT SHP, SF</td>
</tr>
<tr>
<td>107</td>
<td>04210, GEN WAREHOUSE, SF</td>
</tr>
<tr>
<td>108</td>
<td>55010, DISPENSARY, SF</td>
</tr>
<tr>
<td>109</td>
<td>61010, ADMIN OFFICE, SF</td>
</tr>
<tr>
<td>110</td>
<td>71110, FAM HOUSING, UN</td>
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<tr>
<td>111</td>
<td>72210, EM BARRACKS, MN</td>
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<tr>
<td>112</td>
<td>72310, EM MESS HALL, SF</td>
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<tr>
<td>113</td>
<td>72415, B90, MN</td>
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<td>114</td>
<td>72416, B90 MESS, SF</td>
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<td>115</td>
<td>74014, EXCHANGE, SF</td>
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<tr>
<td>116</td>
<td>74063, SERVICE CLUB, SF</td>
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<tr>
<td>117</td>
<td>81160, STAND BY GEN, UN</td>
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<td>118</td>
<td>81230, ELECT DIST LN, LF</td>
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<td>119</td>
<td>83210, SANITR SEWER, LF</td>
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<td>84210, WATER DIS LN, LF</td>
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<td>121</td>
<td>85110, ROADS, MI</td>
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<tr>
<td>122</td>
<td>85210, PARKING AREA, SY</td>
</tr>
<tr>
<td>123</td>
<td>87110, STORM SEWER, LF</td>
</tr>
<tr>
<td>124</td>
<td>87120, DRAIN DITCH, LF</td>
</tr>
<tr>
<td>125</td>
<td>87210, SECURIT FENCE, LF</td>
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<tr>
<td>126</td>
<td>00000, INELIG HOUSE, UN</td>
</tr>
<tr>
<td>127</td>
<td>01320, PER TAXIWAY, SY</td>
</tr>
<tr>
<td>128</td>
<td>11320, TOT PKNG APN, SY</td>
</tr>
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<td>129</td>
<td>04210, SHED SPACE, SF</td>
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<td>44210, TOT WAREHOUSE, SF</td>
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training aircraft. Descriptions and formats of the data for both phase and training aircraft appear in Table 51. The internal aircraft code numbers used in this file are presented in Table 52.

4.23 Table 53 provides a list of the data currently contained in ACDAT*.

BASE DATA FILE

4.24 The Base Data File, called "BASED*", contains 31 pieces of information for each of the nine bases considered in the IFRS system. This information is distributed among the following nine lines in the data file for each base. The formats used are described in Table 54.

a. NAS name (1 item)
b. Parking apron depth (1 item)
c. Fuel data (6 items)
d. Classroom and student data (3 items)
e. Tenant data (3 items)
f. Family housing data (5 items)
g. Base dependent planning factors (3 items)
h. Runway factors (3 items)
i. Tenant aircraft (6 items).

In the analysis of the phantom base, the factors contained in BASED* should reflect the planned estimates for the items represented.

4.25 Table 55 provides a listing of the data currently contained in BASED*.

COST DATA FILE

4.26 The Cost Data File, "INVCO*", contains costing information for each of the facilities presently in the IFRS system. One line is specified for each of the 30 facilities now in the model. The format for each line appears in Table 56.
## TABLE 51
### AIRCRAFT DATA FILE DESCRIPTION

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<td>The integer 1</td>
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<tr>
<td>2-3</td>
<td>I2</td>
<td>Internal aircraft number (see Table 52). Numbers must be between 01 and 21. Leading 0 is required</td>
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<td>4</td>
<td>I1</td>
<td>The integer 1 (indicates type of information, i.e., aircraft name)</td>
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<tr>
<td>6-9</td>
<td>A4</td>
<td>Four-character aircraft name</td>
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<td><strong>Parking Apron Data</strong></td>
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<tr>
<td>2-3</td>
<td>I2</td>
<td>Internal aircraft number (01-21)</td>
</tr>
<tr>
<td>4</td>
<td>I1</td>
<td>The integer 2</td>
</tr>
<tr>
<td>6-</td>
<td>FREE</td>
<td>Aircraft length in feet (A)</td>
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<td>Next</td>
<td>FREE</td>
<td>Wing span in feet (B)</td>
</tr>
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<td>Next</td>
<td>FREE</td>
<td>Wing span plus aircraft spacing within column in feet (C)</td>
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<tr>
<td>Next</td>
<td>FREE</td>
<td>Taxiway width required in feet (D)</td>
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**Hangar Data**

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<tr>
<td>2-3</td>
<td>I2</td>
<td>Internal aircraft number (01-21)</td>
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<td>4</td>
<td>I1</td>
<td>The integer 3</td>
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<tr>
<td>6-</td>
<td>FREE</td>
<td>Aircraft per hangar module</td>
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<td>Next</td>
<td>FREE</td>
<td>Aircraft per crew and equipment module</td>
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<tr>
<td>Next</td>
<td>FREE</td>
<td>Aircraft per basic shop module</td>
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<tr>
<td>Next</td>
<td>FREE</td>
<td>Aircraft per supplementary shop module</td>
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<td>Character</td>
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<tr>
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<td>Internal aircraft number (01-21)</td>
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<td>4</td>
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<td>6-</td>
<td>FREE</td>
<td>Covered warehouse space required per aircraft in square feet</td>
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<td>Shed space required per aircraft in square feet</td>
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<td>FREE</td>
<td>Open storage required per aircraft in square feet</td>
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<td>FREE</td>
<td>Runway length required for landing or takeoff in feet</td>
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<td>FREE</td>
<td>Weight class factor (1-9) (see Table 49)</td>
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<td>FREE</td>
<td>Runway composition requirement (1 for concrete, 2 for asphalt)</td>
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<td><strong>Runway Data (Tenant Aircraft Only)</strong></td>
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<tr>
<td>Same as for training aircraft, except that zero is entered for runway length required</td>
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<td>FREE</td>
<td>Operation and maintenance (support) cost per flight hour in dollars</td>
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TABLE 51 (Cont)

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<td>FREE</td>
<td>Fuel type (1 for jet, 2 for avgas, 3 for helo)</td>
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</table>

|           |        | **Inventory (Training Aircraft Only)** |
| 1         | I1     | The integer 1 |
| 2-3       | I2     | Internal aircraft number (01-15) |
| 4         | I1     | The integer 7 |
| 6-        | FREE   | Total number of aircraft available to CNATRA |

<p>|           |        | <strong>Inventory (Tenant Aircraft)</strong> |
|           |        | Same as for training aircraft, except that zero is entered for total number of aircraft |</p>
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| 1174 | 375, 8, 110 |
| 1175 | 0, 1, 2 |
| 1176 | 180000, 2 |
| 1177 | 0 |
| 1181 | VR |
| 1182 | 93, 9, 117.5, 137.5, 157.5 |
| 1183 | 6, 12, 144, 24 |
| 1184 | 350, 15, 125 |
| 1185 | 0, 2, 2 |
| 1186 | 189000, 2 |
| 1187 | 0 |
| 1191 | VØ |
| 1192 | 27, 7, 37, 2, 57, 2, 77, 2 |
| 1193 | 24, 48, 144, 96 |
| 1194 | 175, 5, 50 |
| 1195 | 0, 1, 2 |
| 1196 | 5000, 2 |
| 1197 | 0 |
| 1201 | VW |
| 1202 | 40, 50, 65, 90 |
| 1203 | 6, 12, 144, 12 |
| 1204 | 900, 15, 275 |
| 1205 | 0, 2, 2 |
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107
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<td>Percent of eligible enlisted requiring family housing (1.0 = 100 percent)</td>
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<td>Percent of officers requiring family housing (1.0 = 100 percent)</td>
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<td>Percent of ineligible enlisted requiring family housing (1.0 = 100 percent)</td>
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TABLE 56
COST DATA FILE DESCRIPTIONS

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<td>I2</td>
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<td>Cost-time adjustment factor</td>
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<td>Cost-time code (this factor is not presently used in the IFRS model; hence a zero is entered for the value)</td>
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<td>FREE</td>
<td>Operation and maintenance cost per unit in dollars</td>
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4.27 Table 57 provides a list of the data which are currently contained in data file INVCO*.

FACILITY REQUIREMENTS COMPUTATION TABLES

4.28 The Facility Requirements Computations Table, "TABLE*", contains several tables used in the computation of base facility requirements. A list and description of the tables appears in Table 58.

4.29 Each of these data tables contains planning factors required in computing facility requirements. Should the user wish to generate new values for all these planning factors or simply modify one table, he may do so by running a program named TABGEN. This utility program is a part of the IFRS system and must be run as an independent program.

4.30 In running this program, the user is first asked to type either 1, to generate all tables in new form, or 2, to update one or more of the existing tables. If he enters 1, the program asks for all the tables, one at a time. The user then types the entire table, column by column. For example, in typing the table FAMESS, (a table with dimensions 7 and 2) the user would type 14 numbers corresponding to the elements in the array FAMESS in the following manner: (1, 1), (2, 1), (3, 1), (4, 1), (5, 1), (6, 1), (7, 1), (1, 2), (2, 2), (3, 2), (4, 2), (5, 2), (6, 2), (7, 2). Each item is separated from the next by a comma for as many lines as necessary, providing no line ends with a comma.
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**TABLE 57**

DATA FILE INVCO*
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</tbody>
</table>
### TABLE 58

**FACILITY REQUIREMENTS COMPUTATIONS TABLE DESCRIPTIONS**

<table>
<thead>
<tr>
<th>Table</th>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAPW</td>
<td>6</td>
<td>Maximum total floor area of public works shop for six levels of total maintenance personnel</td>
</tr>
<tr>
<td>AP</td>
<td>4, 3</td>
<td>Gross warehouse storage space factors in support of personnel</td>
</tr>
<tr>
<td>GWTAB</td>
<td>3</td>
<td>Personnel levels for determining which row of Table AP to use to determine storage requirements per man</td>
</tr>
<tr>
<td>FAMESS</td>
<td>7, 2</td>
<td>Enlisted mess hall gross dining facility floor area requirement (second column) for a total mess hall capacity not exceeding value in first column</td>
</tr>
<tr>
<td>EXCH</td>
<td>10, 2</td>
<td>Gross square foot area of exchange required (second column) for a total installation military strength not exceeding value in first column</td>
</tr>
<tr>
<td>FAEM</td>
<td>8, 2</td>
<td>Gross area in square feet required (second column) for a total base enlisted strength not exceeding the value in first column</td>
</tr>
<tr>
<td>TANKS</td>
<td>15</td>
<td>Tank sizes available for ready fuel storage in gallons</td>
</tr>
<tr>
<td>TAXITO</td>
<td>3</td>
<td>Number of turnoffs required for runways not exceeding 5500, 7500, and 10,000 feet in length, respectively</td>
</tr>
</tbody>
</table>
4.31 If the user wishes to update, he specifies which table indicated in the printout is to be updated. Having specified the table, the user types that table again, column by column. Having received the update instructions, the program responds with a request for another update. Once all updates have been completed, the user types a zero when asked which table to update to order the program to save the updated tables and halt. TABLE* cannot be updated off line.

4.32 Table 59 provides a list of the data which are currently contained in data file TABLE*.
### Table 59
#### DATA FILE TABLE *

<table>
<thead>
<tr>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.580000E+040</td>
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<tr>
<td>0.150000E+020</td>
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<tr>
<td>0.500000E+000</td>
</tr>
<tr>
<td>0.400000E+040</td>
</tr>
<tr>
<td>0.750000E+030</td>
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<tr>
<td>0.170000E+020</td>
</tr>
<tr>
<td>0.100000E+040</td>
</tr>
<tr>
<td>0.200000E+050</td>
</tr>
<tr>
<td>0.175300E+050</td>
</tr>
<tr>
<td>0.458900E+050</td>
</tr>
<tr>
<td>0.400000E+040</td>
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<td>0.100000E+050</td>
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<td>0.200000E+040</td>
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<tr>
<td>0.300000E+050</td>
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<tr>
<td>0.840000E+060</td>
</tr>
</tbody>
</table>
V. UTILITY PROGRAMS

5.1 In addition to the programs required to run the IFRS system, four utility programs were written to provide the user with easy access to listings of the following data files.

- ACFILIST
- BAFILIST
- INFILIST
- TABGEN.

The first three programs are used, respectively, to obtain listings of the data currently stored in the Aircraft Data File (ACDAT*), the Base Data File (BASED*), and the Investment Cost Data File (INVCO*). The user obtains a listing of the data stored in these files and a description of each item when he runs the appropriate utility program.

5.2 The results of running ACFILIST, BAFILIST, and INFILIST appear in Tables 60, 61, and 62, respectively. Program TABGEN is described in the foregoing discussion of updating procedures.
<table>
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<th>TABLE 60</th>
<th>ACFILIST PROGRAM</th>
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</thead>
</table>

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<th>UNIT</th>
<th>T34B</th>
<th>T28C</th>
<th>T-2A</th>
<th>T2BC</th>
<th>TF9J</th>
<th>TA4J</th>
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</thead>
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<td>35.5</td>
<td>34.5</td>
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<td>VT</td>
<td>VR</td>
<td>VØ</td>
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TABLE 60 (Cont)
TABLE 61
BAFILIST PROGRAM

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<th>PENS</th>
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<th>WHIT</th>
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