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**VALUE OF AIR FORCE EXPERIENCE
SOFTWARE PACKAGE:
A USER'S MANUAL**

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13. ABSTRACT (Maximum 200 words) In an effort to aid Air Force decision-makers in the analysis of the effects of policy changes and economic conditions on the value of Air Force experience, the Value of Air Force Experience (VAFE) software package was developed. Incorporated in VAFE are three human capital value models that can be used to value officer and enlisted experience at various levels of experience and training: (a) full investment cost method (FICM), (b) stochastic rewards valuation method (SRVM), and (c) expected net present value method (ENPVM). FICM is a measure of the present cost of replacing officer or enlisted personnel at a desired level. Estimation of SRVM values represents a monetary valuation of the future expected services to be provided by officers or enlisted personnel from continued active duty. ENPVM uses the cost aspects of FICM and the value perspective of SRVM to produce an expected present value of future service to be rendered during a given service tenure. Output for the FICM module consists of the service state (defined as year of service), replacement number, service state costs, and full replacement costs. Output for both the SRVM and ENPVM modules includes the service state, service state values and projected SRVM, or ENPVM, values. Expanded versions of both the full investment cost model and the expected net present value model, which include military compensation as a maintenance cost, were also incorporated into VAFE.			
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PREFACE

Research and development effort was accomplished as a part of project 7719, Force Acquisition and Distribution Systems, and task 771920, Manpower and Personnel Models. The purpose of this effort was to develop a software package designed for analyzing the effects of policy changes and economic conditions on the value of Air Force experience.

We wish to thank Mrs. Barbara Randall for her programming of the VAFE computer module.

VALUE OF AIR FORCE EXPERIENCE SOFTWARE PACKAGE: A USER'S MANUAL

SUMMARY

In an effort to aid United States Air Force (USAF) decision makers in the analysis of the effects of policy changes and economic conditions on the value of USAF experience, the Value of Air Force Experience (VAFE) software package was developed. This manual guides the user through each screen with an input and output example and explanation of options available. Incorporated in VAFE are three human capital value models that can be used to value officer and enlisted experience at various levels of experience and training: (1) full investment cost method, (2) stochastic rewards valuation method, and (3) expected net present value method.

The full investment cost method (FICM) is a stochastic approach which recognizes that an organization must often acquire, develop, and separate many individuals in order to gain one person at the desired level. This approach is a measure of the present cost of replacing officer or enlisted personnel at a desired level. Output for the FICM module consists of the service state (defined as year of service), replacement number, service state costs, and full replacement costs.

The stochastic rewards value method (SRVM) addresses the question of the value to be derived by the USAF from employing individuals at a specified position over some selected future horizon. Estimation of SRVM values represents a monetary valuation of the future expected services to be provided by officers or enlisted personnel from continued active duty.

The difference between the calculation of SRVM and expected net present value method (ENPVM) is the inclusion in ENPVM of all future expected costs of maintaining skills and additional training. Thus, the value associated with each level represents the monetary value of the product produced minus any costs associated with maintaining the labor input to obtain the value. Output for both SRVM and ENPVM modules includes the service state, service state values, and projected values.

INTRODUCTION

The VAFE software package is a menu-driven, user-friendly software package designed for analyzing the effects of policy changes and economic conditions on the value of USAF experience. This effort is an extension of previous research to assess the applicability of three human capital value models (Stone, et al., 1989a; Stone, et al., 1989b) to valuing officer and enlisted experience at various levels of experience and training. These three models were incorporated into the VAFE computer software package:

- 1) Full investment cost method (FICM),
- 2) Stochastic rewards valuation method (SRVM), and
- 3) Expected net present value method (ENPVM).

Expanded versions of both the full investment cost model and the expected net present value model, which include military compensation as a maintenance cost, were also incorporated into VAFE.

The FICM is a stochastic approach which recognizes that an organization must often acquire, develop, and separate many individuals in order to gain one person at the desired level. The use of FICM allows for a sensitivity analysis of personnel policies directed toward reducing attrition, acquisition, and training costs in terms of dollar savings to the USAF (Stone et al., 1989b). FICM is a measure of the present cost of replacing personnel at a desired level.

The SRVM addresses the question of the value to be derived by the USAF from employing individuals at a specified position over some selected future horizon. Estimation of SRVM values represents a monetary valuation of the future expected services to be provided by officers or enlisted personnel from continued active duty. SRVM accounts for the probability of separation at all future levels. In essence, the estimation of SRVM for some selected tenure of future service provides an estimate of the expected value of that future service based on the probabilities of occupying various levels (Stone et al., 1989a).

In an effort to broaden the application of SRVM for policy and personnel decisions, the ENPVM was developed (Stone et al., 1989a). The only difference between the calculation of SRVM and ENPVM is the inclusion in ENPVM of all future expected costs of maintaining skills and additional training. Thus, the value associated with each level represents the monetary value of the product produced minus any costs associated with maintaining the labor input to obtain the value. The same present value calculation is performed for ENPVM as for SRVM, which also accounts for the probability of exit. ENPVM uses the cost aspects of FICM and the value perspective of SRVM to produce an expected present value of future service to be rendered during a given service tenure.

VALUE OF AIR FORCE EXPERIENCE

VAFE is designed to facilitate a user/machine information flow and analysis as indicated in Figure 1. Each screen in VAFE contains two options available to the user at the bottom of the screen. The user can return to the previous screen at any time by pressing F10. The user can also exit any valuation method in VAFE at any time by pressing Esc. If the user has not changed any parameters involved in the valuation methods, e.g., continuation rates, cost components, service state values, etc., pressing Esc will return the user directly to the "SELECT METHOD FOR VALUATION" screen, Screen 1. If the user has revised any data tables, then pressing Esc will send the user to the "DATA

FILE SAVE OPTION" Screen shown in Figure 2. If the user does not wish to save any of these changes, selecting the "Return to requested menu" option and pressing, will return VAFE directly to Screen 1. To save these changes for future use, the user can select the "Save Present Data Tables" option. VAFE will then prompt the user for the appropriate pathname and filename in which to save the data tables. The user enters both of these files following each with a Return. All changes made to the data are then saved in this file, which can be accessed by the user again. If the user attempts to overwrite an existing file using this option, VAFE will prompt the user for confirmation to overwrite the file. Once the file has been saved, the user is then returned to Screen 1 in Figure 3.

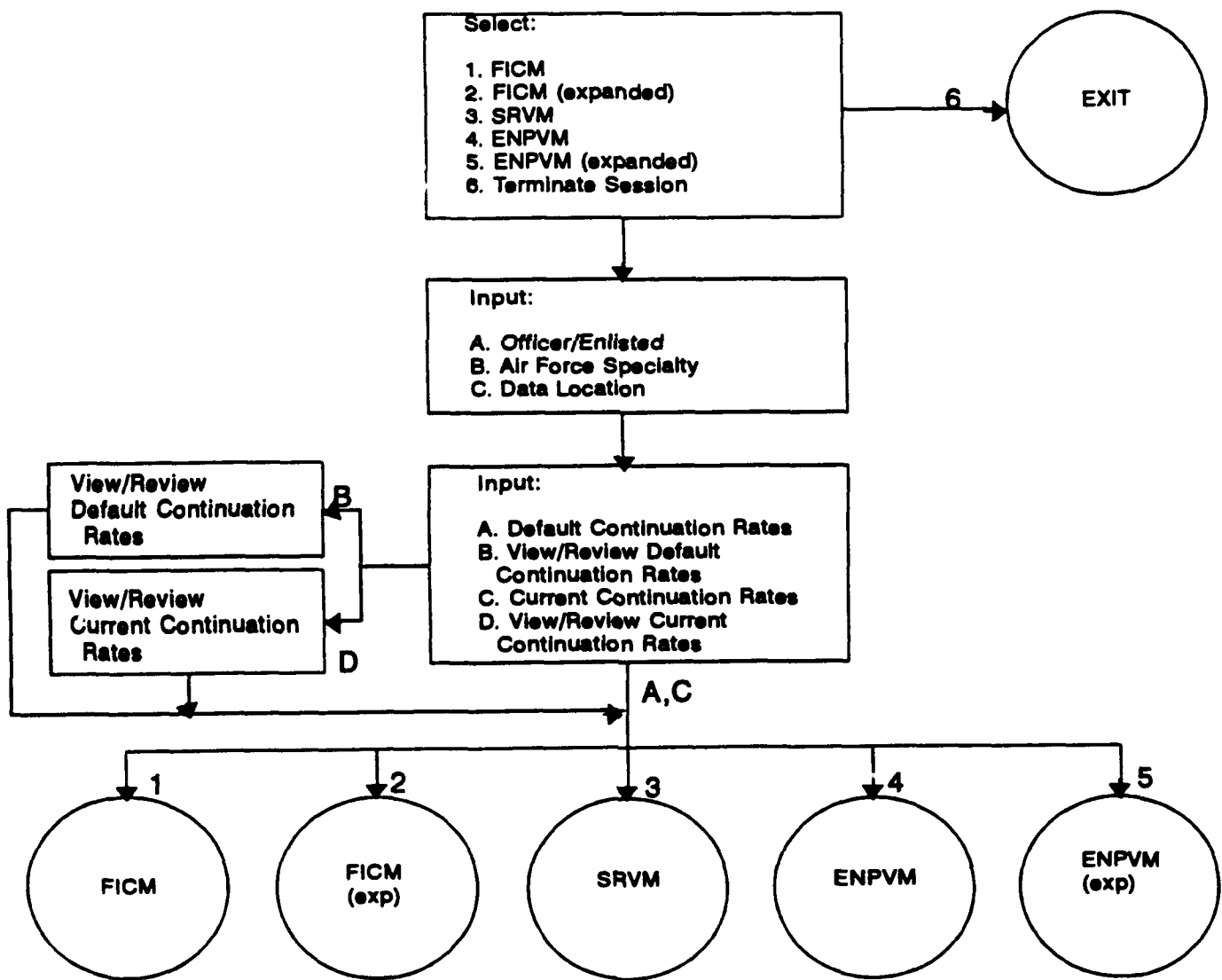


Figure 1. Overview of VAFE System.

Valuation of Air Force Experience

DATA FILE SAVE OPTION

Return to requested menu

Save present data tables

Use Esc to exit.

Figure 2. Data File Save Option Screen.

Valuation of Air Force Experience

SELECT METHOD FOR VALUATION:

Full Investment Cost Method

Full Investment Cost Method (Expanded)

Stochastic Rewards Valuation Method

Expected Net Present Value Method

Expected Net Present Value Method (Expanded)

Terminate Session

Figure 3. Screen 1: Select Method for Valuation.

The following narrative is a screen-by-screen explanation of VAFE. This section describes the processes which are the same for all valuation methods. These processes include selecting the valuation method, selecting the Air Force Specialty (AFS), and the specification of continuation rates. Subsequent sections will provide a screen-by-screen explanation of each of the valuation methods. The expanded versions of both FICM and ENPVM reflect only the addition of military compensation as a cost component of the model. The method used for the valuation of both is the same as that used for the original model, FICM and ENPVM, respectively. Both FICM and FICM Expanded is presented in

Section III. Section IV presents the explanation of SRVM. Section V presents both ENPVM and ENPVM Expanded.

Select Method for Valuation

Screen 1 (Fig. 3) is the starting point for all analyses and provides the user with the opportunity to select the method of valuation to be used or to exit the program. Five methods of valuation are available:

- 1) Full investment cost method,
- 2) Full investment cost method (Expanded),
- 3) Stochastic rewards valuation method,
- 4) Expected net present value method, and
- 5) Expected net present value method (Expanded).

Using the arrow keys, the user can highlight the method of valuation to be used. Pressing Return selects the highlighted method. Highlighting the "Terminate Session" option and pressing Return will allow the user to exit the program. Pressing the Esc key from this screen will also allow the user to exit VAFE.

Data File/Air Force Specialty Selection

Screen 2 (Fig. 4) allows the user to specify whether the data to be used in the analysis will be from a "Software Defined Data File" or from a data file previously saved by the user. This screen always appears following the selection of the method of valuation. To select the "Software Defined Data File" option, press Return. VAFE will then advance the user to Screen 2a (Fig. 5). Screen 2a allows the user to identify the type of personnel to be analyzed (officer or enlisted) and the career field, as well as specify the location of the input data.

Valuation of Air Force Experience

DATA FILE SELECTION

Software defined data file

User saved data file

Use F10 for previous screen.
Use Esc to exit.

Figure 4. Screen 2: Data File Selection.

Valuation of Air Force Experience

SELECT AFS:

Officer (o or O) or Enlisted (e or E):

e

AFS Number (ex. 2720 for enlisted AFS 272x0,
Air Traffic Controllers, or 2516 for
Officer AFS 2516, Engineer):

2720

SELECT PATHNAME: d:\mil\vafe

Use F10 for previous screen
Use Esc to exit.

Figure 5. Screen 2a: Select AFS and Pathname.

A. Enter the type of personnel, either "o" for officers or "e" for enlisted personnel followed by Return.

B. Enter the AFS number for the career field (i.e., 272X0 for Air Traffic Controller or 251X6 for Engineer) followed by Return. The available career fields are listed in the Appendix. This list is current as of 31 Oct 90.

C. Enter the full name of the location of the input data (disk drive, hard disk partition, or pathname; i.e., d:\mil\vafe\) and press Return.

After properly identifying the type of personnel, AFS, and location of the input data, VAFE will automatically proceed to Screen 3 (Fig. 6).

Should the user attempt to use an AFS which is not available through the "Software defined data file" option, VAFE will display the message "NOT A VALID OFFICER (ENLISTED) AFS," and return the user to the Screen 2a (Fig. 5). The user can then enter the correct or alternative AFS. If the user does not enter the correct location of the data, VAFE will respond with a screen displaying the message "FILE DOES NOT EXIST pathname: filename" and return the user to Screen 2a. The user can then enter the correct or alternative AFS and appropriate pathname.

VAFE also has the ability to save and recall changes made by the user to the parameters of the valuation method. If the user wishes to use these changed parameters again, they can be recalled by selecting the "User saved

data file" option in Screen 2 (Fig. 4) and pressing Return. The user can then enter the proper pathname and the name of the previously saved file; each entry followed by Return. VAFE will then display the AFS which was used to create the file being requested by the user and advance to Screen 3. If the user should attempt to use a file which does not exist or makes a mistake when entering the drive pathname or the filename, VAFE will switch to a temporary screen displaying the message "FILE DOES NOT EXIST pathname: filename" for approximately 5 and then return the user to Screen 2 (Fig. 4). The user will then be able to select the "User saved data file" option and repeat the process, supplying the correct filename and drive specification.

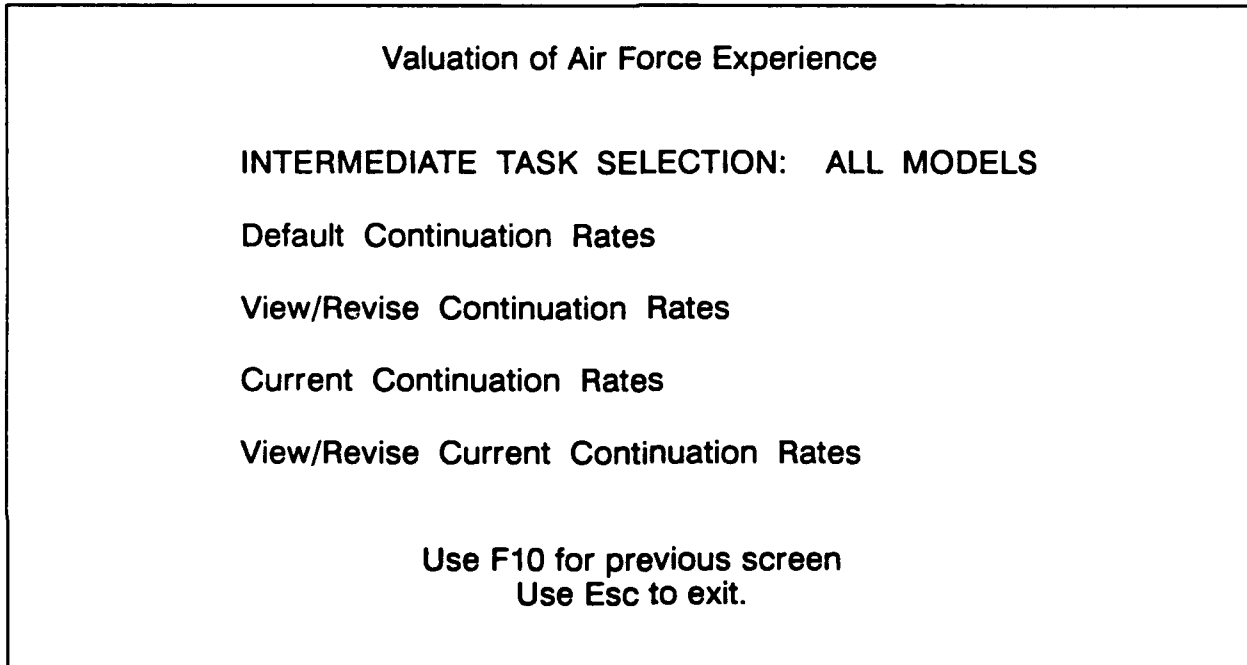


Figure 6. Screen 3: Intermediate Task Selection.

Example: In the example provided in Figure 5, the user wished to analyze data from a software defined data file for enlisted personnel of AFS 272X0. At the first prompt, the user entered an "e" followed by Return. The user then entered the relevant AFS, 272X0, by typing "2720" followed by Return. The next prompt requests the pathname where the AFS data is located. The requested data was located in pathname, d:\mil\vafe. The user entered this pathname and pressed Return. The user was then advanced to Screen 3.

Intermediate Task Selection

Screen 3, entitled "INTERMEDIATE TASK SELECTION: ALL MODELS" (Fig. 6), allows the user to specify the continuation rates that will be used in the selected method of valuation. Continuation rates are career field specific and vary by service state. In VAFE, a service state is defined as each year of service (YOS) from 1 to 30. Continuation rates are defined as the proportion of members of a service state cohort that continue into the next service state

cohort. For example, a continuation rate of 0.45 in service state 4 means that 45% of the personnel in service state (YOS) 4 will continue into service state (YOS) 5. The user is presented with several options to view and/or revise the continuation rates to be used in the subsequent analysis:

A. "Default Continuation Rates" - This option will maintain all continuation rates at their default values. If the user selected a "Software defined data file," then the default values will be those contained in that file. If the user selected a "User saved data file," then the defaults will be maintained as the continuation rates saved in the "User saved data file." After selecting this option and pressing Return, VAFE will automatically advance the user to the next screen for the valuation method selected on Screen 1, without allowing the user to view the continuation rates.

B. "View/Revise Default Continuation Rates" - Selecting this option and pressing Return, will advance the user to Screen 3a (see Fig. 7). Screen 3a displays the default continuation rates for the specified AFS by service state, or YOS, and allows the user to change any of the rates. The continuation rates can be changed either sequentially or independently. To change a continuation rate, use the arrow keys to highlight the rate to be changed, enter the new rate and press Return. The new continuation rate must be a value between 0 and 1 to be accepted by the program. If the user provides a continuation rate greater than 1, the program will automatically set the continuation rate to 1. If the user provides a continuation rate less than 0, the program will automatically set the continuation rate to 0. In both instances, the user will be provided the opportunity to change the user-provided continuation rate before moving to the next service state. The cursor will automatically move to the next service state if the user provides a number which is between 0 and 1. When all desired changes have been made, or when the user has finished viewing the Default rates, pressing F9 will advance the user to the first screen for the valuation method selected on Screen 1.

C. "Current Continuation Rates" - This option will allow the user to use the continuation rates currently in memory. If the user has not revised the default continuation rates, then these default rates will become the current rates. If the default rates have been altered by the user (Option B), or if the user has changed the current rates before (Option D), then the last rates to be entered will become the current rates. If the user selects this option by highlighting it and pressing Return, VAFE will advance to the next screen for the valuation method selected on Screen 1 and these current continuation rates will be used in the valuation to be performed.

D. "View/Revise Current Continuation Rates" - This option allows the user to view as well as revise the current continuation rates. These rates can be changed either sequentially or independently using the method discussed above in Option B. The new continuation rates created will be maintained as the current continuation rates, replacing the old rates in memory. Once again, pressing F9 will advance the user to the first screen for the valuation method selected on Screen 1.

Valuation of Air Force Experience

SELECT CONTINUATION RATES:

1. 0.955	11. 0.958	21. 0.744
2. 0.949	12. 0.981	22. 0.712
3. 0.931	13. 0.971	23. 0.872
4. 0.692	14. 0.989	24. 0.763
5. 0.906	15. 0.981	25. 0.840
6. 0.927	16. 0.993	26. 0.421
7. 0.898	17. 0.992	27. 0.500
8. 0.881	18. 0.992	28. 0.500
9. 0.897	19. 1.000	29. 1.000
10. 0.929	20. 0.620	30. 0.000

Use F10 for previous screen. Use F9 to continue.
Use Esc to exit.

Figure 7. Screen 3a: Select Continuation Rates.

If the user initially chose FICM or FICM Expanded as the method of valuation, the program would proceed to Screen 4 which begins the Section III discussion. If the user chose the SRVM method, VAFE will advance to Screen 6 found in Section IV. Choosing the ENPVM or the ENPVM Expanded method advances VAFE to Screen 8 which is discussed in Section V.

Example: In the example shown in Figure 6, the user has selected the "View/Revise Default Continuation Rates" option by highlighting it and pressing Return. The user was automatically advanced to Screen 3a (Fig. 7), which displays the default continuation rates for enlisted personnel in AFS 272X0. For example, in service state or YOS 4, the continuation rate is 0.692. This example means that 69.2% of the beginning inventory in YOS 4 will continue into YOS 5. The user has the option to change any of the 31 continuation rates or accept them as they appear. In this example, after viewing the continuation rates the user chose not to make any revisions of the rates. The user then pressed F9 to continue the valuation method. The user had initially chosen FICM as the method of valuation, so pressing F9 advanced the user to Screen 4, the next step for the FICM estimation.

FULL INVESTMENT COST MODEL

The FICM is a cost-based model which focuses on positional as opposed to individual cost. The concept of positional investment cost refers to the sacrifice that would have to be incurred today to replace a person occupying a specified position with a substitute who is capable of rendering equivalent services in that given position (Flamholtz, 1985). The differential costs at each

position or level are multiplied by the number of people impacted by that cost element to obtain a full investment cost. There are three basic elements of positional investment cost: acquisition costs, development/learning (formal and informal training) costs, and separation costs.

Costs Components of FICM and FICM Expanded Included in VAFE

In VAFE, four cost components are included in the FICM analysis:

- 1) Recruitment/Acquisition costs,
- 2) Technical training costs,
- 3) Lost productivity costs due to on-the-job training (OJT), and
- 4) Separation costs.

FICM Expanded also considers military compensation as a cost component in addition to these four costs.

Recruitment/Acquisition Costs

Recruitment and acquisition costs consist of the initial cost of accessing an individual in the USAF. For enlisted personnel, this cost includes the cost of recruitment (which includes travel to Lackland AFB), the average cost of travel from Lackland AFB to the first duty station, and a clothing issue cost. These cost elements account for the expenditures necessary to place an individual in basic military training (BMT). The average total cost for BMT accounts for all the fixed and variable costs of training an individual, as well as the premature attrition during BMT (Air Training Command's FY88 Cost Factors Manual, 1988). The calculation of FICM includes all the costs required to replace an individual at each of the 31 service states and therefore includes the fixed costs of providing BMT. BMT costs are not considered to be AFS specific.

Training Costs

Development/learning costs in the Air Force consists of formal technical training in different specialty areas and lost productivity due to OJT training. The information provided in the Air Training Command's FY88 Cost Factors Manual (1988) was used in conjunction with the CODAP data to develop the costs of providing formal technical training for enlisted personnel in each of the AFSs. The formal technical training costs allocated to each YOS were estimated as a weighted average based upon the proportion of individuals who had taken a course in each YOS (Stone et al., 1989a). These technical training costs represent the total costs incurred by the USAF to produce a single training graduate. The factors are a summary of direct or schoolhouse costs, indirect or installation support costs, flying costs, command support costs, and student costs (Air Training Command's FY88 Cost Factors Manual, 1988). The costs of formal technical training for each YOS were based on the courses

normally taken by personnel in each YOS. For each YOS, the expected cost for each technical training course (the product of the probability of taking the course times the cost of the course) was calculated across all courses to produce a total technical training cost for each YOS that is AFS specific.

Lost productivity due to OJT, which represents the informal training costs to the USAF, was estimated primarily for individuals in skill levels 3 and 5; i.e., those individuals with the rank of either E-2, E-3, or E-4 and with a skill level of 3 (semiskilled) or 5 (skilled). Since minimal OJT occurs beyond skill level 5, no OJT costs beyond that level were estimated. To estimate the level of OJT which individuals received while in these two skill levels, occupational survey data from the Armstrong Laboratory's Occupational Research Data Bank (ORDB) were analyzed to provide an estimate of the relationship between time in service and proficiency. The methodology used to estimate the cost of lost productivity due to OJT was the same as that used by Flemming, Cowardin, Reynolds, and Nielson (1986). A similar approach was followed for the calculation of the supervisor cost component (Stone et al., 1989a). OJT costs vary by AFS.

Separation Costs

Airmen may exhibit a tendency to decrease their productivity as they approach a date of separation. An estimate of this lost productivity due to impending separation was calculated using data from the Walk Through Performance Test (WTPT) surveys component of the USAF job performance measurement program (Hedge & Lipscomb, 1987). Data elements from the WTPT surveys indicated that airmen with YOS between 42 and 48 months who exited the USAF demonstrated a 6% loss in productivity relative to the productivity levels of those airmen with the same YOS who reenlisted.

This 6% difference in the performance rating was modeled with the use of ordinary least squares. This rating provided a proportion which was used to monetize the lost productivity of first-term airmen. This proportion was multiplied times the average compensation cost to the USAF of maintaining an airman from the 36th to the 48th month of service. Separation costs were estimated to be approximately \$781.20 for first-term airmen. This estimate was used for all AFSs since evidence suggests that separation costs do not differ across AFSs. In addition, no separation costs were empirically supportable for separations beyond the first-term decision point by the WTPT surveys (Stone, et al., in press).

Additional Personnel Maintenance Costs

The cost to the USAF of maintaining an airman at a given level can be represented by the military compensation paid to him. Military compensation was comprised of basic pay, basic allowance for quarters (BAQ), basic allowance for subsistence (BAS), and the tax advantage accruing from the nontaxable

nature of BAQ and BAS. Military compensation also accounted for promotion rates by AFS determined from the June 1985 and June 1986 Uniform Airman Reports (UARs).

Full Investment Cost Method and Full Investment Cost Method Expanded

Figures 8 and 9 present general flow diagrams of FICM and FICM Expanded in VAFE. The only difference in the decision-making flow between Figures 8 and 9 is the military compensation component of FICM Expanded. The following discussion is a screen-by-screen explanation of FICM and FICM Expanded.

Screen 4 presented in Figure 10 allows the user to access the cost components which are used in FICM and FICM Expanded. The user can view any of these cost elements and make any desired changes to the elements. From Screen 4 (Fig. 10), the user can also compute and view the results of the valuation method. Once results have been computed, i.e., the user has actually selected the option to compute the results and view the output, these results can then be printed from Screen 4.

Any of the cost elements can be viewed or revised by moving the cursor to the desired cost element and pressing Return. VAFE will then advance to the next screen displaying the current values of that cost element for service states 1 to 30. All cost screens are set up the same way.

EXAMPLE: If the user selected "Technical Training Costs" and pressed Return, the next screen to appear would be Screen 4a presented in Figure 11. Screen 4a displays the current cost values by service state for technical training and allows the user to change any of these cost values. The cost values can be changed either sequentially or independently. To change a cost value, use the arrow keys to highlight the rate to be changed, enter the new rate and press Return. The cursor will automatically move to the next service state. When all desired changes have been made, or when the user has finished viewing the current values, pressing F10 will return the user to Screen 4.

The user can also select the "Compute Results and View Output" option. To select this option, move the cursor using the arrow keys to the appropriate option and press Return. VAFE will now compute the value of experience of officers or enlisted personnel in the selected AFS for each service state using the FICM (or FICM Expanded) method. If this option is selected without viewing or revising the cost components of the model, VAFE will perform the computations using the default values for these components. While the computation is in process, VAFE will display the message "COMPUTATIONS IN PROGRESS." Once the computation is complete, the user will be advanced to Screen 5a (Fig. 12). Screen 5a presents the FICM results for the first 17 service states. By pressing Return, the user can proceed to Screen 5b to view the remaining 13 service states. Screen 5b allows the user the option to (1) review the FICM results of the first 17 service states by pressing F10; (2) return to Screen

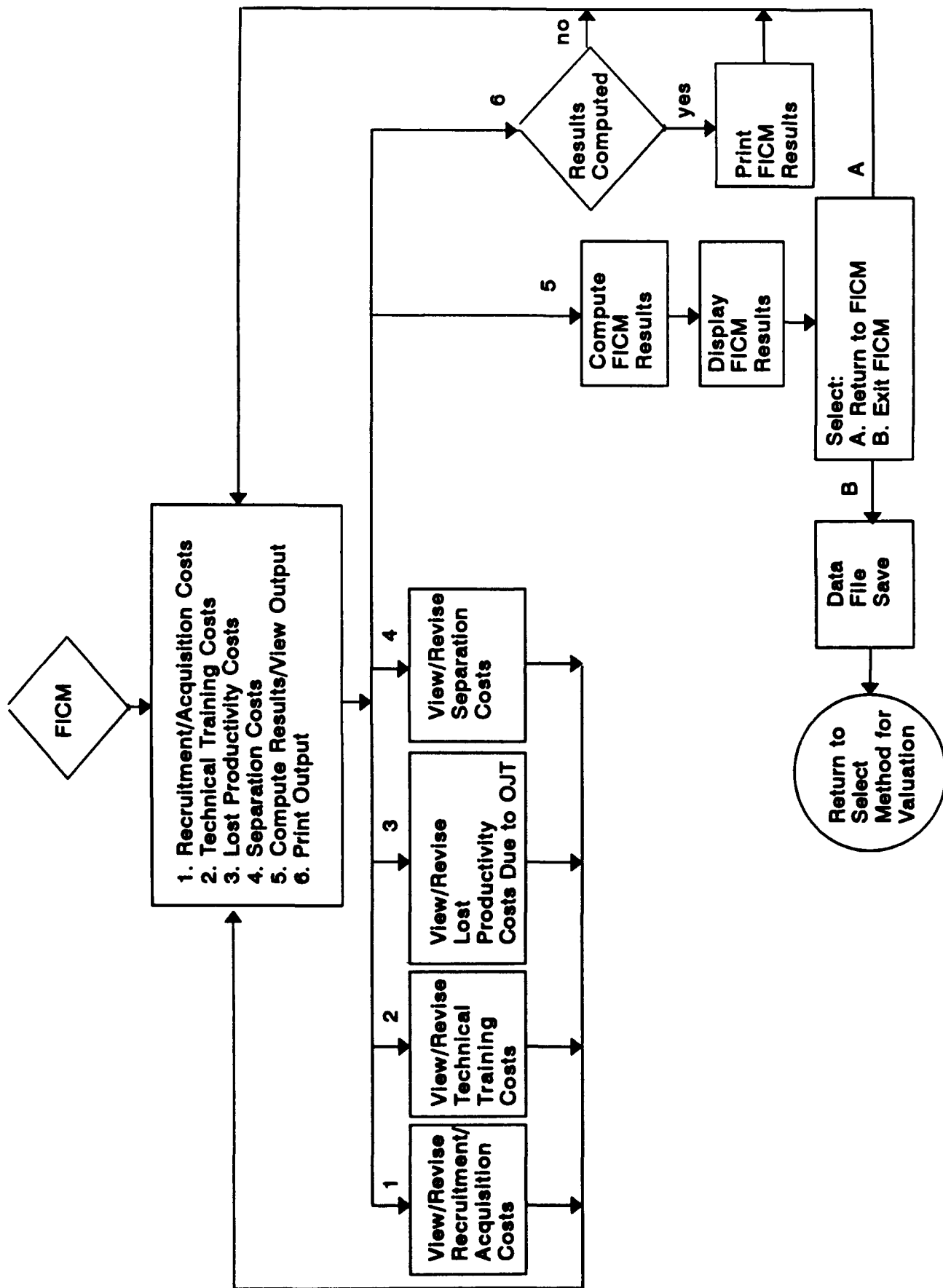


Figure 8. Overview of FICM.

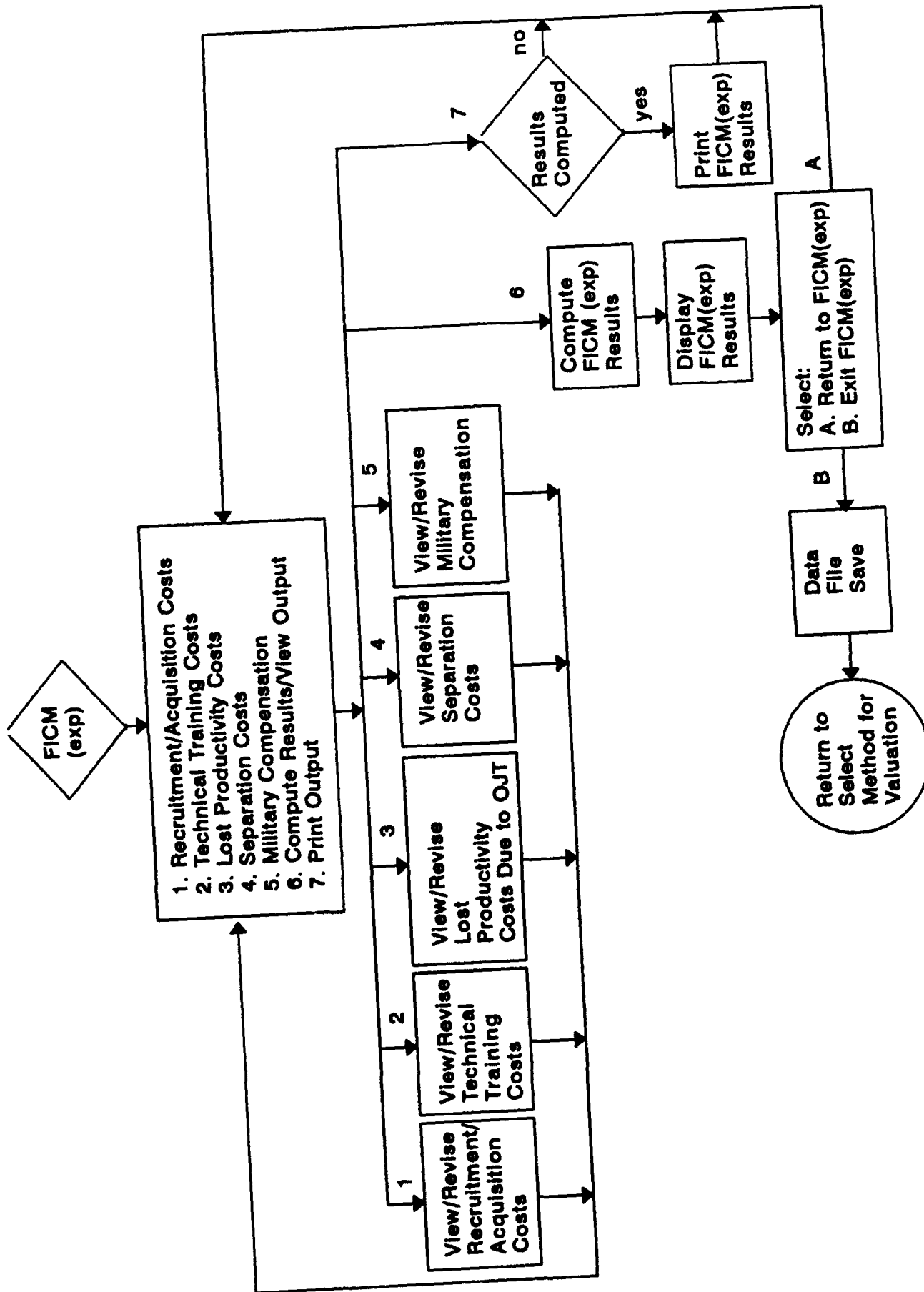


Figure 9. Overview of FICM Expanded.

Valuation of Air Force Experience

COST COMPONENTS OF THE MODEL:

Recruitment/Acquisition Costs

Technical Training Costs

Lost Productivity Costs Due to OJT

Separation Costs

Compute Results and View Output

Print Output of Previously Computed Results

Use F10 for previous screen
Use Esc to exit.

Figure 10. Screen 4: Cost Components of the Model.

Valuation of Air Force Experience

TRAINING COSTS:

1.	0.00	11.	0.00	21.	0.00
2.	4364.98	12.	0.00	22.	0.00
3.	3273.74	13.	0.00	23.	0.00
4.	3273.74	14.	0.00	24.	0.00
5.	3091.86	15.	0.00	25.	0.00
6.	4183.11	16.	325.33	26.	0.00
7.	0.00	17.	304.99	27.	0.00
8.	0.00	18.	447.32	28.	0.00
9.	0.00	19.	508.32	29.	0.00
10.	0.00	20.	447.32	30.	0.00

Use F10 for previous screen
Use Esc to exit.

Figure 11. Screen 4a: Technical Training Costs.

4, the "COST COMPONENTS OF THE MODEL" screen, by pressing Return; or (3) return to Screen 1 (Fig. 3) to select another method of valuation by pressing Esc. Returning to Screen 4 allows the user to alter any of the cost components of the model or to print the results viewed in Screens 5a and 5b.

Returning to Screen 4 provides the user with an opportunity to print the results which were viewed in Screens 5a and 5b, the "Print Output of Previously Computed Results" option. The results exhibited in Screens 5a and 5b can **only** be printed after the "Compute Results and View Output" option on Screen 4 has been selected. Otherwise, VAFE will display the message "RESULTS HAVE NOT BEEN COMPUTED YET" and return the user to Screen 4 (Fig. 10). VAFE will always print the results of the last computed valuation. After making any desired changes to the parameters of the estimation, the user must always select the "Compute Results and View Output" option prior to printing the output. This will allow the user to obtain a printed copy of the present valuation using the desired parameter changes. The user can select the "Print Output of Previously Computed Results" option by using the arrow keys to position the cursor and pressing Return. VAFE will display the message "RESULTS ARE BEING PRINTED" until the printing is complete. Once complete, the user will be returned to Screen 4 (Fig. 10). The output will mirror the results shown by the "Compute Results and View Output" option as exhibited in Table 1, which is an example of the printed results for the valuation presented in Figure 12. These results were computed using enlisted personnel for AFS 272x0 and default rates for continuation rates and all cost components of the FICM analysis.

The user can exit the FICM or FICM Expanded method by pressing Esc from Screen 4 (Fig. 10). If no changes have been made to any of the cost elements or continuation rates, the user will be returned to Screen 1 (Fig. 3). If any cost elements or continuation rates have been revised, the user will be given the option to save those changes. The user will be advanced to the Data File Save Option Screen shown in Figure 2. The user can then select the "Return to requested menu" option by pressing Return. This will return the user to Screen 1 without saving any of the changes made to the parameters of the valuation. If the user selects the "Save Present Data Tables" option, VAFE will then prompt the user for the appropriate pathname and filename. The user enters both of these following each with a Return. All changes made to the data are then saved in this file for future access by the user. If the user attempts to overwrite an existing file using this option, VAFE will prompt the user for confirmation to overwrite the file. Once the file has been saved, the user is returned Screen 1 (Fig. 3).

Example: At Screen 4 (Fig. 10), the user selected the "Technical Training" cost component by using the arrow keys to position the cursor and pressing Return. This moved the user to Screen 4a (Fig. 11). After viewing the technical training costs, the user pressed F10 to return to Screen 4. The user then selected the "Compute Results and View Output" option and was advanced to Screen 5a (Fig. 12). Figure 12 presented the computed results for enlisted AFS 272X0 using the FICM method. The default values for continuation rates

and cost components were used in this example. After viewing the results of Screen 5a, the user pressed Return, bringing up Screen 5b, in order to view the results for service states 18 to 30. The user then pressed Return at this screen. This function returned VAFE to Screen 4. From this screen the user was able to select the "Print Results Previously Computed" option. These results are shown in Table 1. After printing the results, the user was returned to Screen 4. Pressing Esc from this screen allowed the user to exit the FICM method and to return to Screen 1.

Because no revisions had been made to any of the parameters of the model, the user was returned directly to Screen 1.

Extended Discussion

Selecting the "Compute Results and View Output" option produces the valuation results in the format presented in Figure 12. For both the FICM and the FICM Expanded methods, the output will consist of four elements for each YOS 1 to 30:

- 1) Service state,
- 2) Replacement number,
- 3) Service state costs, and
- 4) Full replacement costs.

Screen 5a displays each of these elements for service states 1 to 17, and Screen 5b presents the remaining service states, 18 through 30. The results presented in Figure 12 were computed using the FICM method for enlisted AFS 272X0. No alterations were made to the default values for continuation rates and cost elements in this example. The replacement number was calculated using the continuation rates specified by the user in Screen 3, in this case the default rates for AFS 272X0. The service state costs and the full replacement costs were calculated using the appropriate cost components for FICM estimation of AFS 272X0.

The first element of the output in Figure 12 is the "Service State." This number represents each YOS from 1 to 30 as discussed earlier. The second element is the "Replacement Number." This number represents how many individuals the USAF would have to access in 1 year in order to have 1 airman in a particular service state. For example, from the output presented in Figure 12, for the USAF to have 1 airman in service state 4, it must access at least 1.71 recruits. The third element of the output is the "Service State Costs." These elements are the costs associated with each particular service state. For example, the cost to the USAF of having 1 individual in service state 4 in AFS 272X0 is \$7,361. Because the user selected FICM for valuation, the service state costs do not include the cost of military compensation. The FICM Expanded method would include military compensation in this number. The final element of the output is the "Full Replacement Costs." This cost is the total cost expenditure associated with advancing sufficient numbers of individuals from the accession level to obtain 1 individual at a particular service

FULL INVESTMENT COST OUTPUT - AFS 2720

Service State	Replacement Number	Service State Costs	Full Replacement Costs
1	1.05	8024	8402
2	1.10	15248	24921
3	1.19	7105	34399
4	1.71	7361	60346
5	1.89	6586	73958
6	2.04	8212	88640
7	2.27	0	98708
8	2.58	0	112041
9	2.87	0	124907
10	3.09	0	134453
11	3.23	0	140348
12	3.29	0	143066
13	3.39	0	147339
14	3.43	0	148977
15	3.49	0	151863
16	3.52	325	153261
17	3.55	305	154804

Use Return to go to next page.

FULL INVESTMENT COST OUTPUT - AFS 2720

Service State	Replacement Number	Service State Costs	Full Replacement Costs
18	3.58	447	156504
19	3.58	508	157012
20	5.77	447	253967
21	7.75	0	341353
22	10.89	0	479429
23	12.48	0	549803
24	16.36	0	720581
25	19.48	0	857835
26	46.27	0	2037612
27	92.53	0	4075224
28	185.07	0	8150449
29	185.07	0	8150449
30	0.00	0	0

Use F10 for previous screen; Use Return for previous menu;
Use Esc to exit.

Figure 12. Screen 5 (a and b): Full Investment Cost Output.

Table 1. FULL INVESTMENT COST PRINTED OUTPUT

FULL INVESTMENT COST OUTPUT - AFS 2720			
Service State	Replacement Number	Service State Costs	Full Replacement Costs
1	1.05	8,024	8,402
2	1.10	15,248	24,921
3	1.19	7,105	34,399
4	1.71	7,361	60,346
5	1.89	6,586	73,958
6	2.04	8,212	88,640
7	2.27	0	98,708
8	2.58	0	112,041
9	2.87	0	124,907
10	3.09	0	134,453
11	3.23	0	140,348
12	3.29	0	143,066
13	3.39	0	147,339
14	3.43	0	148,977
15	3.49	0	151,863
16	3.52	325	153,261
17	3.55	305	154,804
18	3.58	447	156,504
19	3.58	508	157,012
20	5.77	447	253,967
21	7.75	0	341,353
22	10.89	0	479,429
23	12.48	0	549,803
24	16.36	0	720,581
25	19.48	0	857,835
26	46.27	0	2,037,612
27	92.53	0	4,075,224
28	185.07	0	8,150,449
29	185.07	0	8,150,449
30	0.00	0	0

state. For example, the full replacement cost of a person in service state 4 is \$60,346. This number means that it would cost the USAF \$60,346 to access 1.71 individuals, progress them through the intermediate service states (accounting for the probabilities of attrition at each intermediate service state), and gain a single individual in service state 4. This number accounts for the costs of accessing and training that individual through those 4 service states. Military compensation is not included in this number because of the method of valuation chosen by the user. In other words, the cost to the USAF of replacing 1 individual in service state 4 with a substitute capable of rendering equivalent services would be \$60,346. A detailed explanation of the methodology used

to calculate these elements is found in "Cost-based Value Models of Air Force Experience" (Stone et al., 1989a).

STOCHASTIC REWARDS VALUATION MODEL

The Stochastic Rewards Valuation Model is based on the notion that an individual is valuable to an organization only in relation to the roles that a person may potentially occupy (Flamholtz, 1985). Thus, an individual's value is determined in relation to the future services which are expected to be rendered to an organization by that individual. SRVM views the movement of people among organizational roles over time as a stochastic process with service state rewards. The model defines service states as organizational roles and the state of exit as leaving the organization. This model regards the movement of people from 1 service state to another as a probabilistic process depending upon the service states previously occupied.

One requirement of SRVM is the determination of the economic value associated with an individual's occupying a given service state for 1 period. This requirement is referred to as the service state value. In a service organization, each person's direct contribution to revenue is the rate at which their services are billed. This computation, however, is considerably more complex in the USAF. The calculation of the value of a service state requires the estimation of a monetary value of the product of military personnel at points along the career path. In a perfectly competitive market for factors of production, a firm will hire labor until the value marginal product (VMP) of the last unit of labor hired equals the cost of the labor unit; e.g., wage (Becker, 1971). Military compensation for enlisted and officer personnel is set at a level which can be under, over, or equal to the wage at which the competitive market values their services (Saving, et al., 1985).

The USAF competes with the private sector industries for experienced enlisted and officer personnel. Since the USAF competes with the private sector for labor, the civilian labor market provides a consistent market evaluation of VMP in the USAF. For the SRVM analysis, wages paid in the private sector will be used as a measure of the VMP of USAF enlisted and officer personnel in the production of national defense and as the basis for estimating the value of service states. The value of each service state is based on the civilian wage equivalent for each AFS as computed from data collected monthly by the Bureau of the Census (U.S. Department of Commerce, 1986). The civilian wage represents the opportunity cost to the airman of remaining in the service, i.e., income which the airman could have made in the private sector for providing similar services (Stone et al., 1989a).

Stochastic Rewards Valuation Method

Figure 13 presents a general flow diagram of SRVM. Screen 6 presented in Figure 14 allows the user to view or revise the information to be used in the SRVM calculation. There are 3 components of the SRVM calculation which can be reviewed or revised from this screen, Screen 6 also allows the user to compute the results of the SRVM calculation and to print these previously computed results.

- 1) Valuation of service states,
- 2) Discount rate, and
- 3) Projection time period.

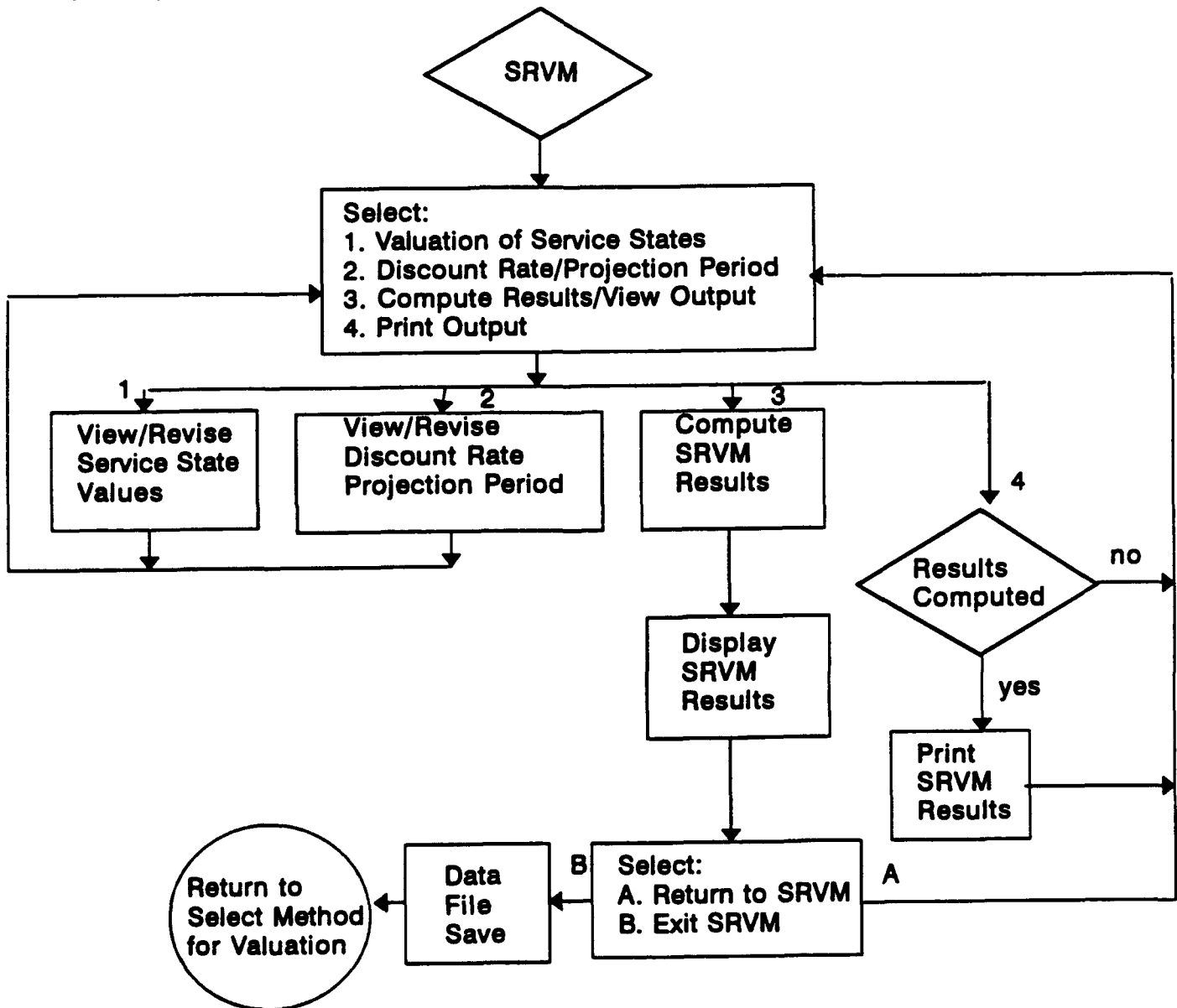


Figure 13. Overview of SRVM.

Valuation of Air Force Experience

STOCHASTIC REWARDS VALUATION MODEL:

Valuation of Service States

Select Discount Rate/Projection Period

Compute Results and View Output

Print Output of Previously Computed Results

Use F10 for previous screen
Use Esc to exit.

Figure 14. Screen 6: Stochastic Rewards Valuation Model.

The user can view or revise the service state values for each of the service states 1 to 30, by using the arrow keys to highlight the "Valuation of Service States" option and pressing Return. This function will automatically advance the user to Screen 6a (Fig. 15). The service state values can be changed either sequentially or independently. To change a service state value, use the arrow keys to highlight the rate to be changed, enter the new rate and press Return. The cursor will automatically advance to the next service state. When all desired changes have been made, or when the user has finished viewing the current values, pressing F10 will return the user to Screen 6.

The user can also view or revise the discount rate and time period for the projection. Using the arrow keys to highlight the "Select Discount Rate/Projection Period" option and pressing Return will advance the user to Screen 6b (Fig. 16). The default value for the discount rate is 6.21 or 6.21% annually (Treasury Bill rate for 1988). The user can use the default value by simply pressing Return. To revise the discount rate, the user can enter the new value and then press Return. The cursor will automatically move to the projection period after the user presses Return. The user can now revise the projection period. If the default value of 4 years is acceptable, the user can press Return. To revise the time period, enter the new time period and then press Return. The maximum time period for projection is 20 years. After the user has pressed Return, VAFE will automatically return to Screen 6.

The user can also select the "Compute Results and View Output" option from Screen 6. To select this option, move the cursor using the arrow keys and press Return at this option. If this option is chosen without viewing or revising the service state values or the discount rate/projection period, VAFE will use the default values for these parameters. VAFE will now compute the

projected value of officers or enlisted personnel in the selected AFS for each service state using the SRVM method. While the computation is in process, VAFE will display the message "COMPUTATIONS IN PROGRESS." Once the computation is complete, the user will be advanced to Screen 7a (Fig. 17). Screen 7a presents the SRVM values for the first 17 service states. By pressing Return, the user is advanced to Screen 7b (Fig. 17) to view the SRVM results for service states 18 through 30. Screen 7b allows the user the option to (1) return to the previous screen to review the SRVM values for the first 17 service states by pressing F10; (2) return to Screen 6 (Fig. 14) by pressing Return; or (3) return to Screen 1 (Fig. 3) by pressing Esc.

Valuation of Air Force Experience		
SERVICE STATE VALUES:		
1. 18261.61	11. 32906.49	21. 38424.55
2. 20122.32	12. 33704.22	22. 38776.78
3. 21951.45	13. 34469.60	23. 39097.43
4. 23749.00	14. 35074.52	24. 39386.49
5. 25514.95	15. 35647.85	25. 39643.96
6. 27003.15	16. 36189.60	26. 39869.85
7. 28449.05	17. 36699.76	27. 40064.15
8. 29852.65	18. 37178.34	28. 40226.86
9. 31213.95	19. 37625.33	29. 40357.99
10. 32076.40	20. 38040.73	30. 40457.53

Use F10 for previous screen
Use Esc to exit.

Figure 15. Screen 6a: Service State Values.

Valuation of Air Force Experience
SELECT DISCOUNT RATE (ex: 6.51 percent annually):
6.21
SELECT PROJECTION TIME PERIOD (ex: 12 for 12 years with 20 Years Maximum):
4
Use F10 for previous screen Use Esc to exit.

Figure 16. Screen 6b: Select Discount Rate and Projection Time Period.

STOCHASTIC REWARDS VALUATION MODEL OUTPUT - AFS 2720

Service State	Service StateValues	Projected Values
1	18261.61	64161.73
2	20122.32	62989.40
3	21951.45	60641.68
4	23749.00	57675.69
5	25514.95	79305.73
6	27003.15	82549.06
7	28449.05	83178.89
8	29852.65	87154.56
9	31213.95	95070.02
10	32076.40	103858.83
11	32906.49	111115.05
12	33704.22	115768.05
13	34469.60	117848.68
14	35074.52	121753.34
15	35647.85	123448.59
16	36189.60	126676.48
17	36699.76	117214.85

Use Return to go to next page.

STOCHASTIC REWARDS VALUATION OUTPUT - AFS 2720

Service State	Service StateValues	Projected Values
18	37178.34	102263.50
19	37625.33	81955.59
20	38040.73	57868.65
21	38424.55	71688.37
22	38776.78	76029.84
23	39097.43	81725.22
24	39386.49	64420.12
25	39643.96	52833.14
26	39869.85	30278.88
27	40064.12	36323.52
28	40226.86	36931.55
29	40357.99	38092.02
30	40457.53	0.00

Use F10 for previous screen; Use Return for previous menu;
Use Esc to exit.

Figure 17. Screen 7 (a and b): Stochastic Rewards Valuation Model Output.

Returning to Screen 6 provides the user with an opportunity to print the results which were viewed in Screens 7a and 7b, the "Print Output of Previously Computed Results" option. The results exhibited in Screens 7a and 7b can only be printed after the "Compute Results and View Output" option on Screen 6 has been selected. Otherwise, VAFE will display the message "RESULTS HAVE NOT BEEN COMPUTED YET" and return the user to Screen 6 (Fig. 14). VAFE will always print the results of the last computed valuation. After making any desired changes to the parameters of the estimation, the user must always select the "Compute Results and View Output" option before printing the output. This selection will allow the user to obtain a printed copy of the present valuation using the desired parameter changes. The user can select the "Print Output of Previously Computed Results" option by using the arrow keys to position the cursor and pressing Return. VAFE will display the message "RESULTS ARE BEING PRINTED" until the printing is complete. Once complete, the user will be returned to Screen 6 (Fig. 14). The output will mirror the results shown by the "Compute Results and View Output" option as exhibited in Table 2, which is an example of the printed results for the valuation presented in Figure 17. These results were computed using enlisted personnel for AFS 272X0 and default values for the service state values, discount rate, and projection period of the SRVM analysis.

The user can exit the SRVM method by pressing Esc from Screen 6 (Fig. 14). If no changes have been made to any of the SRVM elements, the user will be returned to Screen 1 (Fig. 3). If any SRVM elements have been revised, the user will be given the option to save those changes. The user will be advanced to the Data File Save Option Screen shown in Figure 2. The user can then select the "Return to requested menu" option by pressing Return. This selection will return the user to Screen 1 without saving any of the changes made to the parameters of the valuation. If the user selects the "Save Present Data Tables" option, VAFE will then prompt the user for the appropriate pathname and filename. The user enters both of these following each with a Return. All changes made to the data are then saved in this file for future access by the user. If the user attempts to overwrite an existing file using this option, VAFE will prompt the user for confirmation to overwrite the file. Once the file has been saved, the user is returned to Screen 1 (Fig. 3).

Example: In Screen 6 of Figure 14, the user selected the "Valuation of Service States" component using the arrow keys and pressed Return. This brought up Screen 6a as shown in Figure 15. After viewing the service state values for enlisted personnel in AFSC 272X0, the user pressed F10 to return to Screen 6. Next, the user selected the "Select Discount Rate/Projection Period" option and pressed Return. This selection brought up Screen 6b (Fig. 16). The user entered 6.21 for the discount rate and pressed Return. This example implies a 6.21% annual discount rate. To project over a 4-year time period, the user entered 4 at the next prompt and pressed Return. VAFE automatically returned to Screen 6. The user then selected the "Compute Results and View Output" option and was advanced to Screen 7a. In this example, the user computed results for enlisted AFS 272X0 using the SRVM method. The default values for continuation rates, service state values, the discount rate and the projection

time period were used in this example. After viewing the results of Screen 7a, the user pressed Return, bringing up Screen 7b, in order to view the results for service states 18 to 30. The user then pressed Return to return VAFE to Screen 6. From this screen the user was able to select the "Print Results previously computed" option. These selections are the results shown in Table 2. After printing the results, the user was returned to Screen 6. Pressing Esc from this screen allowed the user to exit the SRVM method and to return to Screen 1. Because no revisions had been made to any of the parameters of the model, the user was returned directly to Screen 1.

Table 2. STOCHASTIC REWARDS VALUATION PRINTED OUTPUT

STOCHASTIC REWARDS VALUATION OUTPUT - AFS 2720		
Service State	Service State Values	Projected Values
1	18,261.61	64,161.73
2	20,122.32	62,989.40
3	21,951.45	60,641.68
4	23,749.00	57,675.69
5	25,514.95	79,305.73
6	27,003.15	82,549.06
7	28,449.05	83,178.89
8	29,852.65	87,154.56
9	31,213.95	95,070.02
10	32,076.40	103,858.83
11	32,906.49	111,115.05
12	33,704.22	115,768.05
13	34,469.60	117,848.68
14	35,074.52	121,753.34
15	35,647.85	123,448.59
16	36,189.60	126,676.48
17	36,699.76	117,214.85
18	37,178.34	102,263.50
19	37,625.33	81,955.59
20	38,040.73	57,868.65
21	38,424.55	71,688.37
22	38,776.78	76,029.84
23	39,097.43	81,725.22
24	39,386.49	64,420.12
25	39,643.96	52,833.14
26	39,869.85	30,278.88
27	40,064.12	36,323.52
28	40,226.86	36,931.55
29	40,357.99	38,092.02
30	40,457.53	0.00

VAFE produces the SRVM results as presented in Figure 17. The output consists of three elements,

- 1) Service state,
- 2) Service state values, and
- 3) Projected (SRVM) values.

Screen 7a displays each of these elements for service states 1 to 17. By pressing Return, the user will proceed to Screen 7b which displays these elements for service states 18 to 30. The results presented in Figure 17 were computed using the SRVM method for enlisted AFS 272X0. No revisions were made to the default values for continuation rates, service state values, the discount rate or the projection period in this example. If the user revised any of these elements, those revised values would be used in the calculations of the output instead of the default values.

The first element of the output is the "Service State." This number represents each YOS from 1 to 30 as discussed earlier. The second element is the "Service State Value." These numbers are the same values that the user viewed/revised in Screen 6a. These values represent the dollar value to the USAF of an individual at each service state. The final element of the output is the "Projected Values." This number is a present value estimate of a future flow of services to the USAF. For example, the projected value of an airman at service state 4 is \$57,675.69. This estimate represents the future value to the USAF of the services of the enlisted airman in service state 4 (AFS 272X0) for an expected tenure of 4 years, accounting for the probability of separation during the 4-year tenure, and discounting by a 6.21% rate. A detailed explanation of the methodology used to calculate these elements is found in "Cost-based Value models of USAF Experience" (Stone et al., 1989a).

EXPECTED NET PRESENT VALUE MODEL

ENPVM is a modified version of SRVM. ENPVM accounts for all future expected costs of maintaining skills, additional training and special pay (ENPVM Expanded also includes compensation) in the calculation of service state values. Thus, each service state value represents the monetary value of the product produced minus any costs associated with maintaining the labor input to obtain the value. The same present value calculation is performed for ENPVM as for SRVM, which also accounts for the probability of exit. ENPVM uses the cost aspects of FICM and the value perspective of SRVM to produce an expected present value of future service to be rendered during a given service tenure, net of cost.

Expected Net Present Value Method and Expected Net Present Value Method Expanded

Figures 18 and 19 display a general flow diagram of ENPVM and ENPVM Expanded. The only difference in the decision-making flow between Figures

18 and 19 is the military compensation component of ENPVM Expanded. The following discussion is a screen-by-screen explanation of ENPVM and ENPVM Expanded.

Screen 8 (Fig. 20) allows the user to access the cost components of the ENPVM method. There are four costs which are relevant for the ENPVM analysis:

- 1) Recruitment/acquisition costs,
- 2) Technical training costs,
- 3) Lost productivity costs due to OJT, and
- 4) Separation costs.

The ENPVM Expanded analysis also includes regular military compensation as a cost component in addition to these 4 costs. Any of these cost elements can be viewed or revised by moving the cursor to the desired cost element and pressing Return. For service states 1 to 30, these screens display the current values by service state for each cost element. For example, if the user selected "Recruitment/Acquisition Costs" and pressed Return, the next screen to appear would be Screen 8a (Fig. 21). Screen 8a displays the current cost values by service state for recruitment and acquisition costs and allows the user to change any of these cost values. The cost values can be changed either sequentially or independently. To change a cost value, use the arrow keys to highlight the rate to be changed, enter the new rate and press Return. The cursor will automatically move to the next service state. When all desired changes have been made, or when the user has finished viewing the current values, pressing F10 will return the user to Screen 8.

After viewing/revising the cost components of the model, selecting the "Changes Complete" option and pressing Return will advance the user to Screen 9. If this option is selected without viewing or revising the cost components of the model, VAFE will maintain the cost components at their default values for the selected AFS.

Example: In this example, the user chose at Screen 1 to select the ENPVM Expanded method of valuation. After selecting to use the default continuation rates at Screen 3, the VAFE was advanced to Screen 8e. At Screen 8e (Fig. 22), the user selected the "Recruitment/Acquisition" cost component using the arrow keys and pressed Return. This function brought up Screen 8a (as shown in Fig. 21). After viewing the recruitment costs, the user pressed F10 to return to Screen 8e. The user then selected the "Changes Complete" option, not wishing to view or revise any other cost elements. Pressing Return at this option brought up Screen 9.

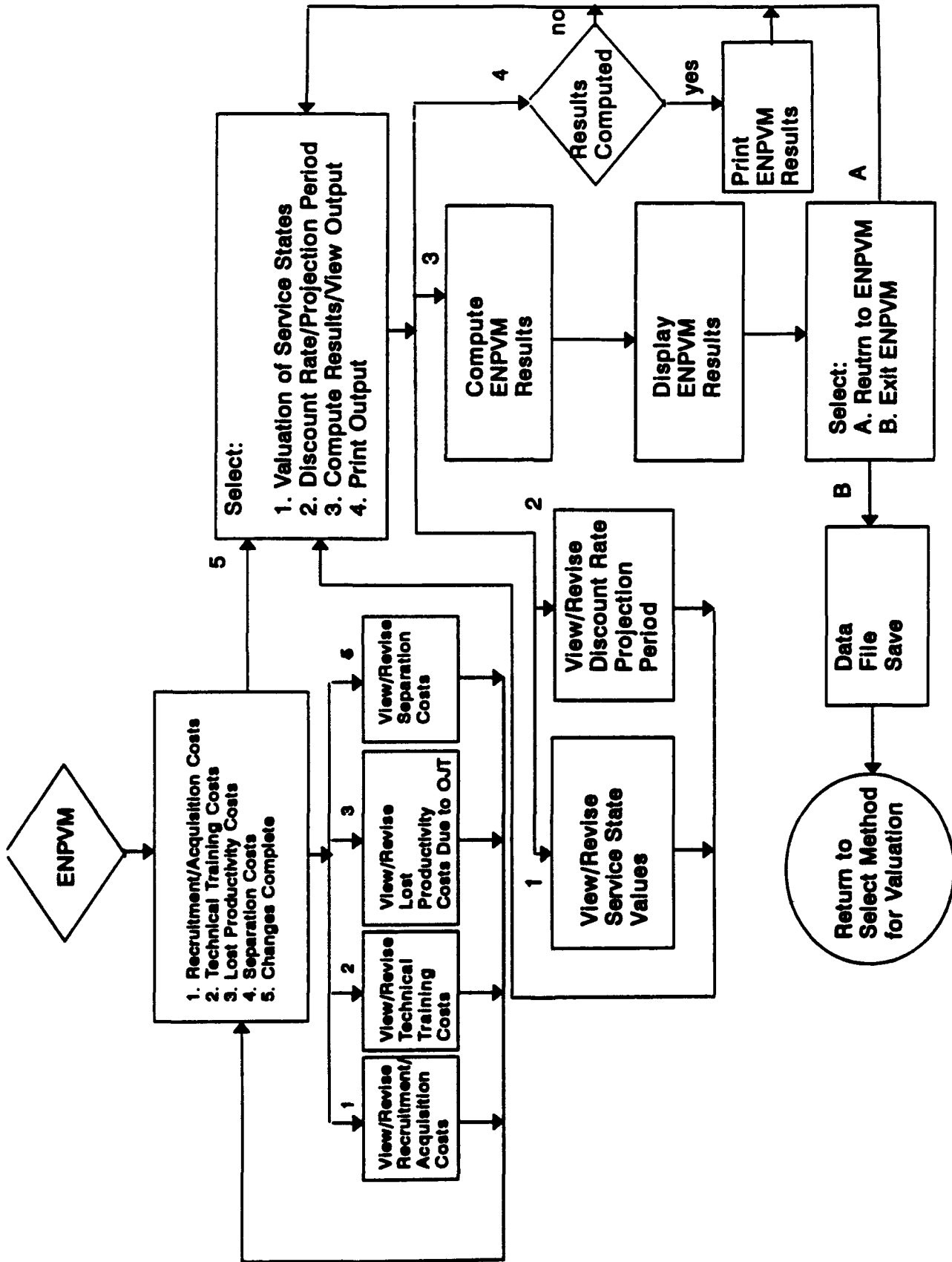


Figure 18. Overview of ENPVM.

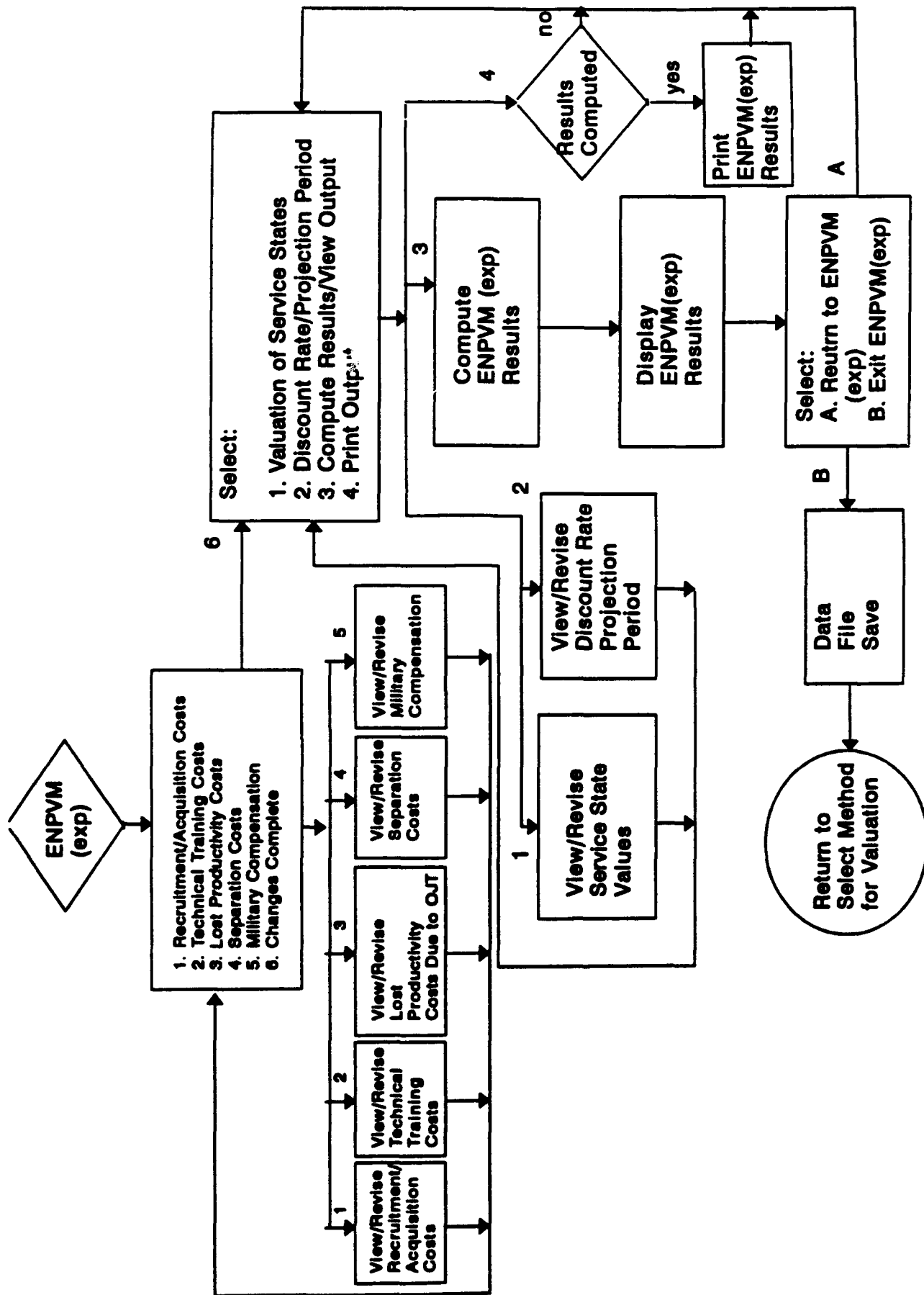


Figure 19. Overview of ENPVM Expanded.

Valuation of Air Force Experience

COST COMPONENTS OF THE MODEL:

Recruitment/acquisition Costs

Technical Training Costs

Lost Productivity Costs Due to OJT

Separation Costs

Changes Complete

Use F10 for previous screen
Use Esc to exit.

Figure 20. Screen 8: Cost Components of the Model.

Valuation of Air Force Experience

RECRUITMENT AND ACQUISITION COSTS:

1. 6415.00	11. 0.00	21. 0.00
2. 0.00	12. 0.00	22. 0.00
3. 0.00	13. 0.00	23. 0.00
4. 0.00	14. 0.00	24. 0.00
5. 0.00	15. 0.00	25. 0.00
6. 0.00	16. 0.00	26. 0.00
7. 0.00	17. 0.00	27. 0.00
8. 0.00	18. 0.00	28. 0.00
9. 0.00	19. 0.00	29. 0.00
10. 0.00	20. 0.00	30. 0.00

Use F10 for previous screen
Use Esc to exit.

Figure 21. Screen 8a: Recruitment and Acquisition Costs.

Similar to SRVM, ENPVM requires service states values and the specification of the projection period and the discount rate. Screen 9 displayed in Figure 23, allows the user to view or revise the information to be used in the present value calculation of ENPVM. This screen also allows the user to compute the results of the ENPVM calculation and to select the "Print Output of Previously Computed Results" option.

Valuation of Air Force Experience

COST COMPONENTS OF THE MODEL:

Recruitment/Acquisition Costs

Technical Training Costs

Lost Productivity Costs Due to OJT

Separation Costs

Military Compensation

Changes Complete

Use F10 for previous screen
Use Esc to exit.

Figure 22. Screen 8e: Cost Components of the Model (Expanded).

Valuation of Air Force Experience

EXPECTED NET PRESENT VALUE MODEL:

Valuation of Service States

Select Discount Rate/Projection Period

Compute Results and View Output

Print Output of Previously Computed Results

Use F10 for previous screen
Use Esc to exit.

Figure 23. Screen 9: Expected Net Present Value Model.

The user can view or revise the service state values for each of the service states 1 to 30 by using the arrow keys to highlight the "Valuation of Service States" option and pressing Return. This function will advance the user to Screen 9a (Fig. 24). The service state values can be changed either sequentially or independently. To change a service state value, use the arrow keys to

highlight the rate to be changed, enter the new rate and press Return. The cursor will automatically move to the next service state. When all desired changes have been made or when the user has finished viewing the current values, pressing F10 will return the user to Screen 9.

Valuation of Air Force Experience		
SERVICE STATE VALUES:		
1. 18261.61	11. 32906.49	21. 38424.55
2. 20122.32	12. 33704.22	22. 38776.78
3. 21951.45	13. 34469.60	23. 39097.43
4. 23749.00	14. 35074.52	24. 39386.49
5. 25514.95	15. 35647.85	25. 39643.96
6. 27003.15	16. 36189.60	26. 39869.85
7. 28449.05	17. 36699.76	27. 40064.15
8. 29852.65	18. 37178.34	28. 40226.86
9. 31213.95	19. 37625.33	29. 40357.99
10. 32076.40	20. 38040.73	30. 40457.53

Use F10 for previous screen
Use Esc to exit.

Figure 24. Screen 9a: Service State Values.

The user can also view or revise the discount rate and projection time period. Using the arrow keys to highlight the "Select Discount Rate/Projection Period" option and pressing Return will advance the user to Screen 9b (Fig. 25). The default value for the discount rate is 6.21 or 6.21% annually (Treasury Bill rate for 1988). The user can select this default value by simply pressing Return. To revise the discount rate, the user can enter the new value and then press Return. The cursor will automatically move to the projection period after the user presses Return. Now the time period for the projection can be revised. If the default value of 4 years is acceptable, the user can press Return. To revise the time period, enter the new time period and press Return. The maximum time period for projection is 20 years. After the user has pressed Return, VAFE will automatically return to Screen 9.

The user can also select the "Compute Results and View Output" option from Screen 9. To select this option, move the cursor using the arrow keys and press Return at this option. VAFE will now compute the projected value of officers or enlisted personnel in the selected AFS for each service state using the ENPVM method. If this option is chosen without viewing or revising the service state values or the discount rate/projection period, VAFE will use the default values for these parameters. While the computation is in process, VAFE will display the message "COMPUTATIONS IN PROGRESS." Once the computation is complete, the user will be advanced to Screen 10a (Fig. 26).

Screen 10a presents the ENPVM values for the first 17 service states. By pressing Return, the user is advanced to Screen 10b (Fig. 26) to view the ENPVM results for service states 18 through 30. Screen 10b allows the user the option to (1) return to the previous screen to review the ENPVM values for the first 17 service states by pressing F10; (2) return to Screen 9 (Fig. 23) by pressing Return; or (3) return to Screen 1 (Fig. 3) by pressing Esc.

Valuation of Air Force Experience

SELECT DISCOUNT RATE (ex: 6.51 % annually):

6.21

**SELECT PROJECTION PERIOD (ex: 12 for 12 years
with 20 years maximum):**

4

Use F10 for previous screen
Use Esc to exit.

Figure 25. Screen 9b: Select Discount Rate and Projection Period.

Returning to Screen 9 provides the user with an opportunity to print the results which were viewed in Screens 10a and 10b (Fig. 26), the "Print Output of Previously Computed Results" option. The results exhibited in Screens 10a and 10b can only be printed after the "Compute Results and View Output" option on Screen 9 has been selected. Otherwise, VAFE will display the message "RESULTS HAVE NOT BEEN COMPUTED YET" and return the user to Screen 9 (Fig. 23). VAFE will always print the results of the last computed valuation. After making any desired changes to the parameters of the estimation, the user must always select the "Compute Results and View Output" option prior to printing the output. This selection will allow the user to obtain a printed copy of the present valuation using the desired parameter changes. The user can select the "Print Output of Previously Computed Results" option by using the arrow keys to position the cursor and pressing Return. VAFE will display the message "RESULTS ARE BEING PRINTED" until the printing is complete. Once complete, the user will be returned to Screen 9 (Fig. 23). The output will mirror the results shown by the "Compute Results and View Output" option as exhibited in Table 3, which is an example of the printed results for the valuation presented in Figure 26. These results were computed using enlisted AFS 272X0 and default values for the continuation rates, cost components, service state values, discount rate, and projection period of the ENPVM Expanded analysis.

EXPECTED NET PRESENT VALUE (EXPANDED) OUTPUT - AFS 2720

Service State	Service State Values	Projected Values
1	-4935.79	-10465.09
2	-10294.75	-1281.63
3	-1142.22	3436.82
4	-815.03	8724.92
5	617.06	18135.48
6	143.21	26822.96
7	8769.76	27623.96
8	9726.32	29277.96
9	10267.81	32014.38
10	11037.52	34447.55
11	10928.01	35907.37
12	11457.18	35931.98
13	11351.05	34662.30
14	11375.19	33603.17
15	10507.80	32185.39
16	10436.99	31348.77
17	9672.75	28338.63

Use Return to go to next page.

EXPECTED NET PRESENT VALUE (EXPANDED) OUTPUT - AFS 2720

Service State	Service State Values	Projected Values
18	9405.61	24016.79
19	8769.59	18550.14
20	9036.95	11809.43
21	9346.06	12866.41
22	8568.49	12005.20
23	6221.52	12361.46
24	5084.27	10173.92
25	7156.99	7158.35
26	7055.35	2114.50
27	3648.96	1685.26
28	1904.19	1675.43
29	2205.77	1352.97
30	1436.79	0.00

Use F10 for previous screen; Use Return for previous menu;
Use Esc to exit.

Figure 26. Screen 10 (a and b): Expected Net Present Value (Expanded) Output.

The user can exit the ENPVM or ENPVM Expanded method by pressing Esc from Screen 9 (Fig. 23). If no changes have been made to any of the ENPVM elements, the user will be returned to Screen 1 (Fig. 3). If any ENPVM elements have been revised, the user will be given the option to save those changes. The user will then be advanced to the Data File Save Option Screen shown in Figure 2. The user can then select the "Return to requested menu" option by pressing Return. This option will return the user to Screen 1 without saving any of the changes made to the parameters of the valuation. If the user selects the "Save Present Data Tables" option, VAFE will then prompt the user for the appropriate pathname and filename. The user enters both of these following each with a Return. All changes made to the data are then saved in this file for future access by the user. If the user attempts to overwrite an existing file using this option, VAFE will prompt the user for confirmation to overwrite the file. Once the file has been saved, the user is returned to Screen 1 (Fig. 3).

Example: At Screen 9 (Fig. 23), the user selected the "Valuation of Service States" component using the arrow keys and pressed Return. This component brought up Screen 9a (as shown in Fig. 24). After viewing the service state values for enlisted personnel in AFS 272X0, the user pressed F10 to return to Screen 9. Next, the user selected the "Select Discount Rate/Projection Period" option and pressed Return. This option brought up Screen 9b (Fig. 25). The user entered 6.21 for the discount rate and pressed Return. This entry implies a 6.21% annual discount rate. To project over a 4 year period, the user entered 4 at the next prompt and pressed Return. VAFE automatically returned to Screen 9. The user then selected the "Compute Results and View Output" option and was advanced to Screen 10a (Fig. 26). In this example, the user computed results for enlisted AFS 272X0 using the ENPVM Expanded method. The default values for continuation rates, cost components, service state values, the discount rate and the projection period were used in this example. After viewing the results of Screen 10a, the user pressed Return, bringing up Screen 10b, in order to view the results for service states 18 to 30. The user then pressed Return at this screen. This function returned VAFE to Screen 9. From this screen the user was able to select the "Print Results previously computed" option. These selections are the results shown in Table 3. After printing the results, the user was returned to Screen 9. This step allowed the user to revise the service state values, the discount rate or the projection period and produce a new set of ENPVM values. To revise the cost components of the calculation, the user would first press Return from Screen 10b. This function would return VAFE to Screen 9. Next, the user would press F10, which would return the user to Screen 8, the "Cost Components" screen where the user could then select a cost component to be viewed or revised. To exit the ENPVM or ENPVM Expanded method and return to Screen 1, the user would press Esc from Screen 9. If any elements or continuation rates have been revised, the user will be given the option to save those changes by being advanced to the Data File Save Option Screen shown in Figure 2.

Table 3. EXPECTED NET PRESENT VALUE (EXPANDED) PRINTED OUTPUT

EXPECTED NET PRESENT VALUE (EXPANDED) OUTPUT - AFS 2720		
Service State	Service State Values	Projected Values
1	-4,935.79	-10,465.09
2	-10,294.75	-1,281.63
3	-1,142.22	3,436.82
4	-815.03	8,724.92
5	617.06	18,135.48
6	143.21	26,822.96
7	8,769.76	27,623.96
8	9,726.32	29,277.96
9	10,267.81	32,014.38
10	11,037.52	34,447.55
11	10,928.01	35,907.37
12	11,457.18	35,931.98
13	11,351.05	34,662.30
14	11,375.19	33,603.17
15	10,507.80	32,185.39
16	10,436.99	31,348.77
17	9,672.75	28,338.63
18	9,405.61	24,016.79
19	8,769.59	18,550.14
20	9,036.95	11,809.43
21	9,346.06	12,866.41
22	8,568.49	12,005.20
23	6,221.52	12,361.46
24	5,084.27	10,173.92
25	7,156.99	7,158.35
26	7,055.35	2,114.50
27	3,648.96	1,685.26
28	1,904.19	1,675.43
29	2,205.77	1,352.97
30	1,436.79	0.20

After selecting the "Compute Results and View Output" option, VAFE will produce the results presented in Figure 26. These results were produced using the ENPVM Expanded method. The output consists of the same three elements presented in the SRVM analysis,

- 1) Service state,
- 2) Service state values, and
- 3) Projected values.

Screen 10a displays each of these elements for service states 1 to 17 while Screen 10b displays these elements for service states 18 to 30.

The results presented in Figure 26 were computed using the ENPVM Expanded method for enlisted AFS 272X0. No alterations were made to the default values for continuation rates, cost components, service state values, the discount rate or the projection time period in this example. If the user revised any of the these elements, those revised values would be used in the calculations of the output instead of the default values.

The first element of the output is the "Service State." This number represents each YOS from 1 to 30 as discussed earlier. The second element is the "Service State Value." These values represent the dollar value to the USAF of an individual at each service state minus the costs associated with maintaining an individual at that service state. These costs include the airman's military compensation, since the user chose ENPVM Expanded as the method of valuation. From Figure 26, an airman in service state 4 has a service state value of -\$815.03. The negative service state value implies that it costs the USAF \$815.03 to maintain an airman in service state 4. The final element of the output is the "Projected Values." This number is a present value estimate of a future flow of services based on the service state values. This estimate represents the future value to the USAF of an individual in AFS 272X0 for an expected tenure of 4 years, accounting for the probability of separation during the 4-year tenure, less all costs to maintain, train, and promote the airman, and discounting by a 6.21% rate. For example, from Figure 26, an airman in service state 4 has a projected value of \$8,724.92 over the expected 4-year tenure. In essence, this means that the USAF will incur a net benefit of \$8,724.92 from retaining the services of an airman in YOS, or service state 4, for 4 additional years of service. A detailed explanation of the methodology used to calculate these elements is found in "Cost-based Value Models of Air Force Experience" (Stone et al., 1989a).

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**APPENDIX
AIR FORCE SPECIALTY CODES**

Table A-1. LIST OF ENLISTED AFSs IN VAFE

111X0	Defensive Aerial Gunner
112X0	In-Flight Refueling Operator
113X0	Flight Engineer
114X0	Aircraft Loadmaster
115X0	Pararescue/Recovery Specialist
116X0	Airborne Communications Systems Operator
117X0	Airborne Warning Command and Control Systems Operator
118X0	Airborne Computer Systems Specialist
118X1	Airborne Command and Control Communications Equipment Specialist
118X2	Airborne Radar Systems Specialist
121X0	Survival Training Specialist
122X0	Aircrew Life Support Specialist
201X0	Intelligence Operations Specialist
201X1	Target Intelligence Specialist
205X0	Electronic Intelligence Operations Specialist
206X0	Imagery Interpreter Specialist
207X1	Morse Systems Operator
207X2	Printer Systems Operator
208X1	Germanic Cryptologic Linguist Technician
208X2	Romance Cryptologic Linguist Technician
208X3	Slavic Cryptologic Linguist Technician
208X4	Far East Cryptologic Linguist Technician
208X5	Mid East Cryptologic Linguist Technician
209X0	Defensive C3CM Specialist
222X0	Geodetic Specialist
231X0	Visual Information Media Specialist
231X1	Graphics Specialist
231X2	Still Photographic Specialist
231X3	Visual Information Production-Documentation Specialist
233X0	Imagery Production Specialist
241X0	Safety Specialist
242X0	Disaster Preparedness Specialist
251X0	Weather Specialist
271X1	Airfield Management Specialist
271X2	Operations Resource Management Specialist
272X0	Air Traffic Control Operator
273X0	Combat Control Operator
274X0	Command and Control Specialist
275X0	Tactical Air Command and Control Specialist
276X0	Aerospace Control and Warning Systems Operator
277X0	Space Systems Operations Specialist
303X1	Air Traffic Control Radar Specialist
303X2	Aircraft Control and Warning Radar Specialist
303X3	Automatic Tracking Radar Specialist

304X0 Wideband Communications Equipment Specialist
 304X1 Navigational Aids Equipment Specialist
 304X2 Meteorological and Navigational Systems Specialist
 304X4 Ground Radio Communications Specialist
 304X5 Television Equipment Specialist
 304X6 Satellite Communications Systems Equipment Specialist
 305X4 Electronic Computer and Switching Systems Specialist
 306X0 Electronic Communication and Cryptographic Equipment
 Systems Specialist
 306X3 Telecommunications Systems Maintenance Specialist
 309X0 Space Systems Equipment Maintenance Specialist
 316X3 Instrumentation Specialist
 324X0 Precision Measurement Equipment Laboratory Specialist
 341X2 Defensive Systems Trainer Specialist
 341X4 Flight Simulator Specialist
 341X6 Navigation/Tactics Training Devices Specialist
 341X7 Missile Trainer Specialist
 361X0 Antenna Systems Installation/Maintenance Specialist
 361X1 Communications Cable Systems Installations/Maintenance Specialist
 362X1 Telephone Switching Specialist
 362X3 Missile Control Communication Systems Specialist
 362X4 Telephone and Data Circuitry Equipment Specialist
 391X0 Maintenance Data Systems Analysis Specialist
 392X0 Maintenance Scheduling Specialist
 404X0 Imagery Systems Maintenance Specialist
 411X1 Missile Maintenance Specialist
 411X2 Missile Facilities Specialist
 451X6 F/FB-111 Avionics Test Station and Component Specialist
 452X3 F/FB-111 Avionic Systems Specialist
 452X4 Tactical Aircraft Maintenance Specialist
 452X5 Tactical Electronic and Environmental Systems Specialist
 454X0 Aerospace Propulsion Specialist
 454X1 Aerospace Ground Equipment (AGE) Mechanic
 454X2 Aircrew Egress Systems Mechanic
 454X3 Aircraft Fuel Systems Mechanic
 454X4 Aircraft Pneudraulic Systems Specialist
 455X0 Photographic and Sensors Maintenance Specialist
 455X1 Avionics Guidance and Control Systems Specialist
 455X2 Communication and Navigation Systems Specialist
 455X4 Airborne Warning and Control Radar Specialist
 455X6 Airborne Command Post Communication Equipment Specialist
 456X0 Bomb-Navigation Systems Specialist
 456X1 Electronic Warfare Systems Specialist
 456X2 Defensive Fire Control Systems (DFCS) Specialist
 457X0 Strategic Aircraft Maintenance Specialist
 457X1 Helicopter Maintenance Specialist
 457X2 Airlift Aircraft Maintenance Specialist

457X3 B-1B and B-2 Avionic Systems Specialist
 458X0 Aircraft Metals Technology Specialist
 458X1 Nondestructive Inspection Specialist
 458X2 Aircraft Structural Maintenance Specialist
 458X3 Fabrication and Parachute Specialist
 461X0 Munitions Systems Specialist
 462X0 Aircraft Armament Systems Specialist
 463X0 Nuclear Weapons Specialist
 464X0 Explosive Ordnance Disposal Specialist
 465X0 Munitions Operations Specialist
 472X0 Special Purpose Vehicle and Equipment Mechanic
 472X1 Special Vehicle Mechanic
 472X2 General Purpose Vehicle Mechanic
 472X3 Vehicle Body Mechanic
 472X4 Vehicle Maintenance Control and Analysis Specialist
 491X1 Communications-Computer Systems Operator
 491X2 Communications-Computer Systems Programming Specialist
 492X1 Communications Systems Radio Operator
 492X2 Communications Systems Electromagnetic Spectrum
 Management Technician
 493X0 Communications-Computer Systems Control Specialist
 496X0 Communications-Computer Systems Planning and
 Programs Management Specialist
 542X0 Electrician
 542X1 Electric Power Line Specialist
 542X2 Electrical Power Production Specialist
 545X0 Refrigeration and Air-Conditioning Specialist
 545X1 Liquid Fuel Systems Maintenance Specialist
 545X2 Heating Systems Specialist
 545X3 Civil Engineering Controls Systems Specialist
 551X0 Pavements Maintenance Specialist
 551X1 Construction Equipment Operator
 552X0 Structural Specialist
 552X2 Metal Fabricating Specialist
 552X5 Plumbing Specialist
 553X0 Engineering Assistant Specialist
 554X0 CE Resources Management Specialist
 555X0 Production Control Specialist
 566X0 Pest Management Specialist
 566X1 Environmental Support Specialist
 571X0 Fire Protection Specialist
 591X0 Seaman
 591X1 Marine Engine Specialist
 602X0 Passenger and Household Goods Specialist
 602X1 Freight and Packaging Specialist
 603X0 Vehicle Operator/Dispatcher
 605X5 Air Transportation Specialist

612X0 Meatcutter
612X1 Subsistence Operations Specialist
623X0 Services Specialist
631X0 Fuels Specialist
645X0 Inventory Management Specialist
645X1 Materiel Storage and Distribution Specialist
645X2 Supply Systems Analysis Specialist
651X0 Contracting Specialist
661X0 Logistics Plans Specialist
672X1 Financial Management Specialist
672X2 Financial Services Specialist
673X0 Auditing Technician
674X0 Cost Analysis Specialist
702X0 Information Management Specialist
703X0 Reprographic Specialist
732X0 Personnel Specialist
732X1 Personal Affairs Specialist
733X1 Manpower Management Technician
734X0 Social Actions Technician
741X1 Fitness and Recreation Specialist
742X0 Open Mess Management Specialist
751X0 Education Specialist
751X1 Training Systems Technician
753X0 Combat Arms Training and Maintenance Specialist
753X1 Gunsmith Technician
791X0 Public Affairs Specialist
791X1 Radio and TV Broadcasting Specialist
792X2 Historian Specialist
811x0 Security Specialist
811X2 Law Enforcement Specialist
821X0 Special Investigations Technician
871X0 Instrumentalist
872X0 Instrumentalist Technician
881X0 Paralegal Specialist
893X0 Chapel Management Specialist
902X0 Medical Service Specialist
902X2 Surgical Service Specialist
903X0 Radiologic Specialist
903X1 Nuclear Medicine Technician
905X0 Pharmacy Specialist
906X0 Medical Administrative Specialist
907X0 Bioenvironmental Engineering Specialist
908X0 Environmental Medicine Specialist
911X0 Aerospace Physiology Specialist
912X5 Optometry Specialist
913X0 Physical Therapy Specialist
913X1 Occupational Therapy Specialist

914X0 Mental Health Service Specialist
 915X0 Medical Materiel Specialist
 918X0 Biomedical Equipment Specialist
 919X0 Orthotic Specialist
 924X0 Medical Laboratory Specialist
 924X1 Histopathology Specialist
 925X0 Cytotechnology Specialist
 926X0 Diet Therapy Specialist
 981X0 Dental Assistant Specialist
 982X0 Dental Laboratory Specialist
 To evaluate the aggregate enlisted force use "9999."

Table A-2. LIST OF OFFICER AFSS IN VAFE

2516	Weather Staff Officer
2616	Scientific Manager
2685	Scientific Analyst
2816	Staff Development Engineering Manager
5525	Civil Engineering Officer
9025	Health Services Administrator
9125	Bioenvironmental Engineer
9316	Staff Clinician
9326	General Practice Physician
9736	Operating Room Nurse
9816	Dental Staff Officer

To evaluate the following officer 2-digit level AFSs use the following:

2599	Weather
2699	Scientific
2899	Development Engineering
5599	Civil Engineering
9099	Health Services Management
9199	Biomedical Sciences
9399	Physician
9799	Nurse
9899	Dental