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Mr. T. Leonard / Mr. M.S. Youmans, Dir., Functional
Process Improvement, CASD/C3I, via memo dtd
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**User's Manual
for the
Functional Economic Analysis Model
(Version 2.3)**

February 1993

**INSTITUTE FOR DEFENSE ANALYSES
1801 N. Beauregard Street, Alexandria, Virginia 22311-1772**

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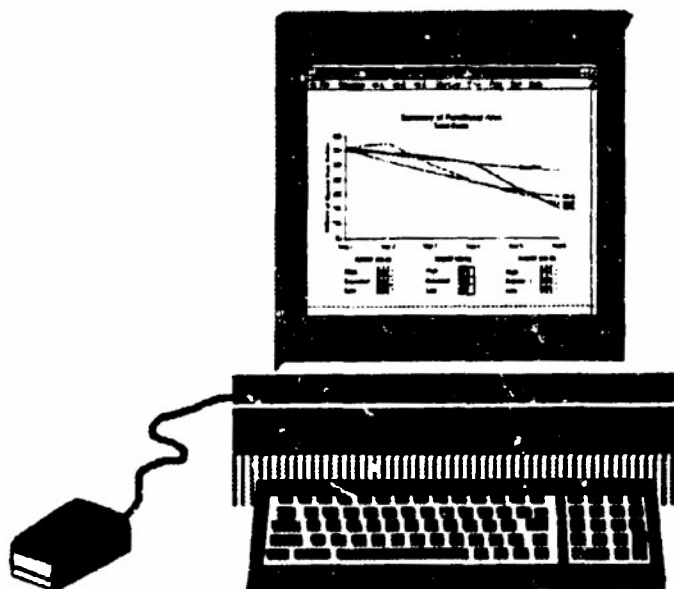
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User's Manual for the Functional Economic Analysis Model (Version 2.3)



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FOREWORD

Version 2.3 of the Functional Economic Analysis Model contains seven major changes as follows:

- addition of edit commands that allow users to customize all of the embedded charts that the model displays.
- updates the DoD deflation factors to those appropriate for the 1993 fiscal year.
- adds the option to cancel simulation.
- data sheets can be viewed in both constant and current dollars.
- data is now entered in constant dollars (verses current/then year dollars) and the model's default screens are also in constant dollars.
- allows the user to clear information relating to the third alternative on the Summary screens when there are only two alternatives.
- improvements to printing procedures.

This version is designed to work with both Microsoft Excel 3.0™ and Microsoft Excel 4.0™. When saving files, we recommend that you save them in Microsoft Excel 3.0™ to allow for compatibility and transferability to other machines.

The model is undergoing continual revision and refinement. If you need assistance or have suggestions, please feel free to call and leave a message:

Feam Hotline:
Telephone: (703) 845-6780

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I. GETTING STARTED

This section describes how to install the model, how to enter data into the model, and introduces the user to the model by briefly discussing how data is entered, analyzed, and displayed.

A. INTRODUCTION

The Functional Economic Analysis Model (FEAM) is intended to support analyses of potential cost-saving alternatives for Department of Defense (DoD) information management, and to aid functional managers in presenting their "business case."¹ The model is designed to allow the user to enter costs and receive information for a series of alternatives to a cost baseline. The baseline represents expected costs for a given function using existing processes to satisfy projected workload. A DMRD Base represents pre-Defense Management Review (DMR) Expenditures and force-reduction levels; it is needed only for DoD level FEAs. The model takes the user-supplied information and performs a Risk-Adjusted, Discounted Cash Flow (RADCF) analysis for each alternative. The results are presented in a series of graphs and tables.²

The remainder of this section gives a brief overview of how to start and use the model. The rest of the manual consists of detailed information on the model, including a discussion of the form of the cost data needed to run the model.

Section II guides the user through entering, editing, and analyzing the data. Information about discount and inflation rates is presented in this section.

Section III presents the four types of computer screens that the user will encounter. The Summary screen depicts the total costs and savings by function. The Alternative screen depicts the savings for a particular alternative. The Cost Breakout screen depicts costs broken out by major types of expenses. Last, the Data Sheet screen serves as the vehicle for the user to input data into the model.

¹ The user should consult the DoD policy on business case analysis for specific guidance on the scope and content of a "business case."

² This analysis is based on chapters 8 and 9 of *The Business Value of Computers*, Paul A. Strussmann, New Canaan, CT: The Information Economics Press, 1990.

Appendix A deals with the risk adjustment computation carried out by the model during the simulation process. An outline of cost elements used in the model and the definitions of the cost elements are presented in Appendix B. Appendix C provides detailed instructions on when and how to use the **Deflator Conversion** program.

The following conventions are used throughout this document:

- Menu names and options are denoted in boldface (e.g., **File** menu)
- Key strokes are denoted by <> signs (e.g., <Return> key).

B. INSTALLING THE MODEL

The FEAM runs on the IBM PC™ and compatibles and the Apple Macintosh™. The user should be familiar with pull-down menus, dialog boxes, and use of the mouse to make selections. The model will require the following:

Minimum	Recommended
Microsoft Excel 3.0™/4.0™	-----
A mouse	-----
2 MB of RAM	4 MB of RAM
20 MB hard disk	40 MB or higher hard disk
2.5 MB free space	3.5 MB or more free space
-----	Math co-processor
<u>IBM compatibles</u>	
Microsoft Windows 3.0™/3.1™	-----
EGA display	VGA or higher display
<u>Macintosh</u>	
Multifinder™	-----
(Note: do not run FEAM under Finder™)	

To install the model on the IBM PC and compatibles, take the following steps:

1. Enter Microsoft Windows.
2. Insert the FEAM disk in drive A or B.
3. Pull down the **File** menu and choose the **Run...** option (Figure 1).
4. In the command line, type "a:\setup" or "b:\setup", depending on whether you have placed the disk in drive A or B (Figure 2). The Setup routine will lead you through installation of the FEAM.

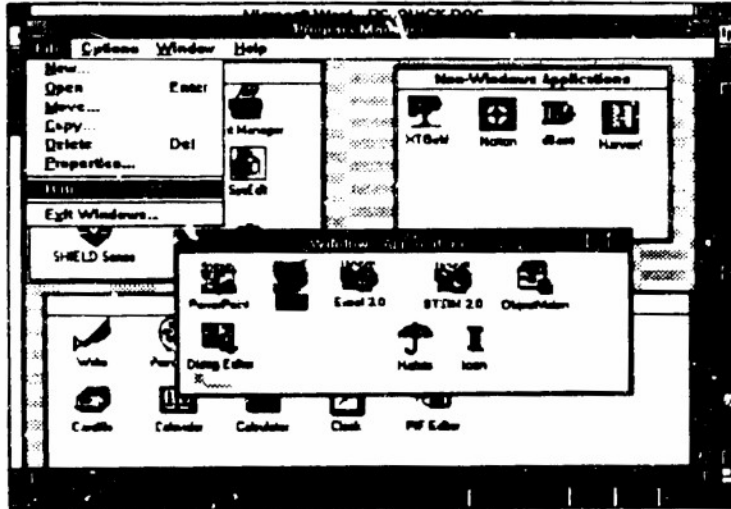


Figure 1. Choosing File/Run

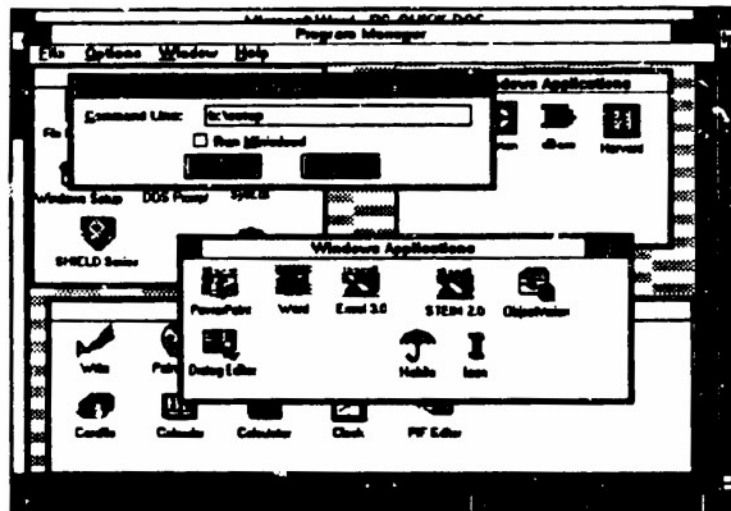


Figure 2. Entering the Command Line

For the Apple Macintosh, take the following steps:

1. Copy the compressed version of the FEAM, labeled "FEAM Ver. 2.3 (Compressed)", from the FEAM disk to your hard disk.
2. Double-click on the file "FEAM Ver. 2.3 (Compressed)" on your hard disk. The installation program will prompt you to select a location for the file, and then copy the model to a folder called "FEAM Ver. 2.3."

Once the model is installed, make sure Excel is not already open and enter the model by double clicking on the FEAM icon (PC compatibles), and the title screen will appear, as shown in Figure 3. If you wish to open Excel first, you may start the FEAM by choosing the "bus_case.xlm" file from the Open option of the File menu.

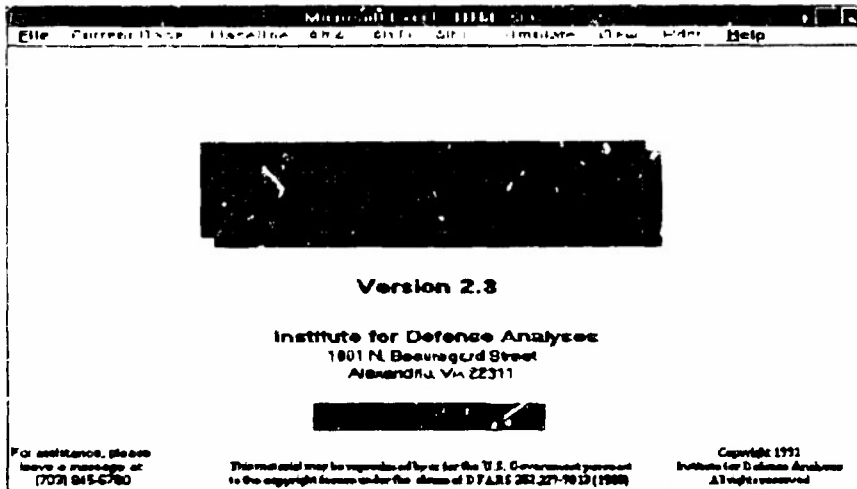


Figure 3. Title Screen

C. OVERVIEW OF THE MODEL

This section briefly describes the use of the model. Figure 4 shows the entire menu structure, which is broken into four levels. The levels are described below.

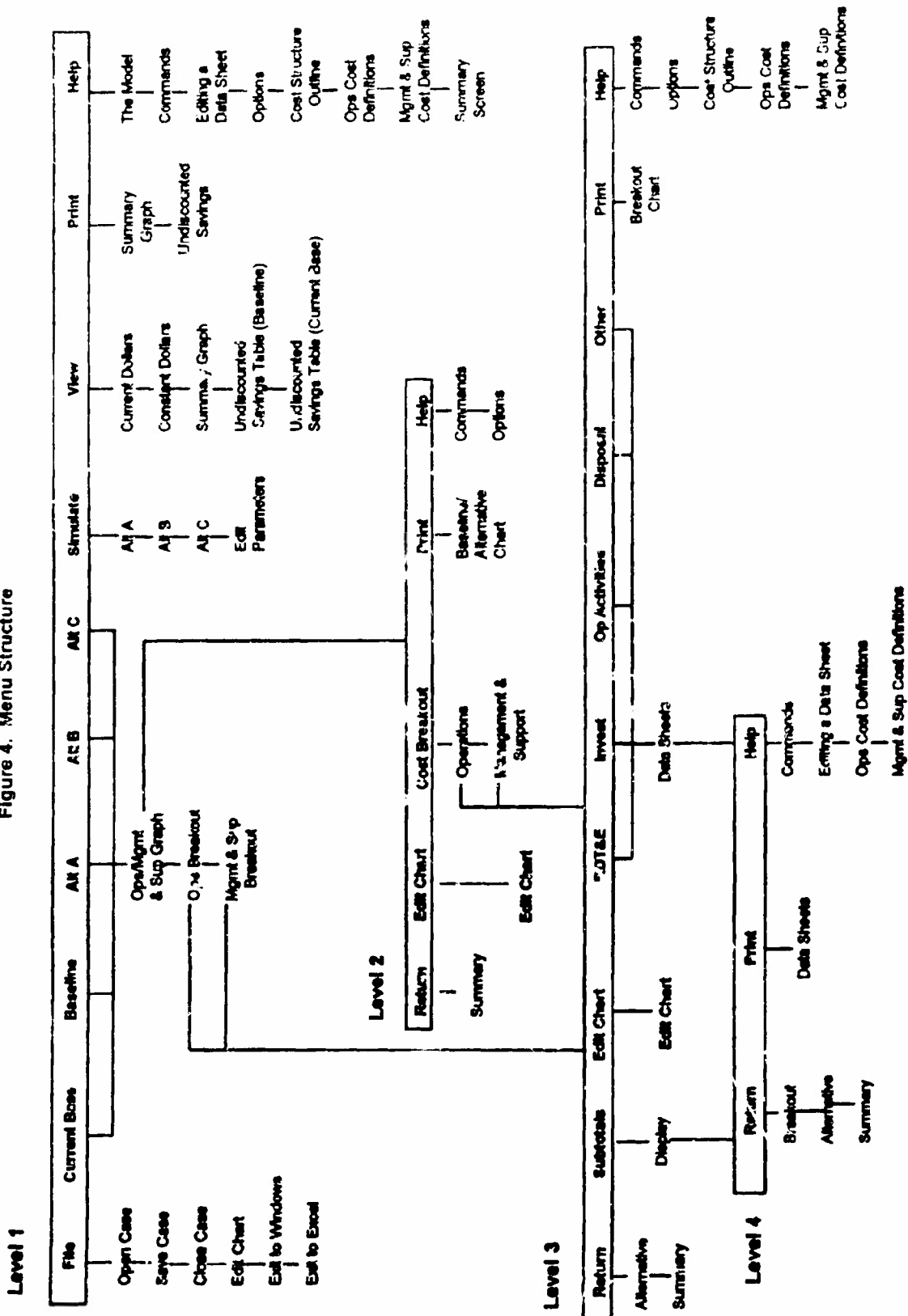
Level 1 has 10 menus available: **File**, **DMRD Base**, **Baseline**, **Alt A**, **Alt B**, **Alt C**, **Simulate**, **View**, **Print**, and **Help**. The **File** menu allows you to open a new case, save a case, close a case, edit a chart, and exit to either Excel or Windows (Desktop on the Macintosh). When you first run the FEAM, two cases are available under **Open Case**: "demo2.cim" and "initial2.cim". The file "demo2.cim" is an example case with a completed data sheet. The file "initial2.cim" is a blank case template that users can use to build business cases. After filling in the data, you can choose the **Save Case** option to save the case. The file name can be only eight characters long. The ".cim" extension should not be added; this will be done by the program. Never save a file as "initial2" or the blank data sheet will be written over. If you enter a case with only two alternatives (A and B) and do not wish to have information displayed for Alternative C, you can save the

case, close the case, and then reopen it. This procedure will clear all information related to Alternative C on the Summary screen for both current-year and constant-year dollars. However, it is not necessary to follow this procedure - only if you prefer to have the Alternative C information cleared from the viewed charts.

The **DMRD Base**, **Baseline**, or one of the three **Alternative** menus lead you through the lower levels where you can enter or view data and disaggregated graphs. Under these menus, you may choose the **Ops/Mgmt & Sup Graph** option to go to Level 2, or either the **Ops Breakout** option or the **Mgmt & Sup Breakout** option to go directly to Level 3. These levels will be discussed later in this section.

The **DMRD Base** represents function costs before any **DMR cuts** or force level reductions. The **Baseline** shows the expected costs of meeting projected workloads using the current processes for the function. The **Alternatives** display the costs of performing those projected workloads with improved processes.

Figure 4. Menu Structure



The **Simulate** menu allows you to apply the RADCF procedure to any one of the three Alternatives. You can choose the **Edit Parameters** option, where the discount rate and the number of simulations can be changed. Once data have been entered and the RADCF simulation has been run, the Summary screen on Level 1 shows a total cost and savings graph. A table showing undiscounted savings by Alternative is also available by using the **View** menu. The **View** menu also allows you to toggle between current and constant dollars and view undiscounted savings by Alternative from both the DMRD Base and the Baseline.

The **Print** and **Help** menus are available on every level of the program. The **Print** menu lets you print graphs or data sheets available at a particular level. The **Help** menu on the first level provides help that will be useful at all levels. Help at the other levels refers specifically to those levels.

On the first three levels, the user has the option to edit graphs or tables available at that level. On Level 1, **Edit Chart** can be found under the **File** menu. On Levels 2 and 3, there is an **Edit** menu choice. There is no option to edit at the data-entry level (Level 4). Selecting **Edit** allows the user to change the type of graph viewed (bar graph, line graph) under the **Gallery** menu. Also, the user may add a legend, text, arrow, etc. by selecting the **Chart** menu choice. To save an altered graph, the user should select **Save As** under the **File** menu and name the graph as something other than **Chart_1.xls**. By doing so, the original graphs will still be part of the model and the user can access the edited charts through Microsoft Excel. It should also be noted that not all types of chart designs will be applicable to the graphs at each level. The chart pattern chosen will dictate the extent to which the user will have to manipulate the embedded chart's series.

Level 2 has two purposes: displaying the **Operations/Management & Support** graph and accessing the other levels of data-entry tables. The **DMRD Base** and **Baseline** graphs show total baseline costs broken out by operations and management and support. The **Alternative** graphs display the differences between total operations and total management and support costs from the **Baseline** over time. The **Cost Breakout** menu takes you to the data-entry levels. The **Return** menu allows you to return to the first level. The **Edit** menu allows you to edit the chart.

The Level 3 screens show a graphical display of the cost element breakout. The **Baseline** cost element breakout graph represents total cost element spending over time. The **Operations** breakout and **Management & Support** breakout screens for any of the alternatives show the differences in cost element spending from the **Baseline** over time. It

is at this level that you choose a life-cycle phase for data entry. The menu choices for data entry are **RDT&E** (Research, Development, Test, and Evaluation), **Invest** (Investment), **Op Activities** (Operational Activities), **Disposal**, and **Other**. Another menu choice is **Subtotals** which allows you to view the cost element totals. No data are entered or changed under this choice. The **Return** menu permits you to return to Level 1 or 2 and the **Edit** menu allows you to edit the chart.

Level 4 is where you input data (discussed in Section II). For the DMRD Base and Baseline, a single entry is required. For the Alternatives, both a high and a low entry are required. The highs and lows may be the same, or may be zero. The **Return** menu allows you to return to Level 1, 2, or 3.

II. MANIPULATING DATA

This section explains how to enter and edit data, and how to analyze the results. The model is designed to accept data that is in Constant Dollars.

A. ENTERING DATA

The steps for creating a new business case are summarized below.

- From the title screen of the model, pull down the **File** menu and select the **Open Case** option.
- Double-click on the file "initial2.cim". A message will appear that suggests first-time users choose the **Baseline** menu item.
- Pull down the **Baseline** menu and select the **Ops Breakout** option. This allows you to bypass the Alternative graph level (Level 2) and go directly to Level 3, where the life-cycle phase is chosen.
- Pull down the **RDT&E** menu item and select the **Data Sheet** option. This brings you to Level 4 where all cost data are entered.
- Enter the cost data for the RDT&E phase (see Section II.B for further information on entering data). All cells must contain a number, even if that number is zero.
- Pull down the **Return** menu and select the **Breakout** option to get back to the life-cycle phase position.
- Choose another life-cycle phase and enter data as for RDT&E. Repeat for each life-cycle phase.
- Choose the **Summary** option from the **Return** menu. This will take you back to Level 1
- Pull down the **Baseline** menu and select the **Mgmt & Sup Breakout** option and repeat the steps for entering data for each life-cycle phase.
- After all data for the **Baseline** have been entered, pull down the **Return** menu and select the **Summary** option.

- Select an Alternative (A, B, or C) and enter data as for the Baseline. The "high" and "low" entries may be the same (see Section II.B). Room is provided for three Alternatives, although only one is needed to run a simulation. If you need more than three Alternatives, create a new case. If you plan to run many Alternatives on the same Baseline data, make a template after entering your Baseline data, and before entering the Alternative data. To do this, enter the Baseline data only, and save the file under a different name (e.g., "base1"). When you open a case, bring up your template instead of "initial2.cim".
- When all the data are entered, pull down the Return menu and select the Summary option. You may now run the simulation by choosing one of the options under the Simulate menu.
- To save your work, pull down the File menu and select the Save Case option. Enter a file name with no more than 8 characters. Do not enter an extension; the extension ".cim" will be automatically attached. All data for the Baseline, DMRD Base, and up to three Alternatives can be entered into one file.

B. EDITING DATA

Once you are in a data sheet, use the arrow keys or the mouse to move the cross hairs to the position to be edited. A rectangular box will appear at the position to be edited. Type in the desired value and press the <Return> key. If you are using Excel 4.0™ and you wish to place the same value in all the years in a cost element, the "Fill Right" and "Fill Down" key stroke commands can be used. Refer to your Excel manual for more information. All values are in millions of constant-year dollars and should be rounded to two decimal places. If data is entered with three or more decimal places, the program will automatically round them up. Below are definitions for the high and low values and what to do when the cost is known with certainty.

- High - The high estimate represents the cost that is exceeded by the actual cost only 2.5 times out of 100.
- Low - The low estimate represents the cost that exceeds the actual cost only 2.5 times out of 100.
- Certainty - If you know with certainty the cost, then make the high and low values the same.

For the simulation to execute correctly, all cells must contain a non-negative numeric value. Do not run the simulation with blank cells; enter zeroes where appropriate. **NOTE:** The default setting of the model is to display data in constant dollars. Do not input data in the Current\$.xls file. The model will not read any data placed in this file by the user.

C. ANALYZING DATA

Once you have entered the data, the model can analyze the data using the Risk-Adjusted, Discounted Cash Flow (RADCF) analysis. The results are shown as graphs and a table. To implement the analysis, choose one of the options under the Simulate menu at the top level. Each Alternative must be simulated separately. The simulation process takes between 50 seconds and 20 minutes on a computer with a math co-processor. Without the math co-processor, it will take much longer. If you wish to discontinue the simulation process, you may do so by selecting the cancel button.

Changes to the discount rate and the number of simulations can be made by selecting the Edit Parameters option from the Simulate menu. For final analysis, 500 simulations are recommended; however, 100 simulations can be used for an intermediate analysis. Running time for 100 simulations is significantly shorter than for 500 simulations.

After selecting the Alternative to simulate, you will be asked for the residual value, the expected useful life of the Alternative beyond the six-year planning period incorporated into the model. To calculate the residual, the model takes the net savings for the last year of the planning period (year 6) and computes the present value of the stream for the selected number of additional years.

The RADCF calculation uses the "high" and "low" estimates entered under the Alternatives to generate a distribution of possible values for each cost element. The model then estimates the cost for each year in each cost category based on a value from that distribution, subtracts it from the corresponding Baseline, and sums all those values to generate a total savings estimate. This process is repeated 500 times. The model then reports the average of these estimates to give an expected savings, as well as a "best" and "worst" case to give a feel for the distribution of these savings. A complete discussion of the simulation methodology is presented in Appendix A.

All graphs can be viewed in either current or constant dollars. Four different deflators are used for converting constant-year dollars into "then" or current-year dollars for the eight cost elements as follows.

<u>Cost Element</u>	<u>Deflator</u>
Civilian labor	TOA-Civilian pay
Military labor	TOA-Total Pay and Allowances
Information Technology	Provided by DDI
Facilities	TOA-Total Non-pay
Material	TOA-Total Non-pay
Other	TOA-Total Non-pay
General Installation Support	TOA-Total Non-pay
Headquarters Support	TOA-Total Non-pay

The Total Obligation Authority (TOA) deflators are taken from Table 5-5 of the *National Defense Budget Estimates for FY 1993* prepared by the DoD Comptroller. The Director of DoD Information (DDI) has elected to provide a separate rate for the Information Technology category because of its unique declining cost behavior in recent years. The deflators are as follows:

<u>Cost Element</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>
Total Non-pay	1.0000	1.0329	1.0664	1.1009	1.1360	1.1708
Information Technology	1.0000	0.8800	0.7740	0.6810	0.6000	0.5280
Civilian Labor	1.0000	1.0445	1.0936	1.1433	1.1862	1.2325
Total Pay and Allowances	1.0000	1.0451	1.0934	1.1423	1.1832	1.2281

The expected RADCF appears on the Summary and Alternative graphs. The "best" and "worst" case RADCFs are shown on the Summary graph. Undiscounted savings are available under the View menu at Level 1.

The results may be printed as graphs or tables. A Print menu is found at each level, and can be used to print only those tables and graphs displayed at that level.

III. THE SCREENS

This section provides a summary of the main screens and their functions. All the graphs require that the data for the DMRD Baseline, Baseline, and at least one Alternative be filled in. Furthermore, graphs are updated after each simulation has been completed.

A. LEVEL 1 - THE SUMMARY SCREEN

The Summary screen is viewed from Level 1 and is shown in Figure 5. If you are at a different level, Level 1 can be reached by choosing the Summary option from the Return menu.

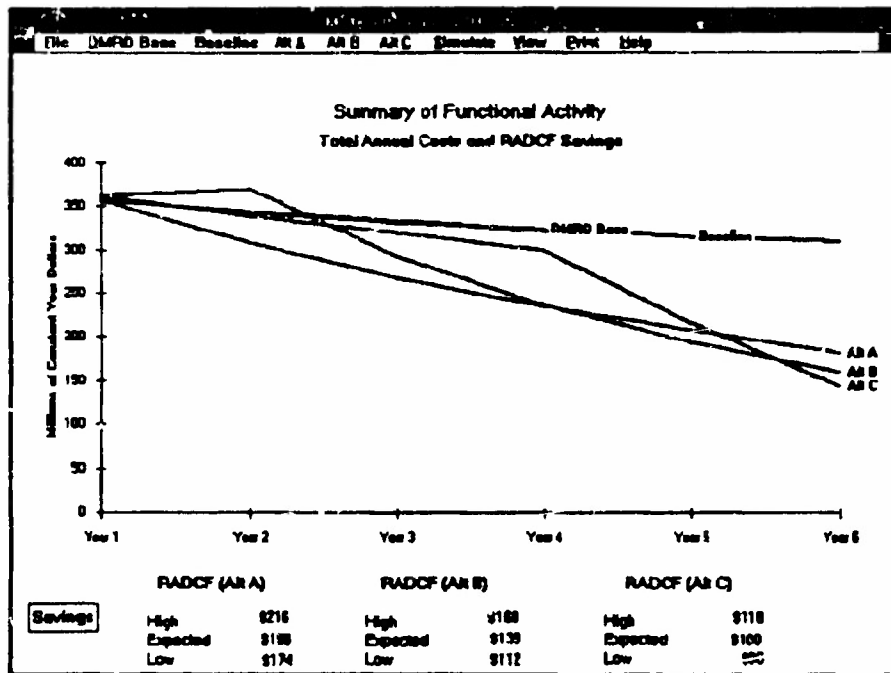


Figure 5. The Summary Screen

The Summary screen shows the total undiscounted costs associated with the DMRD Baseline, Baseline, and each Alternative. There is a Summary screen for current-year dollars and a Summary screen for constant-year dollars. You may toggle between

these screens using the options in the **View** menu. At the bottom of each screen, three RADCF values for each Alternative are displayed. The RADCF represents the cumulative present value of cost savings of each Alternative. The expected RADCF is the average RADCF created by the simulation process, which incorporates risk into the RADCF values. The high and low RADCFs represent the "best" and "worst" cases, respectively. For more information on the risk adjustment calculation, see Appendix A.

The menu choices at the Summary screen include **DMRD Base**, **Baseline**, and the three Alternatives, which take you to the Operations/Management & Support breakout (Level 2) or the Cost Element breakout (Level 3). Also from this screen, you may open and save files, print the Summary graph and undiscounted savings tables for both DMRD Base and Baseline, invoke the simulation routine for a particular Alternative, edit the Summary graph and the undiscounted savings tables, and exit the model. Help at this level includes information on commands, cost structure, and cost element descriptions, as well as information about the Summary screen.

There are three options under the pull-down menus for **DMRD Base**, **Baseline**, and each Alternative, as shown in Figure 6. The first option, **Ops/Mgmt & Sup Graph**, allows you to display the Baseline total costs, broken out by total operations costs and total management and support costs. When this option is selected from one of the Alternative menus (Alt A, Alt B, or Alt C), the cost savings are displayed for the selected Alternative, broken out by operations and management and support costs. These savings represent the generated differences from the Baseline.

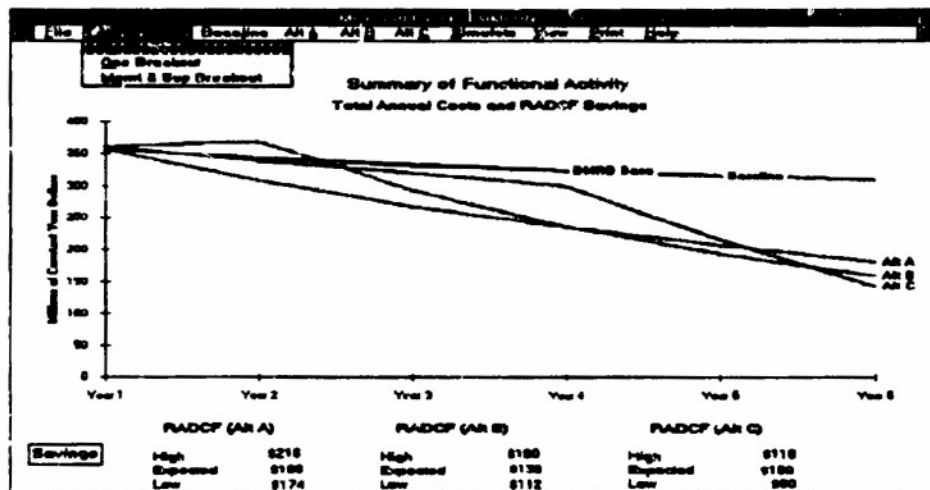


Figure 6. Choosing a Breakout Screen

The second option, **Ops Breakout**, displays total operations costs for the DMRD Base or Baseline broken out by major types of expenses, or, in the case of the Alternatives, the cost savings for operations by major types of expenses.

The third option, **Mgmt & Sup Breakout**, mirrors the **Ops Breakout** option for the management and support side. From the breakout selections, you can access the data sheets on Level 4.

B. LEVEL 2 - THE OPERATIONS/MANAGEMENT AND SUPPORT SCREEN

The Level 2 screen displays a combination of two different charts. The first is the relationship between operations and management and support. This relationship is quantified using the left (y) axis. The second chart displays the tooth/tail ratio (ratio of operations to management and support). This relationship is quantified by using the right-most (y) axis. By selecting the **Ops/Mgmt & Sup Graph** option from the **Baseline** menu, a graph similar to Figure 7 is displayed.

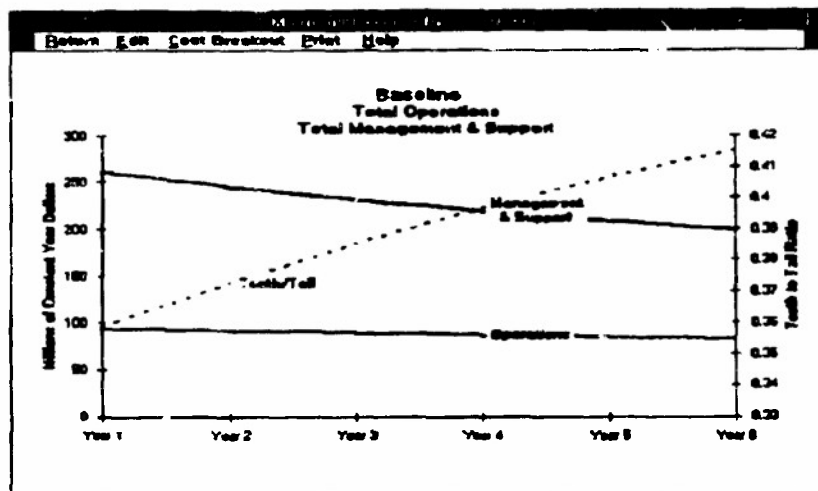


Figure 7. Baseline Ops/Mgmt & Sup Graph

At this point you can return to the Summary graph by choosing the **Return** menu and **Summary** option or break out the costs in more detail.

If instead you select one of the **Alternative** menus and the **Ops/Mgmt & Sup Graph** option, a graph similar to the one in Figure 8 is displayed. The tooth-to-tail ratio

is also displayed on the Alternative screen. The expected RADCF is displayed at the bottom of the screen.

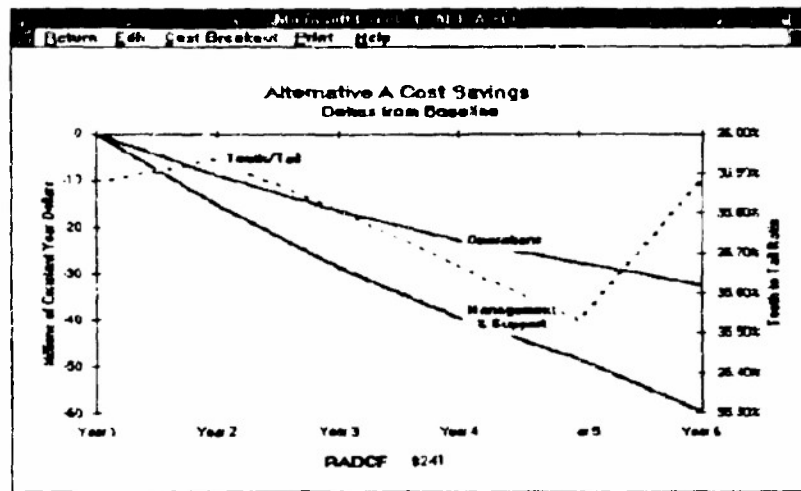


Figure 3. Alternative Screen

At this point you can return to the Summary graph by choosing the Return menu item and the Summary option or break out the cost savings further. Other menu choices are Edit to edit the graph and Print to print the Operations/Management and Support graph.

C. LEVEL 3 - THE COST BREAKOUT SCREEN

If you are following the DMRD Base or Baseline path and select the Operations option from the Cost Breakout menu, a graph similar to Figure 9 is displayed. This graph depicts total operations costs broken-out by its six cost elements: Civilian Labor, Military Labor, Information Technology, Facilities, Materiel, and Other. If you select the Management & Support option from the Cost Breakout menu, these six cost element categories plus General Installation Support and Headquarters Support costs are displayed.

From this level, you can return to the previous levels by using the Return menu, or you can select a life-cycle phase and examine or enter the actual cost data in the data sheets. You can also examine the total cost data by selecting the Subtotals menu. The values in the subtotal sheet are for viewing only and cannot be changed.

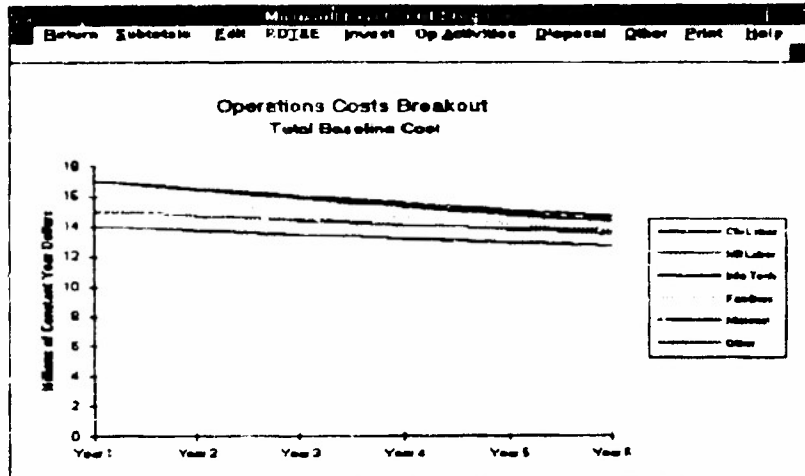


Figure 9. Cost Breakout Screen

If you are following an Alternative path and select the **Cost Breakout** menu item and the **Operations** option, a graph similar to Figure 10 is displayed. This screen depicts operations cost savings broken out by the cost elements. Similarly, if you select the **Management & Support** option, the management and support cost savings are broken out.

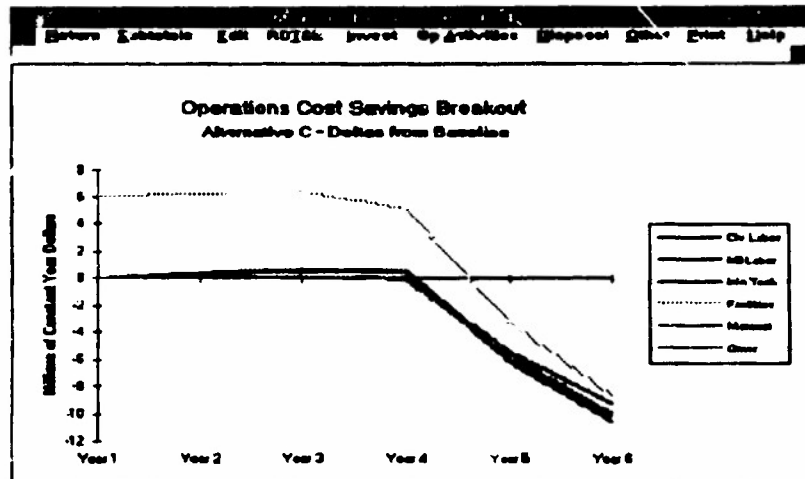


Figure 10. Alternative Breakout Screen

From this screen, you can return to the previous screens by using the **Return** menu, or you can select a life-cycle phase and examine or enter the actual cost data in the data sheets. Again, you can examine the total cost data by cost element by selecting the **Subtotals** menu. Other menu choices at this level are **Edit** to edit the Cost Breakout graph or **Print** to print the Cost Breakout graph.

D. LEVEL 4 - THE DATA SHEET SCREEN

Level 4 is where you enter data. All cost data should be entered in the constant dollar format and entered only into the "Temp.xls" file (see Figures 11,12). The first data sheet, shown in Figure 11, is for the Baseline RDT&E costs. The second data sheet, shown in Figure 12, is for RDT&E costs for an Alternative. The only difference between these screens is that high and low values are entered for an Alternative. The values that make up the Baseline, DMRD Base, and each Alternative are entered in the data sheets. Each cell must have a numeric value in it, even if that value is zero. The high and low entries may have the same value. All data should be rounded to two decimal places. Once the values are entered, the Alternatives can be processed by the simulation routine from the Summary screen.

The screenshot shows a window titled "Baseline Operations Cost Data Sheets" with a menu bar containing "Return", "Print", and "Help". The main content is a table for "A1: RDT&E Phase" with the following data:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
A1.1 Civilian Labor	1.00	2.01	2.02	2.71	2.94	2.99
A1.2 Military Labor	1.00	0.89	0.96	0.94	0.82	0.91
A1.3 Information Technology	2.00	1.94	1.88	1.93	1.77	1.72
A1.4 Facilities	1.00	0.97	0.94	0.91	0.89	0.89
A1.5 Material	5.00	4.89	4.86	4.71	4.61	4.62
A1.6 Other	1.00	1.02	1.01	1.79	1.90	1.84

Figure 11. Baseline Data Sheet Screen

The **Help** menu at the Data Sheet level includes information on the cost element structure and cost element definitions.

Operations Cost Data Sheets, Alternative A							
A1 ROT&F Phase							
(Millions of Constant Year Dollars)							
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
A1.1 Outlier Labor	High	1.00	2.29	2.43	2.7	1.97	1.77
	Low	1.00	2.29	2.17	1.74	1.57	1.33
A1.2 Military Labor	High	1.00	0.90	0.81	0.73	0.66	0.59
	Low	1.00	0.95	0.72	0.61	0.52	0.44
A1.3 Information Technology	High	2.00	1.80	1.82	1.46	1.31	1.18
	Low	2.00	1.75	1.46	1.23	1.04	0.89
A1.4 Facilities	High	1.00	0.80	0.61	0.73	0.66	0.59
	Low	1.00	0.85	0.72	0.61	0.52	0.44
A1.5 Material	High	5.00	4.50	4.06	3.58	3.26	2.95
	Low	5.00	4.25	3.81	3.07	2.61	2.22
A1.6 Other	High	4.00	3.60	3.24	2.82	2.52	2.26
	Low	4.00	3.40	2.88	2.45	2.09	1.77

Figure 12. Alternative Data Sheet Screen

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APPENDIX A

RISK ADJUSTMENT CALCULATION

**APPENDIX A
RISK ADJUSTMENT CALCULATION**

In order to explicitly account for the risks of any given Alternative, a simulation routine has been incorporated into the model. The simulation is performed by selecting the **Simulate** menu at Level 1 and choosing one of the Alternatives (Alt A, Alt B, or Alt C).

The simulation routine works in the following manner:

Each cost element is specified under the Baseline (B) and under the Alternative

(A). If the cost is incurred in year t , the discounted cost saving is $NPV = \frac{B-A}{(1+r)^t}$, where r is the discount rate. Note that we adopt an "end-of-year" discounting convention, so that even savings that accrue in the first year (currently FY 1993) are discounted. The savings are summed over all cost elements and all years. An example is shown below, with a discount rate of 10 percent.

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Baseline	200	180	160
Alternative	190	150	110

$$NPV = \frac{B_1 - A_1}{(1+r)^1} + \frac{B_2 - A_2}{(1+r)^2} + \frac{B_3 - A_3}{(1+r)^3}$$

$$NPV = \frac{10}{1.10} + \frac{30}{1.21} + \frac{50}{1.33}$$

$$NPV = 71.5$$

By default, the model employs a real discount rate of 10 percent per year (0.10). However, the user may alter this parameter by choosing the **Edit Parameters** option from the **Simulate** menu at Level 1. Be certain to enter the discount rate as a decimal (Figure A-1).

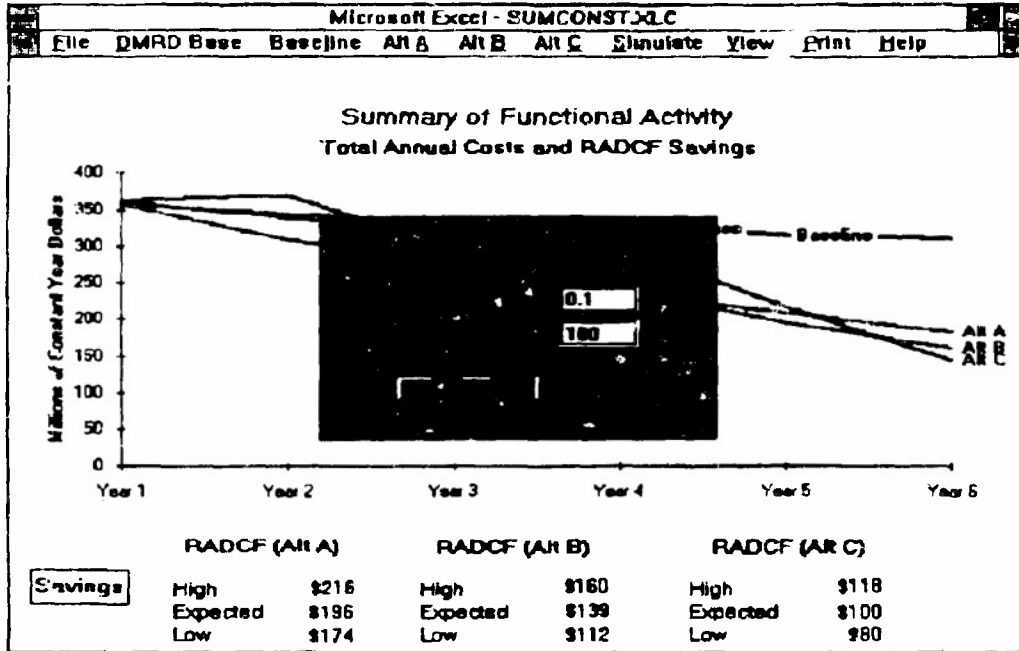


Figure A-1. Edit Parameters

Ordinarily, cost elements are tracked for six years. However, the user has the option of specifying a "residual value." Under this option, all costs for the sixth year are repeated for as many additional years as the user specifies (up to 20 additional years), as illustrated below for a residual value of 2.

$$NPV = \frac{B_1 - A_1}{(1+r)^1} + \frac{B_2 - A_2}{(1+r)^2} + \frac{B_3 - A_3}{(1+r)^3} + \frac{B_4 - A_4}{(1+r)^4} + \frac{B_5 - A_5}{(1+r)^5} + \frac{B_6 - A_6}{(1+r)^6} + \frac{B_6 - A_6}{(1+r)^7} + \frac{B_6 - A_6}{(1+r)^8}$$

The cost elements under the Alternative are simulated to reflect risk. In the data screens, each cost element is entered as both a "low" value (L) and a "high" value (H). These values are chosen so that a cost below L occurs only 2.5 percent of the time, and similarly for a cost above H.

The Alternative cost elements are simulated from a lognormal distribution. That is, the natural logarithm of cost is assumed to have a normal distribution. The lognormal distribution, which applies to the cost element itself, has the property of being skewed to the right, so that extreme costs due to programming errors, schedule delays, etc., are accommodated.

On the logarithmic scale, the mean (denoted m) of the normal distribution is estimated as the midpoint of the logs of the high and low values, $m = \frac{(\log H + \log L)}{2}$. We also use the fact that 95 percent of a normal distribution lies within ± 2 standard deviations (denoted s) of the mean. Hence $\log H - \log L = 4s$, or $s = \frac{(\log H - \log L)}{4}$ and the variance $v = s^2$. On the logarithmic scale, the low and high cost inputs may be interpreted as a band lying ± 2 standard deviations from the "best guess."

By default, the Alternative is simulated 100 times. Within each simulation, every cost element is drawn from its respective lognormal distribution. Then the discounted sums of savings from the Baseline are computed. The result is 100 discounted sums. By choosing **Edit Parameters** under the **Simulate** menu, the user may alter the number of simulations to any number between 1 and 500. We do not recommend that the number be reduced below 100. We recommend that 100 simulations be performed during the early, exploratory stages of analysis. However, 100 simulations may still embody considerable statistical "noise." Therefore, we recommend that 500 simulations be performed for the final analysis.

The output screens report the mean of the 100 (or more) simulations. To reflect the risk of an Alternative, we also report the 2.5 and 97.5 percentiles from the distribution of cost differences. The 2.5 percentile is the value that lies above only 2.5 percent of the simulated cost differences. This value represents the "worst case." The 97.5 percentile is the value that lies above 97.5 percent of the simulated cost differences, or below only 2.5 percent of them. This value represents the "best case."

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APPENDIX B

COST STRUCTURE OUTLINE AND DEFINITIONS

APPENDIX B

COST STRUCTURE OUTLINE AND DEFINITIONS

For the results of the model to be useful, the cost data must be entered in a consistent fashion across all functional areas. This involves using a cost breakdown structure that incorporates the major phases and expense types that are important to life cycle costing. The first subsection of the appendix shows an outline of the cost structure. The second subsection lists detailed definitions for each cost element.

COST STRUCTURE

The cost structure includes three levels of indenture. Each item at the third level should be entered by year, and by high and low estimate where appropriate. Functional managers may choose to maintain these data in a less aggregated form for their own purposes.

A. Operations Costs

A1. RDT&E Phase

- A1.1 Civilian Labor**
- A1.2 Military Labor**
- A1.3 Information Technology**
- A1.4 Facilities**
- A1.5 Materiel**
- A1.6 Other**

A2. Investment Phase

- A2.1 Civilian Labor**
- A2.2 Military Labor**
- A2.3 Information Technology**
- A2.4 Facilities**
- A2.5 Materiel**
- A2.6 Other**

- A3. Operational Activities
 - A3.1 Civilian Labor
 - A3.2 Military Labor
 - A3.3 Information Technology
 - A3.4 Facilities
 - A3.5 Materiel
 - A3.6 Other
- A4. Disposal
 - A4.1 Civilian Labor
 - A4.2 Military Labor
 - A4.3 Information Technology
 - A4.4 Facilities
 - A4.5 Materiel
 - A4.6 Other
- A5. Other Unique Phases (as required)
 - A5.1 Civilian Labor
 - A5.2 Military Labor
 - A5.3 Information Technology
 - A5.4 Facilities
 - A5.5 Materiel
 - A5.6 Other

B. Management & Support Costs

- B1. RDT&E Phase
 - B1.1 Civilian Labor
 - B1.2 Military Labor
 - B1.3 Information Technology
 - B1.4 Facilities
 - B1.5 Materiel
 - B1.6 Other
 - B1.7 General Installation Support (General and Administrative)
 - B1.8 Headquarters Support

- B2. Investment Phase**
 - B2.1 Civilian Labor**
 - B2.2 Military Labor**
 - B2.3 Information Technology**
 - B2.4 Facilities**
 - B2.5 Materiel**
 - B2.6 Other**
 - B2.7 General Installation Support (General and Administrative)**
 - B2.8 Headquarters Support**
- B3. Operational Activities Phase**
 - B3.1 Civilian Labor**
 - B3.2 Military Labor**
 - B3.3 Information Technology**
 - B3.4 Facilities**
 - B3.5 Materiel**
 - B3.6 Other**
 - B3.7 General Installation Support (General and Administrative)**
 - B3.8 Headquarters Support**
- B4. Disposal Phase**
 - B4.1 Civilian Labor**
 - B4.2 Military Labor**
 - B4.3 Information Technology**
 - B4.4 Facilities**
 - B4.5 Materiel**
 - B4.6 Other**
 - B4.7 General Installation Support (General and Administrative)**
 - B4.8 Headquarters Support**
- B5. Other Unique Phases (as required)**
 - B5.1 Civilian Labor**
 - B5.2 Military Labor**
 - B5.3 Information Technology**
 - B5.4 Facilities**
 - B5.5 Materiel**
 - B5.6 Other**
 - B5.7 General Installation Support (General and Administrative)**
 - B5.8 Headquarters Support**

COST DEFINITIONS

This section provides cost definitions for the cost structure shown in section A. The taxonomy is summarized here in the Coding Structure sub-section, and further explanation is provided in the Coding Detail sub-section.

Coding Structure

The first three levels of this structure are required by the model, further detail may be of value to the functional areas.

Position 1: Primary Subdivision of Costs

A (Operations Costs) or B (Management and Support) refers largely to the distinction between direct (Operations) and indirect (Management & Support) costs.

Position 2: Phase of Work

1 (RDT&E), 2 (Investment), 3 (Operational Activities), 4 (Disposal), 5 (Other). The phases represent a summary description of the general kinds of activities being performed to produce output. The costs of each phase can be funded by several different appropriations.

Position 3: Major Cost Elements

Identifies the major types or kinds of resources being used to produce output by Operations and Management & Support as follows:

Operations Costs: 1 (Civilian Labor), 2 (Military Labor), 3 (Information Technology), 4 (Facilities), 5 (Materiel), 6 (Other);

Management & Support Costs: 1 (Civilian Labor), 2 (Military Labor), 3 (Information Technology), 4 (Facilities), 5 (Materiel), 6 (Other), 7 (General Installation Support - General and Administrative), 8 (Headquarter's Support of Installations).

Positions 4-6: Breakout of Major Cost Elements

Breakout is provided by category and source of funding (appropriations and program elements).

2. Coding Detail

A. Operations Costs Represents costs of essential functional activities that are directly related to the primary output(s) of an organizational unit for its intended customers.

A1. Research, Development, Test and Evaluation (RDT&E) Phase. Includes all direct costs involved in research, development, test and evaluation of a new system or a major modification for eventual production and use in operational activities.

A1.1 Civilian labor Includes the total civilian pay cost, both gross pay and all personnel benefits (e.g., retirement, health insurance, etc.) for all personnel directly involved ("hands on") in producing the primary outputs of an organization. These costs exclude all personnel costs for supervision and management.

A1.2 Military labor. Includes the total of all officer and enlisted pay, including allowances and retirement, for all personnel directly involved ("hands on") in producing the primary outputs of an organization. These costs exclude all personnel costs for supervision and management.

A1.3 Information technology. Represents the cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources that can be specifically and directly identified to a primary output. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation and amortization are excluded.

A1.4 Facilities. Consists of all costs involved in owning, leasing and operating a facility that can be directly and solely identified to a specific primary output. It would include costs for construction (including modification) if purchased, leasing costs if rented, appropriate utility charges, and repair and maintenance services (including land-related). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

A1.5 Materiel. Includes all costs for purchases of office furniture, equipment (non-computer), supplies, including printing, and postage that can be directly identified to a primary output. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

A1.6 Other. All other costs that can be specifically identified to a primary output such as project travel, specific job-related technical training, and transportation costs that are not covered by any of the other elements. All non-cash charges such as depreciation and amortization are excluded.

A2. Investment Phase. Includes all direct costs associated with the initial and new purchase of capital assets (real property and equipment) and non-recurring installation and start-up costs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project.

A2.1 Civilian labor. Includes the total civilian pay cost, both gross pay and all personnel benefits (e.g., retirement, health insurance, etc.) for all personnel directly involved ("hands on") in producing the primary outputs of an organization. These costs exclude all personnel costs for supervision and management.

A2.2 Military labor. Includes the total of all officer and enlisted pay, including allowances and retirement, for all personnel directly involved ("hands on") in producing the primary outputs of an organization. These costs exclude all personnel costs for supervision and management.

A2.3 Information technology. Represents the cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources that can be specifically and directly identified to a primary output. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation and amortization are excluded.

A2.4 Facilities. Consists of all costs involved in owning, leasing, and operating a facility that can be directly and solely identified to a specific primary output. It would include costs for construction (including modification) if purchased, leasing costs if rented, appropriate utility charges, and repair and maintenance services (including land-related). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

A2.5 Materiel. Includes all costs for purchases of office furniture, equipment (non-computer), supplies, including printing, and postage that can be directly identified to a primary output. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

A2.6 Other. All other costs that can be specifically identified to a primary output such as project travel, specific job-related technical training, and transportation costs that are not covered by any of the other elements. All non-cash charges such as depreciation and amortization are excluded.

A3. Operational Activities Phase. Represents the recurring costs that can be directly identified to routinely producing primary functional outputs

A3.1 Civilian Labor. Includes the total civilian pay cost, both gross pay and all personnel benefits (e.g., retirement, health insurance, etc.) for all personnel directly involved ("hands on") in producing the primary outputs of an organization. These costs exclude all personnel costs for supervision and management.

A3.2 Military Labor. Includes the total of all officer and enlisted pay, including allowances and retirement, for all personnel directly involved ("hands on") in producing the primary outputs of an organization. These costs exclude all personnel costs for supervision and management.

A3.3 Information Technology. Represents the cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources that can be specifically and directly identified to a primary output. This includes all maintenance and repair, minor modifications, and all replacement items (excluding initial purchase). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation and amortization are excluded.

A3.4 Facilities. Consists of all costs involved in owning, leasing and operating a facility that can be directly and solely identified to a specific primary output. It would include costs for construction (including modification) if purchased, leasing costs if rented, appropriate utility charges, and repair and maintenance services (including land-related). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

A3.5 Materiel. Includes all costs for purchases of office furniture, equipment (non-computer), supplies, including printing, and postage that can be directly identified to a primary output. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

A3.6 Other. All other costs that can be specifically identified to a primary output such as project travel, specific job-related technical training, and transportation costs that are not covered by any of the other elements. All non-cash charges such as depreciation and amortization are excluded.

A4. Disposal Phase. Represents the direct costs of disposing assets less the estimated salvage value or sales price.

A4.1 Civilian labor. Includes the total civilian pay cost, both gross pay and all personnel benefits (e.g., retirement, health insurance, etc.) for all personnel directly involved ("hands on") in producing the primary

outputs of an organization. These costs exclude all personnel costs for supervision and management.

A4.2 Military labor. Includes the total of all officer and enlisted pay, including allowances and retirement, for all personnel directly involved ("hands on") in producing the primary outputs of an organization. These costs exclude all personnel costs for supervision and management.

A4.3 Information Technology. Represents the cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources that can be specifically and directly identified to a primary output. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation and amortization are excluded.

A4.4 Facilities. Consists of all costs involved in owning, leasing and operating a facility that can be directly and solely identified to a specific primary output. It would include costs for construction (including modification) if purchased, leasing costs if rented, appropriate utility charges, and repair and maintenance services (including land-related). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

A4.5 Materiel. Includes all costs for purchases of office furniture, equipment (non-computer), supplies, including printing, and postage that can be directly identified to a primary output. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

A4.6 Other. All other direct costs that can be specifically identified to a primary output such as project travel, specific job-related technical training, and transportation costs that are not covered by any of the other elements. All non-cash charges such as depreciation and amortization are excluded.

A5. Other Unique Phases (as required). Reserved for special or unique types of activities that do not generally fit any of the other phases and is of such significance to warrant separate accounting.

B. Management & Support Costs. Consists of all costs other than operational costs. Such costs are considered to be indirectly related to the primary output because they cannot be easily or economically identified to an output and typically support more than one primary output.

B1. Research, Development, Test and Evaluation (RDT&E) Phase. Includes all indirect costs involved in research, development, test and evaluation of a new system or a major modification for eventual production and use in operational activities.

B1.1 Civilian labor. Consists of the total civilian pay costs, both gross pay and benefits, for all management, supervision and administration for the functional unit. Represents supervision and management within the functional unit and the cost of all administrative activities (e.g., secretarial, general administration, etc.). Also includes the indirect costs for all activities performed within the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters) to support the primary outputs of the particular functional unit.

B1.2 Military labor. Consists of the pay, including allowances and retirement, for all management, supervision and administration for the functional unit. Represents supervision and management within the functional unit and the cost of all administrative activities (e.g., secretarial, general administration, etc.). Also includes the indirect costs for all activities performed within the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters) to support the primary outputs of the particular functional unit.

B1.3 Information Technology. Represents the cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources that cannot be specifically and directly identified to a primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation and amortization are excluded.

B1.4 Facilities. Consists of all indirect costs involved in owning, leasing and operating a facility that cannot be directly and solely identified to a specific primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. It would include costs for construction (including modification) if purchased, leasing costs if rented, appropriate utility charges, and repair and maintenance services (including land-related). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

B1.5 Materiel. Includes all indirect costs for purchases of office furniture, equipment (non-computer), supplies including, printing, and postage that cannot be directly identified to a primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

B1.6 Other. Includes all indirect costs other than labor which support primary outputs such as general training, transportation, and travel. Such costs are incurred within the functional unit or the basic organization at all levels (both installation and headquarters) and cannot be readily classified within any of the other five cost elements. Non-cash charges such as depreciation are excluded.

B1.7 General Installation Support (General and Administrative). Includes all indirect costs for activities performed by installation organizations (other than the basic organization of the functional unit) in support of the functional unit. It includes all the major cost elements excluding information technology i.e. labor, facilities, materiel, and other. Non-cash charges such as depreciation and amortization are excluded.

B1.8 Headquarters Support of Installations. Represents the indirect costs of major and intermediate commands, Service headquarters, Office of Secretary of Defense, Joint Chiefs of Staff, other Defense agencies, and functional headquarters at both the Service and OSD levels.

B2. Investment Phase. Includes all indirect costs associated with the initial and new purchase of capital assets (real property and equipment) and non-recurring installation and start-up costs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project.

B2.1 Civilian labor. Consists of the total civilian pay costs, both gross pay and benefits, for all management, supervision and administration for the functional unit. Represents supervision and management within the functional unit and the cost of all administrative activities (e.g., secretarial, general administration, etc.). Also includes the indirect costs for all activities performed within the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters) to support the primary outputs of the particular functional unit.

B2.2 Military labor. Consists of the pay, including allowances and retirement, for all management, supervision and administration for the functional unit. Represents supervision and management within the functional unit and the cost of all administrative activities (e.g., secretarial,

general administration, etc.). Also includes the indirect costs for all activities performed within the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters) to support the primary outputs of the particular functional unit.

B2.3 Information Technology. Represents the cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources that cannot be specifically and directly identified to a primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation and amortization are excluded.

B2.4 Facilities. Consists of all indirect costs involved in owning, leasing and operating a facility that cannot be directly and solely identified to a specific primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. It would include costs for construction (including modification) if purchased, leasing costs if rented, appropriate utility charges, and repair and maintenance services (including land-related). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

B2.5 Materiel. Includes all indirect costs for purchases of office furniture, equipment (non-computer), supplies including printing, and postage that cannot be directly identified to a primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

B2.6 Other. Includes all indirect costs other than labor which support primary outputs such as general training, transportation, and travel. Such costs are incurred within the functional unit or the basic organization at all levels (both installation and headquarters) and cannot be readily classified within any of the other five cost elements. Non-cash charges such as depreciation are excluded.

B2.7 General Installation Support (General and Administrative). Includes all indirect costs for activities performed by installation organizations (other than the basic organization of the functional unit) in support of the functional unit. It includes all the major cost elements excluding information technology i.e. labor, facilities, materiel, and other. Non-cash charges such as depreciation and amortization are excluded.

B2.8 Headquarters Support of Installations. Represents the indirect costs of major and intermediate commands. Service headquarters, Office of Secretary of Defense, Joint Chiefs of Staff, other Defense agencies, and functional headquarters at both the Service and OSD levels.

B3. Operational Activities. Represents the recurring indirect costs that can be directly identified to routinely producing primary functional outputs

B3.1 Civilian labor. Consists of the total civilian pay costs, both gross pay and benefits, for all management, supervision and administration for the functional unit. Represents supervision and management within the functional unit and the cost of all administrative activities (e.g., secretarial, general administration, etc.). Also includes the indirect costs for all activities performed within the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters) to support the primary outputs of the particular functional unit.

B3.2 Military labor. Consists of the pay, including allowances and retirement, for all management, supervision and administration for the functional unit. Represents supervision and management within the functional unit and the cost of all administrative activities (e.g., secretarial, general administration, etc.). Also includes the indirect costs for all activities performed within the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters) to support the primary outputs of the particular functional unit.

B3.3 Information Technology. Represents the cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources that cannot be specifically and directly identified to a primary output. This includes all maintenance and repair, minor modifications and all replacement items (excluding initial purchase). Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation and amortization are excluded.

B3.4 Facilities. Consists of all indirect costs involved in owning, leasing and operating a facility that cannot be directly and solely identified

to a specific primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. It would include costs for construction (including modification) if purchased, leasing costs if rented, appropriate utility charges, and repair and maintenance services (including land related). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

B3.5 Materiel. Includes all indirect costs for purchases of office furniture, equipment (non-computer), supplies including, printing, and postage that cannot be directly identified to a primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

B3.6 Other. Includes all indirect costs other than labor which support primary outputs such as general training, transportation, and travel. Such costs are incurred within the functional unit or the basic organization at all levels (both installation and headquarters) and cannot be readily classified within any of the other five cost elements. Non-cash charges such as depreciation are excluded.

B3.7 General Installation Support (General and Administrative). Includes all indirect costs for activities performed by installation organizations (other than the basic organization of the functional unit) in support of the functional unit. It includes all the major cost elements excluding information technology i.e. labor, facilities, materiel, and other. Non-cash charges such as depreciation and amortization are excluded.

B3.8 Headquarters Support of Installations. Represents the indirect costs of major and intermediate commands, Service headquarters, Office of Secretary of Defense, Joint Chiefs of Staff, other Defense agencies, and functional headquarters at both the Service and OSD levels.

B4. Disposal Phase. Represents the indirect costs of disposing assets less the estimated salvage value or sales price.

B4.1 Civilian labor. Consists of the total civilian pay costs, both gross pay and benefits, for all management, supervision and administration for the functional unit. Represents supervision and management within the functional unit and the cost of all administrative activities (e.g., secretarial, general administration, etc.). Also includes the indirect costs for all

activities performed within the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters) to support the primary outputs of the particular functional unit.

B4.2 Military labor. Consists of the pay, including allowances and retirement, for all management, supervision and administration for the functional unit. Represents supervision and management within the functional unit and the cost of all administrative activities (e.g., secretarial, general administration, etc.). Also includes the indirect costs for all activities performed within the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters) to support the primary outputs of the particular functional unit.

B4.3 Information Technology. Represents the cost of hardware (including peripheral equipment), software, and related telecommunications equipment purchased from commercial sources that cannot be specifically and directly identified to a primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation and amortization are excluded.

B4.4 Facilities. Consists of all indirect costs involved in owning, leasing and operating a facility that cannot be directly and solely identified to a specific primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. It would include costs for construction (including modification) if purchased, leasing costs if rented, appropriate utility charges, and repair and maintenance services (including land related). The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

B4.5 Materiel. Includes all indirect costs for purchases of office furniture, equipment (non-computer), supplies including, printing, and postage that cannot be directly identified to a primary output. Such costs are incurred within the functional unit or the basic organization (which the functional unit is a part of) at all levels (both installation and headquarters). Normally these resources support two or more primary outputs and cannot be traced easily or economically to primary outputs. The costs of assets already purchased will only be included when they are already being used or are planned to be sold or used on another project. Non-cash charges such as depreciation are excluded.

B4.6 Other. Includes all indirect costs other than labor which support primary outputs such as general training, transportation, and travel. Such costs are incurred within the functional unit or the basic organization at all levels (both installation and headquarters) and cannot be readily classified within any of the other five cost elements. Non-cash charges such as depreciation are excluded.

B4.7 General Installation Support (General and Administrative). Includes all indirect costs for activities performed by installation organizations (other than the basic organization of the functional unit) in support of the functional unit. It includes all the major cost elements excluding information technology i.e. labor, facilities, materiel, and other. Non-cash charges such as depreciation and amortization are excluded.

B4.8 Headquarters Support of Installations. Represents the indirect costs of major and intermediate commands, Service headquarters, Office of Secretary of Defense, Joint Chiefs of Staff, other Defense agencies, and functional headquarters at both the Service and OSD levels.

B5. Other Unique Phases (as required). Reserved for special or unique types of activities that do not generally fit any of the other phases and is of such significance to warrant separate accounting.

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ABBREVIATIONS

ABBREVIATIONS

DDI	Director of DoD Information
DMR	Defense Management Review
DoD	Department of Defense
FEAM	Functional Economic Analysis Model
IDA	Institute for Defense Analyses
RADCF	Risk-Adjusted, Discounted Cash Flow
RDTE	Research, Development, Test and Evaluation
TOA	Total Obligational Authority

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SUPPLEMENTARY

INFORMATION



COMMAND, CONTROL,
COMMUNICATION
AND INTELLIGENCE

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
6000 DEFENSE PENTAGON
WASHINGTON, D. C. 20301-6000



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for *Conrad Leonard*
Michael S. Yoemans
Director, Functional Process Improvement

cc: Frank FitzMaurice, DTIC

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