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The report documents a menu technique which enables the user to execute the Venture Evaluation and Review Technique (VERT) in a quasi-interactive mode. VERT is run interactively through the user responding to executive file prompts and by the creation of VERT input data files through the use of a free form FORTRAN program. However, it is not totally devoid of batch processing since the free form FORTRAN program converts the user input into a card image file for later processing by the VERT FORTRAN program. Secondly, the menu technique

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SECURITY CLASSIFICATION OF THIS PAGE (*When Data Entered*) provides an option for the user to run VERT, utilizing the IBM Conversational Monitoring System (CMS) Batch Facility.

The menu technique displays a series of menus to the user from which he may select any one of several options in executing the VERT program. The menu technique allows the user to ignore the many and varied housekeeping tasks required in executing the VERT program. Thus, the menu techniqe will significantly enhance the user's productivity.

USATSARCOM

TECHNICAL REPORT 82-4

A MENU TECHNIQUE FOR UTILIZING VERT INTERACTIVELY

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JULY 1982

Final Report

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A MENU TECHNIQUE FOR UTILIZING VERT INTERACTIVELY

1.0 BACKGROUND

1.1 The purpose of this technical report is to describe a procedure which enables the user to execute the Venture Evaluation and Review Technique (VERT) in a quasi-interactive mode.

1.2 VERT is a computerized, stochastic network model designed to simulate decision environments under risk. VERT provides the program manager with accurate risk information in all three risk parameters (time, cost and performance) simultaneously. Appendix A to this report contains a copy of a short article written in June 1979 by Major Greg A. Mann, USAF, which describes the capabilities of VERT and its value in assessing the risk of a weapon-system acquisition process. In addition, the network methodology of VERT provides a systematic way to analyze the various tasks required to accomplish a project or mission. This structured approach greatly facilitates the planning and control of such projects.

1.3 The version of VERT utilized by the menu technique will enable the user to construct a network of up to 400 nodes and 750 activities. In addition, up to 85 nodes may be selected by the user in obtaining network time, path cost, total cost, and performance output information in histogram form. The user signals his selection to VERT by placing a two digit number (numbered from 1 to 85) in Columns 15 and 16 of the node card. Terminal nodes automatically print out and therefore, should not be numbered. Furthermore, placing a "16" in Columns 13 and 14 of the node card (including any terminal nodes desired) will establish a "X" and "Y" data file of the histogram output for subsequent "camera-ready" graphical display (color or black and white) via the menu technique.

1.3.1 This version of VERT also includes an user selected option for obtaining a listing of the cumulative mean completion times for each node in the network listed in ascending time order. A "1" entered in Column 9 of the control card evokes this option. A blank in Column 9 signals VERT that the option is not desired. This option is very valuable for analyzing the network.

1.4 The Decision Models Directorate of the US Army Armament Material Readiness Command (ARRCOM) distributed in November 1979 for public release a user's manual for VERT. With the inclusion of the replacement page attached as Appendix B to this report, that user's manual may be used for running this version of VERT. Copies of the VERT User's Manual may be obtained from Mr. Albert J. Patsche, AUTOVON 793-5292. Limited copies are also available by calling Mr. Kenneth L. Kearley, AV 693-3181, Directorate for Plans and Systems Analysis, US Army Troop Support and Aviation Materiel Readiness Command (TSARCOM).

1.5 The author of VERT, Mr. Gerald L. Moeller, has co-authored a book [1/] which introduces the subject of network analysis, provides a history of VERT and describes the VERT computer model in great detail. The version

1/ Moeller, Gerald L; Lee, Sang M.; and Digman, Lester A.; Network Analysis for Management Decisions; Kluwer-Nijhoff Publishing, Copyright 1982.

of VERT described in that book is different from the one utilized by the menu technique in this technical report; however, most of the VERT documentation contained in the book is still applicable. Mr. Moeller is currently employed with the US Army DARCOM Installations and Services Activity, Rock Island, IL, AUTOVON 693-5918.

2.0 INTRODUCTION

2.1 To use the menu technique, access is required to a host which supports the IBM Virtual Machine Facility/370 (VM/370). This system inturn contains the Conversational Monitor System (CMS), [2/] from which the menu technique owes its existence. Thus, in addition to a knowledge of VERT, the user should have an appreciation of CMS. However, because the procedure described in this technical report is in an easy-to-use menu form, it is not necessary that the user be proficient with CMS to use the menu technique. Furthermore, with a few hours of training in VERT and CMS, the user should be capable of using the menu technique on an existing VERT input data file.

2.2 To make use of the camera-ready graphics and network plotting features of the menu technique, access is required to the Tektronix Plot-10 CALCOMP Preview Routine [3/] and the ISSCO TELLAGRAF Computer Graphics System. [4/] The menu technique may still be used without having access to these two systems; however, Menu Items 6 and 7 in the Main Menu would not be available. In addition, no node card of a VERT data file should contain a "16" in Columns 13 and 14 of the card. From this discussion, it should be apparent that the menu technique has been designed primarily for use with a computer graphics terminal. In TSARCOM, the menu technique is used with either a Tektronix 4014 (Black and White CRT Screen) or a Tektronix 4027

2/ IBM, Vertual Machine Facility/370: CMS User's Guide, Order Number GC20-1819-2, Poughkeepsie, New York 12602.

3/ Tektronix, Preview Routines for CALCOMP Plotters, Document Number 062-1526-00, Release Number 1, March 19, 1973, Beaverton, Oregon 97005.

4/ Integrated Software System Corporation (ISSCO), TELLAGRAF User's Manual, Version 4.0, Copywright 1981, San Diego, CA 92121.

(Color CRT Screen) computer graphics terminal (Menu Item 6 in the Main Menu is not usable with the Tektronix 4027). However, any computer graphics terminal which emulates these two pieces of hardware may be used. Furthermore, a teletype terminal, a regular CRT device, or a Texas Instrument (TI) Silent 700 suitcase terminal may also use the menu technique. The only exception as noted previously, is that Menu Items 6 and 7 of the Main Menu would not be available.

2.3 A certain amount of "housekeeping" is necessary to be accomplished before the user can begin using the menu technique. The user first needs to obtain a userid and password for CMS. Then he needs to obtain 4000 blocks of disk space on his 191 "A" Disk and 1000 blocks of disk space on a second disk (194 "W" Disk). This second disk should be formatted in a multi-access mode ("MW"). Then these disks must be loaded with the files listed in Appendix C. With the exception of the two VERT Source Listings (because of their size), the module files, and certain unprintable graphics files, the contents of those files are shown in Appendix D. A magnetic tape can be made available by the author of this technical report to aid the initial loading. Once loaded, a few alterations need to be made in certain executive files before the menu technique is ready to be used. It is recommended that you run some of the sample VERT data files provided before you begin creating your own in order to test out the menu technique for any errors in loading the files. Figure 1, Pages 20-23, provides an example of the "housekeeping" necessary to enable a new user who has access to the TSARCOM Midwest S&E Computer to use the menu technique.

2.4 If you use 194 as your "W" Disk with multi-access mode, then only the following executive files need to be altered, otherwise everywhere "194" appears you will have to change it to the new number:

2.4.1 VERTNEW BATCH A1

Line 1 - Change "FPKERLY" to your userid

Line 1 - Change "FPVERT" to "bbVERT" where "bb" are the first two letters of your userid

Line 3 - Change "FPKERLY" to your userid

Line 4 - Change "FPKERLY" to your userid

Line 4 - Change "KEN" to your 191 read only access password

Line 6 - Change "FPKERLY" to your userid

Line 6 - Change "KLK" to your 194 multi-access password

2.4.2 VERTNEW1 BATCH A1

Line 1 - Change FPKERLY" to your userid

Line 1 - Change "FPVERT" to "bbVERT" where "bb" are the first two letters of your userid

Line 3 - Change "FPKERLY" to your userid

Line 4 - Change "FPKERLY" to your userid

Line 4 - Change "KEN" to your 191 read only access password

Line 6 - Change "FPKERLY" to your userid

Line 6 - Change "KLK" to your 194 multi-access password

2.4.3 VERTTEST EXEC A1

Line 31 - Change "REMOTE 4" to your remote job entry site number

Line 48 - Change "FPKERLY" to your userid

2.4.4 VERTBAT FORTRAN A1

Line 12 - Change "FPKERLY" to your userid. Then recompile, load, and generate a new module for this FORTRAN program.

2.4.5 VERTBAT1 FORTRAN A1

Line 18 - Change "FPKERLY" to your userid. Then recompile, load, and generate a new module for this FORTRAN program.

3.0 DESCRIPTION

3.1 The menu technique consists of a set of CMS Executive files which display the various menus and control the execution of those activities displayed in the menus. There are 5 menus which make up the menu technique. They are: (1) Main Menu Level (2) VERT NETWORK Plot Secondary Menu Level, (3) VERT Graph Secondary Menu Level, (4) VERT Datasets Display Listing Secondary Menu Level, and (5) Tertiary Menu Level for Editing VERT Listing Data Files. An example of these menus with the name of the respective executive file shown at the top of the page are provided as Figures 2-6, Pages 24-28.

3.2 MAIN MENU LEVEL

3.2.1 Figure 2, Page 24, depicts the Main Menu. "VERTEX" is the name of the executive file which displays this menu. Main Menu Item 1 prompts the user for the filename of the VERT data file to be run and whether "X" and "Y" data files for any previously selected node histogram output are to be created for the run. The VERT program is then run. The executive file which carries out Main Menu Item 1 is called " VERTRUN".

3.2.2 Item 2 in the Main Menu lets the user do much the same thing as in Item 1 but with several important differences. Item 2 runs VERT in CMS Batch mode. Running in batch mode frees up the terminal for other activity while the job is executing. Thus, this option should be selected for VERT runs that will take more than a few minutes to complete. The disadvantage of the batch mode is that under heavy workloads, the job may not execute for several hours or until the next day. Because of this, it is highly recommended that debugging jobs be run under Item 1 of the Main Menu and Item 2 reserved for "Analysis" and "What-if" runs. In addition, for debug runs, no more than five monte carlo iterations are normally required for testing the computerized network structure. The executive file which runs Item 2 of the Main Menu is called "VERTBAT".

3.2.2.1 Secondly, running VERT in CMS Batch mode enables the user to submit several jobs back to back. The menu technique uses the second disk (194 "W" Disk) to keep track of each separate run. It is important to remember that all of your VERT jobs must have completed in CMS Batch mode before any one job can be examined. Failure to heed this warning could result in your having to reinitialize and reload your second disk. There are safeguards built in the menu technique to avoid this, however, the persistent user who answers the prompts dishonestly can succeed in damaging his files on the second disk.

3.2.3 The third item in the Main Menu allows the user to view his output for a run previously made from choosing either Menu Item 1 or Item 2 of the Main Menu. If you had run VERT online (Menu Item 1), then the executive file "VERTTEST" places you in CMS Edit mode, at the bottom of the output file called "VOUTPUT AAAA A1". This file is created anew for each VERT online run. If you had run VERT from CMS Batch mode (Menu Item 2), then VERTTEST places you in CMS Edit mode on your second disk (194 "W" Disk) at the top of the output file. The name of the output file will be the same as the input file with the exception of the first two letters which will be "VO". This convention requires the user to use "VI" as the first two letters of all his

VERT input data file filenames. Since CMS allows a maximum of 8 characters for a filename, the remaining 6 or less alphanumeric characters may be anything the user desires.

3.2.3.1 VERTTEST assumes that VERT online runs are primarily debugging runs, while VERT offline (CMS Batch) runs are primarily "Analysis" and "What-if" runs. This "online" vs "offline" difference accounts for the different placement of the CMS Editor pointer in the output file of each type. For debugging runs, "X" and "Y" data files of selected node histogram output should not be requested. Thus, when Menu Item 3 is selected to find out if a debug run was successful or not, VERTTEST will position the CMS Editor pointer at the bottom of VOUTPUT AAAA A1. If this bottom line does not say "LAST RANDOM NUMBER SEED=" then you know that you have errors in the file. You can then enter "QUIT" or "FILE" to get out of CMS Edit mode or, using the various CMS Edit commands, record what errors you made.

3.2.3.2 Once you are out of CMS Edit mode, VERTTEST asks you if you want a hardcopy printout of the output file or not. If you had run the VERT job from CMS Batch mode, VERTTEST also gives you the option to erase any output files you no longer need (A very good idea for subsequent "What-if" runs on the same VERT input data file).

3.2.4 The fourth menu item in the Main Menu, aids the user in creating his own VERT input data file. The executive file which runs this menu item is called "VERTIN". VERTIN gives the user a choice of using free form (commas are used to separate the data fields) or fixed form (data must be placed in the correct fields by either spacing or using the CMS Tabset command) format for creating the VERT input data file. As mentioned previously, the user is assumed to already have a knowledge of VERT.

3.2.5 Item 5 of the Main Menu allows the user to edit and alter an existing VERT input data file. "VERTEDIT", the executive file which runs this menu item prompts the user for the filename of the VERT data file to be edited.

3.3 VERT NETWORK PLOT SECONDARY MENU LEVEL

3.3.1 Entering a "6" from the Main Menu will cause a second menu to be displayed (CRT terminal). "VERTPLT" is the executive file which displays this menu. Figure 3, Page 25, depicts this menu. Menu Item 1 of this secondary menu allows the user to create his own VERT plot data file. At the present, the method used to create a VERT network plot is rather crude. The user must first rough out a sketch of the network on a piece of graph paper. Then he must supply "X" and "Y" coordinate points for each node (box), arc (line) and connector (circle). Appendix E contains an User's Manual for the VERTPLOT Program along with the record layout for the data file. Pages 34 and 88-92, Appendix D contain sample VERTPLOT data files. In addition, no plotter is currently available at TSARCOM for plotting the data file. Thus, viewing the network plot is limited to displaying the network on a Tektronix 4014 (or equivalent) computer graphics terminal using the Tektronix Plot-10 CALCOMP Preview Routine. Hardcopies can be made via a Tektronix hardcopy unit, but the pages must then be pieced together to see the entire network. Action has been taken at TSARCOM to obtain an on-line drum plotter and to improve the VERTPLOT program. However, a target date for completion of these actions are presently unknown. "VERTPLT1" is the executive file which runs this menu item. Figure 7, Pages 29-30, provide some helpful hints in creating your own VERTPLOT data file.

3.3.2 Menu Item 2 of the VERT Network Plot Secondary Menu allows the user to edit and alter an existing VERTPLOT data file. "VERTPLT2", the executive file which runs this menu item, prompts the user for the filename of the VERTPLOT data file to be edited.

3.3.3 Menu Item 3 of this secondary level menu allows the user to view a VERTPLOT data file which had been created previously. "VERTPLT3", the executive file which runs this menu item prompts the user for the filename of the VERTPLOT date file to be displayed. After the user enters the filename, the following options list is displayed on the screen:

E = Erase

H = Hardcopy

W = Set Screen Size

S = Skip Frames

R = Reset Offset

C = Continue

Q = Stop Program

? = This Message

3.3.3.1 The Tektronix Plot-10 Preview Routine for CALCOMP Plotters User's Manual[5/] explains what each of the items in this list do. However, only the third (Set Screen Size) and seventh (Stop Program) item listed in Paragraph 3.3.3 above are used in displaying a VERTPLOT data file. Entering "Q" at this time indicates that you entered the wrong plot file filename or changed your mind about viewing the plot. Entering a "W" indicates that you wish to set the "X" and "Y" coordinates in inches for the entire plot or portion of the plot to be shown on the CRT graphics screen. Once a "W" has been entered, the message "WHERE WOULD YOU LIKE ORIGIN (X,Y)" will be shown on the screen and a bell will sound signalling you to enter the "X" coordinate point for the lower, left-hand portion of the plot to be displayed. Once entered, another bell will sound signalling you to enter the "Y" coordinate point for the lower, left-hand portion of the plot to be displayed. Once entered, the message "ENTER SIZE (WIDTH, HEIGHT)" will be shown on the screen and a bell will sound signalling you to enter the distance in inches from the "X" coordinate point previously entered. Once entered, another bell will sound signalling you to enter the distance in inches from the "Y" coordinate point previously entered. Once entered, another bell will sound signalling you to enter a "C" (for "continue"). Once entered, the screen will clear and the plot will be displayed. After viewing the plot, depress the "RETURN" button on your terminal. NOTE: it is highly recommended that you view the entire plot on the screen first before you make any hardcopies of the plot. Following this advice will allow you to see any corrections needed to the network plot structure thus saving time and paper.

[5/] Tektronix, op.cit.

3.3.4 Menu Item 4 of the VERT Network Plot Secondary Menu provides a display of a sample plot. The first screen is a display of the entire plot and the next 4 screens illustrate what a blow-up of the plot looks like. "VERTPLT4" is the executive file which runs this menu item. VERTPLT4 prompts the user for data throughout the running of this menu item.

3.4 VERT GRAPH SECONDARY MENU LEVEL

3.4.1 Entering a "7" from the Main Menu will cause a second menu to be displayed (CRT terminal). "VERTGRAF" is the executive file which displays the menu. Figure 4, Page 26, depicts this menu. Menu Item 1 of this secondary level menu allows the user to view (in "camera-ready" graphics form) network time, path cost, total cost, and performance output information for specific nodes previously selected during the running of the VERT program. "VERTGRF1" the executive file which runs Menu Item 1, keeps track of how many graphs you had selected to be displayed. Since VERT online jobs and VERT offline (CMS Batch) jobs are handled differently by VERTGRF1, it prompts you for which method you used. If you ran VERT offline, you will then be prompted for the maximum 6 alphanumeric character unique filename of the VERT job run. For online jobs, VERTGRF1 uses the data file called "VBANKNAM DATA A1" to pick up the names of the "X" and "Y" data files for the nodes selected from the last online job completed which requested that these "X" and "Y" data files be created. VERTGRF1 then prompts the user to enter the title for the graph and the title for the X-axis. The title for the Y-axis is fixed as is the basic format of the graph. VERTGRF1 also displays the name of the "X" and "Y" data file to be graphed so that the user knows which titles to put with which graphs. The graph is then displayed. The user depresses the "RETURN" button on his terminal when he is finished viewing the graph. For online jobs, if another graph is to be displayed, the cycle will repeat until all the filenames in VBANKNAM DATA A1 have been displayed. Then the user will be returned to the VERT Graph Secondary Menu Level. For offline jobs, after all the graphs for one particular VERT job have been displayed, VERTGRF1 asks the user if he wants to display graphs for another VERT job which had been run offline. A negative response will return to the user to the VERT Graph Secondary Menu Level. A positive response will result in a repetition of the cycle.

3.4.2 Menu Item 2 of the VERT Graph Secondary Menu allows the user to create his own graphics data file. A knowledge of the ISSCO TELLAGRAF System is required in order to use this option. "VERTGRF2" is the executive file which runs this menu item.

3.4.3 Menu Item 3 of the VERT Graph Secondary Menu allows the user to edit and alter a previously created graphics data file. "VERTGRF3", the executive file which runs this menu item prompts the user for the filename of the graphics file to be edited.

3.4.4 Menu Item 4 of the VERT Graph Secondary Menu displays a graphics file which had been created previously from Item 2 of this menu. "VERTGRF4", the executive file which runs this menu item prompts the user for the file-name of the graphics file to be displayed.

3.4.5 Menu Item 5 displays three sample graphs of a previously completed decision risk analysis (DRA) using VERT. The user depresses the "RETURN" button on his terminal to cycle through the graphs.

3.5 VERT DATASETS DISPLAY LISTING SECONDARY MENU LEVEL

3.5.1 Entering "LIST" from the Main Menu will cause a second menu to be displayed (CRT terminal). "VERTINDX" is the executive file which displays this menu. Figure 5, Page 27, depicts this menu. Menu Item 1 of this secondary menu allows the user to get a listing and brief description of every executive file used in the menu technique. "VERTIND1" is the executive file which runs this menu item. Similarily, "VERTIND2" through "VERTIND6" runs Menu Items 2 through 6 of the VERT Datasets Display Listing Secondary Menu. VERTIND1 prompts the user for his terminal type (Tektronix 4014 or Agile Line Printer) and the number of lines per page. VERTIND1 then displays a listing of the VERT excecutive files. The user continues depressing the "RETURN" button on his terminal until the list is completed and he is returned to the VERT Datasets Display Listing Secondary Menu. VERTIND2 through VERTIND6 all function in the same manner.

3.5.2 TERTIARY MENU LEVEL FOR EDITING VERT LISTING DATA FILES

3.5.2.1 Entering a "7" from the VERT Datasets Display Listing Secondary Menu will cause another menu to be displayed (CRT terminal). "VERTIND7" is the executive file which displays this menu. Figure 6, Page 28, depicts this menu. Menu Items 1 through 6 of the Tertiary Menu for Editing VERT Listing Data Files allow the user to edit and alter the data file lists shown in the menu. No prompting is provided by VERTIND7 since only one data file exists per menu item.

3.6 Entering an "END" from the main menu level, any of the secondary menu levels or the tertiary menu level will exit the user from the menu technique and return him to CMS. Entering a "R" from either the secondary menu levels or the tertiary menu level will return the user to the main menu level. Entering a "S" from the tertiary menu level will return the user to the VERT Datasets Display Listing Secondary Menu Level.

3.6.1 The menus have all been designed so that the user will remain at the menu level he is currently operating at until he either 1) Ends the session 2) Goes to a lower menu level or 3) Returns to a higher menu level. Failure to supply the correct entry at each menu display will cause the menu to be displayed again.

3.6.2 Automatic clearing of the Tektronic 4014 graphics terminal CRT screen or Top-of-Form feed for the Agile Line Printer exists for the VERTIND1 through VERTIND6 executive files only. To allow as much flexibility as possible to users in using the menu techniques for either a TI 700, Tektronix 4027 (scroll CRT terminal), Agile Line Printer, or a Tektronix 4014 (storage-tube CRT terminal), the author decided to let those individuals using the Tektronix 4014 or Tektronix 4027 to do their own clearing of the CRT screen.

3.7 Appendices F-I of this technical report provide some sample terminal sessions using the menu technique. The samples cover using a Tektronix 4054

Graphics Terminal (Emulates a Tektronix 4014 Graphics Terminal), a Tektronix 4027 Graphics Terminal and an Agile Line Printer.

4.0 CONCLUSIONS

4.1 As was mentioned at the beginning of the report, the menu technique executes VERT in a quasi-interactive mode. VERT is run interactively in the sense of the user responding to the executive file prompts and by the creation of VERT input data files through the use of the "VERTFREE" FORTRAN Program. However, it is not totally devoid of batch processing as is in the case of using CMS Batch in the executive file "VERTBAT" and in the conversion of user input by the VERTFREE FORTRAN Program into a card-image file for later processing by the VERT program.

4.2 By the TSARCOM Directorate for Management Information Systems (DMIS) making the switch from the IBM OS/360 System to the IBM Virtual Machine Facility/370 and its Conversational Monitor System (CMS) component, tremendous productivity gains have been realized in executing the VERT program. What had taken several weeks in the creating of the VERT input data file, debugging the network, and running and analyzing the output now takes less than a week.

4.3 These user-created CMS executive files allow the user to ignore the many and varied administrative and housekeeping tasks required in executing the VERT program. The easy-to-use menus not only enable the analyst who is familiar with VERT to pace quickly through the actions required to run and analyze a VERT application, but also enable the customer to be provided with a tool to obtain answers to "What-If" questions on a specific project.

```
enter class 114411
 USACC DATA NUMBERS ARE: AV-693-3582 OR 314-263-3582 --- HAVE A NICE DAY
class 141 start

S+E VM/SP ONLINE
!

.log fjnicco ←—— New User
ENTER PASSWORD:
.[redacted]
FILES: 002 RDR,  NO PRT,  NO PUN
LOGON AT 13:53:08 CDT TUESDAY 07/27/82
MIDWEST S+E COMPUTER CENTER
.
Y (19E) R/O
CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.
CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.
R; T=0.01/0.01 13:53:28

.cp link fpkerly 191 193 rr ←—— Since new user is on the same computer, he can link with
ENTER READ PASSWORD:             my files to copy over the necessary files.
.[redacted]
R; T=0.01/0.03 13:53:51

.access 193 g ←—— Used "g" since the next command uses that filemode.
G (193) R/O
R; T=0.02/0.04 13:53:59

.copy menutrsf exec g1 cms exec a1 ←—— This action and the following command ("CMS COPY") will copy over
R; T=0.05/0.20 13:54:27                all the files required to use the menu technique.

.cms copy
COPY PROFILE EXEC G1 = = A1
COPY VBANKNAM DATA G1 = = A1
COPY VBANKNAM FORTRAN G1 = = A1
COPY VBANKNAM MODULE G1 = = A1
COPY VERTBAT EXEC G1 = = A1
COPY VERTEDIT EXEC G1 = = A1
COPY VERTEX EXEC G1 = = A1
COPY VERTFREE EXEC G1 = = A1
COPY VERTFREE FORTRAN G1 = = A1
COPY VERTFREE MODULE G1 = = A1
COPY VERTGF5A DATA G1 = = A1
COPY VERTGF5B DATA G1 = = A1
COPY VERTGF5C DATA G1 = = A1
COPY VERTGRAF EXEC G1 = = A1
COPY VERTGRF1 EXEC G1 = = A1
COPY VERTGRF2 EXEC G1 = = A1
COPY VERTGRF3 EXEC G1 = = A1
COPY VERTGRF4 EXEC G1 = = A1
COPY VERTGRF5 EXEC G1 = = A1
COPY VERTG5A DATA G1 = = A1
COPY VERTG5B DATA G1 = = A1
COPY VERTG5C DATA G1 = = A1
COPY VERTIN EXEC G1 = = A1
COPY VERTINDX EXEC G1 = = A1
COPY VERTIND1 DATA G1 = = A1
COPY VERTIND1 EXEC G1 = = A1
COPY VERTIND2 DATA G1 = = A1
COPY VERTIND2 EXEC G1 = = A1
COPY VERTIND3 DATA G1 = = A1
COPY VERTIND3 EXEC G1 = = A1
COPY VERTIND4 DATA G1 = = A1
```

FIGURE 1

```
COPY VERTIND4 EXEC G1 = = A1
COPY VERTIND5 DATA G1 = = A1
COPY VERTIND5 EXEC G1 = = A1
COPY VERTIND6 DATA G1 = = A1
COPY VERTIND6 EXEC G1 = = A1
COPY VERTIND7 EXEC G1 = = A1
COPY VERTINP EXEC G1 = = A1
COPY VERTNEW MODULE G1 = = A1
COPY VERTNEW1 MODULE G1 = = A1
COPY VERTPLOT EXEC G1 = = A1
COPY VERTPLOT FORTRAN G1 = = A1
COPY VERTPLOT MODULE G1 = = A1
COPY VERTPLT EXEC G1 = = A1
COPY VERTPLT1 EXEC G1 = = A1
COPY VERTPLT2 EXEC G1 = = A1
COPY VERTPLT3 EXEC G1 = = A1
COPY VERTPLT4 EXEC G1 = = A1
COPY VERTREAD EXEC G1 = = A1
COPY VERTRUN EXEC G1 = = A1
COPY VERTTELE DATA G1 = = A1
COPY VERTTELW DATA G1 = = A1
COPY VERTTERM EXEC G1 = = A1
COPY VERTTEST EXEC G1 = = A1
COPY VERTTEXT DATA G1 = = A1
COPY VICO30P1 DATA G1 = = A1
COPY VILTUGN0 DATA G1 = = A1
COPY VILTUGN1 DATA G1 = = A1
COPY VPECPT2R DATA G1 = = A1
COPY VPLTUGN1 DATA G1 = = A1
COPY VTITLE DATA G1 = = A1
COPY VTITLE FORTRAN G1 = = A1
COPY VTITLE MODULE G1 = = A1
R; T=4.22/14.62 14:00:30
.
```

This Command evokes the User's Profile (Profile Exec A1)

```
 profile
DASD 291 DEFINED
'19E' REPLACES ' Y (19E) '
Y (19E) R/O
C (193) R/O
193 ALSO = G-DISK
FILE NOT FOUND. DISK ' E (194) ' WILL NOT BE ACCESSED
R;
.
```

The Second Disk (194 W) Has not been formatted. The following Commands Will Do This.

FIGURE 1 (continued)

```
 query disk
LABEL   CUU M   STAT CYL TYPE BLKSIZE     FILES  BLKS USED-(%) BLKS LEFT  BLK TOTAL
FJNICC 191 A    R/W  FB 3370  1024          70       1597-80       403       2000
LONNIE 5FF D/A R/O  FB 3370  1024          92       3937-98        63       4000
MNT190 190 S    R/O  FB 3370  1024         192      13454-63      8050      21504
DMP291 291 T    R/W  FB 3370  1024           0          4- 0      1996       2000
MNT19E 19E Y    R/O  FB 3370  1024         595      28561-57     21439      50000
R;

.format 194 w <----- Formatting the 194 W Disk
DMSFOR603R FORMAT WILL ERASE ALL FILES ON DISK 'W(194)'. DO YOU WISH TO CONTINUE? (YES|NO):
.yes
DMSFOR605R ENTER DISK LABEL:
.awc
FORMATTING DISK 'W'.
'2000' FB-512 BLOCKS FORMATTED ON 'W(194)'.
R;

.dirm mdisk
DVHDIR022R ENTER VIRTUAL DISK ADDRESS:
.194
DVHDIR023R ENTER NEW ACCESS MODE, = FOR NO CHANGE, OR ? FOR MORE INFO.
.mw <------ Establishing the 194 W Disk as Multi-Access Mode
DVHDIR024R DO YOU WANT OTHERS TO BE ABLE TO LINK TO THIS DISK IN R/O MODE? IF
           NOT, ENTER A BLANK (ANY PASSWORDS NOW SET WILL BE DELETED). IF YES,
           ENTER PASSWORD, OR = TO RETAIN CURRENT VALUE.
.[redacted]
DVHDIR025R DO YOU WANT OTHERS TO BE ABLE TO LINK TO THIS DISK IN WRITE MODE?
           IF NOT, ENTER A BLANK (WRITE AND MULTI PW'S WILL BE DELETED). IF
           YES, ENTER PASSWORD, OR = TO RETAIN CURRENT VALUE.
.[redacted]
DVHDIR026R DO YOU WANT OTHERS TO BE ABLE TO LINK TO THIS DISK IN MULTI MODE?
           IF NOT, ENTER A BLANK. IF YES, ENTER PASSWORD, OR = TO RETAIN
           CURRENT VALUE.
.[redacted]

DVHDIR005R ENTER CURRENT CP PASSWORD TO VALIDATE COMMAND OR A NULL TO EXIT:
.[redacted]
DVHDIR007I DIRECTORY CHANGE NOT EFFECTIVE UNTIL SOURCE UPDATED AND ONLINE.
R;

.dirm storage 2m <------ This Command is Required for Using TELLAGRAF
DVHMCB075I COMMAND DIRM MDISK : SOURCE UPDATED AND CHANGE ONLINE.

DVHDIR005R ENTER CURRENT CP PASSWORD TO VALIDATE COMMAND OR A NULL TO EXIT:
.[redacted]
DVHDIR007I DIRECTORY CHANGE NOT EFFECTIVE UNTIL SOURCE UPDATED AND ONLINE.
R;

.edit profile exec <----- The following CMS Edit Commands strip from the New User's Profile Inappropriate Records
DVHMCB075I COMMAND DIRM STORAGE : SOURCE UPDATED AND CHANGE ONLINE.
XEDIT:
./5ff
CP LINK LSECO 191 5FF RR
.del2
./193
ACCESS 193 C
.del
.top
TOF:
```

FIGURE 1 (continued)

```
 /5ff
ACCESS 5FF D/A
.del
.file
R;
```

Deletions are made permanent

```
.access 194 w
'194' REPLACES ' W (194) '
R;

.copy verttelw data al = = wl
R;
```

This Command copies the Data File Used for Offline Graphing to the User's 194 W Disk

```
.erase verttelw data al
R;
```

Erases that file from the User's 191 A Disk

```
.query disk
LABEL   CUU M   STAT CYL TYPE BLKSIZE    FILES  BLKS USED-(%) BLKS LEFT  BLK TOTAL
FJNICC  191 A    R/W  FB 3370  1024        69       1594-80       406       2000
LONNIE  5FF D/A R/O   FB 3370  1024        92       3937-98        63       4000
MNT190  190 S    R/O  FB 3370  1024       192      13454-63      8050      21504
DMP291  291 T    R/W  FB 3370  1024         0          4- 0      1996       2000
AWC     194 W    R/W  FB 3370  1024         1          7- 1       993       1000
MNT19E  19E Y    R/O  FB 3370  1024       595      28561-57     21439      50000
R;

.release 5ff
R;

.vertex
E (194) R/O
```

Try out the menu technique

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

   1    =  RUN VERT ONLINE

   2    =  RUN VERT OFFLINE (CMS BATCH)

   3    =  VIEW VERT OUTPUT

   4    =  CREATE A VERT INPUT FILE

   5    =  EDIT AN EXISTING VERT INPUT FILE

   6    =  GET VERT NETWORK PLOT MENU

   7    =  GET VERT GRAPH MENU

  LIST  =  GET VERT DATASETS DISPLAY LISTING MENU

  END   =  END THE SESSION

.end
R;

.q disk
LABEL   CUU M   STAT CYL TYPE BLKSIZE    FILES  BLKS USED-(%) BLKS LEFT  BLK TOTAL
FJNICC  191 A    R/W  FB 3370  1024        69       1594-80       406       2000
AWC     194 E/A R/O   FB 3370  1024         1          7- 1       993       1000
MNT190  190 S    R/O  FB 3370  1024       192      13454-63      8050      21504
DMP291  291 T    R/W  FB 3370  1024         0          4- 0      1996       2000
MNT19E  19E Y    R/O  FB 3370  1024       595      28561-57     21439      50000
R;
```

User's 191 A Disk

User's 194 W Disk. The 194 W Disk is shown here as 194 E/A Disk Because ("194 W") implies Read + Write Capability and ("194 E/A") is read only capability. The menu technique controls this change automatically.

FIGURE 1 (continued)

```
VERTEX EXEC A1
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1     =  RUN VERT ONLINE

    2     =  RUN VERT OFFLINE (CMS BATCH)

    3     =  VIEW VERT OUTPUT

    4     =  CREATE A VERT INPUT FILE

    5     =  EDIT AN EXISTING VERT INPUT FILE

    6     =  GET VERT NETWORK PLOT MENU

    7     =  GET VERT GRAPH MENU

   LIST   =  GET VERT DATASETS DISPLAY LISTING MENU

   END    =  END THE SESSION
```

FIGURE 2

```
VERTPLT EXEC A1
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

    1    =  CREATE A VERT PLOT DATA FILE

    2    =  EDIT AN EXISTING VERT PLOT DATA FILE

    3    =  DISPLAY A VERT PLOT

    4    =  SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED
                               ROUTINE ECP PROCESS -PHASE 1)

    R    =  RETURN TO THE MAIN MENU LEVEL

   END   =  END THE SESSION
```

FIGURE 3

```
VERTGRAF EXEC A1
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

   1    =  DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES

   2    =  CREATE A VERT GRAPHICS DATA FILE

   3    =  EDIT AN EXISTING VERT GRAPHICS DATA FILE

   4    =  DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY

   5    =  SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS
                                              FOR THE COBRA FACTS DRA)

   R    =  RETURN TO THE MAIN MENU LEVEL

  END   =  END THE SESSION
```


FIGURE 4

```
VERTINDX EXEC A1
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

   1    =  DISPLAY A LISTING OF VERT EXECUTIVE PROCEDURES
   2    =  DISPLAY A LISTING OF VERT SOURCE PROGRAMS
   3    =  DISPLAY A LISTING OF VERT INPUT DATA FILES
   4    =  DISPLAY A LISTING OF VERT OUTPUT DATA FILES
   5    =  DISPLAY A LISTING OF VERT GRAPHICS DATA FILES
   6    =  DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES
   7    =  GET LISTING MENU FOR EDITING THE ABOVE DATA FILES
   R    =  RETURN TO THE MAIN MENU LEVEL
  END   =  END THE SESSION
```

FIGURE 5

```
VERTIND7 EXEC A1
TERTIARY MENU LEVEL:  ENTER THE OPTION DESIRED :

   1    =  EDIT THE LISTING OF VERT EXECUTIVE PROCEDURES

   2    =  EDIT THE LISTING OF VERT SOURCE PROGRAMS

   3    =  EDIT THE LISTING OF VERT INPUT DATA FILES

   4    =  EDIT THE LISTING OF VERT OUTPUT DATA FILES

   5    =  EDIT THE LISTING OF VERT GRAPHICS DATA FILES

   6    =  EDIT THE LISTING OF VERT PLOT PREVIEW DATA FILES

   R    =  RETURN TO THE MAIN MENU LEVEL

   S    =  RETURN TO THE SECONDARY MENU LEVEL

  END   =  END THE SESSION
```

FIGURE 6

Lower left-hand X corner

Lower left-hand Y corner

node width

node height

Data is in inches

VERT Input Node Logic

VERT Output Node Logic

```
FILE: VPECPT2R DATA   A1   MIDWEST S+E COMPUTER CENTER                PAGE 001

TROOP SUPPORT LEVEL II ROUTINE PHASE 1 ECP PROCESS
NODE0.     4.00  1.     1.     1  2ECP RECEIVED IN DRSTS-MPC
NODE5.5    4.00  1.     1.     2  2ECP REVIEW COMPLETED
NODE11.0   4.00  1.     1.     2  2ECP RECEIVED BY ELEMENTS
NODE16.5   4.00  1.     1.     2  2COMMENTS COMPLETED BY ELEMENTS
NODE22.0   3.50  1.     2.     2  2COMMENTS RECEIVED BY DRSTS-MPC
NODE27.5   2.00  1.     5.     2  3CONFIG CONTROL BOARD MEETS
NODE33.0   6.0   1.     1.     2  1ECP APPROVED
NODE33.0   4.0   1.     1.     2  1ECP DECISION DEFERED
NODE33.0   2.0   1.     1.     2  1ECP DISAPPROVED
ARC 1.     4.5   5.5    4.5    0  01001T2R      2 - 4 DAYS
ARC 1.     4.2   5.5    4.2    1  1DRSTS-MPC IDENTIFIES T, L, & P
ARC 6.5    4.5   11.0   4.5    0  01005T2R      4 - 6 DAYS
ARC 6.5    4.2   11.0   4.2    1  1DRSTS-MPC SENDS ECP TO ELEMENTS
ARC 12.0   4.5   16.5   4.5    0  01007T2R           15 DAYS
ARC 12.0   4.2   16.5   4.2    1  1ELEMENTS REVIEW & PROVIDE COMMENTS
ARC 17.5   4.5   22.0   4.5    0  01008T2R      3 - 5 DAYS
ARC 17.5   4.2   22.0   4.2    1  1ELEMENTS SEND COMMENTS TO DRSTS-MPC
ARC 23.0   4.0   27.5   4.0    0  01013T2R     11 - 13 DAYS
ARC 23.0   3.7   27.5   3.7    1  1DRSTS-MPC SCHEDULES CC BOARD MEETING
ARC 23.0   5.0   27.5   5.0    0  01009T2R     4 - 6 DAYS
ARC 23.0   4.7   27.5   4.7    1  1DRSTS-MPC COMPILES COMMENTS & SENDS TO CM
ARC 28.5   2.5   33.0   2.5    0  01017T2R          1 DAY    <.15>
ARC 28.5   2.2   33.0   2.2    1  1BOARD DISAPPROVES ECP
ARC 28.5   4.5   33.0   4.5    0  01016T2R          1 DAY    <.25>
ARC 28.5   4.2   33.0   4.2    1  1BOARD DEFERS DECISION ON ECP
ARC 28.5   6.5   33.0   6.5    0  01015T2R          1 DAY    <.60>
ARC 28.5   6.2   33.0   6.2    1  1BOARD APPROVES ECP
END
```

Repeat Factor (Number of times the plot will be overdrawn)

Long arc name

NOTE: The long arc name is created as a separate arc in which the arc line and arrowhead are not drawn. It is placed .9 of an inch below the arc which it describes.

Time required to perform the arc (activity)

Arc start X Position

Arc start Y Position

Arc stop X Position

Arc stop Y Position

a "1" says no arrowhead for the arc

a "1" says no arc line or arrowhead for the arc

Abbreviated arc name

Probability of the arc's occurrence

NOTES:

1. Arcs and Nodes do not have to be entered as separate groups. Some people find it easier to input the file this way; others prefer to intersperse the arcs and nodes.
2. All Real Data is in inches.
3. A node width of one inch is usually sufficient
4. Vary the node height with the number of arcs coming in or going out from it. This method maximizes the number of horizontal arcs in the network.
5. See attached plot of this data file (Next Page).

FIGURE 7

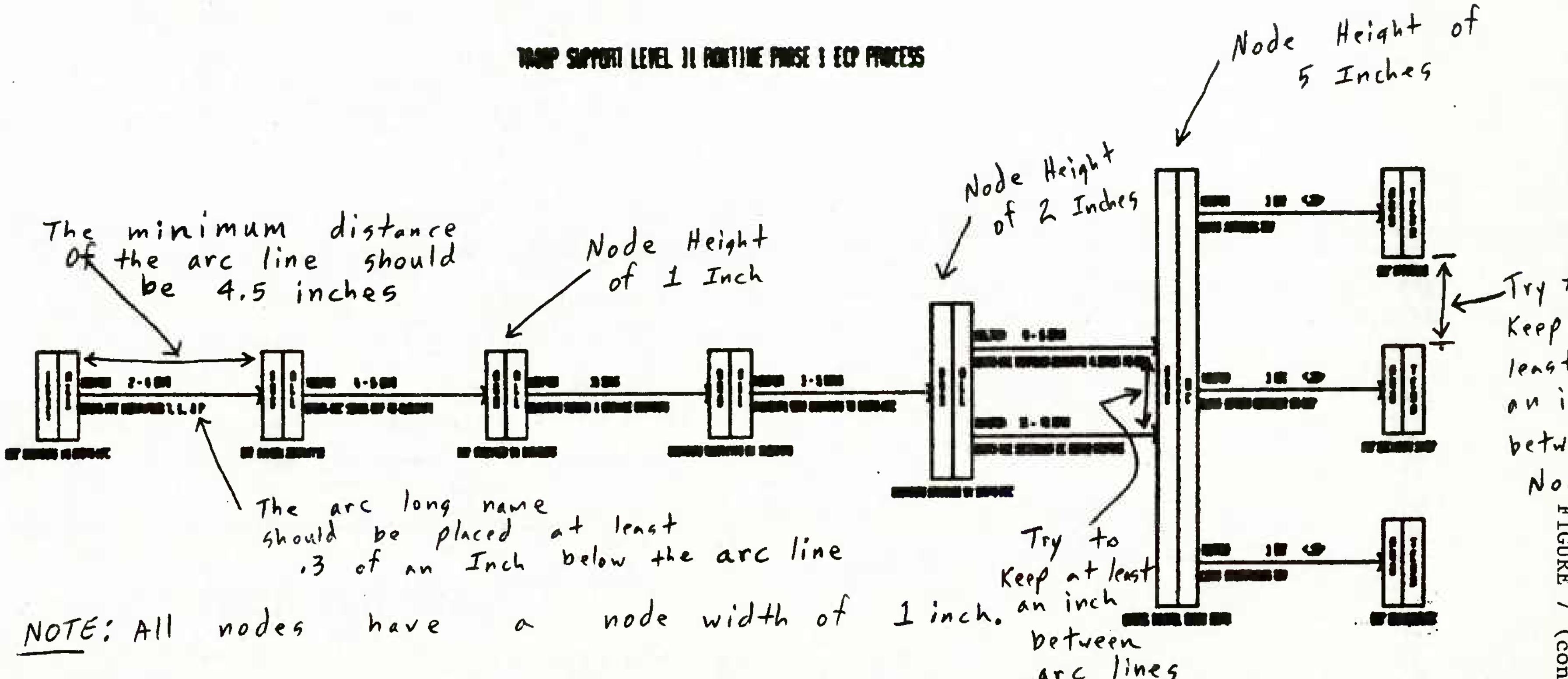


FIGURE 7 (continued)

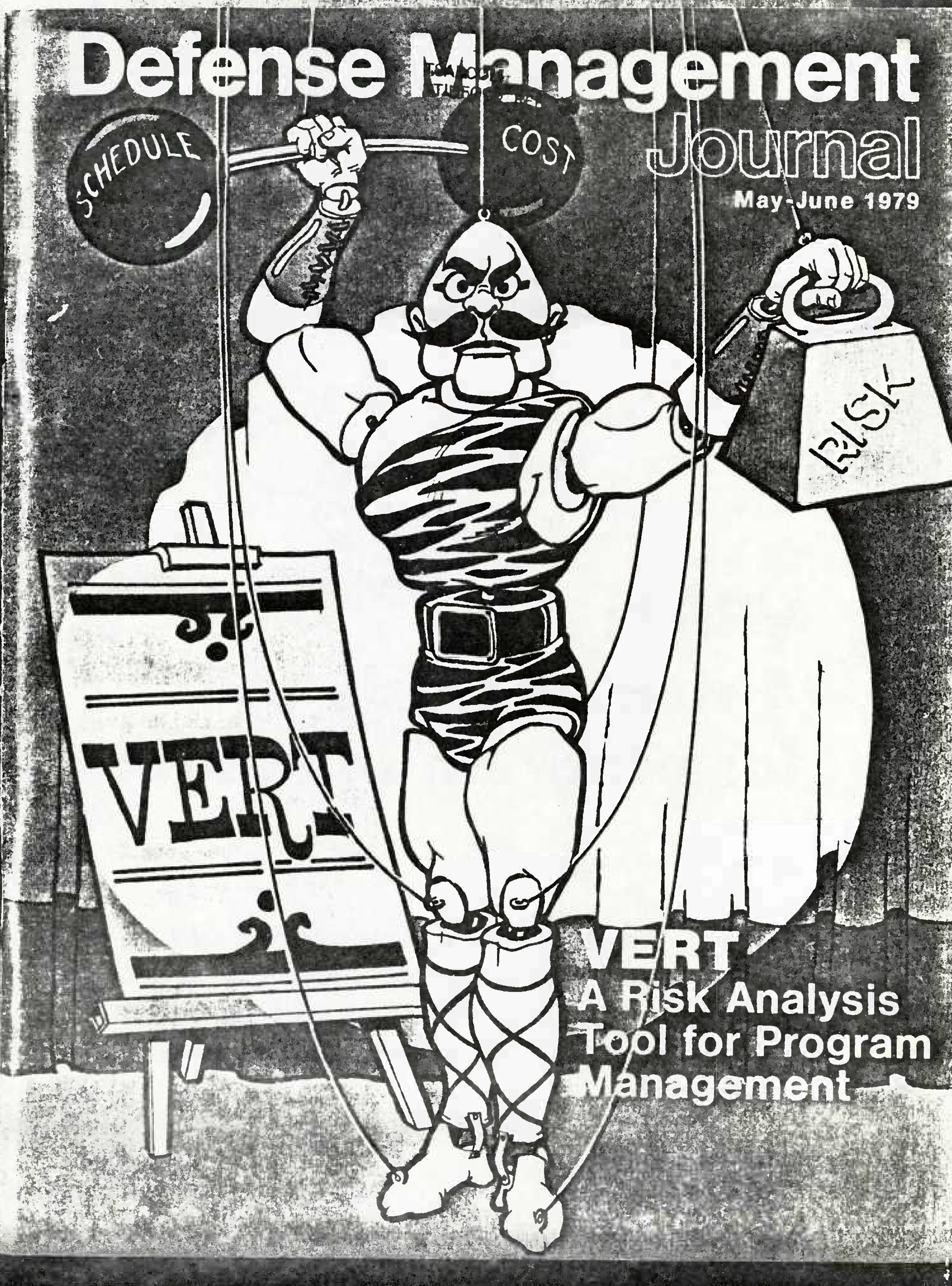
APPENDIX A

A COPY OF A JUNE 1979 DEFENSE MANAGEMENT JOURNAL

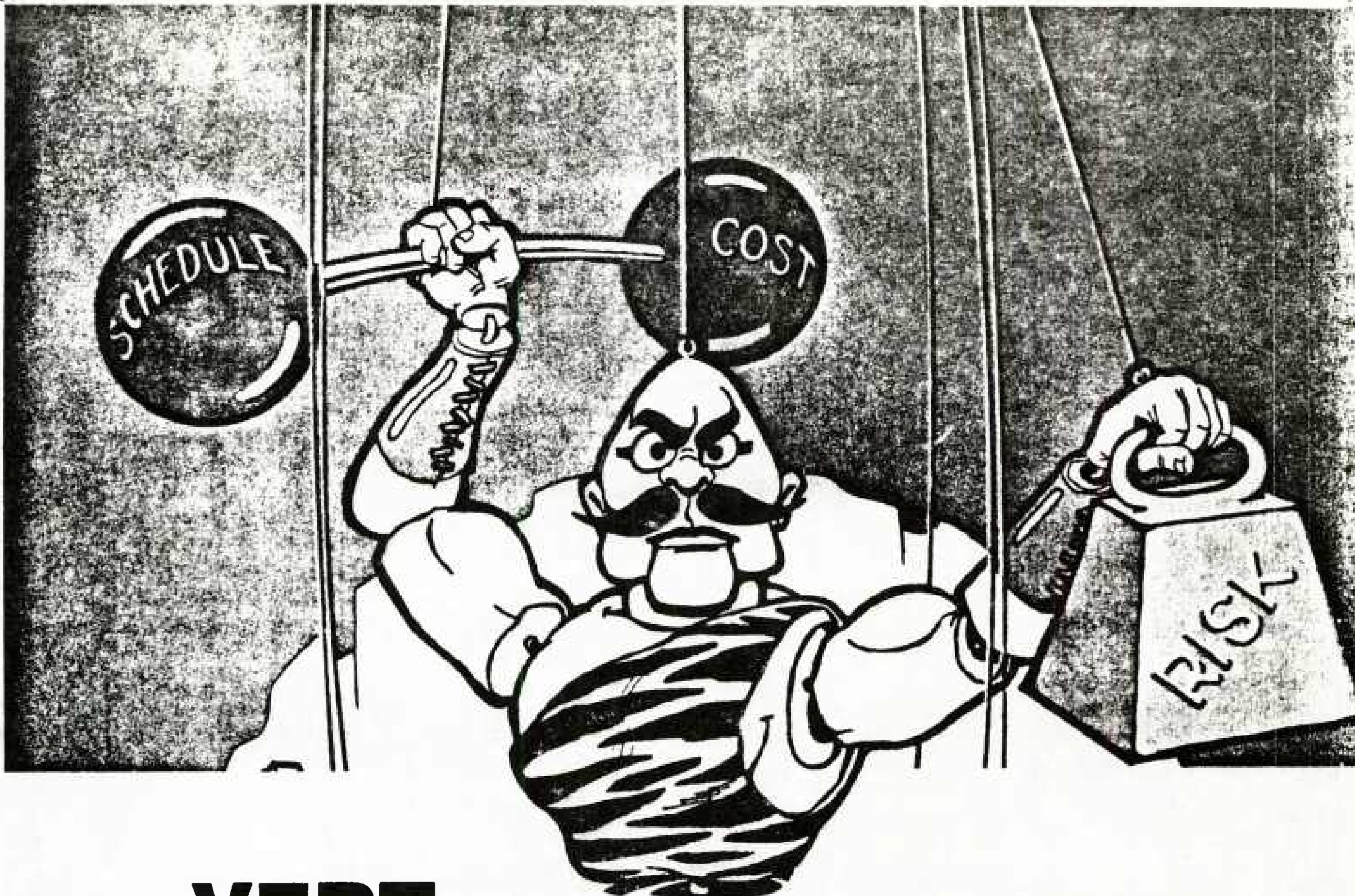
ARTICLE ON VERT

Defense Management Journal

May-June 1979



VERT
A Risk Analysis Tool for Program Management



VERT:
A risk analysis tool for program management

By Major Greg A. Mann, USAF

So far, it has not taken a strong hold, but the Venture Analysis and Review Technique is proving its value for program managers who need to assess the risk of changes in cost, schedule, or specifications.

The weapons-system acquisition process has been subject to a great deal of criticism in the last decade. Poor forecasting has contributed to cost and schedule overruns which often affect our national defense capabilities and create adverse public opinion.[1] Faced with public and Congressional scrutiny, managers can no longer fall back on "cost growth" as an excuse for such overruns, and will be tasked more than ever to buy the best available system for the least possible cost within the prescribed time frame. For each program decision, the program manager must determine the best balance among three parameters: cost, schedule, and performance. In the weapons-system acquisition process, as contrasted with other areas of management, such determinations are more frequent and more complex, and are made with less of the essential information.[2] This is because of the inherent uncertainty involved in identifying and resolving the technological unknowns of developing programs.

Uncertainty creates risk,[3] but risk can be controlled to some extent by risk analysis. In particular, one recently developed quantitative risk-analysis method, the Venture Evaluation and Review Technique, is proving to be a powerful program-management tool and has been applied satisfactorily to several system-development programs.

Background

Studies of weapons-development projects indicate that most cost and time estimates made early in the acquisition cycle eventually prove to be lower than the actual cost and time for development. This cost growth and time delay can be attributed principally to two factors of the initial estimates.[4] First, the inability to accurately predict inflationary trends creates an inherent cost-estimating error. This error, however, tends to be small in relation to the second factor—requirements errors, which result from contractual changes in the scope of work. As a project develops, operational considerations and technical innovation necessitate changes in performance specifications, which in turn affect the schedule and cost. Such changes are most pronounced in a technically complex research and development project. A RAND Corporation study found that requirements uncertainty contributes as much as 30 percent to the variations in cost estimates.[5]

These technical-requirements errors, schedule overruns, and cost overruns, together with the rapid increase in the potential enemy's technical capability, influenced DoD's decision in 1970 to accomplish formal risk analysis as an integral part of the development process.[6] This directive raises a question: how is the program manager to implement formal risk analysis?

Risk analysis is not new. It has always been conducted to varying degrees, based on subjective judgment, experience, and qualitative inputs. Over the past 20 years, numerous risk-analysis techniques have been developed. However, most risk analyses are intuitive and incomplete: intuitive in that the structured quantitative approach often gives way to hunches and blackboard analysis; incomplete in that detailed analyses of isolated aspects of the problem are rarely integrated into a comprehensive analysis.

Because the three parameters of cost, time, and performance are highly interrelated, it is impossible to work with each factor independently without introducing errors.[7] But past techniques could not mathematically represent the three parameters and their interrelationships in a way that provided the program manager with accurate risk information on all three parameters simultaneously.

Furthermore, in the past, military procurement of major weapon systems often sacrificed the cost and schedule parameters in order to maintain prescribed performance requirements. In the 1960s attempts to alleviate the imbalance led to changes in procurement strategy. Today, top managers in the Air Force Systems Command consider cost to be as important as schedule and performance.

As this change in emphasis was evolving, decision-management techniques were also changing. The Critical Path Method and the Program Evaluation and Review Technique were developed in the late 1950s. These original networking techniques were useful in the basic managerial functions of planning, scheduling, and controling. They were also beneficial in laying out tasks and in making gross estimates for material, equipment, and manpower. However, both techniques assumed unrealistically that all activities would be completed successfully.

In the mid-1960s, the Graphical Evaluation and Review Technique was developed as the first computer-oriented networking methodology. From this evolved the Mathematical Network Analyser, developed by the U.S. Army. MATHNET provided the capability for events, activities, activity times, and cost to be modeled probabilistically.

This program was subsequently modified by Army Logistics Management Center personnel and renamed the Risk Information System and Cost Analysis. RISCA provides for the analysis of event uncertainty, but it does not evaluate the risk of failing to attain the performance

[1] *Herbert L. Bevelhymer,* A Proposed Methodology for Weapon Systems Development Risk Analysis, *thesis, Wright-Patterson Air Force Base, Ohio: Air Force Institute of Technology, June 1973, p. 2.*

[2] *Ibid.*

[3] *For purposes of this article,* risk *will be defined as the "probability of not being able to acquire a weapon system of specified performance characteristics within an allotted time, under a given cost and by following a specific course of action." R.R. Lochry* et al., Final Report of the USAF Academy Risk Analysis Study Team, *Denver, Colorado: U.S. Air Force Academy, August 1971.*

[4] *Ibid.*

[5] *Fisher, G.H.,* A Discussion of Uncertainty in Cost Analysis, *The Rand Corporation, April 1962.*

[6] *Deputy Secretary of Defense Memorandum, May 28, 1970, subject: Policy Guidance on Major Weapon System Acquisition.*

[7] *Hamilton T. Lenox,* Risk Analysis, *thesis, Wright-Patterson Air Force Base, Ohio: Air Force Institute of Technology, June 1973, p. 71.*

VERT: a risk analysis tool

objectives. Thus there was still a need to include the performance variables in the total risk-analysis methodology. This was accomplished in 1973 with the development of the Venture Evaluation and Review Technique. Since then, VERT has been used almost exclusively by Army program managers, who have accepted it as a flexible and valuable tool.[8]

The Venture Evaluation and Review Technique uses a network-simulation approach. In brief, this approach determines risk analysis through two steps. The first step entails constructing a graphic representation of the network—the ordered series of activities leading to specific events. The second step consists of analyzing that network using a computer program. The following example illustrates the process.

The F-X, a hypothetical fighter under development, has three major components: an airframe, an engine, and an avionics system. The desired course of action is to build each subsystem concurrently and integrate them later. A model of the essential features of this process as applied to the F-X is depicted in the Figure. The nodes (decision points) in the network represent alternatives which determine the next arc (activity) to be undertaken in the network. Additionally, the size of the problem has a bearing on how the network is structured. If the problem is large and complex, it is often advisable to construct lower level networks or subnetworks of major subsystems.[9]

Once developed, the network is converted to VERT program terminology. The program has a variety of input capabilities that make it possible for decision events and activities occurring in the network to be described. Numerical values for an activity's time, cost, and performance are assigned to each arc. At each node the next arc is determined by probabilities or by some criteria specified by a mathematical relationship.

The process involves a Monte Carlo simulation in which the design of a network flow across the entire network or subnetwork from the beginning to an appropriate end point leads to a trial solution of the problem being modeled. On the F-X fighter, for example, simulation could assess the activity flow across the total development program, or could focus on the flow across the wing-development subnetwork.

The process is repeated as many times as requested by the user in order to create a large sample of possible outcomes. Slack time, completion time, cost, and performance results are generated as output data for each node. A relative frequency distribution depicts the range and concentration of values observed at a given node. Also, the probability of exceeding certain value levels can be obtained from the cumulative frequency distributions, and confidence levels can be inferred.

The computer program produces pictorial histogram approximations for selected nodes. Thus, a program manager would have an integrated risk analysis for a particular point of interest in his program. For example, the analysis of the cost, schedule, and performance risk for the F-X program with respect to meeting the scheduled Defense Systems Acquisition Review Council milestones could be expressed in the following manner.

Schedule Risk. The probability or confidence level of being within eight weeks of the scheduled DSARC is 90 percent; the probability of a schedule overrun of 20 weeks or more is 5 percent.

Cost Risk. The total cost of the program will be within $100 million of the target cost, with a 90 percent confidence level; there is only a 5 percent probability of a cost overrun exceeding $225 million.

Performance Risk. The confidence level of being within 500 pounds of the static sea-level thrust specifications is 90 percent; performance risk could be indexed to other specifications such as speed, weight, reliability, and maintainability.

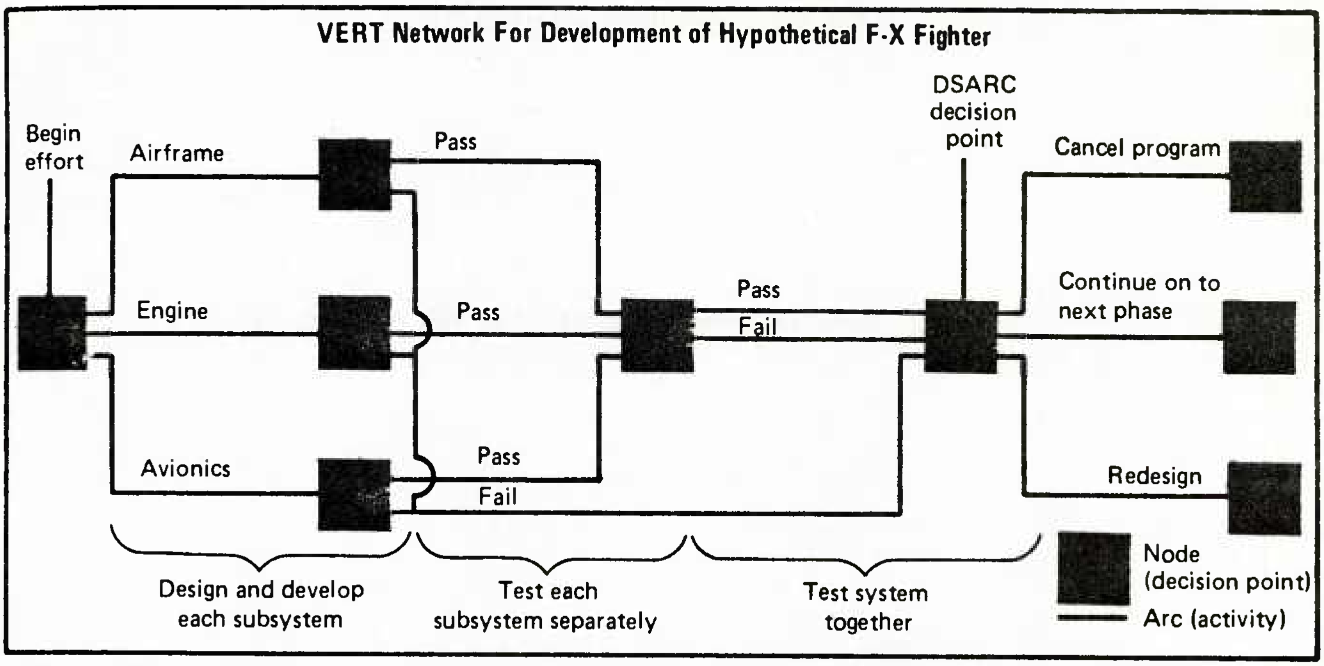
The conclusions of the above analysis could vary as key input parameters change. By modifying the values of the input data, one can easily rerun the model. This sensitivity-analysis capability provides the decision maker with the answers to many hypothetical questions. For example, what if the delivery of critical avionics components on the F-X were to take three weeks longer than originally expected? This contingency could be evaluated quickly. By substituting the "what if" data and rerunning the simulation, the decision maker is provided with new information. Although the program manager is the ultimate user of the VERT analysis, the majority of simulations have been developed and run by the systems analysis or program control offices supporting the manager. Yet VERT is not a difficult risk-analysis technique requiring the services of a computer programmer or systems analyst. All that is needed is an individual who is familiar with basic mathematics and computer programming and who can devote about a week of continuous study and effort to master the model's capabilities.[10] However, such proficiency would be required only in simulating the most complex or unusual risk situations. The extent to which a project needs to be segmented into activities and events is a function of the available data and the results desired. Breaking down complex situations into subnetworks simplifies the programming greatly. Some managers

---

[8] *T.N. Thomas*, VERT: A Risk Analysis Technique for Program Managers, *Defense Systems Management College, May 1977, p. 21.*

[9] *Gerald Moeller*, VERT Documentation, *Rock Island, Illinois: U.S. Army Armament Command, 1976. Moeller developed VERT in 1973.*

[10] *Ibid, p. 4.*



prefer to estimate parameters for the smaller elemental items rather than for the entire system or for higher-level work packages.

If the results achieved in the analysis are not satisfactory, the program manager must analyze the situation and come up with results that agree with his subjective judgment. When the proper relationships are determinable and mathematically tractable, most analysts and decision makers prefer the quantitative approach.[11] In the VERT network-analyzer program, emphasis must be placed on establishing proper relationships. Actual conditions must be represented if creditable analytical results are to be produced. The desire for a quantitative answer or analysis should not force the analyst to disregard or alter critical relationships or facts. The analyst must recognize not only his own limitations but those of VERT as well.

Program applications

The Venture Evaluation and Review Technique has been used in support of several Army programs and at least one Navy project. One of the most noteworthy applications of VERT occurred during the 1975 demonstration and validation phase of the Army's XM-1 Tank development program. The study was structured to examine the XM-1 program manager's question: given a decision to proceed into full-scale engineering development, what is the risk of experiencing unfavorable schedule, cost, or system performance variances? The study was refined to address the following specific objectives:

- Schedule risk expressed as a time distribution for meeting the Army System Acquisition Review Council milestone.
- Cost risk expressed as cost-variance distributions derived from schedule analysis.
- Performance risk expressed as the probability of experiencing a hardware problem that would significantly delay completion of the test program.

VERT simulation was also used in the Cannon-Launched Guided Projectile program to examine the probability that the development effort would successfully reach the production phase. The simulation indicated that there was a 95 percent probability of at least one manufacturer qualifying for full production. It also indicated that the total cost of the program would run about $9 million over baseline cost if there were a 9-month extension in the schedule.[12]

The technique has also been used in support of the Army's Platoon Early Warning System, the M110E1 self-propelled howitzer, and the Advanced Attack Helicopter program. On the helicopter program, VERT was used to evaluate the validation-phase schedules through the second Defense Systems Acquisition Review Council milestone. At this early stage of development there was considerable risk in many areas. The analysis allowed early identification of possible impacts caused by activities having high probabilities of not occurring as planned. The benefits were so great that the program manager requested continuous tracking of the program by VERT simulation.

To explore the capabilities of the risk-assessment technique, the Navy ran a test application of VERT on the radar system for the F-18 aircraft. The risks were related to new performance requirements, and the simulation examined the amount of testing to be conducted in the laboratory versus aboard a flight-test aircraft. Again, the

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[11] *Lenox, p. 72.*

[12] *James B. Besson, Risk Analysis of the 155MM Cannon-Launched Guided Projectile, Rock Island, Illinois: U.S. Army Armament Command, 1976, p. 4.*

analysis provided the program manager with valuable information.

Problems with VERT

Some minor problems have arisen with VERT, but none are considered major obstacles to its effective use. The most frequent problem is related to the collection of data needed to describe the probabilistic behavior of the variables of time, cost, and performance. Although the VERT program is capable of using many different distributions, most data are represented by a triangular distribution indicating, for example, most pessimistic, most likely, and most optimistic. This is not necessarily wrong, but it does not really use the capabilities of the model, and it thus reduces the accuracy of the simulation output.[13]

Another common data problem is the inability to obtain from the experts accurate estimates of the time and cost. The experts tend to be overly optimistic in their estimates, but this problem is waning as they are coming to realize that the data are being used only for a risk-analysis simulation and will not cause them embarrassment by appearing in other documents.

More can be done

Although VERT appears to be quite promising and devoid of major problems, it has not enjoyed wide use. One reason for this lies not with VERT, but with the inadequate understanding of risk-analysis concepts in general.[14] Many program managers are handicapped by a lack of familiarity with quantitative risk-assessment techniques, and few people in the military services are experienced enough to perform the analysis. In Air Force acquisition programs, for example, such techniques have not been used. Similarly, few managers are accustomed to using the outputs of a risk analysis. For instance, probability distributions depict the risk of development more accurately than do point estimates; yet there is widespread resistance to probability distributions because of their unfamiliarity.[15]

Consequently, an education program is needed to instruct analysts and managers in the preparation and use of formal, quantitative risk analysis. The program needs to be designed to emphasize risk analysis for high-level officials who deal with uncertainties in program management and program approval.

Another reason that VERT is not used often is the systems-acquisition community's failure to publicize or offer significant training in VERT. Consequently, program-management personnel are unaware of the technique and its possible applications in the program-development environment. The Army recognized this shortfall and started a comprehensive course of instruction on risk-analysis techniques, primarily oriented toward the RISCA methodology. Now, because of increasing interest and confidence in VERT, the Army Logistics Management Center intends to emphasize it in advanced risk-analysis courses.

Yet another reason VERT is not used more frequently is the problem of limited numbers of personnel and a high rate of personnel turnover in program offices. No agency outside the program office can effectively perform a risk analysis of that program, since only the program office has the necessary data to work with the program manager and has access to him in selecting alternative courses of action. Thus, a risk-analysis team is needed at the product-division staff level to provide the corporate memory necessary to implement a quantitative risk analysis. This team would marry the mechanics of VERT with the data source in the program office.

As the use of VERT increases, knowledge of its applications will grow. Further applications and research are necessary to confirm its validity as a risk-assessment technique. Users need to be encouraged to express their reactions to the technique. These reactions should be analyzed to ascertain the actual benefits being achieved. This investigation could lead to the development of a data bank to determine the degree to which actual program events were substantiated by the model's predictions.

The Venture Evaluation and Review Technique is not necessarily better than any other technique, but it does provide the program manager an accessible tool for integrating cost, schedule, and performance parameters. With VERT, the program manager can add a new dimension to the analysis of program decisions, improving the perspective on alternative courses of action. DMJ

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[13] *Thomas, p. 17.*
[14] *Lochry, p. 107.*
[15] *Ibid.*

APPENDIX B

REPLACEMENT PAGE FOR VERT DOCUMENTATION

1. Full value the partially completed activities.

2. Partial value the partially completed activities.

3. Pruning the uninitiated activities.

4. Full value the unitiated activities.

Option No.	Field Entry	Preceding Computations Used
1.	0 or blank	1 and 3
2.	1	2 and 3
3.	2	1 and 4

Col. 5, Format I1. Full print trip option. Entering a "1" in this column requires a card to be entered following the problem identification card which carries the names of arcs and/or nodes. When any of these arcs or nodes are active, the program will list all the arcs or nodes which were active for the given iteration.

Col. 6, Format I1. Correlation computation and plot option. Entering a "1" in this column requires a card to be entered following the full print trip option card, which carries the correlation and plot combinations wanted for terminal nodes.

Col. 7, Format I1. Cost-performance time interval option. Entering a "1", "2", or "3" in this column requires entering cards following the correlation computation and plot option card which carries the time intervals and possible upper and lower boundaries for the histograms used to plot the cost incurred and/or performance gained during these time intervals. Entering a "1" in this column indicates that cost only is desired, while entering a "2" indicates that performance only is desired. If both cost and performance are desired, a "3" should be entered in this column.

Col. 8, Format I1. Composite terminal node minimuns and maximums option. Entering a "1" in this column requires a card to be entered following the time interval costing option cards which carries the minimums and maximums used to print the time, path cost, overall cost and performance for the composite terminal node.

Col. 9, Format I1. Entering a "1" will evoke the mean print option. Otherwise, leave blank.

Col. 10-20, Format I11. Enter the value initially assigned to the seed of the uniform (0.0 to 1.0) random number generator. The ending value of the seed is printed out at the end of each problem. If this field is left blank or has a "0" entered in it, the seed will be loaded with the value of 435459. Further, when running a series of problems via a single computer run, the program will carry the seed forward to subsequent problems providing this field is left blank in those subsequent problems. There is provision in VERT for embedding two generators, rather than just one uniform random number generator. If the seed is prefixed with a minus (-) sign, the sign will be stripped off the seed and generator number two will be used for the given problem. If the seed is prefixed with a plus (+) sign or no sign, the seed will be used as is and the generator number one will be employed for the given problem.

Cols. 21-24, Format I5. Enter the number of iterations desired for this problem.

Cols. 25-28, Format F4.2. Enter the yearly interest rate used for inflating cost and/or performance values for specific arcs as called out by the user. This number should be entered in percentage form. For example, 7.5 percent should be entered in columns 25-28 as 7.5. If none of the cost and/or performance values of the arcs in the network being processed require discounting, leave this field blank.

Cols. 29-32, Format F4.2. Enter the yearly interest rate used to discount cost and/or performance values for specific arcs as called out by the user. This number should be entered in percentage form similar to the preceding field. If none of the cost and/or performance values of the arcs in the network being processed require discounting, leave this field blank.

Note: The inflation and discounting calculations are made immediately after generating the time, cost and performance values for a given arc. These values are then stored in place of the original values and then used in all future mathematical relationships. However, when the time, cost and performance values for a given arc are interrelated, then the original unadjusted cost and/or performance values are used in the mathematical relationships to calculate values for the dependent variables.

Cols. 33-35, Format F3.2. Enter the time factor which converts the program time to a yearly basis. This program computes interest calculations on a yearly basis. This field carries the number of time units existing in the network time domain in one year. For example, if the network time is in months, a 12. should be entered in columns 33-35. Leave this field blank if the preceding two fields are blank.

Note: Values assigned to the following three fields must all lie within either the closed interval of -1.0 and 0.0 or the closed interval of 0.0 and +1.0. These fields must not jointly carry positive and negative values (i.e., field 1 cannot have a positive entry while fields 2 and/or 3 have negative entries). Entering positive values in these fields will give rise to choosing the terminal node with the least time and cost and the most performance combination as the optimum terminal node. Entering negative values in these fields will cause the terminal node with the largest time and cost and the least performance to be chosen as the optimum terminal node. For further information regarding winning terminal node selection, see the description of the terminal output logic (cols. 10-12 of section D1).

Cols. 36-38, Format F3.2. Enter the weight assigned to time when determining the optimum terminal node.

APPENDIX C

ALPHABETICALLY ORDERED LISTING OF DATA FILES

USED BY THE MENU TECHNIQUE

TAGPRO	DATA	A1
TAGPRO	4014	A1
TAGPRO	4027	A1
VOUTPUT	AAAA	A1
VERT1	AAAA	A1
VERT2	AAAA	A1
VERT3	AAAA	A1
VERT4	AAAA	A1
VERTNEW	BATCH	A1
VERTNEW1	BATCH	A1
VBANKNAM	DATA	A1
VBANKNM1	DATA	A1
VERTBAT	DATA	A1
VERTGF5A	DATA	A1
VERTGF5B	DATA	A1
VERTGF5C	DATA	A1
VERTG5A	DATA	A1
VERTG5B	DATA	A1
VERTG5C	DATA	A1
VERTIND1	DATA	A1
VERTIND2	DATA	A1
VERTIND3	DATA	A1
VERTIND4	DATA	A1
VERTIND5	DATA	A1
VERTIND6	DATA	A1
VERTTELE	DATA	A1
VICO30P1	DATA	A1
VILTUGN0	DATA	A1
VILTUGN1	DATA	A1
VPECPT2R	DATA	A1
VPLTUGN1	DATA	A1
VTITLE	DATA	A1
VERTBAT	EXEC	A1
VERTEDIT	EXEC	A1

VERTEX	EXEC	A1
VERTFREE	EXEC	A1
VERTGRAF	EXEC	A1
VERTGRF1	EXEC	A1
VERTGRF2	EXEC	A1
VERTGRF3	EXEC	A1
VERTGRF4	EXEC	A1
VERTGRF5	EXEC	A1
VERTIN	EXEC	A1
VERTINDX	EXEC	A1
VERTIND1	EXEC	A1
VERTIND2	EXEC	A1
VERTIND3	EXEC	A1
VERTIND4	EXEC	A1
VERTIND5	EXEC	A1
VERTIND6	EXEC	A1
VERTIND7	EXEC	A1
VERTINP	EXEC	A1
VERTPLOT	EXEC	A1
VERTPLT	EXEC	A1
VERTPLT1	EXEC	A1
VERTPLT2	EXEC	A1
VERTPLT3	EXEC	A1
VERTPLT4	EXEC	A1
VERTREAD	EXEC	A1
VERTRUN	EXEC	A1
VERTTERM	EXEC	A1
VERTTEST	EXEC	A1
VBANKNAM	FORTRAN	A1
VERTBAT	FORTRAN	A1
VERTBAT1	FORTRAN	A1
VERTFREE	FORTRAN	A1
VERTNEW	FORTRAN	A1
VERTNEW1	FORTRAN	A1

VERTPLOT	FORTRAN	A1
VTITLE	FORTRAN	A1
VBANKNAM	MODULE	A1
VERTBAT	MODULE	A1
VERTBAT1	MODULE	A1
VERTFREE	MODULE	A1
VERTNEW	MODULE	A1
VERTNEW1	MODULE	A1
VERTPLOT	MODULE	A1
VTITLE	MODULE	A1
VERTTELW	DATA	W1
VERT1	DATA	W1
VERT2	DATA	W1
VERT3	DATA	W1
VERT4	DATA	W1

APPENDIX D

MENU LEVEL ORDERED SOURCE LISTINGS

OF DATA FILES USED BY THE MENU TECHNIQUE

```
&CONTROL OFF
RELEASE 194
ACCESS 194 E/A
-INIT
&GLOBAL2 = 1
&IF &GLOBAL1 = 2 &GOTO -FIN
&IF .&1 = . &GOTO -CONT
&IF .&1 = .END &GOTO -FIN
&IF .&1 = .LIST &GOTO -LIST
&IF .&1 = .7 &GOTO -END7
&IF .&1 = .6 &GOTO -END6
&IF .&1 = .5 &GOTO -END5
&IF .&1 = .4 &GOTO -END4
&IF .&1 = .3 &GOTO -END3
&IF .&1 = .2 &GOTO -END2
&IF .&1 = .1 &GOTO -END1
-CONT
&BEGTYPE

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

   1     =   RUN VERT ONLINE

   2     =   RUN VERT OFFLINE (CMS BATCH)

   3     =   VIEW VERT OUTPUT

   4     =   CREATE A VERT INPUT FILE

   5     =   EDIT AN EXISTING VERT INPUT FILE

   6     =   GET VERT NETWORK PLOT MENU

   7     =   GET VERT GRAPH MENU

  LIST   =   GET VERT DATASETS DISPLAY LISTING MENU

  END    =   END THE SESSION

&ENDTYPE
&READ ARGS
&GOTO -INIT
-END1
EX VERTRUN
&GOTO -PASS
-END2
EX VERTBAT
&GOTO -PASS
-END3
EX VERTTEST
&GOTO -PASS
-END4
EX VERTIN
&GOTO -PASS
-END5
```

```
EX VERTEDIT
&GOTO -PASS
-END6
EX VERTFLT
&GOTO -PASS
-END7
EX VERTGRAF
&GOTO -PASS
-LIST
EX VERTINDX
&GOTO -PASS
-PASS
&ARGS
&GOTO -INIT
-FIN
```

FILE: VERTRUN EXEC A1 MIDWEST S+E COMPUTER CENTER

```
&CONTROL OFF
&TYPE
&TYPE DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ?   ENTER YES/NO
&READ ARGS
&IF &1 = YES &GOTO -RUN2
ERASE * AAAA A
&TYPE ENTER VERT INPUT FILE NAME
&READ ARGS
&CONTROL ALL
FI 05 DISK &1 DATA A1
FI 06 DISK VOUTPUT AAAA A
FI 07 DISK VERTPUN AAAA A
FI 08 DISK VERT1 AAAA A (LRECL 88 BLKSIZE 884 RECFM VBS)
FI 09 DISK VERT2 AAAA A (LRECL 88 BLKSIZE 884 RECFM VBS)
FI 10 DISK VERT3 AAAA A (LRECL 96 BLKSIZE 964 RECFM VBS)
FI 11 DISK VERT4 AAAA A (LRECL 444 BLKSIZE 444 RECFM VBS)
VERTNEW
&CONTROL OFF
&GOTO -CONT
-RUN2
ERASE * AAAA A
&TYPE ENTER VERT INPUT FILE NAME
&READ ARGS
&CONTROL ALL
GLOBAL TXTLIB FORTMOD2 MOD2EEH TTXTCS TTXAGII SANDESUB TELELIB CMSLIB
FI 01 DISK VBANKNAM DATA A1 (RECFM FB LRECL 80
VBANKNAM
FI 01 DISK VBANKNAM DATA A1 (RECFM FB LRECL 80
FI 05 DISK &1 DATA A1
FI 06 DISK VOUTPUT AAAA A1
FI 07 DISK VERTPUN AAAA A1
FI 08 DISK VERT1 AAAA A1 (LRECL 88 BLKSIZE 884 RECFM VBS)
FI 09 DISK VERT2 AAAA A1 (LRECL 88 BLKSIZE 884 RECFM VBS)
FI 10 DISK VERT3 AAAA A1 (LRECL 96 BLKSIZE 964 RECFM VBS)
FI 11 DISK VERT4 AAAA A1 (LRECL 444 BLKSIZE 444 RECFM VBS)
VERTNEW1
-CONT
&CONTROL OFF
COPY PRM DATA A1 PRONLINE DATA A1 (REPLACE
CP MSG * YOUR JOB HAS FINISHED
&READ ARGS
```

FILE: VBANKNAM FORTRAN A1 MIDWEST S+E COMPUTER CENTER

```
      DIMENSION NAME(3)                                                         VBA00
      DATA YES/'Y'/                                                             VBA00
    5 WRITE(6,1)                                                                VBA00
    1 FORMAT(//,' ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN         VBA00
     1'/,'      < NO SPACES, 10 CHARCTERS MAX>')                                VBA00
      READ(5,2) NAME                                                            VBA00
    2 FORMAT(3A4)                                                               VBA00
      WRITE(1,2) NAME                                                           VBA00
      WRITE(6,3)                                                                VBA00
    3 FORMAT(//,' DO YOU WANT TO ENTER ANOTHER FILENAME '/,                     VBA00
     1'    ENTER Y FOR YES OR N FOR NO')                                        VBA00
      READ(5,4) ANSR                                                            VBA00
    4 FORMAT(A1)                                                                VBA00
      IF(ANSR.EQ.YES) GO TO 5                                                   VBA00
      STOP                                                                      VBA00
      END                                                                       VBA00
```

```
&CONTROL OFF
CP QUERY BATCHDV
&TYPE
&TYPE IS BATCHDV "DSC" ?  ENTER YES/NO
&READ ARGS
&IF &1 EQ NO &GOTO -OFF
&BEGTYPE

DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ?  ENTER YES/NO

&END
&READ ARGS
&IF &1 = YES &GOTO -RUN2
FI 04 DISK VERTBAT DATA A1 (RECFM FB LRECL 80 BLKSIZE 6400)
FI 05 TERM
FI 06 TERM
VERTBAT
&BEGSTACK
VERIFY OFF
DOWN 8
GET VERTBAT DATA A1 1 2
DOWN 6
GET VERTBAT DATA A1 3 1
FILE
&END
EDIT VERTNEW BATCH
BATCH SUBMIT VERTNEW BATCH
&BEGSTACK
VERIFY OFF
DOWN 9
DELETE 2
DOWN 6
DELETE
FILE
&END
EDIT VERTNEW BATCH A1
&GOTO -END
-RUN2
 GLOBAL TXTLIB FORTMOD2 MOD2EEH TTXTCS TTXAGII SANDESUB TELELIB CMSLIB
 FI 01 DISK VBANKNM1 DATA A1 (RECFM FB LRECL 80)
VBANKNAM
FI 04 DISK VERTBAT DATA A1 (RECFM FB LRECL 80 BLKSIZE 6400)
FI 05 TERM
FI 06 TERM
VERTBAT1
&BEGSTACK
VERIFY OFF
DOWN 8
GET VERTBAT DATA A1 1 1
DOWN
GET VERTBAT DATA A1 2 3
DOWN 6
GET VERTBAT DATA A1 5 2
FILE
&END
```

FILE: VERTBAT EXEC A1 MIDWEST S+E COMPUTER CENTER

```
EDIT VERTNEW1 BATCH A1
BATCH SUBMIT VERTNEW1 BATCH
&BEGSTACK
VERIFY OFF
DOWN 9
DELETE
DOWN
DELETE 3
DOWN 6
DELETE 2
FILE
&END
EDIT VERTNEW1 BATCH A1
&GOTO -END
-OFF
&TYPE
&TYPE YOU CAN'T RUN VERT OFFLINE AT THIS TIME BECAUSE BATCHDV IS NOT LOGGED ON
CP MSG OP PLEASE LOG BATCHDV ON
&TYPE
&TYPE I HAVE SENT A MESSAGE TO THE OPERATOR TO LOG BATCHDV ON
&TYPE
&TYPE WAIT UNTIL THE OPERATOR TELLS YOU THAT BATCHDV IS LOGGED ON
&TYPE       BEFORE YOU USE MENU ITEM  NO.2  AGAIN
&TYPE
-END
&TYPE
&READ ARGS
```

```
      INTEGER*2 NAME(3)
      WRITE(6,1)
    1 FORMAT(//, '  ENTER THE UNIQUE FILENAME OF THE VERT FILE TO BE RUN
     1'/'       (SIX CHARACTERS MAX)')
      READ(5,2) NAME
    2 FORMAT(3A2)
      WRITE(4,3) NAME
    3 FORMAT('FI 05 DISK VI',3A2,' DATA B1')
      WRITE(4,4) NAME
    4 FORMAT('FI 06 DISK VO',3A2,' DATA W1 (LRECL 132)')
      WRITE(4,5) NAME
    5 FORMAT('CP MSG FPKERLY VI',3A2,' HAS FINISHED')
      STOP
      END
```

```
/JOB FPKERLY FPVERT
/IDENT VERTNEW
CP SPOOL CONSOLE FPKERLY START TERM CLASS C
CP LINK FPKERLY 191 192 RR KEN
ACCESS 192 B/A
CP LINK FPKERLY 194 194 MW KLK
ACCESS 194 W
ERASE * AAAA W
FI 07 DISK VERTPUN AAAA W1
FI 08 DISK VERT1 AAAA W1 (LRECL 88 BLKSIZE 444 RECFM VBS)
FI 09 DISK VERT2 AAAA W1 (LRECL 88 BLKSIZE 444 RECFM VBS)
FI 10 DISK VERT3 AAAA W1 (LRECL 96 BLKSIZE 964 RECFM VBS)
FI 11 DISK VERT4 AAAA W1 (LRECL 444 BLKSIZE 4444 RECFM VBS)
VERTNEW
CP SPOOL CONSOLE STOP NOCONT
CP SPOOL CONSOLE CLOSE
CP SPOOL E NOCONT
CP CLOSE 00E
CP SPOOL E OFF
CP SPOOL D NOCONT
CP CLOSE D
CP SPOOL D OFF
/*
```

FILE: VERTBAT1 FORTRAN A1 MIDWEST S+E COMPUTER CENTER

```
      INTEGER*2 NAME(3)
      WRITE(6,1)
    1 FORMAT(//, '  ENTER THE UNIQUE FILENAME OF THE VERT FILE TO BE RUN
     1'/'        (SIX CHARACTERS MAX)')
      READ(5,2) NAME
    2 FORMAT(3A2)
      WRITE(4,3) NAME
    3 FORMAT('COPY VBANKNM1 DATA B1 VB',3A2,' DATA W1 (REPLACE')
      WRITE(4,4) NAME
    4 FORMAT('FI 01 DISK VB',3A2,' DATA W1')
      WRITE(4,5) NAME
    5 FORMAT('FI 05 DISK VI',3A2,' DATA B1')
      WRITE(4,6) NAME
    6 FORMAT('FI 06 DISK VC',3A2,' DATA W1 (LRECL 132)')
      WRITE(4,7) NAME
    7 FORMAT('COPY PRM DATA A1 PR',3A2,' DATA W1 (REPLACE')
      WRITE(4,8) NAME
    8 FORMAT('CP MSG FPKERLY VI',3A2,' HAS FINISHED')
      STOP
      END
```

```
/JOB FPKERLY FPVERT
/IDENT VERTNEW1
CP SPOOL CONSOLE FPKERLY START TERM CLASS C
CP LINK FPKERLY 191 192 RR KEN
ACCESS 192 B/A
CP LINK FPKERLY 194 194 MW KLK
ACCESS 194 W
ERASE * AAAA W
GLOBAL TXTLIB VFORTLIB TELELIB TTXTCS TTXAGII SANDESUB CMSLIB
FI 07 DISK VERTPUN AAAA W1
FI 08 DISK VERT1 AAAA W1 (LRECL 88 BLKSIZE 444 RECFM VBS)
FI 09 DISK VERT2 AAAA W1 (LRECL 88 BLKSIZE 444 RECFM VBS)
FI 10 DISK VERT3 AAAA W1 (LRECL 96 BLKSIZE 964 RECFM VBS)
FI 11 DISK VERT4 AAAA W1 (LRECL 444 BLKSIZE 4444 RECFM VBS)
VERTNEW1
CP SPOOL CONSOLE STOP NOCONT
CP SPOOL CONSOLE CLOSE
CP SPOOL E NOCONT
CP CLOSE 00E
CP SPOOL E OFF
CP SPOOL D NOCONT
CP CLOSE D
CP SPOOL D OFF
/*
```

```
&CONTROL OFF
&FTIME = 1
&TYPE DID YOU RUN VERT ONLINE ?
&TYPE ENTER YES/NO
&READ ARGS
&ON = &1
&EMODE = NO
&IF &1 = NO &GOTO -BATCH
-ONLINE
&BEGSTACK
BOTTOM
SAVE
&END
EDIT VOUTPUT AAAA A1
&GOTO -CONT
-CONT
&TYPE ENTER YES/NO FOR ROUTING
&READ ARGS
&IF &ON = NO &GOTO -CONT1
&IF &1 = NO &GOTO -EN
&GOTO -CONT3
-CONT1
&IF &EMODE = YES &GOTO -CONT2
&IF &1 = NO &GOTO -ER
&GOTO -CONT3
-CONT2
&IF &1 = NO &GOTO -EN
-CONT3
&TYPE ENTER THE NUMBER OF COPIES YOU WANT
&READ ARGS
ROUTEPRT DEST REMOTE4 COPIES &1
&IF &ON = YES &GOTO -PRTON
&IF &EMODE = NO &GOTO -WMODE
PRINT &FNAME DATA E1 (CC
&GOTO -EN
-WMODE
PRINT &FNAME DATA W1 (CC
&GOTO -ER
-PRTON
PRINT VOUTPUT AAAA A1 (CC
&GOTO -EN
-END1
&FTIME = 2
&TYPE DO YOU WANT TO FIND OUT IF ANY OF YOUR VERT OFFLINE
&TYPE   JOB(S) HAVE FINISHED ?  ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -MSG
BATCH QUERY USER FPKERLY *
&GOTO -CONT4
-MSG
&TYPE YOU CAN'T ACCESS AN OUTPUT FILE UNTIL ALL FILES HAVE BEEN CREATED FROM CMS BAT
&TYPE
&TYPE HOWEVER YOU MAY PRINT OUT A FILE THAT HAS ALREADY BEEN CREATED
&TYPE
&TYPE ENTER YES/NO IF YOU WANT A FILE PRINTED
```

```
&TYPE
&READ ARGS
&EMODE = &1
&IF &1 = NO &GOTO -EN
&TYPE ENTER THE VERT OUTPUT FILE YOU WANT TO PRINT
&TYPE
&TYPE ENTER FILENAME ONLY
&TYPE
&READ ARGS
ACCESS 194 E/A
&FNAME = &1
&GOTO -CONT
-BATCH
&BEGTYPE

 HAVE YOU RECEIVED NOTICE THAT YOUR LAST CMS BATCH JOB SUBMITTED
    HAS COMPLETED ?     ENTER YES/NO

&END
&READ ARGS
&IF &1 = YES &GOTO -END2
&IF &FTIME EQ 1 &GOTO -END1
-CONT4
&TYPE
&TYPE
&TYPE HAS ALL OF YOUR OFFLINE JOBS FINISHED ?
&TYPE
&TYPE    ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -MSG
-END2
ACCESS 194 W
&TYPE ENTER THE VERT OUTPUT FILE YOU WANT TO ACCESS
&TYPE
&TYPE ENTER FILENAME ONLY
&TYPE
&READ ARGS
&BEGSTACK
TOP
SAVE
&END
EDIT &1 DATA W1
&FNAME = &1
&GOTO -CONT
-ER
&F1TIME = 1
-NEXT
&IF &F1TIME EQ 2 &GOTO -CONT5
&TYPE
&TYPE DO YOU WANT TO ERASE ANY OUTPUT FILES ?
&GOTO -CONT6
-CONT5
&TYPE DO YOU WANT TO ERASE ANY MORE OUTPUT FILES ?
-CONT6
&TYPE
```

```
&TYPE ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -EN
&IF &EMODE = YES &GOTO -EN
&F1TIME = 2
&TYPE
&TYPE ENTER THE VERT OUTPUT FILE YOU WANT TO ERASE
&TYPE
&TYPE ENTER FILENAME ONLY
&READ ARGS
ERASE &1 DATA W1
&GOTO -NEXT
-EN
RELEASE 194
ACCESS 194 E/A
```

```
&CONTROL OFF
&BEGTYPE

NOTE:  IN ORDER TO BE ABLE TO RUN VERT OFFLINE, THE FIRST TWO
       LETTERS OF THE VERT INPUT FILENAME MUST BEGIN WITH VI.
       THE REMAINING SIX MAX ALPHANUMERIC CHARACTERS MAY BE
       ANYTHING YOU WISH.

 DO YOU WISH TO USE FREE FORM OR FIXED FORM FORMAT FOR CREATING
 YOUR VERT INPUT FILE ?   ENTER THE OPTION NUMBER LISTED BELOW:

    1  ->  FREE FORM (FIELDS ARE SEPARATED BY COMMAS. THUS ARC
                     OR NODE NAMES MUST NOT CONTAIN COMMAS IN
                     THE NAME. WHEN A FIELD IS NOT USED IT'S
                     ABSENCE MUST BE INDICATED BY A COMMA IF
                     IT IS FOLLOWED BY ANOTHER FIELD. THE
                     PROGRAM WILL PROMPT THE USER FOR DATA)

    2  ->  FIXED FORM  (USE THE TABSET COMMAND TO AID INPUT)

&END
&READ ARGS
&IF .&1 = .2 &GOTO -FIXED
EX VERTFREE
&GOTO -END
-FIXED
EX VERTINF
-END
```

```
&CONTROL OFF
&TYPE
&TYPE ENTER VERT INPUT FILE NAME
&READ ARGS
FI 3 DISK &1 DATA A1 (RECFM FB LRECL 80
VERTFREE
```

```
&CONTROL OFF
&TYPE ENTER NEW VERT INPUT FILENAME
&READ ARGS
EDIT &1 DATA A1
```

```
      COMMON LINEI(81), LINEO(80), IRROR, IFIELD, ITUB, IBLK
     0DIMENSION LSEP(81), IABC(21), ICON(23), IARC(5), IFUN(16),
     1JFUN(16), NODE(9)
      DATA IZERO,ICOMMA,IPLUS,MINUS/1H0,1H,,1H+,1H-/
     0DATA IABC/1HA,1HB,1HC,1HD,1HE,1HF,1HH,1HI,1HK,1HL,1HM,1HN,1HO,1HP,
     11HR,1HS,1HT,1HU,1H1,1H2,1H3/
     0DATA ICON/1,2,3,4,5,6,7,8,9,19,24,28,32,35,38,41,44,47,50,53,62,
     171,80/
      DATA IARC/16,24,28,29,80/
      DATA IFUN/17,18,19,27,28,36,37,45,47,48,49,57,58,66,67,75/
     0DATA JFUN/1H ,1H,,1H,,1HA,1H,,1HA,1H,,1HA,1H ,1H,,1H,,1HA,1H,,
     11HA,1H,,1HA/
      DATA NODE/9,12,14,16,20,24,28,29,80/
C
C     THIS PROGRAM RECEIVES INPUT VIA AN INTERACTIVE TERMINAL AND TRANS-
C        FORMS IT TO THE STANDARD VERT INPUT LAYOUT.  I/O ASSIGNMENTS
C        ITUB = CRT, IOUT = NEW FILE READY FOR VERT
C
      ITUB = 5
      IOUT = 3
      IBLK = JFUN(1)
      LNUMB = 0
      KEY = 0
      ITITLE = 0
C
C     IF A NEW TYPE OF DATA CARD IS BEING LOADED, PRINT A TITLE
C
 1111 KEY = KEY + 1
 1122 IF(ITITLE.EQ.1) GO TO 1300
      GO TO (1133,1155,1177,1199,1211,1233,1255,1277,1888),KEY
 1133 WRITE (ITUB,1144)
 1144 FORMAT(/22H ENTER THE CONTROL CARD)
      GO TO 1300
 1155 IF(IPT1.EQ.IBLK) GO TO 1111
      IF(IPT1.EQ.IZERO)GO TO 1111
      WRITE (ITUB,1166)
 1166 FORMAT(/38H ENTER THE PROBLEM IDENTIFICATION CARD)
      GO TO 1300
 1177 IF(IPT2.EQ.IBLK) GO TO 1111
      IF(IPT2.EQ.IZERO)GO TO 1111
      WRITE (ITUB,1188)
 1188 FORMAT(/38H ENTER THE FULL PRINT TRIP OPTION CARD)
      GO TO 1300
 1199 IF(IPT3.EQ.IBLK) GO TO 1111
      IF(IPT3.EQ.IZERO)GO TO 1111
      WRITE (ITUB,1200)
 12000FORMAT(/55H ENTER THE CORRELATION COMPUTATION AND PLOT OPTION CARD
     1)
      GO TO 1300
 1211 IF(IPT4.EQ.IBLK) GO TO 1111
      IF(IPT4.EQ.IZERO)GO TO 1111
      WRITE (ITUB,1222)
 12220FORMAT(/77H ENTER THE COST-PERFORMANCE TIME INTERVAL OPTION CARDS,
     1 FINISH WITH "ENDCTPR")
      GO TO 1299
```

```
 1233 IF(IPT5.EQ.IBLK) GO TO 1111
      IF(IPT5.EQ.IZERO)GO TO 1111
      WRITE (ITUB,1244)
 1244 FORMAT(/49H ENTER THE COMPOSITE TERMINAL NODE HISTOGRAM CARD)
      GO TO 1300
 1255 WRITE (ITUB,1266)
 1266 FORMAT(/63H ENTER THE MASTER AND SATELLITE ARC CARDS, FINISH WITH
     1"ENDARC")
      GO TO 1299
 1277 WRITE (ITUB,1288)
 1288 FORMAT(/65H ENTER THE MASTER AND SATELLITE NODE CARDS, FINISH WITH
     1 "ENDNODE")
C
C     READ ANOTHER LINE OF DATA
C
 1299 ITITLE = 1
 1300 LNUMB = LNUMB + 1
 1311 WRITE (ITUB,1322) LNUMB
 1322 FORMAT(/37H THE NEXT LINE OF DATA IS LINE NUMBER, I4)
      READ (ITUB,1333) (LINEI(I), I=1,80)
 1333 FORMAT (80A1)
C
C     FIND THE LAST NON BLANK CHARACTER, IF NO NON BLANK CHARACTERS,
C        RESUBMIT, OTHERWISE ENTER A COMMA IF THE LAST NON BLANK
C        CHARACTER WAS NOT A COMMA
C
      IFIELD = 0
      IERROR = 0
      N = 0
      DO 1344 I=1,80
      IF(LINEI(I).NE.IBLK) N = I
 1344 LINEO(I) = IBLK
      IF(N.GT.0) GO TO 1366
      WRITE (ITUB,1355)
 1355 FORMAT(/31H ***ERROR*** NO DATA - RESUBMIT)
      GO TO 1311
 1366 IF(LINEI(N).EQ.ICOMMA) GO TO 1377
      N = N + 1
      LINEI(N) = ICOMMA
C
C     FIND THE LOCATION OF THE SEPARATORS - THE COMMAS
C
 1377 NSEP = 0
      DO 1388 I=1,N
      IF(LINEI(I).NE.ICOMMA) GO TO 1388
      NSEP = NSEP + 1
      LSEP(NSEP) = I
 1388 CONTINUE
C
C     LOAD EACH CARD TYPE
C
      M = 0
      J = 1
      GO TO (1411,1444,1455,1477,1499,1511,1544,1555),KEY
 1399 WRITE (ITUB,1400)
```

```
 1400 FORMAT(/46H ***ERROR*** TOO MANY FIELD ENTRIES - RESUBMIT)
      GO TO 1311
C
C     LOAD THE CONTROL CARD AND THE SWITCHES
C
 1411 IF(NSEP.GT.25) GO TO 1399
      DO 1422 I=1,NSEP
      N = LSEP(I)
      K = ICON(I)
      CALL TRANS (M,N,J,K,0,0)
      M = N
 1422 J = K + 1
      IPT1 = LINEC(1)
      IPT2 = LINEC(5)
      IPT3 = LINEC(6)
      IPT4 = LINEC(7)
      IPT5 = LINEC(8)
 1433 KEY = KEY + 1
      GO TO 1877
C
C     LOAD THE PROBLEM IDENTIFICATION CARD
C
 1444 L = LSEP(NSEP)
      CALL TRANS (0,L,1,80,1,1)
      GO TO 1433
C
C     LOAD THE FULL PRINT TRIP OPTION CARD
C
 1455 IF(NSEP.GT.10) GO TO 1399
      DO 1466 I=1,NSEP
      N = LSEP(I)
      K = J + 7
      CALL TRANS (M,N,J,K,1,0)
      M = N
 1466 J = J + 8
      GO TO 1433
C
C     LOAD THE CORRELATION COMPUTATION AND PLOT OPTION CARD
C
 1477 IF(NSEP.GT.12) GO TO 1399
      DO 1488 I=1,NSEP
      N = LSEP(I)
      K = J + 1
      CALL TRANS (M,N,J,K,0,0)
      M = N
 1488 J = J + 2
      GO TO 1433
C
C     LOAD THE COST-PERFORMANCE TIME INTERVAL OPTION CARDS, FIRST, CHECK
C        FOR THE "ENDCTPR" CARD, THE LAST CARD OF THIS SERIES
C
 1499 IF(NSEP.GT.6) GO TO 1399
      IF(LINEI(1).NE.IABC(5)) GO TO 1522
      IF(LINEI(2).NE.IABC(12))GO TO 1522
      IF(LINEI(3).NE.IABC(4)) GO TO 1522
```

```
      IF(LINEI(4).NE.IABC(3)) GO TO 1522
      IF(LINEI(5).NE.IABC(17))GO TO 1522
      IF(LINEI(6).NE.IABC(14))GO TO 1522
      IF(LINEI(7).NE.IABC(15))GO TO 1522
 1500 ITITLE = 0
      GO TO 1444
C
C     LOAD THE COST-PERFORMANCE TIME INTERVAL OPTION CARDS OR MINIMUMS
C        AND MAXIMUMS FOR THE COMPOSITE TERMINAL HISTOGRAMS
C
 1511 IF(NSEP.GT.8) GO TO 1399
 1522 DO 1533 I=1,NSEP
      N = LSEP(I)
      K = J + 9
      CALL TRANS (M,N,J,K,0,0)
      M = N
 1533 J = J + 10
      IF(KEY - 6)1877,1433,1877
C
C     CHECK FOR ENDARC CARD
C
 1544 IF(LINEI(1).NE.IABC(5)) GO TO 1566
      IF(LINEI(2).NE.IABC(12))GO TO 1566
      IF(LINEI(3).NE.IABC(4)) GO TO 1566
      IF(LINEI(4).NE.IABC(1)) GO TO 1566
      IF(LINEI(5).NE.IABC(15))GO TO 1566
      IF(LINEI(6).NE.IABC(3)) GO TO 1566
      GO TO 1500
C
C     CHECK FOR ENDNODE CARD
C
 1555 IF(LINEI(1).NE.IABC(5)) GO TO 1566
      IF(LINEI(2).NE.IABC(12))GO TO 1566
      IF(LINEI(3).NE.IABC(4)) GO TO 1566
      IF(LINEI(4).NE.IABC(12))GO TO 1566
      IF(LINEI(5).NE.IABC(13))GO TO 1566
      IF(LINEI(6).NE.IABC(4)) GO TO 1566
      IF(LINEI(7).NE.IABC(5)) GO TO 1566
      GO TO 1500
C
C     LOAD THE ARC OR NODE NAME AND CHECK FOR MIN NO. OF COMMAS
C
 1566 M = LSEP(1)
      CALL TRANS (0,M,1,8,1,0)
      IF(NSEP.GE.3) GO TO 1588
      WRITE (ITUB,1577)
 1577 FORMAT(/41H ***ERROR*** NOT ENOUGH COMMAS - RESUBMIT)
      GO TO 1311
 1588 J = 9
      N = LSEP(2)
      I = N - M
      IF(KEY.EQ.8) GO TO 1799
C
C     IF THIS CARD LOOKS LIKE A SATELLITE ARC CARD, TEST IT
C
```

```
      IF(I.NE.6) GO TO 1655
      IPT1 = M + 1
      IPT2 = M + 2
      IPT3 = M + 3
      IPT4 = M + 4
      IPT5 = M + 5
C
C     CHECK FOR TIME
C
      IF(LINEI(IPT2).NE.IABC(17))GO TO 1599
      IF(LINEI(IPT3).NE.IABC(8)) GO TO 1599
      IF(LINEI(IPT4).NE.IABC(11))GO TO 1599
      IF(LINEI(IPT5).EQ.IABC(5)) GO TO 1622
C
C     CHECK FOR COST
C
 1599 IF(LINEI(IPT2).NE.IABC(3)) GO TO 1600
      IF(LINEI(IPT3).NE.IABC(13))GO TO 1600
      IF(LINEI(IPT4).NE.IABC(16))GO TO 1600
      IF(LINEI(IPT5).EQ.IABC(17))GO TO 1622
      IF(LINEI(IPT5).EQ.IABC(8)) GO TO 1622
      IF(LINEI(IPT5).EQ.IABC(4)) GO TO 1622
      IF(LINEI(IPT5).EQ.IABC(2)) GO TO 1622
C
C     CHECK FOR PERFORMANCE
C
 1600 IF(LINEI(IPT2).NE.IABC(14))GO TO 1611
      IF(LINEI(IPT3).NE.IABC(5)) GO TO 1611
      IF(LINEI(IPT4).NE.IABC(15))GO TO 1611
      IF(LINEI(IPT5).EQ.IABC(6)) GO TO 1622
      IF(LINEI(IPT5).EQ.IABC(8)) GO TO 1622
      IF(LINEI(IPT5).EQ.IABC(4)) GO TO 1622
      IF(LINEI(IPT5).EQ.IABC(2)) GO TO 1622
C
C     CHECK FOR BLANK
C
 1611 IF(LINEI(IPT2).NE.IBLK) GO TO 1633
      IF(LINEI(IPT3).NE.IBLK) GO TO 1633
      IF(LINEI(IPT4).NE.IBLK) GO TO 1633
      IF(LINEI(IPT5).NE.IBLK) GO TO 1633
C
C     FIND THE CORRECT PREFIX FOR TIME, COST, PERFORMANCE OR BLANK
C
 1622 IF(LINEI(IPT1).EQ.IABC(4)) GO TO 1677
      IF(LINEI(IPT1).EQ.IABC(7)) GO TO 1677
      IF(LINEI(IPT1).EQ.IABC(15))GO TO 1699
      IF(LINEI(IPT1).EQ.IABC(11))GO TO 1677
C
C     CHECK FOR FILTERS
C
 1633 IF(LINEI(IPT1).NE.IABC(6)) GO TO 1644
      IF(LINEI(IPT2).NE.IABC(8)) GO TO 1644
      IF(LINEI(IPT3).NE.IABC(10))GO TO 1644
      IF(LINEI(IPT4).NE.IABC(17))GO TO 1644
C
```

```
C     DETERMINE WHICH FILTER
C
      IF(LINEI(IPT5).EQ.IABC(19))GO TO 1677
      IF(LINEI(IPT5).EQ.IABC(20))GO TO 1677
      IF(LINEI(IPT5).EQ.IABC(21))GO TO 1688
C
C     CHECK FOR SLACK SATELLITE
C
 1644 IF(LINEI(IPT1).NE.IABC(16))GO TO 1655
      IF(LINEI(IPT2).NE.IABC(10))GO TO 1655
      IF(LINEI(IPT3).NE.IABC(1)) GO TO 1655
      IF(LINEI(IPT4).NE.IABC(9)) GO TO 1655
      IF(LINEI(IPT5).EQ.IBLK) GO TO 1677
C
C     NO SATELLITES, RATHER, ANOTHER ARC CARD, LOAD IT
C
 1655 MAX = NSEP
      IF(NSEP.GT.6) GO TO 1399
      DO 1666 I=2,MAX
      N = LSEP(I)
      K = IARC(I-1)
      L = 1
      IF(K.EQ.28) L = 0
      LL = 0
      IF(K.GT.29) LL = 1
      CALL TRANS (M,N,J,K,L,LL)
      M = N
 1666 J = K + 1
      GO TO 1877
C
C     LOAD THE FORMAT KEY INDICATOR
C
 1677 K = 1
      GO TO 1700
 1688 K = 2
      GO TO 1700
 1699 K = 3
C
C     LOAD THE SATELLITE IDENTIFIER AND THE CARD SEQUENCE NUMBER
C
 1700 CALL TRANS (M,N,9,13,1,0)
      M = N
      N = LSEP(3)
      CALL TRANS (M,N,14,15,0,0)
      M = N
      J = 16
      IF(K - 2)1711,1733,1755
C
C     LOAD DISTRIBUTION, HISTOGRAM, MONTE CARLO, SLACK AND FILTER 1-2
C
 1711 IF(NSEP.GT.9) GO TO 1399
      DO 1722 I=4,NSEP
      N = LSEP(I)
      K = J + 9
      CALL TRANS (M,N,J,K,0,0)
```

```
      M = N
 1722 J = J + 10
      GO TO 1877
C
C     LOAD FILTER 3
C
 1733 IF(NSEP.GT.15) GO TO 1399
      DO 1744 I=5,NSEP,2
      N = LSEP(I-1)
      J = J + 1
      CALL TRANS (M,N,J,J,1,0)
      M = N
      N = LSEP(I)
      J = J + 1
      K = J + 7
      CALL TRANS (M,N,J,K,1,0)
      M = N
 1744 J = J + 8
      GO TO 1877
C
C     LOAD FUNCTIONAL RELATIONSHIPS
C
 1755 IF(NSEP.GT.19) GO TO 1399
      DO 1788 I=4,NSEP
      N = LSEP(I)
      L = I - 3
      K = IFUN(L)
      L = JFUN(L)
C
C     IF THIS IS AN X, Y OR Z FIELD, DETERMINE JUSTIFICATION
C
      IF(L.NE.IABC(1)) GO TO 1777
      L = LINEC(J-1)
      IF(L.EQ.IBLK.OR.L.EQ.IABC(9)) GO TO 1766
      L = 1
      GO TO 1777
 1766 L = 0
 1777 CALL TRANS (M,N,J,K,L,0)
      M = N
 1788 J = K + 1
      GO TO 1877
C
C     IF THIS CARD LOOKS LIKE A SATELLITE NODE CARD, TEST IT
C
 1799 IF(I.NE.5) GO TO 1822
      IPT1 = M + 1
      IPT2 = M + 2
      IPT3 = M + 3
      IPT4 = M + 4
      IPT5 = IBLK
C
C     CHECK FOR THE HISTOGRAM SATELLITE NODE CARD
C
      IF(LINEI(IPT1).NE.IABC(7)) GO TO 1800
      IF(LINEI(IPT2).NE.IABC(8)) GO TO 1800
```

```
      IF(LINEI(IPT3).NE.IABC(16))GO TO 1800
      IF(LINEI(IPT4).EQ.IABC(17))GO TO 1855
C
C     CHECK FOR THE SUBTRACT SATELLITE NODE CARD
C
 1800 IF(LINEI(IPT1).NE.IABC(16))GO TO 1811
      IF(LINEI(IPT2).NE.IABC(18))GO TO 1811
      IF(LINEI(IPT3).NE.IABC(2)) GO TO 1811
      IF(LINEI(IPT4).EQ.IABC(17))GO TO 1844
C
C     CHECK FOR THE SLACK HISTOGRAM NODE CARD
C
 1811 IF(LINEI(IPT1).NE.IABC(16))GO TO 1822
      IF(LINEI(IPT2).NE.IABC(10))GO TO 1822
      IF(LINEI(IPT3).NE.IABC(1)) GO TO 1822
      IF(LINEI(IPT4).EQ.IABC(9)) GO TO 1855
C
C     NO SATELLITES, RATHER, ANOTHER NODE CARD, LOAD IT
C
 1822 MAX = NSEP
      IF(NSEP.GT.10) GO TO 1399
      L = 0
      DO 1833 I=2,MAX
      N = LSEP(I)
      K = NODE(I-1)
      IF(K.GE.29) L = 1
      LL = 0
      IF(K.GT.29) LL = 1
      CALL TRANS (M,N,J,K,L,LL)
      M = N
 1833 J = K + 1
      GO TO 1977
C
C     LOAD THIS SATELLITE NODE CARD
C
 1844 IPT5 = 1
 1855 CALL TRANS (M,N,9,12,1,0)
      M = N
      J = 13
      DO 1866 I=3,NSEP
      N = LSEP(I)
      K = J + 7
      CALL TRANS (M,N,J,K,IPT5,0)
      M = N
 1866 J = J + 8
C
C     PUT THE RECONFIGURED CARD ON THE OUTPUT FILE
C
 1877 IF(IRROR.GT.0) GO TO 1311
      WRITE (IOUT,1333) LINEO
      GO TO 1122
 1888 END FILE IOUT
      CALL EXIT
      END
      SUBROUTINE TRANS (MX,NX,JX,KX,JUST,NOBLK)
```

```
      COMMON LINEI(81), LINEO(80), IPROR, IFIELD, ITUB, IBLK
      DIMENSION LINES(80)
C
C     THIS SUBROUTINE'S MAIN FUNCTION IS THAT OF TRANSFERRING DATA FROM
C        THE INPUT ARRAY TO THE OUTPUT ARRAY FOR A GIVEN DATA FIELD
C
      IFIELD = IFIELD + 1
      M = MX + 1
      N = NX - 1
      IF(N.LT.M) RETURN
      J = JX
      K = KX
C
C     REMOVE THE BLANKS IF REQUESTED & LOAD INTO A STORAGE ARRAY
C
      NUMB = 0
      DO 1900 I=M,N
      IF(NOBLK.NE.0) GO TO 1899
      IF(LINEI(I).EQ.IBLK) GO TO 1900
 1899 NUMB = NUMB + 1
      LINES(NUMB) = LINEI(I)
 1900 CONTINUE
C
C     IS THERE ENOUGH SPACE
C
      L = K - J + 1
      IF(NUMB.LE.L) GO TO 1922
      WRITE (ITUB,1911) IFIELD
 1911 FORMAT(/38H ***ERROR*** TOO MUCH DATA FOR FIELD #, I3)
      IPROR = IPROR + 1
      RETURN
C
C     TRANSFER DATA EITHER RIGHT OR LEFT HAND JUSTIFICATION
C
 1922 DO 1933 I=1,NUMB
      L = NUMB - I + 1
      IF(JUST.EQ.0) LINEO(K) = LINES(L)
      IF(JUST.NE.0) LINEO(J) = LINES(I)
      J = J + 1
 1933 K = K - 1
      RETURN
      END
```

FILE: VERTEDIT EXEC   A1   MIDWEST S+E COMPUTER CENTER

```
&CONTROL OFF
&TYPE ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
&READ ARGS
&BEGSTACK
T
&END
EDIT &1 DATA A1
```

```
&CONTROL OFF
-INIT
&IF .&1 = .     &GOTO -CONT
&IF .&1 = .END  &GOTO -FIN
&IF .&1 = .R    &GOTO -RET
&IF .&1 = .4    &GOTO -END4
&IF .&1 = .3    &GOTO -END3
&IF .&1 = .2    &GOTO -END2
&IF .&1 = .1    &GOTO -END1
-CONT
&BEGTYPE
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

    1   =  CREATE A VERT PLOT DATA FILE

    2   =  EDIT AN EXISTING VERT PLOT DATA FILE

    3   =  DISPLAY A VERT PLOT

    4   =  SAMPLE VERT PLOT (TRCCF SUPPORT LEVEL II MANAGED
                                 ROUTINE ECP PROCESS -PHASE 1)

    R   =  RETURN TO THE MAIN MENU LEVEL

   END  =  END THE SESSION

&ENDTYPE
&READ ARGS
&GOTO -INIT
-END1
EX VERTPLT1
&GOTO -PASS
-END2
EX VERTPLT2
&GOTO -PASS
-END3
EX VERTPLT3
&GOTO -PASS
-END4
EX VERTPLT4
&GOTO -PASS
-PASS
&ARGS
&GOTO -INIT
-FIN
&GLOBAL1 = 2
&GOTO -RET
-RET
```

FILE: VERTPLT1 EXEC   A1 MIDWEST S+E COMPUTER CENTER

```
&CONTROL OFF
&BEGTYPE

NOTE: TO BE CONSISTENT YOU SHOULD USE VP AS THE FIRST TWO LETTERS
      OF THE FILENAME. HOWEVER, IT IT IS NOT MANDATORY THAT YOU DO SO.

&END
&TYPE
&TYPE ENTER THE FILENAME FOR THE VERT PLOT FILE TO BE CREATED
&READ ARGS
EDIT &1 DATA A1
```

```
&CONTROL OFF
&TYPE
&TYPE ENTER FILENAME OF THE PLOT FILE TO BE EDITED
&READ ARGS
EDIT &1 DATA A1
```

FILE: VERTPLT3 EXEC A1 MIDWEST S+E COMPUTER CENTER

```
&CONTROL OFF
&TYPE
&TYPE ENTER FILENAME
&READ ARGS
&BEGSTACK
1
2
&END
EX VERTPLOT &1
```

```
&CONTROL OFF
&BEGSTACK
1
W
0.
0.
35.
13.
C
&END
EX VERTPLOT VRECPT2R
&READ ARGS
&BEGTYPE

THE PLOT YOU JUST SAW WAS 35 INCHES LONG SCALED DOWN
TO 8.5 X 11 INCHES SO THAT THE ENTIRE PLOT COULD BE
VIEWED ON THE SCREEN.

WOULD YOU LIKE TO SEE A BLOWUP OF THE FIRST 11 INCHES
OF THE PLOT ?  ENTER YES/NO
&END
&READ ARGS
&IF &1 = NO &GOTO -END
&BEGSTACK
1
W
0.
0.
11.
8.5
C
&END
EX VERTPLOT VRECPT2R
&READ ARGS
&TYPE
&TYPE DO YOU WANT TO SEE THE NEXT 11 INCHES OF
&TYPE THE PLOT ? ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -END
&BEGSTACK
1
W
10.8
0.
11.
8.5
C
&END
EX VERTPLOT VRECPT2R
&READ ARGS
&TYPE
&TYPE DO YOU WANT TO SEE THE THIRD 11 INCH SECTION OF
&TYPE THE PLOT ? ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -END
```

```
&BEGSTACK
1
W
21.8
0.
11.
8.5
C
&END
EX VERTPLOT VPECPT2R
&READ ARGS
&TYPE
&TYPE DO YOU WANT TO SEE THE LAST 11 INCH SECTION OF
&TYPE THE PLOT ? ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -END
&BEGSTACK
1
W
32.8
0.
11.
8.5
C
&END
EX VERTPLOT VPECPT2R
&READ ARGS
-END
```

```
TROOP SUPPORT LEVEL II ROUTINE PHASE 1 ECP PROCESS                                  1
NODE0.     4.00  1.    1.      1   2ECP RECEIVED IN DRSTS-MPC
NODE5.5    4.00  1.    1.      2   2ECP REVIEW COMPLETED
NODE11.0   4.00  1.    1.      2   2ECP RECEIVED BY ELEMENTS
NODE16.5   4.00  1.    1.      2   2COMMENTS COMPLETED BY ELEMENTS
NODE22.0   3.50  1.    2.      2   2COMMENTS RECEIVED BY DRSTS-MPC
NODE27.5   2.00  1.    5.      2   3CONFIG CONTROL BOARD MEETS
NODE33.0   6.0   1.    1.      2   1ECP APPROVED
NODE33.0   4.0   1.    1.      2   1ECP DECISION DEFERED
NODE33.0   2.0   1.    1.      2   1ECP DISAPPROVED
ARC 1.     4.5   5.5   4.5     0   01001T2R      2 - 4 DAYS
ARC 1.     4.2   5.5   4.2     1   1DRSTS-MPC IDENTIFIES T, L, & P
ARC 6.5    4.5   11.0  4.5     0   01005T2R      4 - 6 DAYS
ARC 6.5    4.2   11.0  4.2     1   1DRSTS-MPC SENDS ECP TO ELEMENTS
ARC 12.0   4.5   16.5  4.5     0   01007T2R         15 DAYS
ARC 12.0   4.2   16.5  4.2     1   1ELEMENTS REVIEW & PROVIDE COMMENTS
ARC 17.5   4.5   22.0  4.5     0   01008T2R      3 - 5 DAYS
ARC 17.5   4.2   22.0  4.2     1   1ELEMENTS SEND COMMENTS TO DRSTS-MPC
ARC 23.0   4.0   27.5  4.0     0   01013T2R     11 - 13 DAYS
ARC 23.0   3.7   27.5  3.7     1   1DRSTS-MPC SCHEDULES CC BOARD MEETING
ARC 23.0   5.0   27.5  5.0     0   01009T2R      4 - 6 DAYS
ARC 23.0   4.7   27.5  4.7     1   1DRSTS-MPC COMPILES COMMENTS & SENDS TO CM
ARC 28.5   2.5   33.0  2.5     0   01017T2R          1 DAY    <.15>
ARC 28.5   2.2   33.0  2.2     1   1BOARD DISAPPROVES ECP
ARC 28.5   4.5   33.0  4.5     0   01016T2R          1 DAY    <.25>
ARC 28.5   4.2   33.0  4.2     1   1BOARD DEFERS DECISION ON ECP
ARC 28.5   6.5   33.0  6.5     0   01015T2R          1 DAY    <.60>
ARC 28.5   6.2   33.0  6.2     1   1BOARD APPROVES ECP
END
```

```
&CONTROL OFF
FI 1 DISK &1 DATA A1 (RECFM F LRECL 80 BLOCK 80
FI 5 TERM
FI 6 TERM
FI 8 DISK TEMPB DATA T1 (RECFM F LRECL 120 BLOCK 120
FI 10 DISK TEMPPLOT DATA T1 (RECFM F LRECL 133 BLOCK 133
VERTPLOT
```

```
      COMMON IRROR, IOUT
     0DIMENSION IBUF(1000), ITYPE(4), LOGI(4,4), LOGO(4,6), ID(72),
     1NAME(44), IHOLD(44)
      DATA ITYPE/4HNODE,4HARC ,4HCIRL,4HEND /
     0DATA LOGI,LOGO/1HI,1HN,1HI,1HT,1HA,1HN,1HD,1H ,1HP,1HA,1HN,1HD,
     11H ,1HO,1HR,1H ,1HT,1HE,1HR,1HM,1HA,1HL,1HL,1H ,1H ,1HM,1HO,1H ,
     21HP,1HL,1HT,1H1,1HP,1HL,1HT,1H2,1HP,1HL,1HT,1H3/
       CALL INITT(240)
       CALL TERM(3,1024)
      CALL PLOTS (IBUF,1000,14)
C
C     I/O PARAMETERS AND SHEET DIMENSIONS
C
C     INPT = 5
      INPT = 1
C     IOUT = 6
      IOUT = 10
      IWK1 = 8
      BOTTOM = 1.5
C     SPAN = 48.0
C     WIDTH = 10.5
      WIDTH = 29.
      SPAN = 400.
C
C     READ RUN ID, SCALE AND LETTER HEIGHT, THEN INITIALIZE
C        IPEN1 = COLOR OF THE NODES
C        IPEN2 = COLOR OF THE SYMBOLS
C        IPEN3 = COLOR OF THE ARCS
C
 1111 READ (INPT,1122,END=1833) ID, SCALE, HIGH, NREP
 1122 FORMAT (72A1, F4.0, F3.0, I1)
      WRITE (IOUT,1133) ID, SCALE, HIGH, NREP
 11330FORMAT (1H1, 72A1, 1X, 7HSCALE =, F5.1, 2X, 15HLETTER HEIGHT =,
     1F4.2, 2X, 20HNO. OF REPETITIONS =, I2/ 1HO, 20X, 18HINPUT CARD COL
     2UMNS/ 5H  1-4, 4X, 4H5-10, 3X, 5H11-16, 3X, 5H17-22, 3X, 15H23-282
     39-3233-36, 20X, 5H37-80, 25X, 4HXMIN, 6X, 4HXMAX, 6X, 4HYMIN, 6X,
     44HYMAX)
      IRROR = 0
      IF(SCALE.LT.0.0) CALL ERROR (1144)
      IF(HIGH.LT.0.0) CALL ERROR (1155)
      IF(SCALE.LE.0.0) SCALE = 1.0
      IF(HIGH.LE.0.0) HIGH = 0.1
      XMIN = 9.0E70
      XMAX =-9.0E70
      YMIN = 9.0E70
      YMAX =-9.0E70
      KOUNT = 0
      ITAL = 0
      REWIND IWK1
      IPEN1 = 1
      IPEN2 = 1
      IPEN3 = 1
      NUM = 465
C     WRITE (10,10) NUM
 10   FORMAT (5X, 'IN AT STATEMENT ', I5)
```

```
C
C     READ A DATA CARD - NODE, ARC OR CIRCLE CARD
C
 1166 READ (INPT,1177,END=1844) IDF, X0, Y0, X1, Y1, LIN, LOT, NAME
 1177 FORMAT (A4, 4F6.0, 2I4, 44A1)
      X2  = X0
      Y2  = Y0
      X3  = X1
      Y3  = Y1
      J = 0
      DO 1199 I=1,44
      IHOLD(I)  = LOGI(4,2)
      IF(J.NE.0) GO TO 1188
      IF(NAME(I).EQ.LOGI(4,2)) GO TO 1199
 1188 J = J + 1
      IHOLD(J)  = NAME(I)
 1199 CONTINUE
      IF(J.EQ.0) GO TO 1222
      DO 1200 I=1,J
      K = J - I + 1
      IF(IHOLD(K).NE.LOGI(4,2)) GO TO 1211
 1200 CONTINUE
 1211 J = K
 1222 Z = HIGH*FLOAT(J)
      ANGLE  = 0.0
C
C     NODE CARD
C
      IF(IDF.NE.ITYPE(1)) GO TO 1411
      JDF  = 1
      IF(X1.EQ.0.0) X1 =   5.0*HIGH
      IF(X1.LT.0.0) CALL ERROR (1233)
      IF(Y1.EQ.0.0) Y1 = 10.0*HIGH
      IF(Y1.LT.0.0) CALL ERROR (1244)
      XM  = X0 + 0.5*X1
      X1  = X0 + X1
      Y1  = Y0 + Y1
C
C     COMPUTE THE NODE NAME BOUNDARY
C
      IF(J.GT.0) GO TO 1266
      CALL ERROR (1255)
      GO TO 1277
 1266 XN  = XM - Z*0.5 + 0.25*HIGH
      YN  = Y0 - 2.0*HIGH
      IF(XN.LT.XMIN) XMIN = XN
      IF(YN.LT.YMIN) YMIN = YN
      X = XN + Z
      IF(X.GT.XMAX) XMAX = X
C
C     CHECK THE LOGIC
C
 1277 IF(LIN.LT.1.OR.LIN.GT.8) CALL ERROR (1288)
      IF(LIN.GT.4) GO TO 1322
      IF(LOT.LT.1.OR.LOT.GT.6) CALL ERROR (1299)
```

```
      X = 2.5*HIGH
      IF(X3.LT.X) CALL ERROR (1300)
      Y = 4.5*HIGH
      IF(Y3.LT.Y) CALL ERROR (1311)
      GO TO 1522
C
C     COMPUTE THE SPECIAL LOGIC SYMBOL BOUNDARY
C
 1322 IF(LIN.NE.5) GO TO 1333
      X = 4.5
      Z = 11.0
      GO TO 1344
 1333 IF(LIN.NE.6) GO TO 1366
      X = 5.5
      Z = 13.0
 1344 IF(LCT.EQ.0.0) CALL ERROR (1355)
 1366 IF(LIN.NE.7) GO TO 1388
      X = 3.5
      Z = 9.0
      IF(LCT.LE.0.0) CALL ERROR (1377)
 1388 IF(LIN.NE.8) GO TO 1400
      X = 2.0
      Z = 4.0
      IF(LCT.NE.0.0) CALL ERROR (1399)
 1400 X = XM - X*HIGH
      Z = X + Z*HIGH
      Y = Y1  + 2.0*HIGH
      IF(X.LT.XMIN) XMIN = X
      IF(Z.GT.XMAX) XMAX = Z
      IF(Y.GT.YMAX) YMAX = Y
      GO TO 1522
C
C     ARC CARD
C
 1411 IF(IDF.NE.ITYPE(2)) GO TO 1499
      NUM = 1365
C     WRITE (10,10) NUM
      JDF = 2
      IF(J.EQ.0) GO TO 1522
      XN = X0
      YN = Y0
      X = X1
      Y = Y1
      IF(X1 - X0)1422,1444,1433
 1422 XN = X1
      YN = Y1
      X = X0
      Y = Y0
 1433 ANGLE = (Y - YN)/(X - XN)
      IF(ABS(ANGLE).LT.6.0) GO TO 1466
 1444 CALL ERROR (1455)
      GO TO 1522
 1466 ANGLE = ATAN(ANGLE)
      SINZ = SIN(ANGLE)
      COSZ = COS(ANGLE)
```

```
      TANZ = SINZ/COSZ
      IF(ANGLE.LE.0.0) GO TO 1477
      X = HIGH + HIGH*SINZ
      Y = HIGH*(2.0*TANZ + 1.0/COSZ)
      Y = Y*Y + HIGH*HIGH
      Y = SQRT(Y - X*X)
      GO TO 1488
 1477 X = HIGH
      Y = HIGH*((1.0 - ABS(SINZ))/ABS(COSZ))
 1488 XN = XN + X
      YN = YN + Y
      IF(YN.GT.YMAX) YMAX = YN
      X = XN + Z*COSZ
      Y = YN + Z*SINZ
      IF(X.GT.XMAX) XMAX = X
      IF(Y.GT.YMAX) YMAX = Y
      IF(Y.LT.YMIN) YMIN = Y
      GO TO 1522
C
C     CIRCLE CARD
C
 1499 IF(IDF.NE.ITYPE(3)) GO TO 1555
      NUM = 1765
C     WRITE (10,10) NUM
      JDF = 3
      IF(X1.EQ.0.0) X1 = 2.5*HIGH
      IF(X1.LT.0.0) CALL ERROR (1500)
      IF(J.LE.0) GO TO 1511
      XN = X0 - Z*0.5 + 0.25*HIGH
      YN = Y0 - 0.5*HIGH
      IF(XN.LT.XMIN) XMIN = XN
      IF(YN.LT.YMIN) YMIN = YN
      X = XN + Z
      Y = Y + HIGH
      IF(X.GT.XMAX) XMAX = X
      IF(Y.GT.YMAX) YMAX = Y
 1511 ANGLE = X1
      X1 = X0 + ANGLE
      X0 = X0 - ANGLE
      Y1 = Y0 + ANGLE
      Y0 = Y0 - ANGLE
C
C     CHECK MAX-MINS OF THE OUTER BOUNDARY OF THE MAJOR ITEM
C
C1522 WRITE (IWK1) IHOLD,J,JDF,X0,Y0,X1,Y1,XN,YN,ANGLE,LIN,LOT
 1523 FORMAT (44A1, 2I5, 7F8.2, 2I5)
 1522 WRITE (IWK1,1523) IHOLD,J,JDF,X0,Y0,X1,Y1,XN,YN,ANGLE,LIN,LOT
      NUM = 1975
C     WRITE (10,10)  NUM
      KOUNT = KOUNT + 1
      IF(X0.LT.XMIN) XMIN = X0
      IF(X0.GT.XMAX) XMAX = X0
      IF(X1.LT.XMIN) XMIN = X1
      IF(X1.GT.XMAX) XMAX = X1
      IF(Y0.LT.YMIN) YMIN = Y0
```

```
      IF(Y0.GT.YMAX) YMAX = Y0
      IF(Y1.LT.YMIN) YMIN = Y1
      IF(Y1.GT.YMAX) YMAX = Y1
 1533 WRITE (IOUT,1544) IDF,X2,Y2,X3,Y3,LIN,LOT,NAME,XMIN,XMAX,YMIN,YMAX
 1544 FORMAT (1H , A4, 4F8.2, 2I5, 44A1, 4F10.2)
      GO TO 1166
C
C     END CARD
C
 1555 IF(ILF.EQ.ITYPE(4)) GO TO 1577
      CALL ERROR (1566)
      GO TO 1533
C
C     CHECK THE TITLE DIMENSIONS
C
 1577 K = 0
      NUM = 2195
C     WRITE (10,10)  NUM
      L = 0
      DO 1588 I=1,72
      J = 73 - I
      IF(K.EQ.0.AND.ID(I).NE.LOGI(4,2)) K = I
 1588 IF(L.EQ.0.AND.ID(J).NE.LOGI(4,2)) L = J
      IF(K.EQ.0) GO TO 1600
      XM = L - K + 1
      Z = 2.0*HIGH
      X = XMIN + (XMAX - XMIN)*0.5 - 0.5*XM*Z
      IF(X.LT.XMIN) XMIN = X
      X0 = X + XM*Z
      IF(X0.GT.XMAX) XMAX = X0
      Y = YMAX + 1.0 + 2.0*Z
      IF(Y.GT.YMAX) YMAX = Y
      Y = Y - Z
      WRITE (IOUT,1599) XMIN, XMAX, YMIN, YMAX
 1599 FORMAT (33H0AFTER PLOTTING THE TITLE, XMIN =, F10.2, 8H  XMAX =,
     1F10.2, 8H  YMIN =, F10.2, 8H  YMAX =, F10.2)
 1600 Y0 = YMAX - YMIN
      Y1 = Y0*SCALE
      IF(Y1.LE.WIDTH) GO TO 1622
      SCALE = WIDTH/Y0
      WRITE (IOUT,1611) SCALE
 1611 FORMAT (33H0Y DIMENSION FORCES SCALE DOWN TO, F6.2)
 1622 X0 = XMAX - XMIN
      X1 = X0*SCALE
      IF(X1.LE.SPAN) GO TO 1644
      SCALE = SPAN/X0
      WRITE (IOUT,1633) SCALE
 1633 FORMAT (33H0X DIMENSION FORCES SCALE DOWN TO, F6.2)
 1644 IF(SCALE.LT.0.05) CALL ERROR (1655)
C
C     IF NO ERRORS, PLOT THE NETWORK FOR THE NUMBER OF REPETITIONS RE-
C        QUESTED, FIRST READY THE PLOTTER
C
C     WRITE (10,10)  NUM
      IF(IERROR.GT.0) GO TO 1111
```

```
      CALL FACTOR (1.0)
C     CALL PLOT (2.0,-40.0,-3)
C     CALL PLOT (0.0,BOTTOM,-3)
      CALL PLOT (0.0, 0.0, -3)
      CALL FACTOR (SCALE)
      NUM = 2595
C     WRITE (10,10) NUM
 1660 REWIND IWK1
      CALL NEWPAG
      CALL TSEND
      IDF = 0
C
C     READ A CARD AS STORED ON DISK
C
 1666 IDF = IDF + 1
      CALL TSEND
      IF(IDF.GT.KOUNT) GO TO 1800
      READ (IWK1,1523) IFOLD,J,JDF,X0,Y0,X1,Y1,XN,YN,ANGLE,LIN,LOT
      NUM = 2675
C     WRITE (10,10)  NUM
      X0 = X0 - XMIN
      Y0 = Y0 - YMIN
      X1 = X1 - XMIN
      Y1 = Y1 - YMIN
      XN = XN - XMIN
      YN = YN - YMIN
C
C     NODE CARD
C
      IF(JDF.NE.1) GO TO 1744
C     CALL NEWPEN(IPEN2)
      DO 1677 I=1,J
      CALL SYMBOL (XN,YN,HIGH,IFOLD(I),0.0,1)
      CALL TSEND
 1677 XN = XN + HIGH
C     CALL NEWPEN(IPEN1)
      CALL PLOT  (X0,Y0,3)
      CALL PLOT  (X1,Y0,2)
      CALL PLOT  (X1,Y1,2)
      CALL PLOT  (X0,Y1,2)
      CALL PLOT  (X0,Y0,2)
      Z = (X1 - X0)*0.5
      XM = X0 + Z
      IF(LIN.GT.4) GO TO 1699
C
C     PLOT THE SPLIT NODE DIVIDER AND LOGIC
C
      CALL PLOT  (XM,Y0,3)
      CALL PLOT  (XM,Y1,2)
      X0 = XM - Z*0.5 - 0.25*HIGH
      X1 = X0 + Z
      Y0 = Y0 + (Y1 - Y0)*0.5 + 1.75*HIGH
      Y1 = 1.5*HIGH
C     CALL NEWPEN(IPEN2)
      DO 1688 I=1,4
```

```
      CALL SYMBOL (X0,Y0,HIGH,LOGI(I,LIN),0.0,1)
      CALL SYMBOL (X1,Y0,HIGH,LOCC(I,LCT),0.0,1)
 1688 Y0 = Y0 - Y1
      NUM = 3045
C     WRITE (10,10)  NUM
      GO TO 1666
C
C     PLOT THE SPECIAL NODE LOGIC
C
 1699 Y0 = Y1 + HIGH
C     CALL NEWPEN(IPEN2)
      IF(LIN.NE.5) GO TO 1700
      X0 = XM - 4.5*HIGH
      CALL SYMBOL (X0,Y0,HIGH,7HCOMPARE,0.0,7)
      Z = 7.0
 1700 IF(LIN.NE.6) GO TO 1711
      X0 = XM - 5.5*HIGH
      CALL SYMBOL (X0,Y0,HIGH,9HPREFERRED,0.0,9)
      Z = 9.0
 1711 IF(LIN.NE.7) GO TO 1722
      X0 = XM - 3.5*HIGH
      CALL SYMBOL (X0,Y0,HIGH,5HQUEUE,0.0,5)
      Z = 5.0
 1722 IF(LIN.NE.8) GO TO 1733
      X0 = XM - 2.0*HIGH
      CALL SYMBOL (X0,Y0,HIGH,4HSORT,0.0,4)
      GO TO 1666
 1733 X0 = X0 + Z*HIGH
      Z = LCT
      CALL NUMBER (X0,Y0,HIGH,Z,0.0,-1)
      NUM = 3295
C     WRITE (10,10)  NUM
      GO TO 1666
C
C     ARC CARD
C
 1744 IF(JDF.NE.2) GO TO 1777
      IF(J.EQ.0) GO TO 1766
      X3 = COS(ANGLE)*HIGH
      Y3 = SIN(ANGLE)*HIGH
      ANGLE = ANGLE*57.296
C     CALL NEWPEN(IPEN2)
      DO 1755 I=1,J
      CALL SYMBOL (XN,YN,HIGH,IHOLD(I),ANGLE,1)
      XN = XN + X3
 1755 YN = YN + Y3
 1766 IF(LCT.NE.0) GO TO 1666
C     CALL NEWPEN(IPEN3)
      CALL PLOT (X0,Y0,3)
C     IF(LIN.EQ.0) CALL ARCHD (X0,Y0,X1,Y1,HIGH,0.0,16)
      IF(LCT.EQ.0) CALL PLOT (X1,Y1,2)
      IF(LIN.EQ.0) CALL ARCHD (X0,Y0,X1,Y1,HIGH)
      GO TO 1666
C
C     CIRCLE CARD
```

```
C
 1777 IF(J.LE.0) GO TO 1799
C     CALL NEWPEN(IPEN2)
      DO 1788 I=1,J
      CALL SYMBOL (XN,YN,HIGH,IHOLD(I),0.0,1)
 1788 XN = XN + HIGH
 1799 IF(LOT.NE.0) GO TO 1666
      Y1 = Y1 - ANGLE
C     CALL NEWPEN(IPEN1)
C     CALL CIRCL (X1,Y1,0.0,360.0,ANGLE,ANGLE,0.0)
      CALL CIRCL (X1,Y1,ANGLE)
C     WRITE (10,10)  NUM
      GO TO 1666
C
C     PUT TITLE ON
C
 1800 IF(K.EQ.0) GO TO 1822
      X1 = X - XMIN
      Y1 = Y - YMIN
C     CALL NEWPEN(IPEN2)
      Z = 2.0*HIGH
      DO 1811 I=K,L
      CALL SYMBOL (X1,Y1,Z,ID(I),0.0,1)
 1811 X1 = X1 + Z
 1822 ITAL = ITAL + 1
      X = XMAX - XMIN
C     CALL PLOT (X,0.0,-3)
      CALL PLOT (0.0, 0.0, -3)
      IF (ITAL.LT.NREP) GO TO 1660
C     WRITE (10,10)  NUM
      GO TO 1111
C
C     CLOSE OUT
C
 1833 CALL TSEND
      CALL PLOT (0.0,0.0,999)
      STOP
 1844 CALL ERROR (1855)
      STOP 13
      END
      SUBROUTINE ERROR (I)
      COMMON IERROR, IOUT
      IERROR = IERROR + 1
      WRITE (IOUT,1866) IERROR, I
 1866 FORMAT (1H0, I4, 17H.  E R R O R  NO., I6)
      RETURN
      END
       SUBROUTINE ARCHD (X0,Y0,X1,Y1,HIGH)
C  ASSUMES ALL LINES ARE VERTICAL OR HORIZONTAL
       HIGHX1 = -HIGH
       HIGHX2 = -HIGH
       HIGHY1 =  HIGH
       HIGHY2 = -HIGH
       IF (X1 .EQ. X0)  HIGHX1 =  HIGH
       IF (X0 .GT. X1)  HIGHX1 =  HIGH
```

```
      IF (X0 .GT. X1)  HIGHX2 =  HIGH
      IF (Y1 .GT. Y0)  HIGHY1 = -HIGH
      IF (Y0 .GT. Y1)  HIGHY2 =  HIGH
      X = X1 + HIGHX1
      Y = Y1 + HIGHY1
      CALL PLOT (X,Y,3)
      CALL PLOT (X1,Y1,2)
      X = X1 + HIGHX2
      Y = Y1 + HIGHY2
      CALL PLOT (X,Y,2)
      RETURN
      END
      SUBROUTINE CIRCL (X,Y,RADIUS)
      CALL PLOT (X,Y,3)
      X = X - RADIUS
      DO 50 J=1,360
      ANGLE = J*0.0174533
      X1 = X + (RADIUS * COS(ANGLE))
      Y1 = Y + (RADIUS * SIN(ANGLE))
      CALL PLOT (X1,Y1,2)
50    CONTINUE
      RETURN
      END
```

```
&CONTROL OFF
-INIT
&IF .&1 = .     &GOTO -CONT
&IF .&1 = .END  &GOTO -FIN
&IF .&1 = .R    &GOTO -RET
&IF .&1 = .5    &GOTO -END5
&IF .&1 = .4    &GOTO -END4
&IF .&1 = .3    &GOTO -END3
&IF .&1 = .2    &GOTO -END2
&IF .&1 = .1    &GOTO -END1
-CONT
&BEGTYPE
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

   1    =  DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES

   2    =  CREATE A VERT GRAPHICS DATA FILE

   3    =  EDIT AN EXISTING VERT GRAPHICS DATA FILE

   4    =  DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY

   5    =  SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS
                                   FOR THE COBRA FACTS DRA)

   R    =  RETURN TO THE MAIN MENU LEVEL

  END   =  END THE SESSION

&ENDTYPE
&READ ARGS
&GOTO -INIT
-END1
EX VERTGRF1
&GOTO -PASS
-END2
EX VERTGRF2
&GOTO -PASS
-END3
EX VERTGRF3
&GOTO -PASS
-END4
EX VERTGRF4
&GOTO -PASS
-PASS
&ARGS
&GOTO -INIT
-FIN
&GLOBAL1 = 2
&GOTO -RET
-RET
```

```
&CONTROL OFF
&TYPE
&TYPE ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO
&READ ARGS
&IF &1 = YES &GOTO -COLOR
COPY TAGPRO 4014 A1 TAGPRO DATA A1 (REPLACE
&GOTO -NEXT
-COLOR
COPY TAGPRO 4027 A1 TAGPRO DATA A1 (REPLACE
-NEXT
&TYPE
&TYPE DID YOU RUN VERT ONLINE ? ENTER YES/NO
&READ ARGS
&IF &1 = NO &GOTO -OFFLINE
COPY PRONLINE DATA A1 PRM DATA A1 (REPLACE
-INIT
COPY VBANKNAM DATA A1 TEMPCRAY DATA A1 (REPLACE
&ERROR &GOTO -END
&BEGSTACK
TOP
/BANKDATA
GET VBANKNAM DATA A1 1 1
VERIFY OFF
C //*/
C /$/*/
FILE
&EN
EDIT VERTTELE DATA A1
FI 2 DISK VTITLE DATA A1
VTITLE
&BEGSTACK
VERIFY OFF
DOWN 8
GET VTITLE DATA A1 1 2
FILE
&END
EDIT VERTTELE DATA A1
&BEGSTACK
VERTTELE (XEQ
&END
EXEC TELEGRAF
&BEGSTACK
VERIFY OFF
DOWN 9
DELETE 2
/BANKDATA
DOWN
DELETE
FILE
&END
EDIT VERTTELE DATA A1
&BEGSTACK
VERIFY OFF
DOWN
DELETE
```

```
FILE
&END
EDIT VBANKNAM DATA A1
&GOTO -INIT
-OFFLINE
&BEGTYPE

HAVE ALL VERT OFFLINE JOBS COMPLETED ? ENTER YES/NO
&END
&READ ARGS
&IF &1 = NO &GOTO -MSG
ACCESS 194 W
-BEGIN
&BEGTYPE

ENTER THE UNIQUE FILENAME OF THE VERT JOB RUN
     (SIX CHARACTERS MAX)

&END
&READ ARGS
&VBANKNAM = &CONCAT VB &1
&PRM = &CONCAT PR &1
COPY &PRM DATA W1 PRM DATA A1 (REPLACE
-BEGIN2
COPY &VBANKNAM DATA W1 TEMPORAY DATA W1 (REPLACE
&ERROR &GOTO -CONT
&BEGSTACK
TOP
/BANKDATA
&END
&STACK GET &VBANKNAM DATA W1 1 1
&BEGSTACK
VERIFY OFF
C //*/
C /$/*/
FILE
&END
EDIT VERTTELW DATA W1
FI 2 DISK VTITLE DATA W1
VTITLE
&BEGSTACK
VERIFY OFF
DOWN 8
GET VTITLE DATA W1 1 2
FILE
&END
EDIT VERTTELW DATA W1
&BEGSTACK
VERTTELW (XEQ
&END
EXEC TELEGRAF
&BEGSTACK
VERIFY OFF
DOWN 9
DELETE 2
```

```
FILE: VERTGRF1 EXEC      A1   MIDWEST S+E COMPUTER CENTER

/BANKDATA
DOWN
DELETE
FILE
&END
EDIT VERTTELW DATA W1
&STACK DOWN
&STACK DELETE
&STACK FILE
EDIT &VBANKNAM DATA W1
&GOTO -BEGIN2
-CONT
ERASE &PRM DATA W1
&TYPE
&TYPE DO YOU WANT TO DISPLAY GRAPHS FOR ANOTHER VERT JOB RUN OFFLINE
&TYPE
&TYPE ENTER YES/NO
&READ ARGS
&IF &1 = YES &GOTO -BEGIN
RELEASE 194
ACCESS 194 E/A
&GOTO -FIN
-MSG
&BEGTYPE

YOU CAN'T DISPLAY VERT GRAPHS USING TELEGRAF BANKDATA FILES
UNTIL ALL VERT OFFLINE JOBS HAVE COMPLETED.
&END
&READ ARGS
&GOTO -FIN
-END
ERASE FRONLINE DATA A1
-FIN
ERASE PRM DATA A1
CP SET MSG ON
```

```
      DIMENSION ITITLE(18), IDIMEN(15)
      WRITE(6,3)
    3 FORMAT(///,' ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE'/,
     1' QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>')
      READ(5,4) ITITLE
    4 FORMAT(18A4)
      WRITE(6,6)
    6 FORMAT(//,' ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE'/,
     1' QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>')
      READ(5,7) IDIMEN
    7 FORMAT(15A4)
      WRITE(2,8) ITITLE
    8 FORMAT(6HTITLE ,18A4)
      WRITE(2,9) IDIMEN
    9 FORMAT(16HX AXIS LABEL IS ,15A4)
      STOP
      END
```

```
GENEHATE A PLCT.
FRAME.
Y AXIS MIN 0.0, MAX 1.0, STEP 0.1
X GRID CN.
Y GRID CN.
Y AXIS LABEL IS 'PRCEABILITY CF CCMPLETICN',
             LENGTH 8.
X AXIS LENGTH 10.
X AXIS CCLCR IS YELLCW.
Y AXIS CCLCR IS YELLCW.
TITLE CCLCR IS YELLCW.
X PAGE 14.
Y PAGE 11.
Y ORIGIN 1 .
X ORIGIN 2 .
CURVE 1 THICKNESS 3.
CURVE 1 SYMBCL CCUNT 0.
LEGEND UNITS CCCRCINATE.
LEGEND X CRIGIN 4, Y ORIGIN 4940 .
BANKDATA.
EOD.
GO.
**FILE**
```

```
GENERATE A PLCT.
FRAME.
Y AXIS MIN 0.0, MAX 1.0, STEP 0.1
X GRID CN.
Y GRID CN.
Y AXIS LABEL IS 'PRCEABILITY CF CCMPLETICN',
                LENGTH 8.
X AXIS LENGTH 10.
X AXIS CCLCR IS YELLCW.
Y AXIS CCLCR IS YELLCW.
TITLE CCLCR IS YELLCW.
X PAGE 14.
Y PAGE 11.
Y CRIGIN 1 .
X CRIGIN 2 .
CURVE 1 THICKNESS 3.
CURVE 1 SYMBCL CCUNT 0.
LEGEND UNITS CCCRCINATE.
LEGEND X CRIGIN 4, Y CRIGIN 4940 .
BANKCATA.
ECD.
GC.
**FILE**
```

```
&CONTROL OFF
&BEGTYPE

NOTE: TO BE CONSISTENT YOU SHOULD USE VG AS THE FIRST TWO LETTERS
      OF THE FILENAME. HOWEVER, IT IS NOT MANDATORY THAT YOU DO SO.

&END
&TYPE
&TYPE ENTER THE FILENAME FOR THE VERT GRAPH FILE TO BE CREATED
&READ ARGS
EDIT &1 DATA A1
```

```
&CONTROL OFF
&TYPE
&TYPE ENTER FILENAME OF THE GRAPH FILE TO BE EDITED
&READ ARGS
EDIT &1 DATA A1
```

```
&CONTROL OFF
&TYPE
&TYPE  ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO
&READ ARGS
&IF &1 = YES &GOTO -COLOR
COPY TAGPRO 4014 A1 TAGPRO DATA A1 (REPLACE
&GOTO -NEXT
-COLOR
COPY TAGPRO 4027 A1 TAGPRO DATA A1 (REPLACE
-NEXT
&TYPE
&TYPE ENTER THE FILENAME OF THE GRAPH FILE TO BE VIEWED
&READ ARGS
EX TELEGRAF &1 (XEQ
```

```
&CONTROL OFF
&TYPE
&TYPE ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO
&READ ARGS
&IF &1 = YES &GOTO -COLOR
COPY TAGPRO 4014 A1 TAGPRO DATA A1 (REPLACE
&GOTO -NEXT
-COLOR
COPY TAGPRO 4027 A1 TAGPRO DATA A1 (REPLACE
-NEXT
EX PRESENT VERTGF5A
EX PRESENT VERTGF5B
EX PRESENT VERTGF5C
```

```
GENERATE A PLOT.
FRAME.
Y AXIS MIN 0.0, MAX 1.0, STEP 0.1
X GRID ON.
Y GRID ON.
Y AXIS LABEL IS 'PROBABILITY OF COMPLETION',
            LENGTH 8.
X AXIS LENGTH 10.
X AXIS LABEL IS 'SCHEDULE IN MONTHS'.
TITLE IS 'FACTS/ITMS SOLE SOURCE'.
X AXIS COLOR IS YELLOW.
Y AXIS COLOR IS YELLOW.
TITLE COLOR IS YELLOW.
X PAGE 14.
Y PAGE 11.
Y ORIGIN 1 .
X ORIGIN 2 .
INPUT DATA.
32.84,0.00 33.25,.004 33.66,.006 34.06,.013 34.47,.036 34.88,.064
35.29,.113 35.69,.177 36.10,.268 36.51,.355 36.92,.458 37.33,.564
37.73,.669 38.14,.758 38.55,.829 38.96,.890 39.37,.931 39.77,.963
40.18,.982 40.59,.989 41.00,.995 41.41,.999 41.81,1.0
END.
CURVE 1 THICKNESS 3.
CURVE 1 SYMBOL COUNT 0.
LEGEND UNITS COORDINATE.
LEGEND X ORIGIN 4, Y ORIGIN 4940 .
GO.
```

```
GENERATE A PLOT.
FRAME.
Y AXIS MIN 0.0, MAX 1.0, STEP 0.1
X GRID ON.
Y GRID ON.
Y AXIS LABEL IS 'PROBABILITY OF COMPLETION',
            LENGTH 8.
X AXIS LENGTH 10.
X AXIS LABEL IS 'COST IN MILLIONS'.
TITLE IS 'FACTS/ITMS SOLE SOURCE'.
X AXIS COLOR IS YELLOW.
Y AXIS COLOR IS YELLOW.
TITLE COLOR IS YELLOW.
X PAGE 14.
Y PAGE 11.
Y ORIGIN 1 .
X ORIGIN 2 .
INPUT DATA.
28.96,0.0 29.2,.011 29.43,.02 29.67,.058 29.91,.106 30.15,.161
30.39,.244 30.63,.336 30.87,.43 31.11,.534 31.34,.614 31.58,.687
31.82,.746 32.06,.812 32.3,.857 32.54,.898 32.78,.927 33.02,.96
33.26,.979 33.49,.993 33.73,.999 33.97,.999 34.21,1.0
END.
CURVE 1 THICKNESS 3.
CURVE 1 SYMBOL COUNT 0.
LEGEND UNITS COORDINATE.
LEGEND X ORIGIN 4, Y ORIGIN 4940 .
GO.
```

```
GENERATE A PLOT.
FRAME.
Y AXIS MIN 0.0, MAX 1.0, STEP 0.1
X GRID ON.
Y GRID ON.
Y AXIS LABEL IS 'PROBABILITY OF COMPLETION',
             LENGTH 8.
X AXIS LENGTH 10.
X AXIS LABEL IS 'PERFORMANCE WEIGHT IN POUNDS'.
TITLE IS 'FACTS/ITMS SOLE SOURCE'.
X AXIS COLOR IS YELLOW.
Y AXIS COLOR IS YELLOW.
TITLE COLOR IS YELLOW.
X PAGE 14.
Y PAGE 11.
Y ORIGIN 1 .
X ORIGIN 2 .
INPUT DATA.
61.60,0.00 62.19,.011 62.77,.031 63.36,.061 63.94,.116 64.53,.179
65.12,.242 65.70,.320 66.29,.401 66.87,.502 67.46,.594 68.04,.671
68.63,.751 69.21,.812 69.80,.865 70.38,.905 70.97,.937 71.55,.964
72.14,.984 72.73,.995 73.31,.998 73.90,.998 74.48,1.0
END.
CURVE 1 THICKNESS 3.
CURVE 1 SYMBOL COUNT 0.
LEGEND UNITS COORDINATE.
LEGEND X ORIGIN 4, Y ORIGIN 4940 .
GO.
```

```
&CONTROL OFF
-INIT
&IF &GLOBAL1 = 2 &GOTO -FIN
&IF &GLOBAL2 = 2 &GOTO -RET
&IF .&1 = .    &GOTO -CONT
&IF .&1 = .END &GOTO -FIN
&IF .&1 = .R   &GOTO -RET
&IF .&1 = .7   &GOTO -END7
&IF .&1 = .6   &GOTO -END6
&IF .&1 = .5   &GOTO -END5
&IF .&1 = .4   &GOTO -END4
&IF .&1 = .3   &GOTO -END3
&IF .&1 = .2   &GOTO -END2
&IF .&1 = .1   &GOTO -END1
-CONT
&BEGTYPE
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

   1    =  DISPLAY  A LISTING OF VERT EXECUTIVE PROCEDURES

   2    =  DISPLAY A LISTING OF VERT SOURCE PROGRAMS

   3    =  DISPLAY A LISTING OF VERT INPUT DATA FILES

   4    =  DISPLAY A LISTING OF VERT OUTPUT DATA FILES

   5    =  DISPLAY A LISTING OF VERT GRAPHICS DATA FILES

   6    =  DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES

   7    =  GET LISTING MENU FOR EDITING THE ABOVE DATA FILES

   R    =  RETURN TO THE MAIN MENU LEVEL

  END   =  END THE SESSION

&ENDTYPE
&READ ARGS
&GOTO -INIT
-END1
EX VERTINC1
&GOTO -PASS
-END2
EX VERTINC2
&GOTO -PASS
-END3
EX VERTINC3
&GOTO -PASS
-END4
EX VERTINC4
&GOTO -PASS
-END5
EX VERTINC5
&GOTO -PASS
-END6
```

```
EX VERTIND6
&GOTO -PASS
-END7
EX VERTIND7
&GOTO -PASS
-PASS
&ARGS
&GOTO -INIT
-FIN
&GLOBAL1 = 2
&GOTO -RET
-RET
```

```
FILE: VERTIND1 EXEC     A1  MIDWEST S+E COMPUTER CENTER

&CONTROL OFF
-AGAIN
&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL
 OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

    1  ->  TEKTRONIX 4014 GRAPHICS TERMINAL

    2  ->  AGILE LINE PRINTER

&END
&READ ARGS
&IF .&1 = .1 &TERMTYPE = TEK
&IF .&1 = .2 &TERMTYPE = AGILE
&IF .&1 = .1 &GOTO -CONT
&IF .&1 = .2 &GOTO -CONT
&GOTO -AGAIN
-CONT
EX VERTTERM VERTIND1 DATA A1 22 &TERMTYPE NOH
```

```
FILE: VERTIND1 DATA     A1  MIDWEST S+E COMPUTER CENTER

VERTEX    EXEC A1  -DISPLAYS AND RUNS THE MAIN LEVEL MENU

VERTRUN   EXEC A1  -RUNS THE VERT MODULES VERTNEW AND VERTNEW1 ONLINE

VERTBAT   EXEC A1  -RUNS THE VERT MODULES VERTNEW AND VERTNEW1 OFFLINE

VERTTEST  EXEC A1  -DISPLAYS VERT OUTPUT FROM EITHER AN ONLINE OR OFFLINE RUN

VERTREAD  EXEC A1  -READS THE CONSOLE FILES TO CHECK IF A VERT OFFLINE JOB HAS
                    COMPLETED     <THIS EXEC IS A PART OF THE VERTTEST EXEC>

VERTIN    EXEC A1  -RUNS THE VERTINP AND VERTFREE EXECS WHICH ALLOW CREATION
                     OF A FIXED FORM OR FREE FORM VERT INPUT DATA FILE

VERTINP   EXEC A1  -ALLOWS CREATION OF A FIXED FORM VERT INPUT DATA FILE

VERTFREE  EXEC A1  -RUNS THE FREE FORM VERT INPUT FILE MODULE (VERTFREE)

VERTEDIT  EXEC A1  -EDITS EXISTING VERT INPUT DATA FILES

VERTPLT   EXEC A1  -DISPLAYS AND RUNS THE SECONDARY LEVEL PLOT MENU

VERTPLT1  EXEC A1  -ALLOWS CREATION OF A VERT NETWORK PLOT DATA FILE

VERTPLT2  EXEC A1  -EDITS EXISTING VERT NETWORK PLOT DATA FILES

VERTPLT3  EXEC A1  -RUNS THE VERTPLOT EXEC FOR DISPLAYING A VERT NETWORK PLOT

VERTPLT4  EXEC A1  -DISPLAYS THE SAMPLE VERT NETWORK PLOT

VERTPLOT  EXEC A1  -RUNS THE VERTPLOT MODULE FOR DISPLAYING A VERT NETWORK PLOT

VERTGRAF  EXEC A1  -DISPLAYS AND RUNS THE SECONDARY LEVEL GRAPHICS MENU

VERTGRF1  EXEC A1  -DISPLAYS VERT GRAPHS USING TELEGRAF BANKDATA FILES

VERTGRF2  EXEC A1  -ALLOWS CREATION OF MANUALLY INPUTTED GRAPHICS DATA FILES

VERTGRF3  EXEC A1  -EDITS EXISTING MANUALLY CREATED GRAPHICS DATA FILES

VERTGRF4  EXEC A1  -DISPLAYS MANUALLY CREATED GRAPHICS DATA FILES

VERTGRF5  EXEC A1  -DISPLAYS THE SAMPLE VERT GRAPHS

VERTINDX  EXEC A1  -DISPLAYS AND RUNS THE SECONDARY LEVEL LIST MENU

VERTIND1  EXEC A1  -LISTS THE VERT EXECUTIVE PROCEDURES

VERTIND2  EXEC A1  -LISTS THE VERT SOURCE PROGRAMS AND MODULES

VERTIND3  EXEC A1  -LISTS THE VERT INPUT DATA FILES

VERTIND4  EXEC A1  -LISTS THE VERT OUTPUT DATA FILES

VERTIND5  EXEC A1  -LISTS THE VERT GRAPHICS DATA FILES
```

FILE: VERTINCI DATA A1 MIDWEST S+E COMPUTER CENTER

VERTIND6 EXEC A1 -LISTS THE VERT PLOT DATA FILES

VERTIND7 EXEC A1 -DISPLAYS AND RUNS THE TERTIARY LEVEL INDEX UPDATE MENU

VERTTERM EXEC A1 -CONTROLS THE INDEX LISTS TO 22 LINES OF TEXT PER SCREEN

```
&CONTROL OFF
-AGAIN
&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL
 OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

    1  ->  TEKTRONIX 4014 GRAPHICS TERMINAL

    2  ->  AGILE LINE PRINTER

&END
&READ ARGS
&IF .&1 = .1 &TERMTYPE = TEK
&IF .&1 = .2 &TERMTYPE = AGILE
&IF .&1 = .1 &GOTO -CONT
&IF .&1 = .2 &GOTO -CONT
&GOTO -AGAIN
-CONT
EX VERTTERM VERTIND2 DATA A1 22 &TERMTYPE NOH
```

FILE: VERTIND2 DATA A1 MIDWEST S+E COMPUTER CENTER

```
VERTNEW   FORTRAN A1 -400 NODE, MEAN NODE OPTION, VERSION OF VERT

VERTNEW   MODULE  A1 -400 NODE, MEAN NODE OPTION, VERT LOAD MODULE

VERTNEW1  FORTRAN A1 -VERTNEW WITH TELEGRAF CALL COMMANDS FOR CREATING
                      TELEGRAF BANKDATA FILES

VERTNEW1  MODULE  A1 -LOAD MODULE FOR VERTNEW1

VBANKNAM  FORTRAN A1 -CREATES THE TITLES FOR THE TELEGRAF BANKDATA FILES

VBANKNAM  MODULE  A1 -LOAD MODULE FOR VBANKNAM FORTRAN A1

VTITLE    FORTRAN A1 -CREATES THE TITLES FOR THE VERTTELE AND VERTTELW
                      DATA FILES TO BE USED IN DISPLAYING TELEGRAF
                      BANKDATA FILES

VTITLE    MODULE  A1 -LOAD MODULE FOR VTITLE FORTRAN A1

VERTFREE  FORTRAN A1 -RUNS THE FREE FORM VERT INPUT DATA FILE PROGRAM

VERTFREE  MODULE  A1 -LOAD MODULE FOR VERTFREE

VERTPLOT  FORTRAN A1 -SOURCE PROGRAM FOR PLOTTING VERT NETWORKS

VERTPLOT  MODULE  A1 -LOAD MODULE FOR VERTPLOT

VERTBAT   FORTRAN A1 -CREATES THE VARIABLE RECORDS FOR VERTNEW BATCH A1

VERTBAT   MODULE  A1 -LOAD MODULE FOR VERTBAT FORTRAN A1

VERTBAT1  FORTRAN A1 -CREATES THE VARIABLE RECORDS FOR VERTNEW1 BATCH A1

VERTBAT1  MODULE  A1 -LOAD MODULE FOR VERTBAT1 FORTRAN A1

VERTNEW   BATCH   A1 -INPUT FILE FOR CMS BATCH USING VERTNEW MODULE A1 OFFLINE

VERTNEW1  BATCH   A1 -INPUT FILE FOR CMS BATCH USING VERTNEW1 MODULE A1 OFFLINE

VERTBAT   DATA    A1 -TEMPORARY OUTPUT FILE FOR BOTH VERTBAT AND VERTBAT1
```

```
&CONTROL OFF
-AGAIN
&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL
 OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

    1  ->  TEKTRONIX 4014 GRAPHICS TERMINAL

    2  ->  AGILE LINE PRINTER

&END
&READ ARGS
&IF .&1 = .1 &TERMTYPE = TEK
&IF .&1 = .2 &TERMTYPE = AGILE
&IF .&1 = .1 &GOTO -CONT
&IF .&1 = .2 &GOTO -CONT
&GOTO -AGAIN
-CONT
EX VERTTERM VERTIND3 DATA A1 22 &TERMTYPE NOH
```

FILE: VERTIND3 DATA A1 MIDWEST S+E COMPUTER CENTER

VIDC30P1 DATA A1 -FM COBRA 30MM CHAIN GUN DRA (TIME, COST & TECH RISK)

VILTUGN1 DATA A1 -PC AWC REVISED NDI LARGE TUG DRA (TIME ONLY)

VILTUGNO DATA A1 -PC AWC NDI LARGE TUG DRA (TIME ONLY)

```
 1 4    1          435459  100                 1.0        1.0
 COBRA-30MM PROGRAM-PROGRAM ALTERNATIVE 1
 0.0          6.0
 6.0          12.0
 12.0         18.0
 18.0         24.0
 24.0         30.0
 0.0          30.0
 ENDCTPR
 D1        START     1          1.
 HS2GS     1         18         1.
 HS2GS     DTIME 1   3.          5.53        8.13        6.5
 HS2GS     M      1  .95
 FHS2GS    1         FAIL       1.
 FHS2GS    M      1  .05
 M/AG2     18        31         1.
 M/AG2     DTIME 1   3.          2.98        4.38        3.5
 D15       31        SUCCESS    1.
 D2        START     2          1.
 BLDG3     2         14         1.
 BLDG3     DTIME 1   3.          1.28        1.88        1.5
 BLDG3     DCOST 1   3.          .312        .634        .519
 BLDG3     M      1  .98
 FBLDG3    2         FAIL       1.
 FBLDG3    M      1  .02
 HSG3      14        19         1.
 HSG3      DTIME 1   3.          6.38        9.38        7.5
 HSG3      DCOST 1   3.          .312        .634        .519
 HSG3      M      1  .995
 FHSG3     14        FAIL       1.
 FHSG3     M      1  .005
 TST/MG3   19        32         1.
 TST/MG3   DTIME 1   3.          5.95        8.75        7.0
 TST/MG3   DCOST 1   3.          .312        .634        .519
 TST/MG3   M      1  .995
 FTST/MG319          FAIL       1.
 FTST/MG3M        1  .005
 D16       32        SUCCESS    1.
 D3        START     3          1.
 BLDG4     3         22         1.
 BLDG4     DTIME 1   3.          9.35        13.75       11.0
 BLDG4     DCOST 1   3.          .346        .731        .597
 BLDG4     M      1  .985
 FBLDG4    3         FAIL       1.
 FBLDG4    M      1  .015
 D14       18        22         1.
 SG4TCGE   22        24         1.
 SG4TCGE   DTIME 1   3.          .43         .63         .5
 D4        START     4          1.
 BLDG5     4         15         1.
 BLDG5     DTIME 1   3.          3.4         5.          4.0
 BLDG5     DCOST 1   3.          .346        .731        .597
 BLDG5     M      1  .985
 FBLDG5    4         FAIL       1.
 FBLDG5    M      1  .015
```

TSTG5	15		20	1.		
TSTG5	DTIME	1	3.	1.42	2.09	1.67
TSTG5	DCOST	1	3.	.346	.731	.597
TSTG5	M	1	.99			
FTSTG5	15		FAIL	1.		
FTSTG5	M	1	.01			
D6	START		6	1.		
BLDT1	6		16	1.		
BLDT1	DTIME	1	3.	4.42	6.5	5.2
BLDT1	DCOST	1	3.	.244	.392	.319
BLDT1	M	1	1.0			
FBLDT1	6		FAIL	1.		
FBLDT1	M	1	0.0			
STITCH	16		20	1.		
STITCH	DTIME	1	3.	.43	.63	.5
TSTG5T1	20		33	1.		
TSTG5T1	DTIME	1	3.	8.78	12.91	10.33
TSTG5T1	DCOST	1	3.	.346	.731	.597
TSTG5T1	M	1	.98			
FTSTG5T1	20		FAIL	1.		
FTSTG5T1	M	1	.02			
D17	33		SUCCESS	1.		
D5	START		5	1.		
BLD3GS	5		23	1.		
BLD3GS	DTIME	1	3.	9.35	13.75	11.0
BLD3GS	DCOST	1	3.	1.038	2.193	1.790
BLD3GS	M	1	.995			
FBLD3GS	5		FAIL	1.		
FBLD3GS	M	1	.005			
SG8TCB	23		35	1.		
SG8TCB	DTIME	1	3.	.43	.63	.5
D19	35		SUCCESS	1.		
D7	START		7	1.		
SG6TCB	23		27	1.		
SG6TCB	DTIME	1	3.	.43	.63	.5
SG7TCB	23		28	1.		
SG7TCB	DTIME	1	3.	.43	.63	.5
BLDT2	7		24	1.		
BLDT2	DTIME	1	3.	5.95	8.75	7.0
BLDT2	DCOST	1	3.	.244	.392	.319
BLDT2	M	1	1.0			
FBLDT2	7		FAIL	1.		
FBLDT2	M	1	0.0			
TSTG4T2	24		34	1.		
TSTG4T2	DTIME	1	3.	5.1	7.5	6.0
TSTG4T2	DCOST	1	3.	.244	.392	.319
TSTG4T2	M	1	.98			
FTSTG4T2	24		FAIL	1.		
FTSTG4T2	M	1	.02			
D18	34		SUCCESS	1.		
D8	START		8	1.		
BLDT3	8		25	1.		
BLDT3	DTIME	1	3.	7.65	11.25	9.0
BLDT3	DCOST	1	3.	.244	.392	.319
BLDT3	M	1	1.0			

FBLDT3	8		FAIL	1.		
FBLDT3	M	1	0.0			
ST3TCB	25		27	1.		
ST3TCB	DTIME	1	3.	.43	.63	.5
D9	START		9	1.		
BLDT4	9		26	1.		
BLDT4	DTIME	1	3.	7.65	11.25	9.0
BLDT4	DCOST	1	3.	.244	.392	.319
BLDT4	M	1	1.0			
FBLDT4	9		FAIL	1.		
FBLDT4	M	1	0.0			
ST4TCB	26		28	1.		
ST4TCB	DTIME	1	3.	.43	.63	.5
D10	START		10	1.		
ENGP	10		17	1.		
ENGP	DTIME	1	3.	1.79	2.63	2.1
ENGP	DCOST	1	3.	.972	1.373	1.058
ENGP	M	1	1.0			
FENGP	10		FAIL	1.		
FENGP	M	1	0.0			
FBMCDP	17		21	1.		
FBMCDP	DTIME	1	3.	5.02	7.38	5.9
FBMCDP	DCOST	1	3.	.972	1.373	1.058
FBMCDP	M	1	1.0			
FFBMCDP	17		FAIL	1.		
FFBMCDP	M	1	0.0			
TSTP	21		36	1.		
TSTP	DTIME	1	3.	7.23	10.63	8.5
TSTP	DCOST	1	3.	.972	1.373	1.058
TSTP	M	1	1.0			
FTSTP	21		FAIL	1.		
FTSTP	M	1	0.0			
D20	36		SUCCESS	1.		
D11	START		11	1.		
BLDI	11		27	1.		
BLDI	DTIME	1	3.	10.2	15.	12.0
BLDI	DCOST	1	3.	.972	1.373	1.058
BLDI	M	1	1.0			
FBLDI	11		FAIL	1.		
FBLDI	M	1	0.0			
INTI	27		29	1.		
INTI	DTIME	1	3.	1.23	1.88	1.5
INTI	DCOST	1	3.	.972	1.373	1.058
INTI	M	1	1.0			
FINTI	27		FAIL	1.		
FINTI	M	1	0.0			
TSTI	29		37	1.		
TSTI	DTIME	1	3.	2.98	4.38	3.5
TSTI	DCOST	1	3.	.972	1.373	1.058
TSTI	M	1	.95			
FTSTI	29		FAIL	1.		
FTSTI	M	1	.05			
D21	37		SUCCESS	1.		
D12	START		12	1.		
BLDG	12		28	1.		

```
BLDQ     DTIME 1 3.        14.88      21.88      17.5
BLDQ     DCOST 1 3.        .972       1.373      1.058
BLDQ     M     1 1.0
FBLDQ    12      FAIL      1.
FBLDQ    M     1 0.0
INTQ     28      30        1.
INTQ     DTIME 1 3.        .43        .63        .5
INTQ     DCOST 1 3.        .972       1.373      1.058
INTQ     M     1 1.0
FINTQ    28      FAIL      1.
FINTQ    M     1 0.0
TSTQ     30      38        1.
TSTQ     DTIME 1 3.        4.25       6.25       5.0
TSTQ     DCOST 1 3.        .972       1.373      1.058
TSTQ     M     1 .97
FTSTQ    30      FAIL      1.
FTSTQ    M     1 .03
D22      38      SUCCESS 1.
ENDARC
START    1  2
1        2  3
2        2  3
3        2  3
4        2  3
5        2  3
6        2  3
7        2  3
8        2  3
9        2  3
10       2  3
11       2  3
12       2  3
14       2  3
15       2  3
16       2  2
17       2  3
18       2  2
19       2  3
20       2  3
21       2  3
22       4  2
23       2  2
24       2  3
25       2  2
26       2  2
27       2  3
28       2  3
29       2  3
30       2  316 1
31       2  2
32       2  2
33       2  2
34       2  2
35       2  2
36       2  2
```

```
37      2  2
38      2  2
SUCCESS 2  116
FAIL    4 11
ENDNODE
```

```
1 4   1 1    435459 1000            1.        1.
AWC DKA REVISED NCI LARGE TUC PROGRAM
0.0         6.0
6.0         12.0
12.0        18.0
18.0        24.0
24.0        30.0
0.0         30.0
ENDCTPR
PRSTRCC START    APPFCC  1.00 PREPARE AND STAFF ROC - TRADOC
PRSTRCC DTIME 1          3      150.0       320.0       180.0
LOGRCC  START    APPFCC  1.00 COORDINATE AND ESTAB LOG RQMTS - TSARCCM
LOGRCC  DTIME 1          3      150.0       180.0       170.0
IEPTECCMAPPFCC   NCIWCI  1.00 PREPARE IEP - TECOM
IEPTECCMDTIME 1          3       30.0       120.0        60.0
IEPTRADCAPPFCC   NCIWCI  1.00 PREPARE IEP - TRADOC
IEPTRADCDTIME 1          3       30.0        90.0        60.0
MKTSVY  NDIWGI  CCMPL-MS1.00 CONDUCT MARKET SURVEY AND PREPARE
MKTSVY  DTIME 1          3       30.0        60.0        45.0
USERSVY CCMPL-MSCCMPL-US1.00 CONDUCT USER SURVEY AND PREPARE REPORT
USERSVY DTIME 1          3       30.0        60.0        45.0
PREPRPT CCMPL-USCCMPLRPT1.00 PREPARE AND COMPLETE MKT/USER SURVEY RESULTS REPORT
PREPRPT DTIME 1          3       60.0       120.0        90.0
EVALLCG CCMPLRPTPREIPR   1.00 EVALUATE LOGISTICS CONSIDERATIONS
EVALLCG DTIME 1          3       15.0        60.0        30.0
IERTECCMCCMPLRPTPREIPR   1.00 PREPARE IEP - TECOM
IERTECCMDTIME 1          3       15.0        60.0        40.0
IERTRADCCCMPLRPTPREIPR   1.00 PREPARE IER - TRADOC
IERTRADCDTIME 1          3       15.0       120.0        60.0
PPQQPRI APPRCC   PREIPR  1.00 PREPARE PROVISICNAL QQPRI
PPQQPRI DTIME 1          3       10.0        45.0        24.0
DRAFTPMPAPPFCC   PREIPR  1.00 PREPARE DRAFT ACQUISITION PLAN
DRAFTPMPDTIME 1          3       90.0       210.0       120.0
DRAFTMACAPPFCC   PREIPR  1.00 PREPARE DRAFT MACI PROGRAM PLAN
DRAFTMACDTIME 1          3       45.0       120.0        60.0
C&ECHARTAPPRCC   C&EEST  1.00 C&E EVALUATION TEAM CHARTERED
C&ECHARTDTIME 1          3       30.0       120.0        60.0
CEEVALPLC&EEST  INITCESY1.00 COMPLETE COMMUNICATION ELECTRONICS EVALUATION PLAN
CEEVALPLDTIME 1          3        5.0        30.0        10.0
C&ESVY  INITCESYCCMPL-CE1.00 PERFORM C&E EVALUATION SURVEY
C&ESVY  DTIME 1          3       60.0       120.0        90.0
C&ERPT  CCMPL-CESTARTNDI1.00 PREPARE AND COMPLETE C&E SURVEY REPORT
C&ERPT  DTIME 1          3       15.0        60.0        30.0
R&DPRCG MADP-I  STARTR&D1.00 PREPARE FOR R&D PROGRAM
R&DPRCG DTIME 1          1       30.0
R&DPRCG MTIME 1      0.05
MACIPRCGMADP-I  STARTMAC1.00 PREPARE FOR MACI PROGRAM                               B15
MACIPRCGDTIME 1          1       30.0
MACIPRCGMTIME 1      0.05
NDIDECSNMADP-I  STARTNDI1.00 APPROVE NDI DECISION                                   B15
NDIDECSNDTIME 1          3       15.0        45.0        30.0
NDIDECSNMTIME 1      0.90
IPRPKG  PREIPR  MADP-I  1.00 PREPARE AND STAFF IPR PACKAGE                          B15
IPRPKG  DTIME 1          3       45.0        90.0        60.0
PREPFPD STARTNDIPFINPUT 1.00 PREPARE FUNCTIONAL PURCHASE DESCRIPTION
```

```
PREPFPD DTIME 1          3      90.0      210.0      150.0
PREPLDR STARTNDIFFINPUT 1.00 PREPARE LOGISTICS CATA REQUIREMENTS
PREPLDR DTIME 1          3      60.0      90.0       70.0
DRAFTPPKFFINFUT MADP-II 1.00 PREPARE CRAFT PROCUREMENT PACKAGE
DRAFTPPKDTIME 1          3      30.0      60.0       45.0
DRFTMPI STARTNDIMADP-II 1.00 PREPARE INITIAL CRAFT MATERIEL PLAN
DRFTMPI DTIME 1          3      50.0      80.0       60.0
UPDIERTESTARTNDIMADP-II 1.00 UPDATE IER - TECCM
UPDIERTEDTIME 1          3      30.0      90.0       60.0
UPDIERTRSTARTNDIMADP-II 1.00 UPDATE IER - TRACOC
UPDIERTRDTIME 1          3      30.0      120.0      90.0
PREPAPP STARTNDIAFINFUT 1.00 PREPARE ADVANCE PROCUREMENT PLAN
PREPAPP DTIME 1          3      90.0      150.0      120.0
FINNETPLSTARTNDIAFINPUT 1.00 FINALIZE NET PLAN
FINNETPLDTIME 1          3      30.0      90.0       60.0
DEFMNTPLSTARTNDIAFINFUT 1.00 FINALIZE DEPOT/CONTR MAINT SUPPORT PLAN
DEFMNTPLDTIME 1          3      45.0      90.0       60.0
FINPRCVPSTARTNDIAPINFUT 1.00 FINALIZE PROVISIONING PLAN
FINPRCVPDTIME 1          3      60.0      120.0      90.0
FINCGPRISTARTNDIMADP-II 1.00 UPDATE AND FINALIZE QQPRI
FINCGPRIDTIME 1          3      60.0      180.0      120.0
FINAL-APAFINFUT MADP-II 1.00 FINALIZE AP
FINAL-APDTIME 1          3      30.0      60.0       45.0
DRAFTMFFMADP-II MFFDRAFT1.00 PREPARE CRAFT MATERIEL FIELDING PLAN
DRAFTMFPDTIME 1          3      50.0      80.0       60.0
ESTBNETTMADP-II EST-NETT1.00 ESTABLISH NETT
ESTBNETTDTIME 1          3      120.0     180.0      140.0
FINPPK  MADP-II ISSUERFP1.00 FINALIZE PROCUREMENT PACKAGE
FINPPK  DTIME 1          3      120.0     210.0      180.0
PREPPSLSISSUERFPRECPPSLS1.00 PREPARE PROPOSALS
PREPPSLSDTIME 1          3      30.0      90.0       60.0
EVAL-FFPRECPPSLSINIT-NEG1.00 EVALUATE HARDWARE/SOFTWARE PROPOSALS
EVAL-FFPDTIME 1          3      30.0      90.0       60.0
NEG-FFP INIT-NEGCOMPLNEG1.00 COMPLETE FIRM FIXED PRICE CONTRACT NEGOTIATIONS
NEG-FFP DTIME 1          3      24.0      40.0       30.0
PREAWDSYCCMPLNEGSVYCCMPL1.00 COMPLETE PRE-AWARD SURVEY FFP CONTRACT
PREAWDSYDTIME 1          3      24.0      60.0       30.0
PRCD-AWDSVYCCMPLAWDPRCD 1.00 AWARD PRODUCTION FIRM FIXED PRICE (FFP) CONTRACT
PRCD-AWDDTIME 1          3      24.0      45.0       30.0
EVAL-BCASVYCCMPLAWD-EOA 1.00 EVALUATE EOA PROPOSALS
EVAL-BCADTIME 1          3      30.0      60.0       45.0
EVAL-CLSSVYCCMPLAWD-CLS 1.00 EVALUATE CLS PROPOSALS
EVAL-CLSDTIME 1          3      30.0      60.0       45.0
CCMMLTMSAWDPRCD DUMMY1  1.00 PREPARE CCMMERCIAL TMS
CCMMLTMSDTIME 1          3      120.0     210.0      160.0
FABCRFI AWDPRCD DELCFFI 1.00 FABRICATE FIRST CRAFT
FABCRFI DTIME 1          3      270.0     540.0      420.0
PROVISNGAWDPRCD FULL-REL1.00 ACCOMPLISH FULL PROVISIONING
PROVISNGDTIME 1          3      720.0     1440.0     1080.0
ASL/PLL AWD-ECA COMP-ASL1.00 ESTABLISH ASL/PLL
ASL/PLL DTIME 1          3      85.0      120.0      90.0
ESTABCLSAWD-CLS CLSFAC  1.00 ESTABLISH CLS FACILITY
ESTABCLSDTIME 1          3      100.0     180.0      140.0
COORDMFPMFPDRAFTMFPCOORD1.00 COORDINATE MFP
COORDMFPDTIME 1          3      90.0      120.0      90.0
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FIN-MFF MFFCCCRCMFFCCMPL1.00 PUBLISH  MFP
FIN-MFP DTIME 1           3     80.0     120.0     SC.C
TRNCREWIEST-NETTACCPT1  1.00 TRAIN INITIAL CREW
TRNCREWIDTIME 1           1    10.0
SUPPLTMSDUMMY1  ACPT-TMS1.00 SUPPLEMENT CCMMERCIAL MANUALS (VERIFICATICN)
SUPPLTMSDTIME 1           3     90.0     180.C     150.0
TMLEAD1 DUMMY1  CELCFF1 1.00S90-CAY TM LEAD TIME
TMLEAD1 DTIME 1           1     90.0
TRIALS  DELCFF1 TESTCR1 1.00 CCNDUCT DCCK/SEA TRIALS
TRIALS  DTIME 1           3     10.0     30.C     15.0
CCRRECTNTESTCR1 ACCPT1  1.00 CCRRECT TEST-IDENTIFIED DEFICIENCIES
CORRECTNDTIME 1           3      0.0     90.0     30.0
LTRPTTECTESTCR1 ACCPT1  1.00 PREPARE LETTER REPORT - TECOM
LTRPTTECDTIME 1           3     15.0     90.0     45.0
LTRPTTRATESTCR1 ACCPT1  1.00 PREPARE LETTER REPORT - TRADOC
LTRPTTRADTIME 1           3     30.0     120.0    45.0
ASLLEADTCCMF-ASLACCPT1  1.00S30-CAY ASL LEAD TIME
ASLLEADTDTIME 1           1     30.0
CLSLEADTCLSFAC  ACCPT1  1.00S30-LAY CLS LEAD TIME
CLSLEADTDTIME 1           1     30.0
TMLEAD2 ACPT-TMSCCND-REL1.00S30-CAY TM LEAD TIME
TMLEAD2 DTIME 1           1     30.0
REL-LEACACCPT1  CCND-REL1.00 PREPARE MATERIEL RELEASE PKG - CONDITIONAL
REL-LEADDTIME 1           3     30.0     90.C     45.C
MFP-LEADMFFCCMPLICC     1.00S6-MCNTH LEAC TIME
MFP-LEADDTIME 1           1    180.0
ACCPTREMACCPT1  FINALCEL1.00 ACCEPT REMAINING CRAFT - QUANTITY DEPENDENTT (TWO)
ACCPTREMDTIME 1           3    180.0     360.0    270.C
TAG-TMS ACPT-TMSFULL-REL1.00 PREPARE AUTHENTICATED TAG MANUALS
TAG-TMS DTIME 1           3    120.0     310.C    180.0
USE-BCA CCMP-ASLFULL-REL1.00 UTILIZE BOA - DUMMY ACTIVITY
USE-BLA DTIME 1           1      1.0
FRELLEADCCNC-RELFULL-REL1.00 PREPARE FULL RELEASE PACKAGE
FRELLEADDTIME 1           3     30.0     SC.C     45.0
IOCLEAD2CCND-RELICCLEAC 1.00SLEAC TIME FRCM CCND REL TO IOC - TO FIND SLACK
IOCLEAD2DTIME 1           1      1.0
IOCLEAD1FULL-RELICCLEAC 1.00SLEAC TIME FRCM FULL REL TO IOC - TC FIND SLACK
ICCLEAD1DTIME 1           1      1.0
LEAD-ICCICCLEAD ICC     1.00SLOGIC TC PERMIT SHCRTEST LEAD TIME FRCM FULL/CCNREL
LEAD-ICCDTIME 1           1      1.0
MTSP-FCEACCPT1  INIT-FCE1.00 PREPARE MTSP FCR FCE
MTSP-FCEDTIME 1           3     60.0     120.0     70.C
IEP-FCE STARTIEPINIT-FCE1.00 PREPARE IEP FCR FOE - TRADOC
IEP-FCE DTIME 1           3     90.0     180.0    120.0
PERF-FCEINIT-FOECCMPLFCE1.00 PERFCRM FCE
PERF-FCEDTIME 1           3     30.0     90.C      45.0
FOE-IER CCMPLFOELCMPLIER1.00 PREPARE IER FCR FOE - TRADOC
FCE-IER DTIME 1           3     45.0     90.0      65.0
STAFFIERCCMPLIERCLCRECNF1.00 STAFF INDEPENDENT EVALUATICN REPORT(IER)
STAFFIERDTIME 1           3     50.0     90.0      60.0
FLDIPRFKCCCFDCNFFLDGIPR 1.00 STAFF THE FIELDING IPR PACKAGE
FLDIPRFKDTIME 1           3     75.0     120.C     SC.C
FLRELDCCFLDGIPR FULL-REL1.00 STAFF THE FULL-RELEASE DOCUMENTATION
FLRELDCCDTIME 1           3     35.0     75.0      35.0
ENDARC
```

```
START    1  2                  START PROGRAM, ROC AND LOGISTICS RQMTS
APPROC   2  2                  APPROVE ROC
NDIWG1   2  2                  CONVENE NDI WORKING GROUP
COMPL-MS2   2                  COMPLETE MARKET SURVEY
COMPL-US2   2                  COMPLETE USER SURVEY
COMPLRPT2   2                  COMPLETE EVALUATION OF FFP CONTRACT PROPOSALS
PREIPR   2  2                  RECEIVE IPR INPUT, START IPR PACKAGE
MADP-I   2  3                  CONVENE MADP-I (IPR)
C&EEST   2  2                  COMPLETE COMMUNICATIONS & ELECTRONICS (C&E) CHART
INITCESY2   2                  COMPLETE C&E EVALUATION PLANNING
COMPL-CE2   2                  COMPLETE C&E ACTION FOR C&E REPORT
STARTR&D2   1                  COMMENCE R&D PROGRAM
STARTNDI2   2                  COMMENCE NDI PROGRAM
STARTMAC2   1                  COMMENCE MACI PROGRAM
PPINPUT  2  2                  COMPLETE INPUTS TO PROCUREMENT PACKAGE
APINPUT  2  2                  COMPLETE INPUTS TO ACQUISITION PLAN
MADP-II  2  2                  CONVENE MADP-II (IPR)
ISSUERFP2   2                  ISSUE RFP FOR HARDWARE,CLS BOA
RECPPSLS2   2                  RECEIVE PROPOSALS FROM PROSPECTIVE SUPPLIERS
INIT-NEG2   2                  COMPLETE INITIAL NEGOTIATIONS OF FFP CONTRACT
COMPLNEG2   2                  COMPLETE FINAL NEGOTIATIONS OF FFP CONTRACT
SVYCCMPL2   2                  COMPLETE SURVEY OF FFP CONTRACTOR
AWDPROD  2  216 1              AWARD PRODUCTION CONTRACT
AWD-BOA  2  2                  AWARD BOA OPTION
AWD-CLS  2  2                  AWARD CLS OPTION
DUMMY1   2  2                  RECEIVE COMMERCIAL TMS
MFPDRAFT2   2                  COMPLETE DRAFT MATERIEL FIELDING PLAN
DELCRF1  2  216 2              DELIVER CRAFT 1
EST-NETT2   2                  NEW EQPT/IKPT ESTABLISHED
CLSFAC   2  2                  CLS FACILITY COMPLETED
ACPT-TMS2   2                  ACCEPT INTERIM MANUALS (VERIFIED & SUPPLEMENTED)
COMP-ASL2   2                  COMPLETE ASL/PLL
TESTCR1  2  2                  DOCK/SEA TRIALS COMPLETED
ACCPT1   2  2                  ACCEPT FIRST CRAFT
MFPCOORD2   2                  COORDINATION OF MFP COMPLETE
MFPCOMPL2   2                  MFP COMPL
COND-REL2   2                  CONDITIONAL RELEASE
STARTIEP1   2                  TRADOC START IEP FOR FOE
FULL-REL2   2                  FULL RELEASE
IOCLEAD  4  2                  DUMMY NODE TO GET TO IOC
IOC      2  116                INITIAL OPERATIONAL CAPABILITY
FINALDEL2   1                  FINAL CRAFT DELIVERED
INIT-FOE2   2                  INITIATE FOE
COMPLFOE2   2                  COMPLETE FOE
COMPLIER2   2                  COMPLETE IER FOR FOE
COORDCNF2   2                  COMPLETE STAFFING OF INDEPENDENT EVALUATION REPORT
FLDGIPR  2  2                  COMPLETE FIELDING IPR PACKAGE FOR FULL RELEASE
ENDNODE
```

```
1 4   1       435459 1000            1.        1.
AWC DRA NDI LARGE TUG PROGRAM
0.0          6.0
6.0          12.0
12.0         18.0
18.0         24.0
24.0         30.0
0.0          30.0
ENDCTPR
PRSTRCC START    APPRCC  1.00 PREPARE AND STAFF RCC - TRADOC
PRSTRCC DTIME 1          3     150.0      320.0      180.0
LOGRCC  START    APPRCC  1.00 COORDINATE AND ESTAB LOG RQMTS - TSARCOM
LOGRCC  DTIME 1          3     150.0      180.0      170.0
IEPTECOMAPPRCC  NDIWG1   1.00 PREPARE IEP - TECOM
IEPTECOMDTIME 1          3      30.0      120.0       60.0
IEPTRADCAPPRCC  NDIWG1   1.00 PREPARE IEP - TRADOC
IEPTRADCDTIME 1          3      30.0       90.0       60.0
MKTSVY  NDIWG1  COMPL-MS1.00 CONDUCT MARKET SURVEY AND PREPARE
MKTSVY  DTIME 1          3      30.0       60.0       45.0
USERSVY COMPL-MSCOMPL-US1.00 CONDUCT USER SURVEY AND PREPARE REPORT
USERSVY DTIME 1          3      30.0       60.0       45.0
EVALLOG COMPL-USIPRSTART1.00 EVALUATE LOGISTICS CONSIDERATIONS
EVALLOG DTIME 1          3      15.0       60.0       30.0
IERTECOMCOMPL-USIPRSTART1.00 PREPARE IER - TECOM
IERTECOMDTIME 1          3      15.0       60.0       40.0
IERTRADCCOMPL-USIPRSTART1.00 PREPARE IER - TRADOC
IERTRADCDTIME 1          3      15.0      120.0       60.0
PPQQPRI APPRCC  IPRSTART1.00 PREPARE PROVISIONAL QQPRI
PPQQPRI DTIME 1          3      10.0       45.0       24.0
DRAFTAP APPRCC  IPRSTART1.00 PREPARE DRAFT ACQUISITION PLAN
DRAFTAP DTIME 1          3      90.0      210.0      120.0
R&DPROG MADP-I  STARTR&D1.00 PREPARE FOR R&D PROGRAM
R&DPROG DTIME 1          1      30.0
R&DPROG MTIME 1      0.05                                          B15
MACIPROGMADP-I  STARTMAC1.00 PREPARE FOR MACI PROGRAM
MACIPROGDTIME 1          1      30.0
MACIPROGMTIME 1      0.05                                          B15
NDIDECSNMADP-I  STARTNDI1.00 APPROVE NDI DECISION
NDIDECSNDTIME 1          3      15.0       45.0       30.0
NDIDECSNMTIME 1      0.90                                          B15
IPRPKG  IPRSTARTMADP-I  1.00 PREPARE AND STAFF IPR PACKAGE
IPRPKG  DTIME 1          3      45.0       90.0       60.0
PREPFPD STARTNDIFFINPUT 1.00 PREPARE FUNCTIONAL PURCHASE DESCRIPTION
PREPFPD DTIME 1          3      90.0      210.0      150.0
PREPLDR STARTNDIPPINPUT 1.00 PREPARE LOGISTICS DATA REQUIREMENTS
PREPLDR DTIME 1          3      60.0       90.0       70.0
DRAFTPPKPFINPUT MADP-II 1.00 PREPARE DRAFT PROCUREMENT PACKAGE
DRAFTPPKDTIME 1          3      30.0       60.0       45.0
UPDIERTESTARTNDIMADP-II 1.00 UPDATE IER - TECOM
UPDIERTEDTIME 1          3      30.0       90.0       60.0
UPDIERTRSTARTNDIMADP-II 1.00 UPDATE IER - TRADOC
UPDIERTRDTIME 1          3      30.0      120.0       90.0
PREPAPP STARTNDIAPINPUT 1.00 PREPARE ADVANCE PROCUREMENT PLAN
PREPAPP DTIME 1          3      90.0      150.0      120.0
FINNETPLSTARTNDIAPINPUT 1.00 FINALIZE NET PLAN
```

```
FINNETPLDTIME 1              3      30.0       90.0       60.0
DEFMNTPLSTARTNDIAPINPUT 1.00 FINALIZE DEPOT/CONTR MAINT SUPPORT PLAN
DEFMNTPLDTIME 1              3      45.0       90.0       60.0
FINPROVPSTARTNDIAPINPUT 1.00 FINALIZE PROVISIONING PLAN
FINPROVPDTIME 1              3      60.0       120.0      90.0
FINCCPRISTARTNDIMACP-II 1.00 UPDATE AND FINALIZE CCPRI
FINCCPRIDTIME 1              3      60.0       180.0      120.0
FINAL-APAPINPUT MACP-II 1.00 FINALIZE AP
FINAL-APDTIME 1              3      30.0       60.0       45.0
DRAFTMFPMACP-II MFPDRAFT1.00 PREPARE CRAFT MATERIEL FIELDING PLAN
DRAFTMFPDTIME 1              3      50.0       80.0       60.0
ESTBNETTMACP-II EST-NETT1.00 ESTABLISH NETT
ESTBNETTDTIME 1              3      120.0      180.0      140.0
FINPRK  MACP-II ISSUERFP1.00 FINALIZE PROCUREMENT PACKAGE
FINPRK  DTIME 1              3      120.0      210.0      180.0
PREPPSLSISSUERFPRECPPSLS1.00 PREPARE PROPOSALS
PREPPSLSDTIME 1              3      30.0       90.0       60.0
EVAL-FFPRECPPSLSAWDPROC 1.00 EVALUATE HARDWARE/SOFTWARE PROPOSALS
EVAL-FFPDTIME 1              3      30.0       90.0       60.0
EVAL-ECAPRECPPSLSAWD-ECA 1.00 EVALUATE ECA PROPOSALS
EVAL-ECADTIME 1              3      30.0       60.0       45.0
EVAL-CLSRECPPSLSAWD-CLS 1.00 EVALUATE CLS PROPOSALS
EVAL-CLSDTIME 1              3      30.0       60.0       45.0
COMMLTMSAWDPROD DUMMY1  1.00 PREPARE COMMERCIAL TMS
COMMLTMSDTIME 1              3      60.0       120.0      90.0
FABCRF1 AWDPROD DELCRF1 1.00 FABRICATE FIRST CRAFT
FABCRF1 DTIME 1              3      270.0      540.0      420.0
PROVISNGAWDPROD FULL-REL1.00 ACCOMPLISH FULL PROVISIONING
PROVISNGDTIME 1              3      720.0      1440.0     1080.0
ASL/PLL AWD-ECA COMP-ASL1.00 ESTABLISH ASL/PLL
ASL/PLL DTIME 1              3      85.0       120.0      90.0
ESTABCLSAWD-CLS CLSFAC  1.00 ESTABLISH CLS FACILITY
ESTABCLSDTIME 1              3      100.0      180.0      140.0
COORDMFPMFPDRAFTMFPCOORD1.00 COORDINATE MFP
COORDMFPDTIME 1              3      90.0       120.0      90.0
FIN-MFP MFPCOORDMFPCOMPL1.00 PUBLISH  MFP
FIN-MFP DTIME 1              3      80.0       120.0      90.0
TRNCREW1EST-NETTACCPT1  1.00 TRAIN INITIAL CREW
TRNCREW1DTIME 1              1      10.0
SUPPLTMSDUMMY1  ACPT-TMS1.00 SUPPLEMENT COMMERCIAL MANUALS (VERIFICATION)
SUPPLTMSDTIME 1              3      30.0       90.0       30.0
TMLEAD1 DUMMY1  DELCRF1 1.00S90-DAY TM LEAD TIME
TMLEAD1 DTIME 1              1      90.0
TRIALS  DELCRF1 TESTCR1 1.00 CONDUCT DOCK/SEA TRIALS
TRIALS  DTIME 1              3      10.0       30.0       15.0
CORRECTNTESTCR1 ACCPT1  1.00 CORRECT TEST-IDENTIFIED DEFICIENCIES
CORRECTNDTIME 1              3      0.0        90.0       30.0
LTRPTTECTESTCR1 ACCPT1  1.00 PREPARE LETTER REPORT - TECOM
LTRPTTECDTIME 1              3      15.0       90.0       45.0
LTRPTTRATESTCR1 ACCPT1  1.00 PREPARE LETTER REPORT - TRADOC
LTRPTTRADTIME 1              3      30.0       120.0      45.0
ASLLEADTCOMP-ASLACCPT1  1.00S30-DAY ASL LEAD TIME
ASLLEADTDTIME 1              1      30.0
CLSLEADTCLSFAC  ACCPT1  1.00S30-DAY CLS LEAD TIME
CLSLEADTDTIME 1              1      30.0
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TMLEAD2 ACPT-TMSCOND-REL1.00S30-DAY TM LEAD TIME
TMLEAD2 DTIME 1          1       30.0
REL-LEADACCPT1  COND-REL1.00 PREPARE MATERIEL RELEASE PKG - CONDITIONAL
REL-LEADDTIME 1          3       30.0       90.0       45.0
MFP-LEADMFPCOMPLIOC      1.00S6-MONTH LEAD TIME
MFP-LEADDTIME 1          1      180.0
ACCPTREMACCPTL  FINALDEL1.00 ACCEPT REMAINING CRAFT - QUANTITY DEPENDENTT (TWO)
ACCPTREMDTIME 1          3      1[illegible]0.0     [illegible]0.0      270.0
TAG-TMS ACPT-TMSFULL-REL1.00 PREPARE AUTHENTICATED TAG MANUALS
TAG-TMS DTIME 1          3      [illegible]0.0     180.0      120.0
USE-BCA COMP-ASLFULL-REL1.00 UTILIZE BCA - DUMMY ACTIVITY
USE-BCA DTIME 1          1        1.0
FRELLEADCOND-RELFULL-REL1.00 PREPARE FULL RELEASE PACKAGE
FRELLEADDTIME 1          3       30.0       90.0       45.0
IOCLEAD2COND-RELIOCLEAD 1.00SLEAD TIME FROM COND REL TO IOC - TO FIND SLACK
IOCLEAD2DTIME 1          1        1.0
IOCLEAD1FULL-RELIOCLEAD 1.00SLEAD TIME FROM FULL REL TO IOC - TO FIND SLACK
IOCLEAD1DTIME 1          1        1.0
LEAD-IOCIOCLEAD IOC      1.00SLOGIC TO PERMIT SHORTEST LEAD TIME FROM FULL/CONREL
LEAD-IOCDTIME 1          1        1.0
HTSP-FOEFULL-RELINIT-FOE1.00 PREPARE MISP FOR FOE
HTSP-FOEDTIME 1          3       60.0      120.0       90.0
IEP-FOE STARTIEPINIT-FOE1.00 PREPARE IEP FOR FOE - TRADOC
IEP-FOE DTIME 1          3       90.0      180.0      120.0
PERF-FOEINIT-FOECOMPLFOE1.00 PERFORM FOE
PERF-FOEDTIME 1          3       30.0       90.0       45.0
FOE-IER COMPLFOECOMPLIER1.00 PREPARE IER FOR FOE - TRADOC
FOE-IER DTIME 1          3       45.0       90.0       65.0
ENDARC
START    1  2                    START PROGRAM, ROC AND LOGISTICS RQMTS
APPROC   2  2   1                APPROVE ROC
NDIWG1   2  2   2                CONVENE NDI WORKING GROUP
COMPL-MS2   2   3                COMPLETE MARKET SURVEY
COMPL-US2   2   4                COMPLETE USER SURVEY
IPRSTART2   2   5                RECEIVE IPR INPUT, START IPR PACKAGE
MADP-I   2  3   6                CONVENE MADP-I (IPR)
STARTR&D2   1                    COMMENCE R&D PROGRAM
STARTNDI2   2   7                COMMENCE NDI PROGRAM
STARTMAC2   1                    COMMENCE MACI PROGRAM
PPINPUT  2  2   8                COMPLETE INPUTS TO PROCUREMENT PACKAGE
APINPUT  2  2   9                COMPLETE INPUTS TO ACQUISITION PLAN
MADP-II  2  2  10                CONVENE MADP-II (IPR)
ISSUERFP2   2  11                ISSUE RFP FOR HARDWARE,CLS BOA
RECPPSLS2   2  12                RECEIVE PROPOSALS FROM PROSPECTIVE SUPPLIERS
AWDPROD  2  2  13                AWARD PRODUCTION CONTRACT
AWD-BCA  2  2  14                AWARD BCA OPTION
AWD-CLS  2  2  15                AWARD CLS OPTION
DUMMY1   2  2  16                RECEIVE COMMERCIAL TMS
MFPDRAFT2   2  17                COMPLETE DRAFT MATERIEL FIELDING PLAN
DELCRF1  2  2  18                DELIVER CRAFT 1
EST-NETT2   2  19                NEW EQPT/TRPT ESTABLISHED
CLSFAC   2  2  20                CLS FACILITY COMPLETED
ACPT-TMS2   2                    ACCEPT INTERIM MANUALS (VERIFIED & SUPPLEMENTED)
COMP-ASL2   2                    COMPLETE ASL/PLL
TESTCR1  2  2                    DOCK/SEA TRIALS COMPLETED
```

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ACCPT1    2  2        ACCEPT FIRST CRAFT
MFPCOORD2    2        COORDINATION OF MFP COMPLETE
MFPCOMPL2    2        MFP COMPL
COND-REL2    2        CONDITIONAL RELEASE
STARTIEP1    2        TRADOC START IEP FOR FDE
FULL-REL2    2        FULL RELEASE
IOCLEAD 4    2        DUMMY NODE TO GET TO IOC
IOC       2  1        INITIAL OPERATIONAL CAPABILITY
FINALDEL2    1        FINAL CRAFT DELIVERED
INIT-FDE2    2        INITIATE FDE
COMPLFDE2    2        COMPLETE FDE
COMPLIER2    1        COMPLETE IER FOR FDE
ENDNODE
```

```
FILE: VERTIND4 EXEC      A1  MIDWEST S+E COMPUTER CENTER

&CONTROL OFF
-AGAIN
&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL
 OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

     1  ->  TEKTRONIX 4014 GRAPHICS TERMINAL

     2  ->  AGILE LINE PRINTER

&END
&READ ARGS
&IF .&1 = .1 &TERMTYPE = TEK
&IF .&1 = .2 &TERMTYPE = AGILE
&IF .&1 = .1 &GOTO -CONT
&IF .&1 = .2 &GOTO -CONT
&GOTO -AGAIN
-CONT
EX VERTTERM VERTIND4 DATA A1 22 &TERMTYPE NOH
```

```
VOUTPUT   AAAA A1   -OUTPUT FILE FROM RUNNING A VERT INPUT FILE ONLINE
                       (THIS FILE IS CREATED ANEW FOR EACH RUN)

VERT1     AAAA A1   -TEMPORARY WORKFILE FOR VERT RUN ONLINE

VERT2     AAAA A1   -TEMPORARY WORKFILE FOR VERT RUN ONLINE

VERT3     AAAA A1   -TEMPORARY WORKFILE FOR VERT RUN ONLINE

VERT4     AAAA A1   -TEMPORARY WORKFILE FOR VERT RUN ONLINE

VO&1      DATA W1   -OUTPUT FILES FOR VERT JOBS RUN OFFLINE
                    (&1 IS THE SIX MAX ALPHANUMERIC CHARACTER INPUT
                     FILENAME ENTERED WHEN A JOB IS RUN OFFLINE)

VERT1     AAAA W1   -TEMPORARY WORKFILE FOR VERT RUN OFFLINE

VERT2     AAAA W4   -TEMPORARY WORKFILE FOR VERT RUN OFFLINE

VERT3     AAAA W4   -TEMPORARY WORKFILE FOR VERT RUN OFFLINE

VERT4     AAAA W4   -TEMPORARY WORKFILE FOR VERT RUN OFFLINE
```

```
FILE: VERTIND5 EXEC      A1  MIDWEST S+E COMPUTER CENTER

&CONTROL OFF
-AGAIN
&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL
 OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

     1  ->  TEKTRONIX 4014 GRAPHICS TERMINAL

     2  ->  AGILE LINE PRINTER

&END
&READ ARGS
&IF .&1 = .1 &TERMTYPE = TEK
&IF .&1 = .2 &TERMTYPE = AGILE
&IF .&1 = .1 &GOTO -CONT
&IF .&1 = .2 &GOTO -CONT
&GOTO -AGAIN
-CONT
EX VERTTERM VERTIND5 DATA A1 22 &TERMTYPE NOH
```

FILE: VERTINO5 DATA A1 MIDWEST S+E COMPUTER CENTER

PRONLINE DATA A1		-TELEGRAF FILE WHICH CONTAINS THE VERT BANKDATA FILES (THIS FILE IS CREATED ANEW FOR EACH VERT ONLINE RUN)
PR&1	DATA W1	-FILES CONTAINING TELEGRAF VERT BANKDATA FILES (&1 IS THE SIX MAX ALPHANUMERIC CHARACTER VERT INPUT FILENAME ENTERED WHEN A VERT OFFLINE RUN IS MADE. THESE FILES ARE CREATED ANEW FOR EACH OFFLINE RUN SESSION)
TAGPRO	DATA A1	-TELEGRAF HOUSEKEEPING FILE FOR DISPLAYING GRAPHS
TAGPRO	4014 A1	-REPLACES TAGPRO DATA A1 WITH THIS FILE FOR BLACK & WHITE GRAPHS
TAGPRO	4027 A1	-REPLACES TAGPRO DATA A1 WITH THIS FILE FOR COLOR GRAPHS
TAGTRA	DATA A1	-TELEGRAF OUTPUT FILE CONTAINING A LISTING OF THE TELEGRAF ACTIONS REQUIRED TO DISPLAY A GRAPH
TEMPORAY	DATA A1	-SCRATCH FILE USED BY VERTGRF1 EXEC A1
TEMPORAY	DATA W1	-SCRATCH FILE USED BY VERTGRF1 EXEC A1
VBANKNAM	DATA A1	-TEMPORARY FILE WHICH HOLDS THE VERT BANKDATA FILENAMES (THIS FILE IS CREATED ANEW FOR EACH ONLINE RUN)
VBANKNM1	DATA A1	-TEMPORARY FILE WHICH HOLDS THE VERT BANKDATA FILENAMES (THIS FILE IS CREATED ANEW FOR EACH OFFLINE RUN)
VB&1	DATA W1	-TEMPORARY FILES WHICH HOLD VERT BANKDATA FILENAMES (&1 IS THE SIX MAX ALPHANUMERIC CHARACTER VERT INPUT FILENAME ENTERED WHEN A VERT OFFLINE RUN SESSION IS MADE. THESE FILES ARE CREATED ANEW FOR EACH SESSION)
VTITLE	DATA A1	-SCRATCH FILE USED TO HOLD THE GRAPH TITLE AND X AXIS TITLE FOR EACH GRAPH DISPLAYED VIA AN ONLINE RUN (THIS FILE IS CREATED ANEW FOR EACH GRAPH DISPLAYED)
VTITLE	DATA W1	-SCRATCH FILE USED TO HOLD THE GRAPH TITLE AND X AXIS TITLE FOR EACH GRAPH DISPLAYED VIA AN OFFLINE RUN (THIS FILE IS CREATED ANEW FOR EACH GRAPH DISPLAYED)
VERTTELE	DATA A1	-HOLDS THE SKELETAL DATA FOR GENERATING A VERT GRAPH CREATED FROM A VERT ONLINE RUN
VERTTELW	DATA W1	-HOLDS THE SKELETAL DATA FOR GENERATING A VERT GRAPH CREATED FROM A VERT OFFLINE RUN
VERTGF5A	DATA A1	-HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS TIME GRAPH
VERTG5A	DATA A1	-DATA FILE FOR THE COBRA FACTS TIME GRAPH
VERTGF5B	DATA A1	-HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS COST GRAPH
VERTG5B	DATA A1	-DATA FILE FOR THE COBRA FACTS COST GRAPH

FILE: VERTIND5 DATA   A1   MIDWEST S+E COMPUTER CENTER

VERTGF5C DATA A1   -FULLS GRAPHICS PRINT VECTORS FOR COBRA FACTS PERFORMANCE GRAPH

VERTG5C DATA A1   -DATA FILE FOR THE COBRA FACTS PERFORMANCE GRAPH

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FILE: VERTING6 EXEC      A1  MIDWEST S+E COMPUTER CENTER


&CONTROL OFF
-AGAIN
&BEGTYPE

ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL
 OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

     1  ->  TEKTRONIX 4014 GRAPHICS TERMINAL

     2  ->  AGILE LINE PRINTER

&END
&READ ARGS
&IF .&1 = .1 &TERMTYPE = TEK
&IF .&1 = .2 &TERMTYPE = AGILE
&IF .&1 = .1 &GOTO -CONT
&IF .&1 = .2 &GOTO -CONT
&GOTO -AGAIN
-CONT
EX VERTTERM VERTING6 DATA A1 22 &TERMTYPE NOH
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TEMPB    DATA T1  -TEMPORARY WORKFILE USED BY VERTPLOT EXEC A1

TEMPLOT  DATA T1  -TEMPORARY WORKFILE USED BY VERTPLOT EXEC A1

VPEDFT2R DATA A1  -DATA FILE FOR PLOTTING THE TROOP SUPPORT LEVEL II
                   MANAGED ROUTINE ECP PHASE I PROCESS

VPLTUGN1 DATA A1  -DATA FILE FOR PLOTTING THE PO A&C LARGE TUG NETWORK
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FILE: VPLTUGN1 DATA      A1   MIDWEST S+E COMPUTER CENTER


LARGE TUG ACQUISITION PROGRAM                                                     0.60    1
NODE0.     4.5    1.     2.      1   2PROJECT INITIATED
ARC 1.     6.     5.5    6.      0   0PRSTROC   150-180-320 DAYS
ARC 1.     5.7    5.5    5.7     0   1PREPARE AND STAFF ROC - TRADOC
ARC 1.     5.     5.5    5.      0   0LCCROC    150-170-180 DAYS
ARC 1.     4.7    5.5    4.7     0   1COORD & ESTAB LOG RQMTS - TSARCOM
NODE5.5    2.5    1.     6.      2   2DA ROC APPROVED
ARC 6.5    8.     11.    8.      0   0IEPTECOM   30-60-120  DAYS
ARC 6.5    7.7    11.    7.7     0   1PREPARE IEP - TECOM
ARC 6.5    7.     11.    7.      0   0IEPTRADOC 30-60-90   DAYS
ARC 6.5    6.7    11.    6.7     0   1PREPARE IEP - TRADOC
ARC 6.5    6.     33.    6.      0   0PPQQPRI    10-24-45   DAYS
ARC 6.5    5.7    11.    5.7     0   1PREPARE PROVISIONAL QQPRI
ARC 6.5    5.     33.    5.      0   0DRAFTPMP  90-120-210 DAYS
ARC 6.5    4.7    11.    4.7     0   1PREPARE DRAFT ACQUISITION PLAN
ARC 6.5    4.     33.    4.      0   0DRAFTMAC   45-60-120  DAYS
ARC 6.5    3.7    11.    3.7     0   1PREPARE DRAFT MACI PROGRAM PLAN
ARC 6.5    3.     11.    3.      0   0C&ECHART   30-60-120  DAYS
ARC 6.5    2.7    11.    2.7     0   1C&E EVALUATION TEAM CHARTERED
NODE11.    6.5    1.     2.      2   2CONVENE NDI WORKING GROUP
ARC 12.    7.5    16.5   7.5     0   0MKTSVY      30-45-60   DAYS
ARC 12.    7.2    16.5   7.2     0   1CONDUCT MARKET SURVEY & PREP RPT
NODE11.    2.5    1.     1.      2   2COMM & ELCT ESTABLISHED
ARC 12.    3.     16.5   3.      0   0CEEVALPL    5-10-30    DAYS
ARC 12.    2.7    16.5   2.7     0   1CMPLT COMM ELECT EVAL PLAN
NODE16.5   7.     1.     1.      2   2COMPLETE MARKET SURVEY
ARC 17.5   7.5    22.    7.5     0   0USERSVY    30-45-60   DAYS
ARC 17.5   7.2    22.    7.2     0   1CONDUCT USER SURVEY & PREP RPT
NODE16.5   2.5    1.     1.      2   2INITIATE C&E SURVEY
ARC 17.5   3.     22.    3.      0   0C&ESVY     60-90-120  DAYS
ARC 17.5   2.7    22.    2.7     0   1PERFORM C&E EVALUATION SURVEY
NODE22.    7.     1.     1.      2   2COMPLETE USER SURVEY
ARC 23.    7.5    27.    7.5     1   0PRERPT     60-90-120  DAYS
ARC 23.    7.2    27.5   7.2     0   1PREP & CMPLT MKT/USER SVY RESULTS RPT
ARC 27.    7.5    27.    8.      1   0
ARC 27.    8.     27.5   8.      0   0
NODE22.    2.5    1.     1.      2   2COMPLETE C&E SURVEY
ARC 23.    3.     46.    3.      0   0C&ERPT     15-30-60   DAYS
ARC 23.    2.7    27.5   2.7     0   1PREP & COMPLETE C&E SURVEY REPORT
NODE27.5   6.5    1.     3.      2   2FINAL REPORT COMPLETE
ARC 28.5   9.     33.    9.      0   0EVALLOG    15-30-60   DAYS
ARC 28.5   8.7    33.    8.7     0   1EVALUATE LOGISTICS CONSIDERATIONS
ARC 28.5   8.     33.    8.      0   0IERTECOM   15-40-60   DAYS
ARC 28.5   7.7    33.    7.7     0   1PREPARE IER - TECOM
ARC 28.5   7.     33.    7.      0   0IERTRADOC  15-60-120  DAYS
ARC 28.5   6.7    33.    6.7     0   1PREPARE IER - TRADOC
NODE33.    3.5    1.     6.      2   2RECEIVE IPR INPUT, START IPR PACKAGE
ARC 34.    6.5    38.5   6.5     0   0IPRPKG     45-60-90   DAYS
ARC 34.    6.2    38.5   6.2     0   1PREPARE AND STAFF IPR PACKAGE
NODE38.5   5.     1.     3.      2   3CONVENE MADP-I (IPR)
ARC 39.5   7.5    44.    7.5     0   0R&DPROG        30     DAYS   <PROB=0.05>
ARC 39.5   7.2    42.5   7.2     0   1PREPARE FOR R&D PROGRAM
ARC 39.5   6.5    46.    6.5     0   0NDIDECS    15-30-45   DAYS   <PROB=0.90>
ARC 39.5   6.2    43.    6.2     0   1APPROVE NDI DECISION
ARC 39.5   5.5    44.    5.5     0   0MACIPROG       30     DAYS   <PROB=0.05>
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ARC 39.5	5.2	42.5	5.2	0	1PREPARE FOR MACI PROGRAM
NODE44.	7.	1.	1.	2	1COMMENCE R&D PROGRAM
NODE44.	5.	1.	1.	2	1COMMENCE MACI PROGRAM
NODE46.	1.5	1.	10.	2	2COMMENCE NDI PROGRAM
ARC 47.	11.	51.5	11.	0	0PREPFPD 90-150-210 DAYS
ARC 47.	10.7	51.5	10.7	0	1PREPARE FUNCTIONAL PURCHASE DESCRIP
ARC 47.	10.	51.5	10.	0	0PREPLDR 60-70-90 DAYS
ARC 47.	9.7	51.5	9.7	0	1PREPARE LOGISTICS DATA REQUIREMENTS
ARC 47.	9.	57.	9.	0	0CRFTMP1 50-60-80 DAYS
ARC 47.	8.7	51.5	8.7	0	1INITIAL CRAFT MATERIEL FIELDING PLAN
ARC 47.	8.	57.	8.	0	0UPDIERTE 30-90-120 DAYS
ARC 47.	7.7	51.5	7.7	0	1UPDATE IER - TECOM
ARC 47.	7.	57.	7.	0	0UPDIERTR 30-90-120 DAYS
ARC 47.	6.7	51.5	6.7	0	1UPDATE IER - TRADOC
ARC 47.	6.	57.	6.	0	0FINQQPRI 60-120-180 DAYS
ARC 47.	5.7	51.5	5.7	0	1UPDATE AND FINALIZE QQPRI
ARC 47.	5.	51.5	5.	0	0PREAPP 90-120-150 DAYS
ARC 47.	4.7	51.5	4.7	0	1PREPARE ADVANCE PROCUREMENT PLAN
ARC 47.	4.	51.5	4.	0	0FINNETPL 30-60-90 DAYS
ARC 47.	3.7	51.5	3.7	0	1FINALIZE NET PLAN
ARC 47.	3.	51.5	3.	0	0DEPMNTPL 45-60-90 DAYS
ARC 47.	2.7	51.5	2.7	0	1FINALIZE DEPOT/CNTR MAINT SPT PLAN
ARC 47.	2.	51.5	2.	0	0FINPROV 60-90-120 DAYS
ARC 47.	1.7	51.5	1.7	0	1INALIZE PROVISIONING PLAN
NODE51.5	9.5	1.	2.	2	2COMPLETE INPUTS TO PROCUREMENT PACKAGE
ARC 52.5	10.5	57.	10.5	0	0CRAFTPPK 30-45-60 DAYS
ARC 52.5	10.2	57.	10.2	0	1PREPARE CRAFT PROCUREMENT PACKAGE
NODE51.5	1.5	1.	4.	2	2COMPLETE INPUTS TO ACQUISITION PLAN
ARC 52.5	3.5	57.	3.5	0	0FINAL-AP 30-45-60 DAYS
ARC 52.5	3.2	57.	3.2	0	1FINALIZE ACQUISITION PLAN
NODE57.	1.5	1.	10.	2	2CONVENE MACP-II (IPR)
ARC 58.	10.5	62.5	10.5	0	0CRAFTMFP 50-60-80 DAYS
ARC 58.	10.2	62.5	10.2	0	1PREPARE CRAFT MATERIEL FIELDING PLAN
ARC 58.	8.5	62.5	8.5	0	0ESTBNETT 120-140-180 DAYS
ARC 58.	8.2	62.5	8.2	0	1ESTABLISH NEW EQUIP TRNG TEAM
ARC 58.	6.5	62.5	6.5	0	0FINPPK 120-180-210 DAYS
ARC 58.	6.2	62.5	6.2	0	1FINALIZE PROCUREMENT PACKAGE
NODE62.5	10.	1.	1.	2	2COMPLETE CRAFT MATERIEL FIELDING PLAN
ARC 63.5	10.5	68.	10.5	0	0COORDMFP 90-90-120 DAYS
ARC 63.5	10.2	68.	10.2	0	1COORDINATE MATERIEL FIELDING PLAN
NODE62.5	8.	1.	1.	2	2NEW EQUIP/TRPT ESTABLISHED
ARC 63.5	8.5	79.25	8.5	0	0TRNCREW1 10 DAYS
ARC 63.5	8.2	68.	8.2	0	1TRAIN INITIAL CREW
NODE62.5	6.	1.	1.	2	2ISSUE RFP FOR HARDWARE, CLS BOA
ARC 63.5	6.5	68.	6.5	0	0PREPPSLS 30-60-90 DAYS
ARC 63.5	6.2	68.	6.2	0	1PREPARE PROPOSALS
NODE68.	10.	1.	1.	2	2COORDINATION OF MFP COMPLETE
ARC 69.	10.5	73.5	10.5	0	0FIN-MFP 80-90-120 DAYS
ARC 69.	10.2	73.5	10.2	0	1PUBLISH MATERIEL FIELDING PLAN
NODE68.	6.	1.	1.	2	2RECEIVE PROPOSALS FROM PROSPECTIVE SUPPLIERS
ARC 69.	6.5	73.5	6.5	0	0EVAL-FFP 30-60-90 DAYS
ARC 69.	6.2	73.5	6.2	0	1EVALUATE HARDWARE/SOFTWARE PROPOSALS
NODE73.5	10.	1.	1.	2	2MATERIEL FIELDING PLAN COMPLETE
ARC 74.5	10.5	79.25	10.5	0	0MFP-LEAD 180 DAYS
ARC 74.5	10.2	79.	10.2	0	1* SLACK * 6 MONTH LEAD TIME

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NODE73.5  6.     1.     1.      2   2INITIATE NEGOTIATIONS
ARC 74.5  6.5    79.    6.5     0   ONEG-FFP    24-30-40    DAYS
ARC 74.5  6.2    79.    6.2     0   1CMPLETE FFP CONTRACT NEGOTIATIONS
CIRL79.5  10.5   .25                 B
CIRL79.5  8.5    .25                 A
NODE79.   6.     1.     1.      2   2NEGOTIATIONS COMPLETED
ARC 80.   6.5    84.5   6.5     0   0PREAWDSY   24-30-60    DAYS
ARC 80.   6.2    84.5   6.2     0   1COMPLETE PRE-AWARD SURVEY FFP CNTRCT
NODE84.5  1.     1.     7.      2   2SURVEY COMPLETED
ARC 85.5  6.5    90.    6.5     0   0PROD-AWD   24-30-45    DAYS
ARC 85.5  6.2    90.    6.2     0   1AWARD PRODUCTION FFP CONTRACT
ARC 85.5  3.5    90.    3.5     0   0EVAL-BOA   30-45-60    DAYS
ARC 85.5  3.2    90.    3.2     0   1EVALUATE BOA PROPOSALS
ARC 85.5  1.5    90.    1.5     0   0EVAL-CLS   30-45-60    DAYS
ARC 85.5  1.2    90.    1.2     0   1EVALUATE CNTRCT LOG SPT PROPOSALS
NODE90.   5.     1.     3.      2   2AWARD PRODUCTION CONTRACT
ARC 91.   7.5    95.5   7.5     0   0COMMLTMS 120-160-210 DAYS
ARC 91.   7.2    95.5   7.2     0   1PREPARE COMMERCIAL TMS
ARC 91.   6.5    101.   6.5     0   0FABCRFT  270-420-540 DAYS
ARC 91.   6.2    101.   6.2     0   1FABRICATE FIRST CRAFT
ARC 91.   5.5    97.25  5.5     0   0PROVISNG 720-1080-1440 DAYS
ARC 91.   5.2    97.    5.2     0   1ACCOMPLISH FULL PROVISIONING
NODE90.   3.     1.     1.      2   2AWARD BOA OPTION
ARC 91.   3.5    95.5   3.5     0   0ASL/PLL  85-90-120  DAYS
ARC 91.   3.2    95.5   3.2     0   1ESTABLISH ASL/PLL
NODE90.   1.     1.     1.      2   2AWARD CLS OPTION
ARC 91.   1.5    95.5   1.5     0   0ESTABCLS 100-140-180 DAYS
ARC 91.   1.2    95.5   1.2     0   1ESTABLISH CLS FACILITY
NODE95.5  7.     1.     4.      2   2RECEIVE COMMERCIAL TMS
ARC 96.5  9.5    101.   9.5     0   0SUPPLTMS  90-150-180 DAYS
ARC 96.5  9.2    101.   9.2     0   1SUPPLEMENT COMML MANUALS * VERIFY *
ARC 96.5  7.5    101.   7.5     0   0TMLEAD1            90    DAYS
ARC 96.5  7.2    101.   7.2     0   1* SLACK * 90 DAY TECH MANUALS LEAD TIME
CIRL97.5  5.5    .25                 C
NODE95.5  3.     1.     2.      2   2COMPLETE ASL/PLL
ARC 96.5  4.5    112.   4.5     0   0ASLLEAD            30    DAYS
ARC 96.5  4.2    101.   4.2     0   1* SLACK * 30 DAY ASL LEAD TIME
ARC 96.5  3.5    101.253.5      0   0USE-BOA            1     DAY
ARC 96.5  3.2    101.   3.2     0   1UTILIZE BOA # DUMMY ACTIVITY #
CIRL101.5 3.5    .25                 C
NODE95.5  1.     1.     1.      2   2CLS FACILITY COMPLETED
ARC 96.5  1.5    112.   1.5     0   0CLSLEAD            30    DAYS
ARC 96.5  1.2    101.   1.2     0   1* SLACK * 30 DAY CLS LEAD TIME
NODE101.  9.     1.     2.      2   2ACCEPT INTERIM MANUALS
ARC 102.  10.5   108.2510.5     0   0TAG-TMS  120-180-310 DAYS
ARC 102.  10.2   106.5  10.2    0   1PREPARE AUTHENTICATED TAG MANUALS
ARC 102.  9.5    109.259.5      0   0TMLEAD2            30    DAYS
ARC 102.  9.2    106.5  9.2     0   1* SLACK * 30 DAY TECH MANUAL LEAD TIME
NODE101.  6.     1.     2.      2   2DELIVER CRAFT 1
ARC 102.  7.     106.5  7.      0   0TRIALS    10-15-30    DAYS
ARC 102.  6.7    106.5  6.7     0   1CONDUCT DOCK/SEA TRIALS
CIRL108.5 10.5   .25                 E
CIRL109.5 9.5    .25                 F
NODE106.5 6.     1.     3.      2   2DOCK/SEA TRIALS COMPLETED
ARC 107.5 8.5    112.   8.5     0   0CORRECTN   0-30-90    DAYS
```

FILE: VFLTUGN1 DATA   A1   MIDWEST S+E COMPUTER CENTER

```
ARC  107.5  8.2    112.   8.2      0    1CORRECT TEST IDENTIFIED DEFICIENCIES
ARC  107.5  7.5    112.   7.5      0    0LTRPTTEC   15-45-90    DAYS
ARC  107.5  7.2    112.   7.2      0    1PREPARE LETTER REPORT - TECOM
ARC  107.5  6.5    112.   6.5      0    0LTRPTTRA   30-45-120   DAYS
ARC  107.5  6.2    112.   6.2      0    1PREPARE LETTER REPORT - TRADOC
CIRL107.    3.     .25                   A
ARC  107.253.      112.   3.       0    0TRNCREW1        10   DAYS
ARC  107.5  2.7    112.   2.7      0    1TRAIN INITIAL CREW
NODE112.    10.    1.     1.       1    2TRADOC START IEP FOR FOE
ARC  113.   10.5   117.5  10.5     0    0IEP-FOE    90-120-180 DAYS
ARC  113.   10.2   117.5  10.2     0    1PREPARE IEP FOR FOE - TRADOC
NODE112.    1.     1.     8.       2    2ACCEPT FIRST CRAFT
ARC  113.   8.5    117.5  8.5      0    0MTSP-FOE   60-70-120   DAYS
ARC  113.   8.2    117.5  8.2      0    1PREPARE MTSP FOR FOE
ARC  113.   5.     117.5  5.       0    0REL-LEAD   30-45-90    DAYS
ARC  113.   4.7    117.5  4.7      0    1PREPARE MATERIEL RELEASE PKG - COND
ARC  113.   1.5    158.   1.5      0    0ACCPTREM  180-270-360 DAYS
ARC  113.   1.2    117.5  1.2      0    1ACCEPT REMAINING CRAFT - QTY DEPEND - 2
CIRL114.    6.     .25                   F
ARC  114.256.      117.5  6.       0    0TMLEAD2         30 DAYS
ARC  114.5  5.7    117.5  5.7      0    130 DAY TM LEAD TIME
NODE117.5   8.     1.     3.       2    2INITIATE FOE
ARC  118.5  9.5    123.   9.5      0    0PERF-FOE   30-45-90    DAYS
ARC  118.5  9.2    123.   9.2      0    1PERFORM FOE
NODE117.5   4.5    1.     2.       2    2CONDITIONAL RELEASE
ARC  118.5  6.     145.   6.       0    0FRELLEAD   30-45-90    DAYS
ARC  118.5  5.7    123.   5.7      0    1PREPARE FULL RELEASE PACKAGE
ARC  118.5  5.     123.255.        0    0IOCLEAD2        1    DAY
ARC  118.5  4.7    123.   4.7      0    1* SLACK * LEAD TIME - COND REL TO IOC
NODE123.    9.     1.     1.       2    2COMPLETE FOE
ARC  124.   9.5    128.5  9.5      0    0FOE-IER    45-65-90    DAYS
ARC  124.   9.2    128.5  9.2      0    1PREPARE IER FOR FOE - TRADOC
CIRL123.5   5.     .25                   G
NODE128.5   9.     1.     1.       2    2COMPLETE IER FOR FOE
ARC  129.5  9.5    134.   9.5      0    0STAFFIER   50-60-90    DAYS
ARC  129.5  9.2    134.   9.2      0    1STAFF INDEPENDENT EVAL REPORT
NODE134.    9.     1.     1.       2    2COMPLETE STAFFING OF IER
ARC  135.   9.5    139.5  9.5      0    0FLDIPRPK   75-90-120   DAYS
ARC  135.   9.2    139.5  9.2      0    1STAFF THE FIELDING IPR PACKAGE
NODE139.5   9.     1.     1.       2    2CMPL FLDG IPR PKG FOR FULL REL
ARC  140.5  9.5    145.   9.5      0    0FLRELDOC   25-35-75    DAYS
ARC  140.5  9.2    145.   9.2      0    1STAFF THE FULL RELEASE DOCUMENTATION
CIRL140.    8.     .25                   E
ARC  140.258.      145.   8.       0    0TAG-TMS  120-180-310 DAYS
ARC  140.5  7.7    145.   7.7      0    1PREPARE AUTHENTICATED TAG MANUALS
CIRL141.    7.     .25                   C
ARC  141.257.      145.   7.       0    0PROVISNG 720-1080-1440 DAYS
ARC  141.5  6.7    145.   6.7      0    1ACCOMPLISH FULL PROVISIONING
CIRL140.    5.     .25                   D
ARC  140.255.      145.   5.       0    0LSE-BOA        1   DAY
ARC  140.5  4.7    145.   4.7      0    1UTILIZE BOA - DUMMY ACTY
NODE145.    4.     1.     6.       2    2FULL RELEASE
ARC  146.   7.     151.5  7.       0    0IOCLEAD1       1   DAY
ARC  146.   6.7    151.5  6.7      0    1* SLACK * LEAD TIME - FULL REL TO IOC
CIRL147.    6.     .25                   G
```

```
ARC 147.256.     151.5 6.      0   0IOCLEAD2      1  DAY
ARC 147.5 5.7    151.5 5.7     0   1* SLACK * LEAD TIME - COND REL TO IOC
NODE151.5 5.5    1.    2.      4   2DUMMY NODE TO GET IOC
ARC 152.5 6.5    158.  6.5     0   OLEAD-IOC      1  DAY
ARC 152.5 6.2    158.  6.2     0   1* SLACK * LOGIC -MIN LT- FULL/COND REL
CIRL154.  5.5    .25                9
ARC 154.255.5    158.  5.5     0   OMFP-LEAD     180  DAYS
ARC 154.5 5.2    158.  5.2     0   1* SLACK * 6 MONTH LEAD TIME
NODE153.  5.     1.    2.      2   1INITIAL OPERATIONAL CAPABILITY
NODE153.  1.     1.    1.      2   1FINAL CRAFT DELIVERED
END
```

```
&CONTROL OFF
-INIT
&IF .&1 = .    &GOTO -CONT
&IF .&1 = .END &GOTO -FIN
&IF .&1 = .S   &GOTO -RET2
&IF .&1 = .R   &GOTO -RET
&IF .&1 = .6   &GOTO -END6
&IF .&1 = .5   &GOTO -END5
&IF .&1 = .4   &GOTO -END4
&IF .&1 = .3   &GOTO -END3
&IF .&1 = .2   &GOTO -END2
&IF .&1 = .1   &GOTO -END1
-CONT
&BEGTYPE
TERTIARY MENU LEVEL:  ENTER THE OPTION DESIRED :

    1    =  EDIT  THE LISTING OF VERT EXECUTIVE PROCEDURES

    2    =  EDIT THE LISTING OF VERT SOURCE PROGRAMS

    3    =  EDIT THE LISTING OF VERT INPUT DATA FILES

    4    =  EDIT THE LISTING OF VERT OUTPUT DATA FILES

    5    =  EDIT THE LISTING OF VERT GRAPHICS DATA FILES

    6    =  EDIT THE LISTING OF VERT PLOT PREVIEW DATA FILES

    R    =  RETURN TO THE MAIN MENU LEVEL

    S    =  RETURN TO THE SECONDARY MENU LEVEL

   END   =  END THE SESSION

&ENDTYPE
&READ ARGS
&GOTO -INIT
-END1
&BEGSTACK
TOP
&END
EDIT VERTIND1 DATA A1
&GOTO -PASS
-END2
&BEGSTACK
TOP
&END
EDIT VERTIND2 DATA A1
&GOTO -PASS
-END3
&BEGSTACK
TOP
&END
EDIT VERTIND3 DATA A1
&GOTO -PASS
```

```
-END4
&BEGSTACK
TOP
&END
EDIT VERTIND4 DATA A1
&GOTO -PASS
-END5
&BEGSTACK
TOP
&END
EDIT VERTIND5 DATA A1
&GOTO -PASS
-END6
&BEGSTACK
TOP
&END
EDIT VERTIND6 DATA A1
&GOTO -PASS
-PASS
&ARGS
&GOTO -INIT
-FIN
&GLOBAL1 = 2
&GOTO -RET2
-RET
&GLOBAL2 = 2
&GOTO -RET2
-RET2
```

```
*
*******************************
*                             *
* EXEC WRITTEN BY:            *
*                             *
*     LONNIE D. ANTWILER      *
*     3 MARCH 1981            *
*                             *
*******************************
*
*
*
&CONTROL OFF
CP SET EMSG OFF
*&ERROR &GOTO -END
&COUNT = 31
&START = 1
&STCNT = 1
&IF &&INDEX NE NCH &GOTO -L13
&STCNT = 0
&IF &INDEX = 3 &ARGS &1 &2
&IF &INDEX = 4 &ARGS &1 &2 &3
&IF &INDEX = 5 &ARGS &1 &2 &3 &4
&IF &INDEX = 6 &ARGS &1 &2 &3 &4 &5
-L13 &END    = &COUNT - &STCNT
&OUT    = TEK
&FM     = A
&IF &1 = ? &GOTO -HELP
&IF &INDEX = 2 &GOTO -DONE
&IF &INDEX = 3 &IF &3 = TEK &GOTO -DONE
&IF &INDEX = 3 &IF &3 = AGILE &GOTO -L1
&TEST = &DATATYPE &3
&IF &INDEX = 3 &IF &TEST = NUM &GOTO -L2
&IF &INDEX = 3 &IF &TEST = CHAR &GOTO -L3
&IF &INDEX = 4 &IF &TEST = NUM  &GOTO -L4
&IF &INDEX = 4 &IF &TEST = CHAR &GOTO -L5
&IF &INDEX > 5 &GOTO -END
&FM = &3
&COUNT = &4
&TEST = &DATATYPE &COUNT
&IF &TEST = CHAR &GOTO -L8
&END    = &COUNT - &STCNT
&IF &5 NE TEK &OUT = AGILE
-DONE &CONTINUE
&IF &OUT = TEK &SKIP 3
&IF &OUT = AGILE &SKIP 2
&TYPE TERMINAL TYPE MUST BE TEK OR AGILE
&GOTO -END
&TEST = &DATATYPE &COUNT
&IF &TEST = NUM &SKIP 2
-L8 &TYPE EXPECTED TO RECEIVE THE NUMBER OF LINES PER PAGE
&GOTO -END
&LEN = &LENGTH &FM
&IF &LEN <= 2 &SKIP 2
&TYPE FILE MODE IS WRONG
```

```
&GOTO -END
STATE &1 &2 &FM
&IF &RETCODE NE 0 &GOTO -ERROR
&IF &OUT = TEK &SKIP 5
&TYPE DO YOU WANT TO STOP AT PAGE BREAKS (YES OR NO)?
&READ VARS &PGBRK
&IF .&PGBRK NE .YES &PGBRK = NO
&TYPE
&GOTO -L7
&BEGTYPE



&END
-L7 &CONTINUE
&IF &STCNT = 1 &IF &OUT = TEK &TYPE &1 &2 &FM
&IF &STCNT = 1 &IF &OUT = AGILE &TYPE &1 &2 &FM
-LOOP &CONTINUE
T &1 &2 &FM &START &END
&IF &RETCODE NE 0 &GOTO -END
&IF &OUT = TEK &SKIP 3
&IF &PGBRK = YES &READ VARS &DUMMY
&TYPE
&GOTO -L6
&READ VARS &DUMMY
&BEGTYPE



&END
-L6 &IF &START = 1 &IF &STCNT = 1 &START = 0
&IF .&DUMMY = . &GOTO -L9
&TEST = &DATATYPE &DUMMY
&IF &TEST = CHAR &GOTO -L9
&IF &DUMMY = 0  &GOTO -L9
&IF &DUMMY < 0  &GOTO -L11
&LOOP -L10 &DUMMY
&START = &START + &COUNT
-L10 &END = &END + &COUNT
&GOTO -L9
-L11 &DUMMY = -1 - &DUMMY
&LOOP -L12 &DUMMY
&START = &START - &COUNT
-L12 &END = &END - &COUNT
&IF &START < 1 &END  = &COUNT - &STCNT
&IF &START < 1 &START = 1
&IF &START = 1 &GOTO -L7
&GOTO -LOOP
-L9 &CONTINUE
&START = &START + &COUNT
&END = &END + &COUNT
&GOTO -LOOP
-L1 &OUT = AGILE
&GOTO -DONE
-HELP &CONTINUE
```

```
&BEGTYPE
THERE ARE 6 PARAMETERS:
     FN     - FILE NAME
     FT     - FILE TYPE
     FM     - FILE MODE                                    DEFAULT  A
     LINES  - NUMBER OF LINES PER PAGE                     DEFAULT  31
     TERM   - TERMINAL TYPE (AGILE OR TEK)                 DEFAULT  TEK
     NOH    - NO HEADER WILL BE PRINTED

NOTE ON THE TEKTRONIX TERMINAL:
          CHAR 1 - ESC 8 - 31 LINES/PAGE
          CHAR 2 - ESC 9 - 34 LINES/PAGE
          CHAR 3 - ESC : - 54 LINES/PAGE
          CHAR 4 - ESC ; - 60 LINES/PAGE

NOTE ON THE AGILE PRINTER:
          MAXIMUM IS 66 LINES/PAGE
&END
&GOTO -END
-L2 &COUNT = &3
&TEST = &DATATYPE &COUNT
&IF &TEST = CHAR &GOTO -L8
&END = &COUNT - &STCNT
&GOTO -DONE
-L3 &FM = &3
&GOTO -DONE
-L4 &COUNT = &3
&TEST = &DATATYPE &COUNT
&IF &TEST = CHAR &GOTO -L8
&END = &COUNT - &STCNT
&IF &4 = AGILE &OUT = AGILE
&GOTO -DONE
-L5 &FM = &3
&TEST = &DATATYPE &4
&IF &4 = TEK &GOTO -DONE
&IF &TEST = CHAR &OUT = AGILE
&IF &TEST = NUM &COUNT = &4
&IF &TEST = NUM &END    = &COUNT - &STCNT
&GOTO -DONE
-ERROR &TYPE FILE " &1 &2 &FM " NOT FOUND
-END CP SET EMSG TEXT
&CONTROL CMS
```

APPENDIX E

USER'S MANUAL FOR THE VERTPLOT PROGRAM

VERTPLOT

This program plots publication quality copies of VERT networks using the CALCOMP plotter. Three different types of elements along with an accompanying maximum of seventy two digits of alpha-numeric identification information are plotted by this program. These elements are (1) a node, (2) an arc and (3) a circle which is used for making discontinuous arc connections. The plot location of each network element must be specified. This feature makes it possible to stylize a network to gain a maximum of ease of comprehension as opposed to ease of run off as afforded by a fully automated network plotting program. These automated programs usually arbitrarily locates each element in the network irrespective of the function it performs. In order to position each element in the plot, an origin for the whole plot must be established. The origin serves as location base from which all measurements are made. It can be a corner of a critical node, a starting node, an artificial lower left hand corner of a plot, etc. After establishing an origin, each network element's position is then established relative to the origin in units of X and Y inches. This program is setup for a CALCOMP drum type plotter which uses a roll of velum paper to plot on. The X-axis of the origin lies parallel to the roll's bottom edge while the Y-axis is perpendicular to that same edge. The maximum overall plot length allowed (the maximum in the X direction) is controlled by the variable labeled SPAN in the computer listing. Similarly, the maximum height (the maximum in the Y direction) is controlled by WIDTH. The variable BOTTOM moves the pen off the bottom edge of the paper by the value assigned this variable. The values given these variables, which must be in inches, can readily be adjusted to accommodate the various sizes of plotters and lengths of velum paper available.

Additional features of this program include the options of entering the height of the annotation (letter height); node, arc and circle size; and the overall scale of the plot. The scale feature enables making small notebook size plots as well as large wall hanging demonstration plots.

A. Definition of Inputs

Data elements include entering first an identification-control card followed by a mixture of node, arc and circle cards which sequentially plots the network. Plotting the node, arcs and circles in the natural sequence in which they lie on the plot will greatly reduce the pen travel time. Thus, entering all the node, arc or circle cards in separate groups should be avoided. Following the last card of the plot, an END card must be entered to signal the end of the plot. Multiple plots can be stacked one behind another to form a job stream of plots for a single computer run.

A1. Identification Control Card

Columns 1-72, FORMAT 72A1. Enter any alpha-numeric information deemed helpful in identifying this run. This data will be printed as a title at the top of the plot. If a title is not wanted, leave this field blank.

Columns 73-76, FORMAT F4.0. Enter the scale use to make the plot. Entering a 1.0 will produce a 1 = 1, normal sized plot, while entering a 2.0 will produce a plot twice the normal size. If the field is left blank, this program will default to a scale value of 1.0.

Columns 77-79, FORMAT F3.0. Enter the annotation height in inches used for the arc and node names and the circle symbols. If this field is left blank, the program will default to 0.1 inches.

Column 80, FORMAT I1. To sharpen the lines and to patch up places where the pen may skip, it is necessary to have the pen travel over each line a repeated number of times. The repeat factor is carried in this column. If a zero is entered or if this field is left blank, the program will assume that once is enough. To hold down cost, this field should be left blank on initial debug type runs.

A2. Node Card

Columns 1-4, FORMAT A4. Enter the card type identifier - Node.

Columns 5-10, FORMAT F6.0. Relative to the origin, enter in inches the X coordinate of the lower left hand corner of this node.

Columns 11-16, FORMAT F6.0. Relative to the origin, enter in inches the Y coordinate of the lower left hand corner of this node.

Columns 17-22, FORMAT F6.0. Enter in inches the node width. If this field is left blank, the program will default to a value of five times the annotation height (columns 77-80 of the identification-control card).

Columns 23-28, FORMAT F6.0. Enter in inches the height of the node. If this field is left blank, the program will default to a value of ten times the annotation height (columns 77-80 of the identification-control card).

Columns 29-32, FORMAT I4. Enter the input logic code number (defined as follows).

Input Logic Code Number	Type of Input Logic
1	INITIAL
2	AND
3	PARTIAL AND
4	OR
5	COMPARE
6	PREFERRED
7	QUEUE
8	SORT

Columns 33-36, FORMAT I4. Enter the output logic code number (defined below) or enter the number of servers desired if QUEUE logic is used or enter the number of output arcs desired to be initiated if COMPARE or PREFERRED input logic was requested. Under this latter option, a minus sign (-) must prefix this number if utilization of the desired condition is wanted. Otherwise, this number will be picked up as a positive number and thus the demand condition will be used.

Output Logic Code Number	Type of Output Logic
1	TERMINAL
2	ALL
3	MONTE CARLO
4	FILTER 1
5	FILTER 2
6	FILTER 3

Columns 37-80, FORMAT 44A1. Enter the name of the node being plotted followed by any other comments desired. This information will be printed in one straight line centered below the node, at a distance of one annotation height (columns 77-79 of the identification-control card) away from the node and lastly, at a height of one annotation.

A3. Arc Card

Columns 1-4, FORMAT A4. Enter the card type identifier - ARC .

Columns 5-10, FORMAT F6.0. Relative to the origin, enter in inches the X coordinate of one end of the arc.

Columns 11-16, FORMAT F6.0. Relative to the origin, enter in inches the Y coordinate of the same end point defined in the previous field.

Columns 17-22, FORMAT F6.0. Relative to the origin, enter in inches the X coordinate of the remaining end of the arc.

Columns 23-28, FORMAT F6.0. Relative to the origin, enter in inches the Y coordinate of the same end point defined in the previous field.

Columns 29-32, FORMAT I4. Enter a "1" in column 32 to suppress getting an arrowhead on the end point defined by the previous two fields. Otherwise, leave this field blank to get the arrowhead.

Columns 33-36, FORMAT I4. Enter a "1" in column 36 to suppress getting both an arrowhead and an arc line. Otherwise, leave this field blank to get both if the arrowhead has not been already suppressed via the previous field.

Columns 37-80, FORMAT 44A1. Enter the name of the arc being plotted followed by any other comments desired. This information will be printed in one straight line parallel and above the arc line, at a distance of one annotation height (columns 77-79 of the identification-control card) away from the arc line. Printing will start at a distance of one annotation height inside the left hand end of the arc line and will have a height of one annotation. This field should be left blank if a straight line without any printing above it is desired.

A4. Circle Card

Columns 1-4, FORMAT A4. Enter the card type identifier - CIRL.

Columns 5-10, FORMAT F6.0. Relative to the origin, enter in inches the X coordinate of the center of the circle.

Columns 11-16, FORMAT F6.0. Relative to the origin, enter in inches the Y coordinate of the center of the circle.

Columns 17-22, FORMAT F6.0. Enter in inches the radius of the circle desired. If this field is left blank, the program will default to a value of 2.5 times the annotation height (columns 77-80 of the identification-control card).

Columns 23-32. Leave blank.

Columns 33-36, FORMAT I4. Enter a "1" in column 36 to suppress getting the circle (use this when just printing symbols).

Columns 37-80, FORMAT 44A1. Enter the symbol(s) desired to be plotted in the center of the circle. This information will be plotted the height of the annotation (columns 77-79 of the identification-control card). This field should be left blank if a circle without any symbols printed in it is desired.

A5. End Card

Columns 1-4, FORMAT A4. Enter the card type identifier - END .

Columns 5-80. Leave blank.

NOTE: If an error is encountered while reading in the data and checking to see if the plot will fit within the allowed boundaries, the run will be scrapped before attempting to plot it.

B. Error Messages

1144 A negative value for the scale (columns 73-76 of the identification-control card) is not allowed.

1155 A negative value for the annotation height (columns 77-79 of the identification-control card) is not allowed.

1233 The following node was given a negative value for its width.

1244 The following node was given a negative value for its height.

1255 The following node does not have a name.

1288 The input logic of the following node is incorrect.

1299 The output logic of the following node is incorrect.

1300 The following node is not wide enough to accommodate printing the name of the logic within the node.

1311 The following node is not tall enough to accommodate printing the name of the logic within the node.

1355 The number of output arcs desired to be initiated for the following node having either COMPARE or PREFERRED logic is incorrect.

1377 The number of servers for the following node having QUEUE logic is incorrect.

1399 The following node is designated as having SORT logic columns 29-32 should not have any entries.

1455 The following arcs slope is too steep to allow printing its name.

1500 The following circle has a negative value for its radius.

1566 The following card does not have an acceptable card type identifier (columns 1-4).

1655 The dimensions of this problem are so great that the plot scale must be reduced to less than the unacceptable level of 0.05.

COMPUTER TAPE/MEMORY LAYOUT
(SOP 700-ZP-2)

PROJECT NO	PROJECT TITLE	PROGRAMMER	DATE	TAPE IDENT
	VERT PLOT DATA CARDS LAYOUT			

BLOCKED ☐ YES ☐ NO

BLOCKING FACTOR

ID card

Columns 1–72				
TITLE (72A1)	SCALE (1.0) F4.Ø	HEIGHT (0.1) F3.0	1	REPEAT FACTOR I1

Red = Default Values

Node card

Node							
A4	X-Coord F6.Ø	Y-Coord. F6.Ø	NODE WIDTH (5 * Ann) F6.Ø	NODE HEIGHT (10 * Ann) F6.Ø	LOGIC CODE No. I4	OUTPUT LOGIC No. I4	NODE NAME (44A1)
NODE							

Arc card

Arc							
	X-Coord. Begin F6.Ø	Y-Coord. Begin F6.Ø	X-Coord. End F6.Ø	Y-Coord. End F6.Ø	ARROW HEAD Ø or 1 I4	ARC LINE Ø or 1 I4	ARC COMMENTS (44A1)
ARC							

Ø = Not Suppressed
1 = Suppressed

Circle card

Circle						
	X-Coord. Center F6.Ø	Y-Coord. Center F6.Ø	Radius (2.5 * Ann) F6.Ø	Blank	Circle Code Ø or 1 I4 (1 = Suppress)	CIRCLE SYMBOL (44A1)
CIRL						

END card

END	
END	BLANK

IHOLD (44A1) Title	J # chars.	JDF 1, 2, 3 N, C, A	XØ LL coord. of a node	YØ	X1 LR coord. of a node	Y1	XN Coord. ...	YN

AMSAV-C ... 7 May 69	ANGLE Z	LIN ARROWHD 1 ...	LOT ARC LINE ...

Edition of 21 Mar 68, may be used.

APPENDIX F

SAMPLE SESSION NUMBER 1:

GET A DESCRIPTION OF VERT DATASETS

USED BY THE MENU TECHNIQUE

(AGILE Line Printer)

```
                                    Class "160" is 300 baud
enter class 116600 ←
class 160 start
cms6 ←              Enter to Get Into CMS
ready to ibm

S+E VM/SP ONLINE     Depress "RETURN" Button
! ←

.log fpkerly      }
ENTER PASSWORD:   } Enter Userid and Password
.[redacted]
DASD 190 LINKED R/O; R/W BY MAINT; R/O BY 030 USERS
DASD 19E LINKED R/O; R/W BY MAINT; R/O BY 029 USERS
DASD 196 LINKED R/W; R/O BY FTBACKUP
LOGMSG - 09:58:45 CDT TUESDAY 07/20/82
*THE 3705 WILL BETAKEN OFFLINE AT 1200 HRS CDT 7/20/82. UNTIL
*FURTHER NOTICE ALL LINES WILL GO THRU THE COMTEN.  THE ONLY
*VALID PACX CLASSES ARE 160-162: 160 = 300-1800 BPS, 161 = 2400-4800 BPS
,
* AND 162 = 9600 BPS.
LOGON AT 07:29:19 CDT FRIDAY 07/23/82
MIDWEST S+E COMPUTER CENTER
. ←                  Depress "RETURN" Button
Y (19E) R/O
CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.
CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.
DASD 291 DEFINED
'19E' REPLACES ' Y (19E) '
Y (19E) R/O
E (194) R/O
R; ← CMS "READY" Mode

.vertex ←          Enter the Name of the Executive File
E (194) R/O        Which Runs the Menu Technique

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

   1     =  RUN VERT ONLINE

   2     =  RUN VERT OFFLINE (CMS BATCH)

   3     =  VIEW VERT OUTPUT

   4     =  CREATE A VERT INPUT FILE

   5     =  EDIT AN EXISTING VERT INPUT FILE

   6     =  GET VERT NETWORK PLOT MENU

   7     =  GET VERT GRAPH MENU

  LIST   =  GET VERT DATASETS DISPLAY LISTING MENU

  END    =  END THE SESSION


.list ← I Chose to Get a Listing of the VERT
        Data sets Used by the Menu Technique
```

```
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :
```
← To Get This Menu on a Separate Page, I Simply Rolled the Paper Forward To a New Page Before Depressing the "RETURN" Button After Entering "list" Above

```
   1   -  DISPLAY A LISTING OF VERT EXECUTIVE PROCEDURES
   2   -  DISPLAY A LISTING OF VERT SOURCE PROGRAMS
   3   -  DISPLAY A LISTING OF VERT INPUT DATA FILES
   4   -  DISPLAY A LISTING OF VERT OUTPUT DATA FILES
   5   -  DISPLAY A LISTING OF VERT GRAPHICS DATA FILES
   6   -  DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES
   7   -  GET LISTING MENU FOR EDITING THE ABOVE DATA FILES
   R   -  RETURN TO THE MAIN MENU LEVEL
  END  -  END THE SESSION

.1
```
← I Chose to Look at the Executive Files

```
ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL
 OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

    1  ->  TEKTRONIX 4014 GRAPHICS TERMINAL

    2  ->  AGILE LINE PRINTER


.2

NOTE:
         ON THE TEKTRONIX TERMINAL:
         CHAR 1 - ESC 8 - 31 LINES/PAGE
         CHAR 2 - ESC 9 - 34 LINES/PAGE
         CHAR 3 - ESC : - 54 LINES/PAGE
         CHAR 4 - ESC ; - 60 LINES/PAGE

         ON THE AGILE PRINTER:
         MAXIMUM IS 66 LINES/PAGE

ENTER THE NUMBER OF LINES/PAGE DESIRED

.50
DO YOU WANT TO STOP AT PAGE BREAKS ( YES OR NO ) ?
.yes
```
← If You Don't Stop At Page Breaks the Whole File Will Be Printed Before Stopping

```
VERTEX    EXEC A1  -DISPLAYS AND RUNS THE MAIN LEVEL MENU

VERTRUN   EXEC A1  -RUNS THE VERT MODULES VERTNEW AND VERTNEW1 ONLINE

VERTBAT   EXEC A1  -RUNS THE VERT MODULES VERTNEW AND VERTNEW1 OFFLINE

VERTTEST  EXEC A1  -DISPLAYS VERT OUTPUT FROM EITHER AN ONLINE OR OFFLINE RUN

VERTREAD  EXEC A1  -READS THE CONSOLE FILES TO CHECK IF A VERT OFFLINE JOB HAS
                    COMPLETED     <THIS EXEC IS A PART OF THE VERTTEST EXEC>

VERTIN    EXEC A1  -RUNS THE VERTINP AND VERTFREE EXECS WHICH ALLOW CREATION
                     OF A FIXED FORM OR FREE FORM VERT INPUT DATA FILE

VERTINP   EXEC A1  -ALLOWS CREATION OF A FIXED FORM VERT INPUT DATA FILE

VERTFREE  EXEC A1  -RUNS THE FREE FORM VERT INPUT FILE MODULE (VERTFREE)

VERTEDIT  EXEC A1  -EDITS EXISTING VERT INPUT DATA FILES

VERTPLT   EXEC A1  -DISPLAYS AND RUNS THE SECONDARY LEVEL PLOT MENU

VERTPLT1  EXEC A1  -ALLOWS CREATION OF A VERT NETWORK PLOT DATA FILE

VERTPLT2  EXEC A1  -EDITS EXISTING VERT NETWORK PLOT DATA FILES

VERTPLT3  EXEC A1  -RUNS THE VERTPLOT EXEC FOR DISPLAYING A VERT NETWORK PLOT

VERTPLT4  EXEC A1  -DISPLAYS THE SAMPLE VERT NETWORK PLOT

VERTPLOT  EXEC A1  -RUNS THE VERTPLOT MODULE FOR DISPLAYING A VERT NETWORK PLOT

VERTGRAF  EXEC A1  -DISPLAYS AND RUNS THE SECONDARY LEVEL GRAPHICS MENU

VERTGRF1  EXEC A1  -DISPLAYS VERT GRAPHS USING TELEGRAF BANKDATA FILES

VERTGRF2  EXEC A1  -ALLOWS CREATION OF MANUALLY INPUTTED GRAPHICS DATA FILES

VERTGRF3  EXEC A1  -EDITS EXISTING MANUALLY CREATED GRAPHICS DATA FILES

VERTGRF4  EXEC A1  -DISPLAYS MANUALLY CREATED GRAPHICS DATA FILES

VERTGRF5  EXEC A1  -DISPLAYS THE SAMPLE VERT GRAPHS

VERTINDX  EXEC A1  -DISPLAYS AND RUNS THE SECONDARY LEVEL LIST MENU

VERTIND1  EXEC A1  -LISTS THE VERT EXECUTIVE PROCEDURES

VERTIND2  EXEC A1  -LISTS THE VERT SOURCE PROGRAMS AND MODULES
```

To Get the Listing to Begin at the Top of the Page, Position the Paper to the Top of the Page and Depress the "RESET" Button on the AGILE Printer Before Depressing the "RETURN" Button After Entering "yes" Above

Before Depressing the "RETURN" Button, I Repositioned the Paper and Depressed the "RESET" Button. All Subsequent Lists Should Now Begin at the Top of the Page

```
VERTIND3 EXEC A1  -LISTS THE VERT INPUT DATA FILES

VERTIND4 EXEC A1  -LISTS THE VERT OUTPUT DATA FILES

VERTIND5 EXEC A1  -LISTS THE VERT GRAPHICS DATA FILES

VERTIND6 EXEC A1  -LISTS THE VERT PLOT DATA FILES

VERTIND7 EXEC A1  -DISPLAYS AND RUNS THE TERTIARY LEVEL INDEX UPDATE MENU

VERTTERM EXEC A1  -CONTROLS THE INDEX LISTS TO 22 LINES OF TEXT PER SCREEN

-EOF-
```

. ← Depress "RETURN" Button to Continue

```
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

    1     -  DISPLAY A LISTING OF VERT EXECUTIVE PROCEDURES

    2     -  DISPLAY A LISTING OF VERT SOURCE PROGRAMS

    3     -  DISPLAY A LISTING OF VERT INPUT DATA FILES

    4     -  DISPLAY A LISTING OF VERT OUTPUT DATA FILES

    5     -  DISPLAY A LISTING OF VERT GRAPHICS DATA FILES

    6     -  DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES

    7     -  GET LISTING MENU FOR EDITING THE ABOVE DATA FILES

    R     -  RETURN TO THE MAIN MENU LEVEL

  END     -  END THE SESSION

.5
```

I Now Chose to Look at the Data Files Used by the Graphics Portion of the Menu Technique

```
ENTER THE TERMINAL TYPE OPTION NUMBER LISTED BELOW:
(EITHER OPTION WORKS THE SAME FOR A TI 700 TERMINAL
 OR A TEKTRONIX 4027 COLOR GRAPHICS TERMINAL)

     1  => TEKTRONIX 4014 GRAPHICS TERMINAL

     2  => AGILE LINE PRINTER

.2

NOTE:
         ON THE TEKTRONIX TERMINAL:
         CHAR 1 - ESC 8 - 31 LINES/PAGE
         CHAR 2 - ESC 9 - 34 LINES/PAGE
         CHAR 3 - ESC : - 54 LINES/PAGE
         CHAR 4 - ESC ; - 60 LINES/PAGE

         ON THE AGILE PRINTER:
         MAXIMUM IS 66 LINES/PAGE

ENTER THE NUMBER OF LINES/PAGE DESIRED
.60
```

This Time I Chose to Print 60 Lines Per Page of the Listing of the Data Files of the Graphics Portion of the Menu Technique Shown on the Next Page

```
DO YOU WANT TO STOP AT PAGE BREAKS ( YES OR NO ) ?
.no
```

I Chose Not to Stop at Page Breaks

PRM	DATA A1	-TELEGRAF FILE WHICH CONTAINS THE VERT BANKDATA FILES (THIS FILE IS CREATED ANEW FOR EACH VERT ONLINE RUN)
PR&1	DATA W1	-FILES CONTAINING TELEGRAF VERT BANKDATA FILES (&1 IS THE SIX MAX ALPHANUMERIC CHARACTER VERT INPUT FILENAME ENTERED WHEN A VERT OFFLINE RUN IS MADE. THESE FILES ARE CREATED ANEW FOR EACH OFFLINE RUN SESSION)
TAGPRO	DATA A1	-TELEGRAF HOUSEKEEPING FILE FOR DISPLAYING GRAPHS
TAGPRO	4014 A1	-REPLACES TAGPRO DATA A1 WITH THIS FILE FOR BLACK & WHITE GRAPHS
TAGPRO	4027 A1	-REPLACES TAGPRO DATA A1 WITH THIS FILE FOR COLOR GRAPHS
TAGTRA	DATA A1	-TELEGRAF OUTPUT FILE CONTAINING A LISTING OF THE TELEGRAF ACTIONS REQUIRED TO DISPLAY A GRAPH
TEMPORAY	DATA A1	-SCRATCH FILE USED BY VERTGRF1 EXEC A1
TEMPORAY	DATA W1	-SCRATCH FILE USED BY VERTGRF1 EXEC A1
VBANKNAM	DATA A1	-TEMPORARY FILE WHICH HOLDS THE VERT BANKDATA FILENAMES (THIS FILE IS CREATED ANEW FOR EACH ONLINE RUN
VB&1	DATA W1	-TEMPORARY FILES WHICH HOLD VERT BANKDATA FILENAMES (&1 IS THE SIX MAX ALPHANUMERIC CHARACTER VERT INPUT FILENAME ENTERED WHEN A VERT OFFLINE RUN SESSION IS MADE. THESE FILES ARE CREATED ANEW FOR EACH SESSION)
VTITLE	DATA A1	-SCRATCH FILE USED TO HOLD THE GRAPH TITLE AND X AXIS TITLE FOR EACH GRAPH DISPLAYED VIA AN ONLINE RUN (THIS FILE IS CREATED ANEW FOR EACH GRAPH DISPLAYED)
VTITLE	DATA W1	-SCRATCH FILE USED TO HOLD THE GRAPH TITLE AND X AXIS TITLE FOR EACH GRAPH DISPLAYED VIA AN OFFLINE RUN (THIS FILE IS CREATED ANEW FOR EACH GRAPH DISPLAYED)
VERTTELE	DATA A1	-HOLDS THE SKELETAL DATA FOR GENERATING A VERT GRAPH CREATED FROM A VERT ONLINE RUN
VERTTELW	DATA W1	-HOLDS THE SKELETAL DATA FOR GENERATING A VERT GRAPH CREATED FROM A VERT OFFLINE RUN
VERTGF5A	DATA A1	-HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS TIME GRAPH
VERTG5A	DATA A1	-DATA FILE FOR THE COBRA FACTS TIME GRAPH
VERTGF5B	DATA A1	-HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS COST GRAPH
VERTG5B	DATA A1	-DATA FILE FOR THE COBRA FACTS COST GRAPH
VERTGF5C	DATA A1	-HOLDS GRAPHICS PRINT VECTORS FOR COBRA FACTS PERFORMANCE GRAPH
VERTG5C	DATA A1	-DATA FILE FOR THE COBRA FACTS PERFORMANCE GRAPH

-EOF-

```
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

      1     -  DISPLAY A LISTING OF VERT EXECUTIVE PROCEDURES

      2     -  DISPLAY A LISTING OF VERT SOURCE PROGRAMS

      3     -  DISPLAY A LISTING OF VERT INPUT DATA FILES

      4     -  DISPLAY A LISTING OF VERT OUTPUT DATA FILES

      5     -  DISPLAY A LISTING OF VERT GRAPHICS DATA FILES

      6     -  DISPLAY A LISTING OF VERT PLOT PREVIEW DATA FILES

      7     -  GET LISTING MENU FOR EDITING THE ABOVE DATA FILES

      R     -  RETURN TO THE MAIN MENU LEVEL

    END     -  END THE SESSION
```

Since I Chose Not to Stop at Page Breaks, The Data File Was Listed and this Menu Displayed Before stopping

```
.r

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

      1     -  RUN VERT ONLINE

      2     -  RUN VERT OFFLINE (CMS BATCH)

      3     -  VIEW VERT OUTPUT

      4     -  CREATE A VERT INPUT FILE

      5     -  EDIT AN EXISTING VERT INPUT FILE

      6     -  GET VERT NETWORK PLOT MENU

      7     -  GET VERT GRAPH MENU

    LIST    -  GET VERT DATASETS DISPLAY LISTING MENU

    END     -  END THE SESSION

.end
R;
```

Back in CMS "READY" mode

```
.logoff
CONNECT= 00:09:10 VIRTCPU= 000:01.63 TOTCPU= 000:03.82
LOGOFF AT 07:38:32 CDT FRIDAY 07/23/82
```

APPENDIX G

SAMPLE SESSION NUMBER 2:

RUN, PRINT, AND GRAPH USING AN

EXISTING VERT INPUT DATA FILE

(Tektronix 4027 Color Graphics Terminal) enter class 116622

USACC DATA NUMBERS ARE: AV693-3582 OR 314-263-3582
class 162 start
cms6

READY-TO-IBM

S+E VM/SP ONLINE

! ← Depress "RETURN" Button

.log fpkerly

restart
.log fpkerly

ENTER PASSWORD: Enter userid and password
.

DASD 196 LINKED R/W; R/O BY FTBACKUP
LOGON AT 06:19:51 CDT TUESDAY 08/03/82
MIDWEST S+E COMPUTER CENTER
. ← Depress "RETURN" Button

Y (19E) R/O
CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.
CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.
DASD 291 DEFINED
'19E' REPLACES ' Y (19E) '
Y (19E) R/O
E (194) R/O
R; ← CMS "READY" mode

.VERTEX_ ← Enter the name of the executive file which runs the menu technique.

THIS PAGE DEPICTS LOGGING ON THE COMPUTER TERMINAL (TEKTRONI 4027 COLOR GRAPHICS TERMINAL) AND GETTING INTO CMS "READY" MODE.

UNLESS OTHERWISE STATED ALL PAGES IN THIS SESSION WERE CREATED BY MANUALLY DEPRESSING THE "ERASE" BUTTON ON THE COMPUTER TERMINAL. EACH PAGE IS AN ACTUAL PICTURE OF THE COMPUTER GRAPHICS TERMIN CRT SCREEN.

APPENDIX G

SAMPLE SESSION NUMBER 2:

RUN, PRINT, AND GRAPH USING AN

EXISTING VERT INPUT DATA FILE

(Tektronix 4027 Color Graphics Terminal)

TAGPRO	DATA	A1
TAGPRO	4Ø14	A1
TAGPRO	4Ø27	A1
VOUTPUT	AAAA	A1
VERT1	AAAA	A1
VERT2	AAAA	A1
VERT3	AAAA	A1
VERT4	AAAA	A1
VERTNEW	BATCH	A1
VERTNEW1	BATCH	A1
VBANKNAM	DATA	A1
VBANKNM1	DATA	A1
VERTBAT	DATA	A1
VERTGF5A	DATA	A1
VERTGF5B	DATA	A1
VERTGF5C	DATA	A1
VERTG5A	DATA	A1
VERTG5B	DATA	A1
VERTG5C	DATA	A1
VERTIND1	DATA	A1
VERTIND2	DATA	A1
VERTIND3	DATA	A1
VERTIND4	DATA	A1
VERTIND5	DATA	A1
VERTIND6	DATA	A1
VERTTELE	DATA	A1
VICO3ØP1	DATA	A1
VILTUGNØ	DATA	A1
VILTUGN1	DATA	A1
VPECPT2R	DATA	A1
VPLTUGN1	DATA	A1
VTITLE	DATA	A1
VERTBAT	EXEC	A1
VERTEDIT	EXEC	A1

E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.5_ ← Item 5 is selected

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
.VILTUGN1 ← Large Tug NDI (Revised) Schedule VERT input data file

EDIT:
TOF:
./ENDARC ← Find the end of the arc records

ENDARC
./AWDPROD ← Find the First Node to be selected for "camera-ready" graphs.

AWDPROD 2 2 AWARD PRODUCTION CONTRACT
.ZONE 13 14
.C/ /16/
Change Columns 13 and 14 of the "AWDPROD" Node record from blanks to "16".

AWDPROD 2 216 AWARD PRODUCTION CONTRACT
.ZONE 15 16
.C/ / 1/
Since "AWDPROD" is not a terminal node, a sequence number (in this case "1") is required in Columns 15 and 1 of the record.

AWDPROD 2 216 1 AWARD PRODUCTION CONTRACT
.ZONE 1 80 ← Reset the zone to its normal setting

./DELC ← Find the Second node to be selected for "camera-ready" graphs.

DELCRF1 2 2 DELIVER CRAFT 1
.ZONE 13 14
.C/ /16/
Change Columns 13 and 14 of the "DELCRF1" node record from blanks to "16".

DELCRF1 2 216 DELIVER CRAFT 1
._

```
ZONE 15 16
.C/ / 2/
```

Since "DELCRF1" is not a terminal node either, sequence Number "2" is placed in Columns 15 and 16 of the recor

```
DELCRF1 2  216 2              DELIVER CRAFT 1
.ZONE 1 80
```

Reset Zone

```
./IOC /
```

Find Node "IOC" (First occurrence of phrase "IOC")

```
IOCLEAD 4  2                  DUMMY NODE TO GET TO IOC
```

Wrong Node

```
.=
```

Find Node "IOC" Again (Second occurrence)

```
IOC     2  1                  INITIAL OPERATIONAL CAPABILITY
.ZONE 13 14
.C/ /16/
```

Change Columns 13 and 14 of the "IOC" node record from blanks to "16"

```
IOC     2  116                INITIAL OPERATIONAL CAPABILITY
.FILE_
```

Since IOC is a terminal node (Number "1" in Column 12 of the Record) no sequence number is used. "FILE" makes the changes permanent.

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

   1     =  RUN VERT ONLINE

   2     =  RUN VERT OFFLINE (CMS BATCH)

   3     =  VIEW VERT OUTPUT

   4     =  CREATE A VERT INPUT FILE

   5     =  EDIT AN EXISTING VERT INPUT FILE

   6     =  GET VERT NETWORK PLOT MENU

   7     =  GET VERT GRAPH MENU

  LIST   =  GET VERT DATASETS DISPLAY LISTING MENU

  END    =  END THE SESSION

.5_
```

← Another VERT input file is to be edited

ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
.VIC030P1

Cobra 30mm Gun Program Alternative 1 Decision Risk Analysis (DRA) VERT input data file

EDIT:
TOF:
.T2

Type 2 Records of the File

TOF:
1 4 1 435459 500 1.0 1.0

500 Monte Carlo iterations will be used for the VERT run

./ENDARC

Find the end of the arc records

ENDARC
./30

Find Node "30" (System Integration)

30 2 3
.ZONE 13 14

.C/ /16/

30 2 316
.ZONE 15 16

.C/ / 1/

Set Node "30" for "camera-ready" graphs

30 2 316 1
.ZONE 1 80

Reset Zone

./SUCC

Find Node "SUCCESS" (Project Completion)

SUCCESS 2 1
.ZONE 13 14_

```
.C/ /16/
SUCCESS 2  116
.FILE
```

Change columns 13 and 14 of the "SUCCESS" node from blanks to "16". Since "SUCCESS" is a terminal node no sequence number is used.

The changes are made permanent

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

   1    =  RUN VERT ONLINE

   2    =  RUN VERT OFFLINE (CMS BATCH)

   3    =  VIEW VERT OUTPUT

   4    =  CREATE A VERT INPUT FILE

   5    =  EDIT AN EXISTING VERT INPUT FILE

   6    =  GET VERT NETWORK PLOT MENU

   7    =  GET VERT GRAPH MENU

  LIST  =  GET VERT DATASETS DISPLAY LISTING MENU

  END   =  END THE SESSION
```

I did not clear the page here because I knew I had enough room on the screen for the menu. To clear the page, Depress the "ERASE" button on your terminal before completing the entry "FILE" above.

```
.2_
```

Item 2 is selected.

```
BATCHDV  - DSC

IS BATCHDV "DSC" ? ENTER YES/NO
.yes


DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ?  ENTER YES/NO

.yes


ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.awdprod$
```

The name selected for the "X" and "Y" data file to hold the histogram data for the First node selected of the Large Tug NDI Schedule VERT input data file. I could have used any name here.

```
DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.y


ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.delcrf1$
```

The second name is selected

```
DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.y_
```

```
ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.ioc$
```

the third name is selected

```
DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.n
```

No more names are selected since only three nodes in the Large Tug NDI Schedule VERT input data file were originally selected for "camera-ready" graphs.

```
 ENTER THE SIX CHARACTER UNIQUE FILENAME OF THE VERT FILE TO BE RUN
.ltugn1
```

the unique part of a VERT input data file filename. Since a CMS filename is restricted to 8 characters maximum, this 6 character unique filename is also a maximum. Less than 6 characters can be entered.

```
EDIT:
Job "00077215" entered in batch system.
EDIT:
```

The job number for this offline run

```
._
```

Depress the "RETURN" button on your terminal to continue

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.2_

Another VERT input data file is to be run offline

```
06:26:41

MSG FROM BATCH01 :  VILTUGN1 HAS FINISHED
```

The First offline run has finished already

```
CON FILE 0187 FROM BATCH01   COPY 001    NOHOLD
CON FILE 0188 FROM BATCH01   COPY 001    NOHOLD
BATCHDV   - DSC

IS BATCHDV "DSC" ? ENTER YES/NO
.yes


DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ?  ENTER YES/NO

.yes


ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.co30time$
```

schedule data for Node "30"

The VERT input data file to be run this time is the Cobra 30mm Gun Program Alternati DRA. Only two nodes were originally selected ("30" and "SUCCESS for "camera-ready" graphs. Howeve since this input file include cost information, 3 "X" and "Y" histogram data files will be required for each node. The first "X" and "Y" data file contai schedule data, the second path cost data, and the third total cost data.

```
DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.y


ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.co30pcost$_
```

path cost data for node "30"

DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.co30tcost$ total cost data for node "30"

DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.coendtime$ schedule data for node "SUCCESS"

DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.y

ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.coendpcost$_ Path cost data for node "SUCCESS"

```
DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.y


ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 10 CHARCTERS MAX>
.coendtcost$
```

Total Cost Data for node "SUCCESS"

```
DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.n
```

No more names are selected

```
 ENTER THE SIX CHARACTER UNIQUE FILENAME OF THE VERT FILE TO BE RUN
.co30p1
```

Cobra 30mm Gun Program Alternative 1 DRA VERT input data fil

```
EDIT:
Job "00078215" entered in batch system.
EDIT:
```

the job number for this offline run

```
._
```

Depress the "RETURN" button on your terminal to continue

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1     =  RUN VERT ONLINE

    2     =  RUN VERT OFFLINE (CMS BATCH)

    3     =  VIEW VERT OUTPUT

    4     =  CREATE A VERT INPUT FILE

    5     =  EDIT AN EXISTING VERT INPUT FILE

    6     =  GET VERT NETWORK PLOT MENU

    7     =  GET VERT GRAPH MENU

  LIST    =  GET VERT DATASETS DISPLAY LISTING MENU

  END     =  END THE SESSION

.3_
```

Item 3 is selected

DID YOU RUN VERT ONLINE ?
ENTER YES/NO
.no

HAVE YOU RECEIVED NOTICE THAT YOUR LAST CMS BATCH JOB SUBMITTED
HAS COMPLETED ? ENTER YES/NO

.no ← A "NO" is entered since the "VIC030P1" run has not finishe

DO YOU WANT TO FIND OUT IF ANY OF YOUR VERT OFFLINE
JOB (S) HAVE FINISHED ? ENTER YES/NO
.yes

The "VIC030P1" run is executing (ACT = ACTIVE).

The "VILTUGN1" run previously submit has completed (CMP = COMPLETED).

BATQUR283I Performing query for userid "FPKERLY"

Usrident	Sysident	Status	Last activity	Machine	Output	sent to
VERTNEW1	00078215	ACT	08/03/82 06:29:34	BATCH01	*	*
VERTNEW1	00077215	CMP	08/03/82 06:26:43	BATCH01	*	*
VERTNEW1	00055214	CMP	08/02/82 12:26:00	BATCH02	*	*
VERTNEW1	00054214	CMP	08/02/82 12:20:54	BATCH01	*	*
VERTNEW1	00053214	CMP	08/02/82 11:55:03	BATCH01	*	*
VERTNEW1	00052214	CMP	08/02/82 11:41:10	BATCH01	*	*
VERTNEW1	00051214	CMP	08/02/82 11:39:14	BATCH01	*	*
VERTNEW1	00040211	CMP	07/30/82 12:43:01	BATCH01	*	*
VERTNEW1	00039211	CMP	07/30/82 12:27:45	BATCH01	*	*
VERTNEW1	00038211	CMP	07/30/82 10:46:13	BATCH01	*	*
VERTNEW1	00037211	CMP	07/30/82 10:33:16	BATCH01	*	*
VERTNEW1	00036211	CMP	07/30/82 10:23:40	BATCH01	*	*
VERTNEW1	00035211	CMP	07/30/82 10:15:21	BATCH01	*	*
VERTNEW1	00034211	CMP	07/30/82 10:14:52	BATCH01	*	*
VERTNEW1	00033211	CMP	07/30/82 09:41:51	BATCH01	*	*

VERTNEW1	00032211	CMP	07/30/82	09:06:51	BATCH02	*	*
VERTNEW1	00031211	CMP	07/30/82	09:06:27	BATCH01	*	*
VERTNEW1	00030211	CMP	07/30/82	08:47:05	BATCH01	*	*
VERTNEW1	00029211	CMP	07/30/82	08:41:15	BATCH01	*	*
VERTNEW1	00028211	CMP	07/30/82	08:34:43	BATCH01	*	*
VERTNEW	00026210	CMP	07/29/82	15:11:23	BATCH01	*	*
VERTNEW	00025210	CMP	07/29/82	14:49:25	BATCH01	*	*
VERTNEW1	00021210	CMP	07/29/82	13:32:17	BATCH01	*	*
VERTNEW	00020210	CMP	07/29/82	13:24:48	BATCH01	*	*
VERTNEW1	00019210	CMP	07/29/82	13:08:21	BATCH02	*	*
VERTNEW	00018210	CMP	07/29/82	13:07:39	BATCH01	*	*
VERTNEW	00017210	CMP	07/29/82	12:44:01	BATCH01	*	*
VERTNEW1	00016210	CMP	07/29/82	12:42:22	BATCH01	*	*
VERTNEW	00011209	CMP	07/28/82	14:37:05	BATCH01	*	*

HAS ALL OF YOUR OFFLINE JOBS FINISHED ?

ENTER YES/NO
.no

A "NO" is entered since the "VICO30PI" run has not yet finished.

06:31:21

MSG FROM BATCH01 : VICO30P1 HAS FINISHED

the "VICO30PI" run just finished

CON FILE 0192 FROM BATCH01 COPY 001 NOHOLD
CON FILE 0193 FROM BATCH01 COPY 001 NOHOLD
YOU CAN'T ACCESS AN OUTPUT FILE UNTIL ALL FILES HAVE BEEN CREATED FROM CMS BATCH
!

HOWEVER YOU MAY PRINT OUT A FILE THAT HAS ALREADY BEEN CREATED

ENTER YES/NO IF YOU WANT A FILE PRINTED

Since I entered "NO" above, I am not allowed to view the output from the "VILTUGN1" run. This is a safeguard to prevent me from damaging my 194 W disk.

```
.no
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1     =  RUN VERT ONLINE
    2     =  RUN VERT OFFLINE (CMS BATCH)
    3     =  VIEW VERT OUTPUT
    4     =  CREATE A VERT INPUT FILE
    5     =  EDIT AN EXISTING VERT INPUT FILE
    6     =  GET VERT NETWORK PLOT MENU
    7     =  GET VERT GRAPH MENU
   LIST   =  GET VERT DATASETS DISPLAY LISTING MENU
   END    =  END THE SESSION

.3_
```

I do not want a printout of the "VILTUGN1" output file at this time.

Depressing the "ERASE" butto on the Tektronix 4027 Color Graphics Terminal befor completing the entry "NO" above will place the menu on a separate page.

The output file from the "VILTUGN1" run is to be viewed.

DID YOU RUN VERT ONLINE ?
ENTER YES/NO
.no

HAVE YOU RECEIVED NOTICE THAT YOUR LAST CMS BATCH JOB SUBMITTED
HAS COMPLETED ? ENTER YES/NO

.yes A "YES" is now entered since the "VICO30P1" run has finished.

'194 E/A' RELEASED
ENTER THE VERT OUTPUT FILE YOU WANT TO ACCESS

ENTER FILENAME ONLY

.voltugn1 The full name of the output file is entered

EDIT:
TOF:
EDIT:
.t17_ Type 17

name of the VERT Input Data File

```
TOF:
1AWC DRA REVISED NDI LARGE TUG PROGRAM
0PROBLEM IDENTIFICATION CARD OPTION--------------------------------     1
0TYPE OF INPUT OPTION----------------------------------------------     0
0TYPE OF OUTPUT OPTION---------------------------------------------     4
0COSTING AND PRUNING OPTION----------------------------------------     0
0FULL PRINT TRIP OPTION--------------------------------------------     0
0CORRELATION COMPUTATION AND PLOT OPTION---------------------------     0
0COST-PERFORMANCE TIME INTERVAL OPTION-----------------------------     1
0COMPOSITE TERMINAL NODE MINIMUMS AND MAXIMUMS OPTION--------------     0
0MEAN PRINT ORDER--------------------------------------------------     1
0INITIAL SEED------------------------------------------------------ 435459
0NUMBER OF ITERATIONS----------------------------------------------    250
0YEARLY INTEREST RATE USED FOR INFLATION ADJUSTMENTS---------------   0.0
0YEARLY INTEREST RATE USED FOR PRESENT VALUE DISCOUNTING-----------   0.0
0TIME FACTOR WHICH CONVERTS PROGRAM TIME TO A YEARLY BASE----------   0.0
0                                    TIME      COST      PERF
.b
0FULL-REL          2321.0044                  222
.quit_
```

The mean comple node times optio was selected

250 Monte Carlo Iteratio were used

GO TO THE bottom of the file

The Node "FULL-REL" (FULL RELEA will take on the average 2321 days to be reached from project initiation. This node was reached by the arc path selected 222 out of the total 250 iterations.

To get out of the output file

```
ENTER YES/NO FOR ROUTING
.yes
```

A hardcopy printout (11" x 14") will be made of the "VILTUGN1 run. Pages G-49 through G-72 show this printout.

```
ENTER THE NUMBER OF COPIES YOU WANT
.1

PRT FILE 0196  TO  OSMVT    COPY 001   NOHOLD

DO YOU WANT TO ERASE ANY OUTPUT FILES ?

ENTER YES/NO
.yes

FP8ABB   IS HASP JOB 8432
```

Job Number of the printout (Remote 4 Batch Printer will be used)

```
ENTER THE VERT OUTPUT FILE YOU WANT TO ERASE

ENTER FILENAME ONLY
.voltugn1
```

the output file just viewed is erased since I do not need it any longer.

```
DO YOU WANT TO ERASE ANY MORE OUTPUT FILES ?

ENTER YES/NO
.no_
```

```
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1     =  RUN VERT ONLINE

    2     =  RUN VERT OFFLINE (CMS BATCH)

    3     =  VIEW VERT OUTPUT

    4     =  CREATE A VERT INPUT FILE

    5     =  EDIT AN EXISTING VERT INPUT FILE

    6     =  GET VERT NETWORK PLOT MENU

    7     =  GET VERT GRAPH MENU

  LIST    =  GET VERT DATASETS DISPLAY LISTING MENU

  END     =  END THE SESSION

.3_
```

the "VICO30P1" run is to be viewed

```
DID YOU RUN VERT ONLINE ?
ENTER YES/NO
.no


 HAVE YOU RECEIVED NOTICE THAT YOUR LAST CMS BATCH JOB SUBMITTED
    HAS COMPLETED ?     ENTER YES/NO

.yes

'194 E/A' RELEASED
ENTER THE VERT OUTPUT FILE YOU WANT TO ACCESS

ENTER FILENAME ONLY

.voco30p1

EDIT:
TOF:
EDIT:
.t17_
```

17 Records of the output file from the "VIC030P1" Run is to be listed

```
TOF:
1COBRA-30MM PROGRAM—PROGRAM ALTERNATIVE 1
0PROBLEM IDENTIFICATION CARD OPTION————————————————————————          1
0TYPE OF INPUT OPTION——————————————————————————————————————          0
0TYPE OF OUTPUT OPTION—————————————————————————————————————          4
0COSTING AND PRUNING OPTION————————————————————————————————          0
0FULL PRINT TRIP OPTION————————————————————————————————————          0
0CORRELATION COMPUTATION AND PLOT OPTION———————————————————          0
0COST—PERFORMANCE TIME INTERVAL OPTION—————————————————————          1
0COMPOSITE TERMINAL NODE MINIMUMS AND MAXIMUMS OPTION——————          0
0MEAN PRINT ORDER——————————————————————————————————————————          0
```

mean print opt. not selected

```
0INITIAL SEED——————————————————————————————————————————————     435459
0NUMBER OF ITERATIONS——————————————————————————————————————        500
```

500 iterations selected

```
0YEARLY INTEREST RATE USED FOR INFLATION ADJUSTMENTS———————        0.0
0YEARLY INTEREST RATE USED FOR PRESENT VALUE DISCOUNTING———        0.0
0TIME FACTOR WHICH CONVERTS PROGRAM TIME TO A YEARLY BASE——        0.0
0                                 TIME      COST      PERF
.b
```

Go to the bottom of the file

```
0    LAST RANDOM NUMBER SEED =     302426683
```

last record in the file since the mean print option was not selected

```
.quit_
```

get out of the output file

ENTER YES/NO FOR ROUTING
.yes ← Pages G-73 through G-100 show this printout.

ENTER THE NUMBER OF COPIES YOU WANT
.1

PRT FILE 0198 TO OSMVT COPY 001 NOHOLD

DO YOU WANT TO ERASE ANY OUTPUT FILES ?

ENTER YES/NO
.yes

ENTER THE VERT OUTPUT FILE YOU WANT TO ERASE

ENTER FILENAME ONLY — the output file is erased since it is no longer need
.voco30p1 ←

FP8ABB IS HASP JOB 8435 ← Job number for the printout of the "VICO30P1" Run.
DO YOU WANT TO ERASE ANY MORE OUTPUT FILES ?

ENTER YES/NO
.no_

```
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

   1    =  RUN VERT ONLINE

   2    =  RUN VERT OFFLINE (CMS BATCH)

   3    =  VIEW VERT OUTPUT

   4    =  CREATE A VERT INPUT FILE

   5    =  EDIT AN EXISTING VERT INPUT FILE

   6    =  GET VERT NETWORK PLOT MENU

   7    =  GET VERT GRAPH MENU

  LIST  =  GET VERT DATASETS DISPLAY LISTING MENU

  END   =  END THE SESSION

.7_
```

Item 7 is selected

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES
2	=	CREATE A VERT GRAPHICS DATA FILE
3	=	EDIT AN EXISTING VERT GRAPHICS DATA FILE
4	=	DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY
5	=	SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS FOR THE COBRA FACTS DRA)
R	=	RETURN TO THE MAIN MENU LEVEL
END	=	END THE SESSION

.1_

Camera-Ready Graphs Are to be Displayed for the two offline runs just completed.

ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO
.yes

DID YOU RUN VERT ONLINE ? ENTER YES/NO
.no

HAVE ALL VERT OFFLINE JOBS COMPLETED ? ENTER YES/NO
.yes

'194 E/A' RELEASED

ENTER THE SIX CHARACTER UNIQUE FILENAME FOR THE VERT JOB RUN

.ltugn1 6 characters max, less than 6 may be entered

the graphs from the Large Tug Run are to be displayed first.

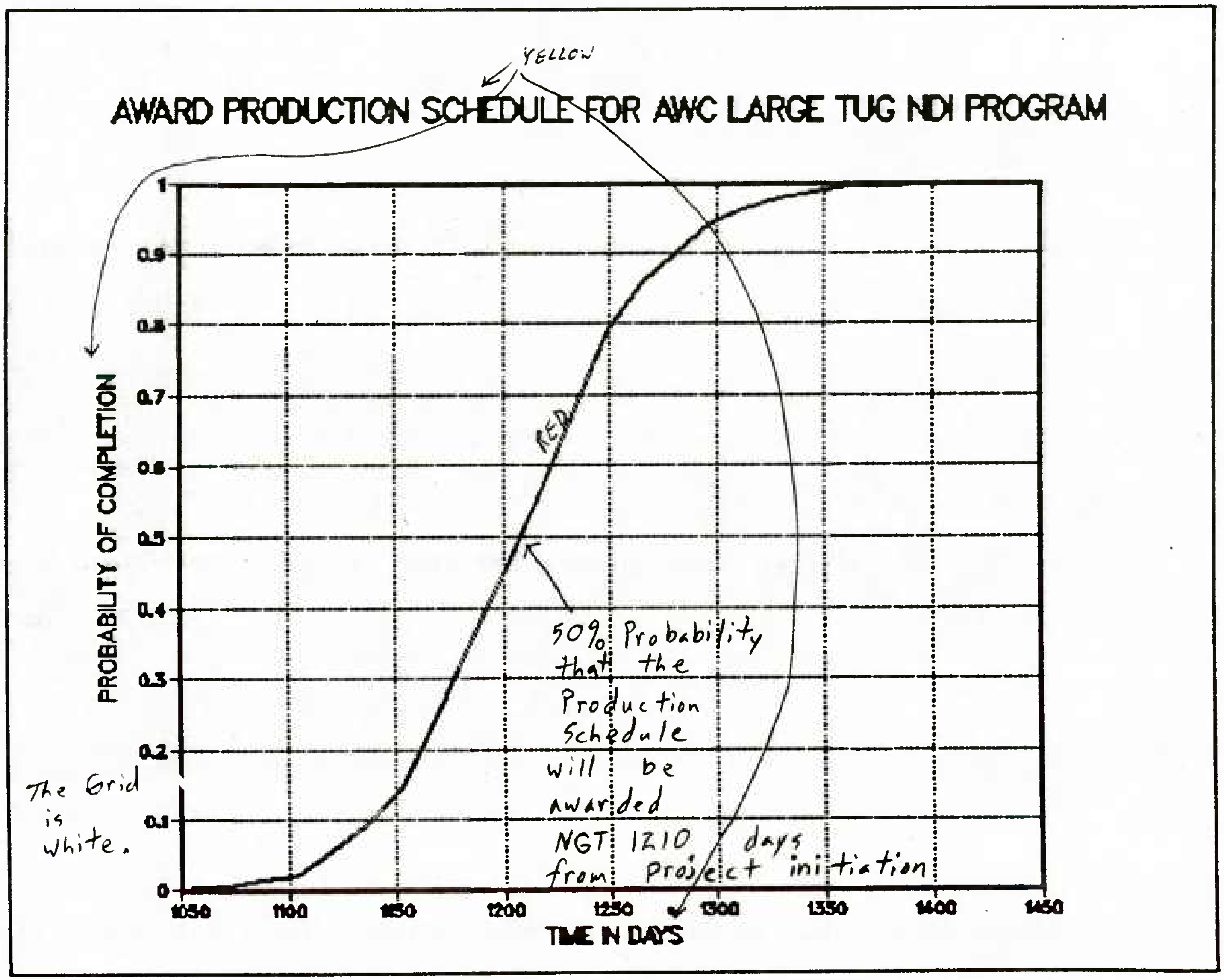
EDIT:
TOF:
BANKDATA.
AWDPRODS

The name of the first graph to be displayed. Compare the following graph with page G-61 of this appendix to see the difference of a "camera-ready" graph.

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'award production schedule for awc large tug ndi program'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'time in days'._

after completing this entry, the CRT screen will be cleared automatically.



Depress "RETURN" button to continue. The CRT screen will be cleared automatically.

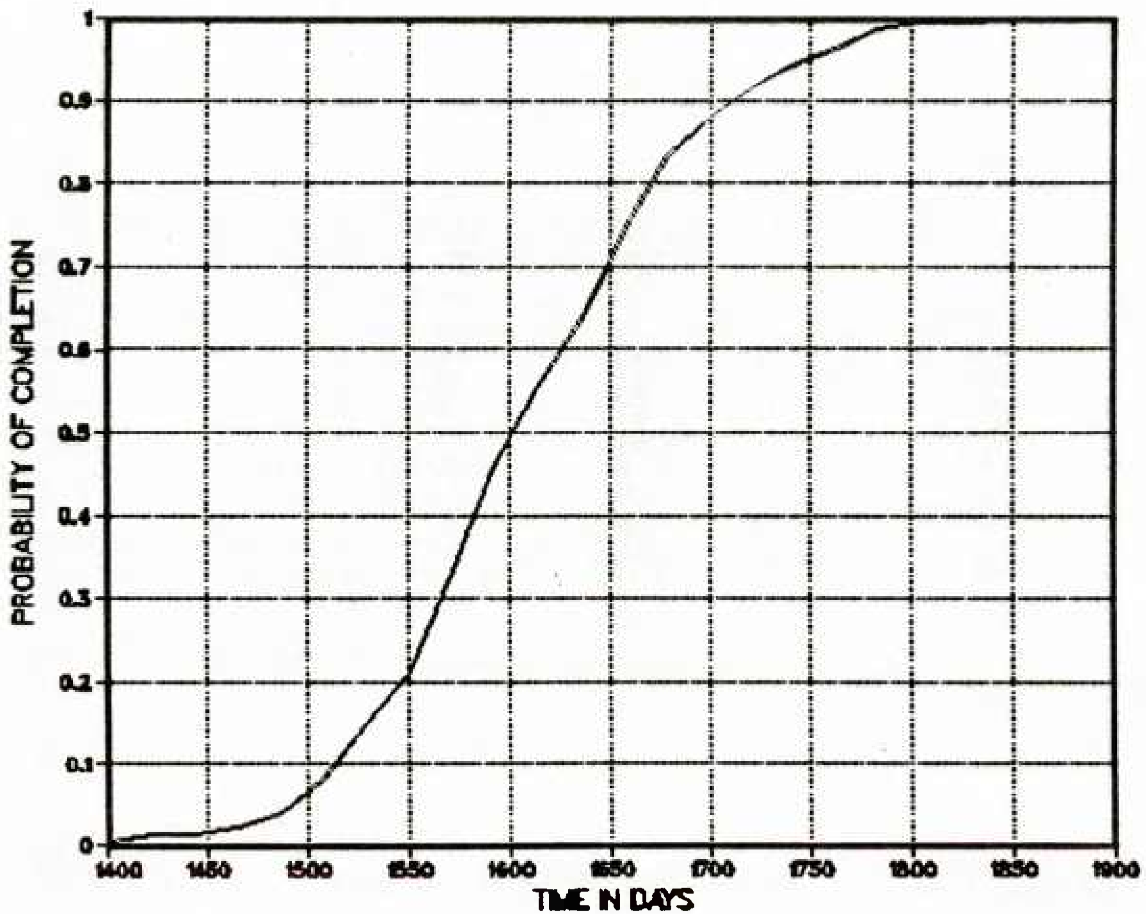
```
END OF TELL-A-GRAF 4.0 --    8188 VECTORS GENERATED IN    1 PLOT FRAMES.
         PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
AWDPROD$
EDIT:
TOF:
BANKDATA.
DELCRF1$
```

The second graph to be displayed

```
ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'schedule for delivery of first awc large tug craft'.


ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'time in days'._
```

SCHEDULE FOR DELIVERY OF FIRST AWC LARGE TUG CRAFT



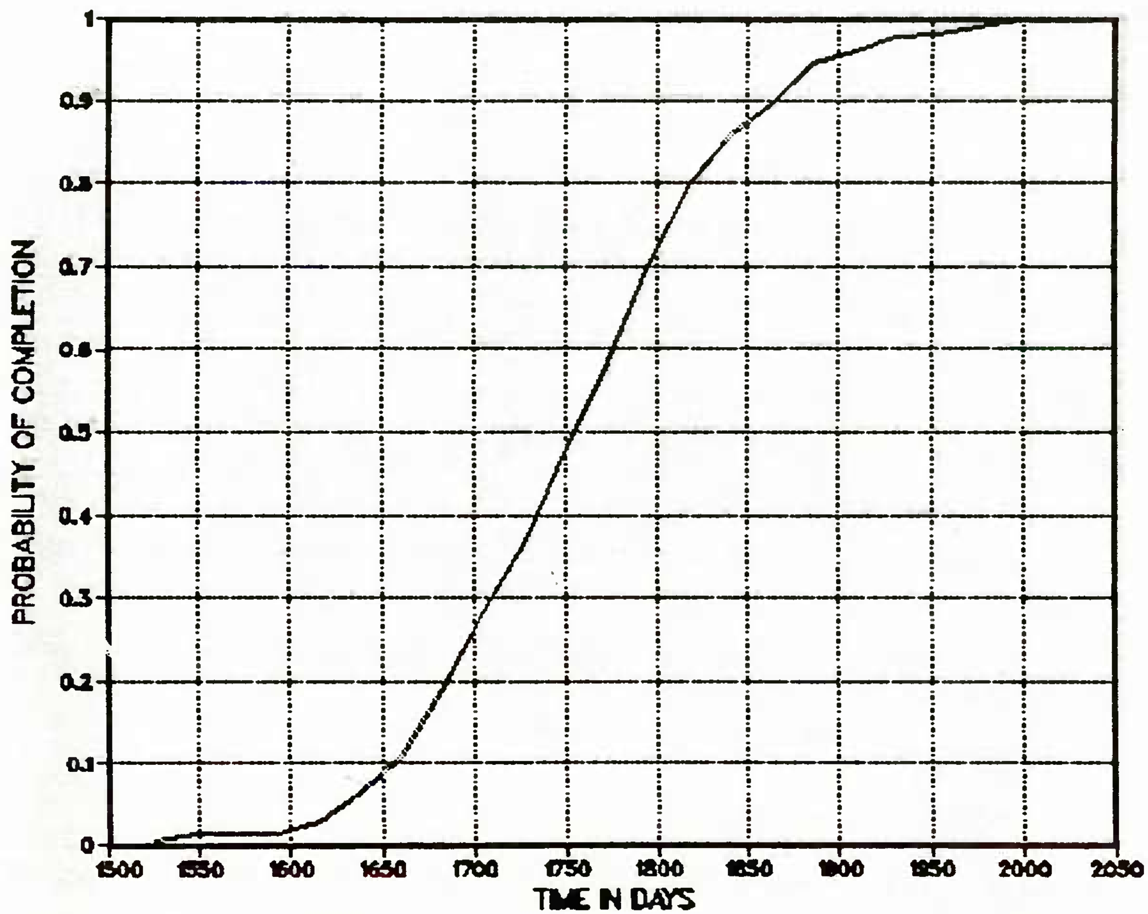
END OF TELL-A-GRAF 4.0 — 8892 VECTORS GENERATED IN 1 PLOT FRAMES.
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:
EDIT:
DELCRF1$
EDIT:
TOF:
BANKDATA.
IOC$ ← The third graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'initial operational capability schedule for awc large tug ndi program'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'time in days'._

INITIAL OPERATIONAL CAPABILITY SCHEDULE FOR AWC LARGE TUG NDI PROGRAM



END OF TELL-A-GRAF 4.0 — 9644 VECTORS GENERATED IN 1 PLOT FRAMES.
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.

EDIT:
EDIT:
IOC$
EOF:
INPUT FILE 'VBLTUGN1 DATA W1' NOT FOUND.

No more graphs to be displayed for the "VILTUGN1" Run.

DO YOU WANT TO DISPLAY GRAPHS FOR ANOTHER VERT JOB RUN OFFLINE

ENTER YES/NO
.yes

ENTER THE SIX CHARACTER UNIQUE FILENAME FOR THE VERT JOB RUN

.co30p1_

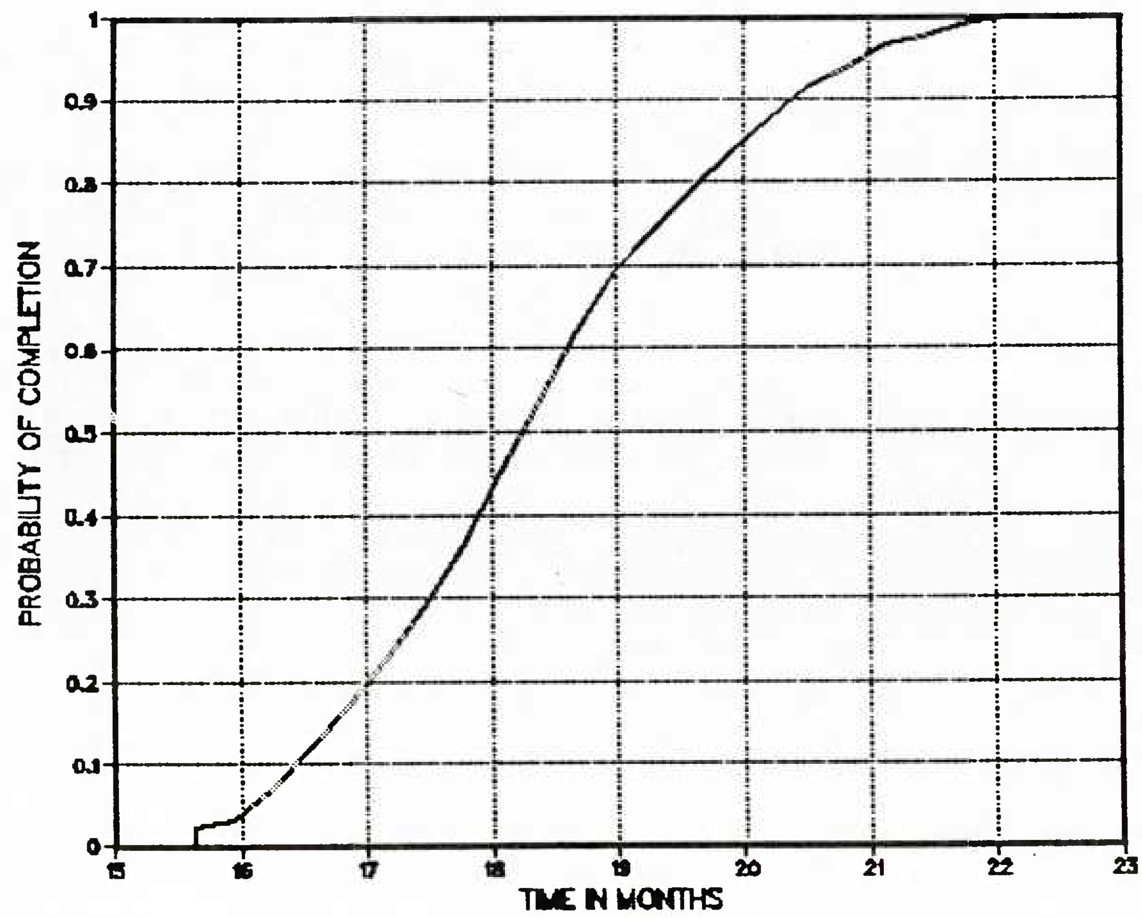
The six graphs (3 for each node selected since the "VICO30P1" input file contains cost information) for the "VICO30P1" RUN are TO BE Displayed.

EDIT:
TOF:
BANKDATA.
C030TIMES$ ← The name of the First Graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'cobra 30mm system integration dra schedule'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'time in months'._

COBRA 30MM SYSTEM INTEGRATION DRA SCHEDULE

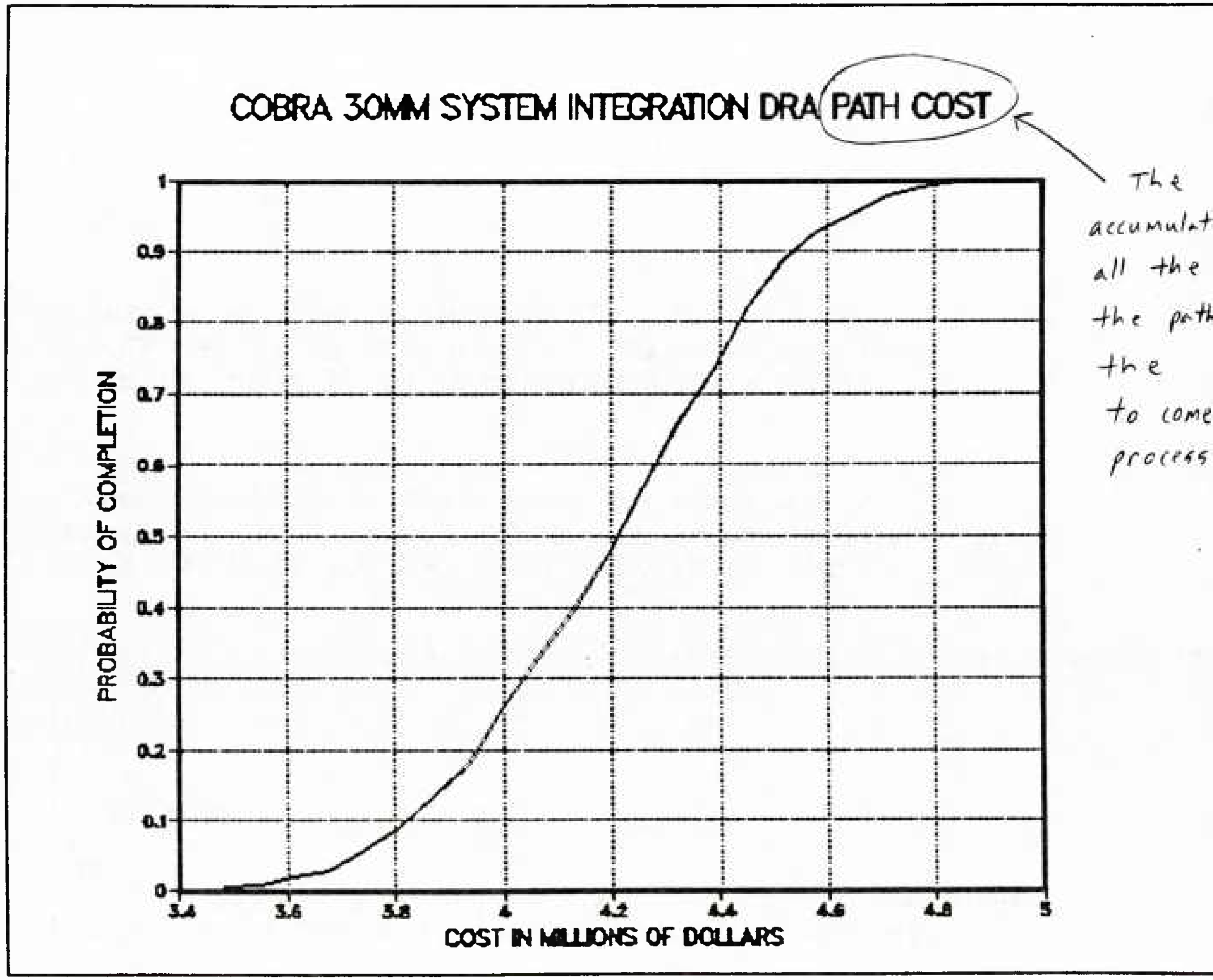


```
END OF TELL-A-GRAF 4.0 —     7531 VECTORS GENERATED IN     1 PLOT FRAMES.
        PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
CO30TIME$
EDIT:
TOF:
BANKDATA.
CO30PCOST$
```

The name of the second graph to be displayed

```
ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'cobra 30mm system integration dra path cost'.


ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'cost in millions of dollars'._
```

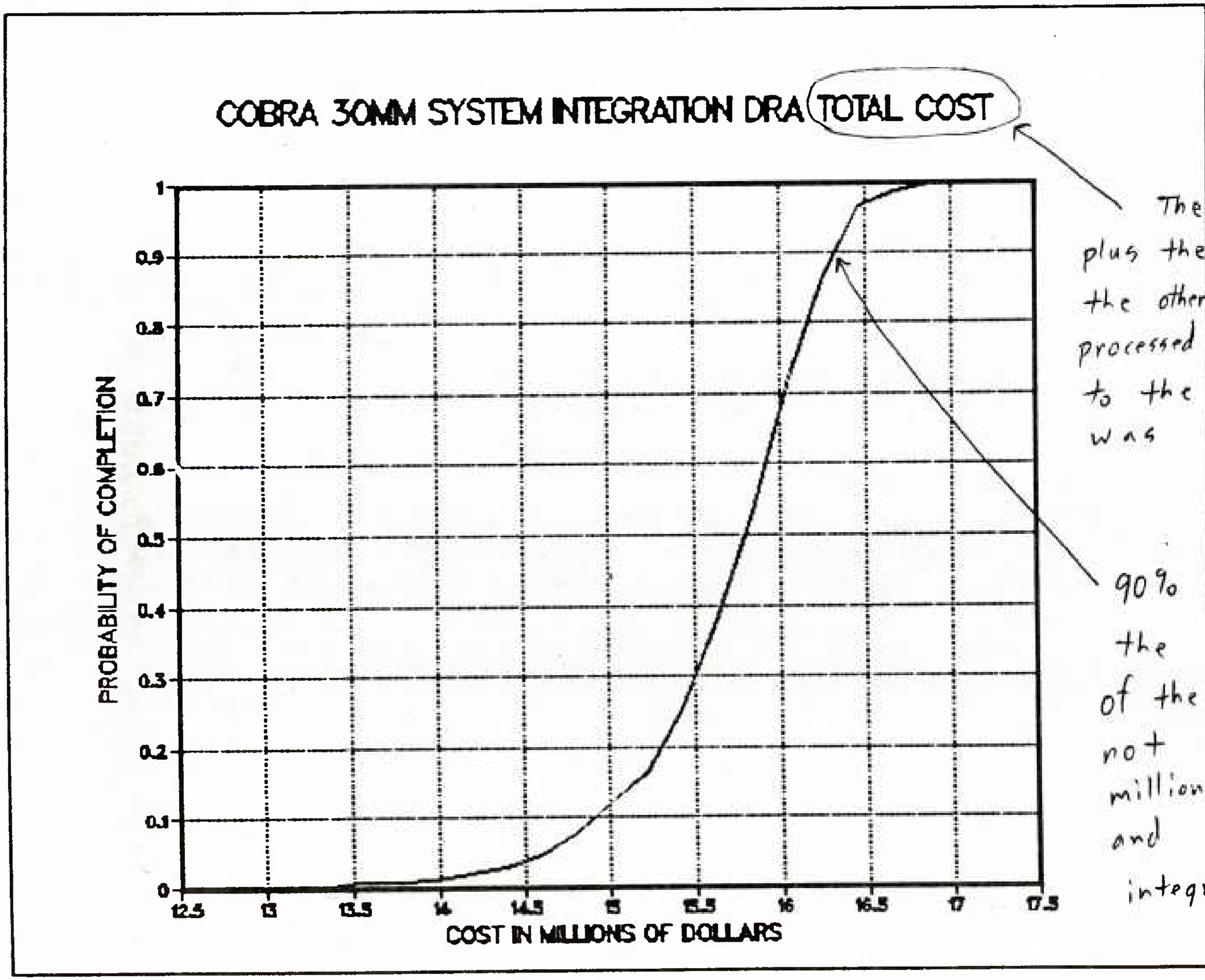


The total cost accumulated in processing all the activities on the path(s) through which the network flow(s) had to come in order to process this node

END OF TELL-A-GRAF 4.0 —   7917 VECTORS GENERATED IN   1 PLOT FRAMES.
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
CO30PCOST$
EDIT:
TOF:
BANKDATA.
CO30TCOST$ The third graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'cobra 30mm system integration dra total cost'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'cost in millions of dollars'._



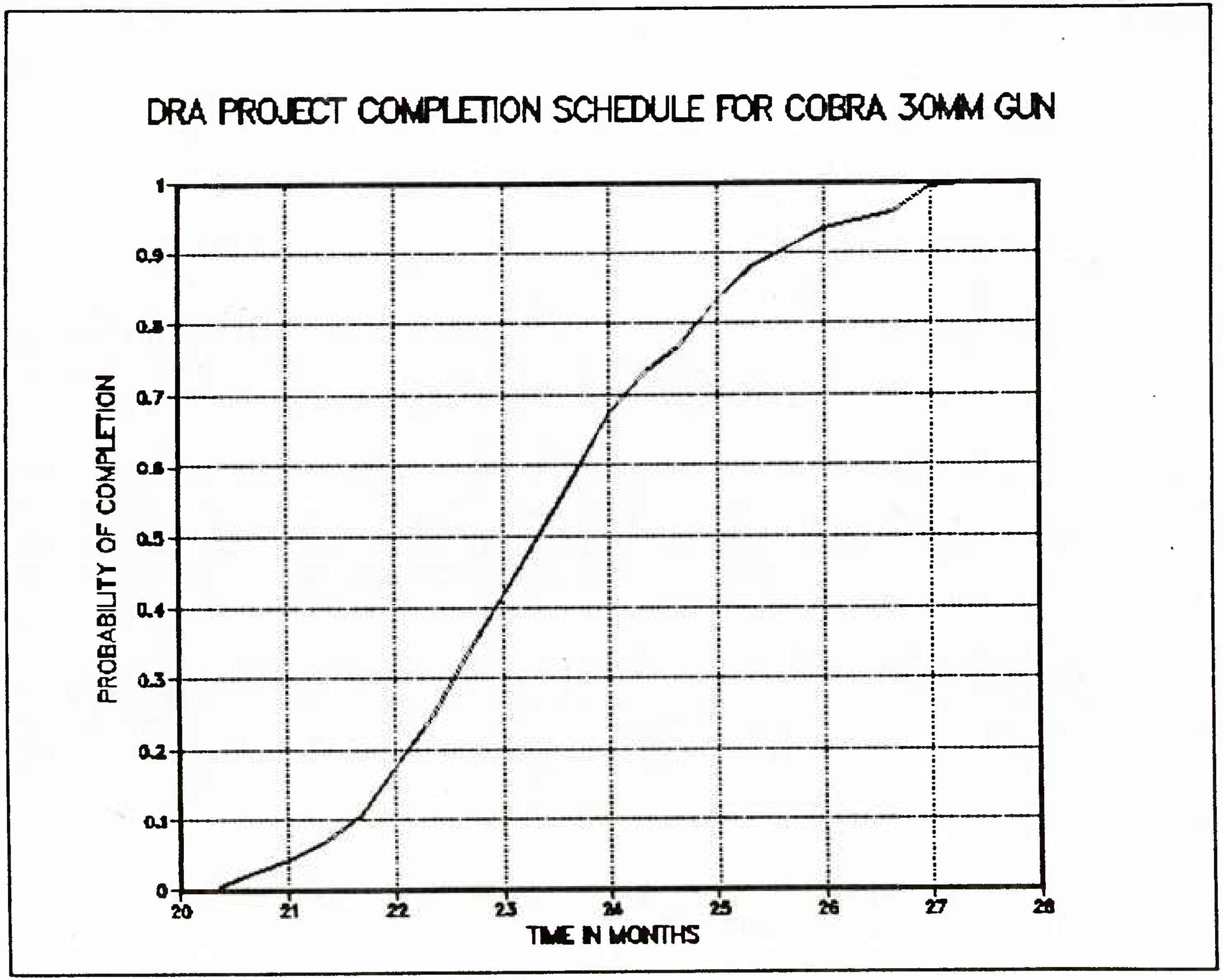
The path cost plus the cost of all the other activities processed during and prior to the time this node was processed.

90% Probability that the total cost of the project will not exceed 16.4 million dollars up to and including system integration.

END OF TELL-A-GRAF 4.0 — 8618 VECTORS GENERATED IN 1 PLOT FRAMES.
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
CO30TCOST$
EDIT:
TOF:
BANKDATA.
COENDTIME$ ← the fourth graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'dra project completion schedule for cobra 30mm gun '.

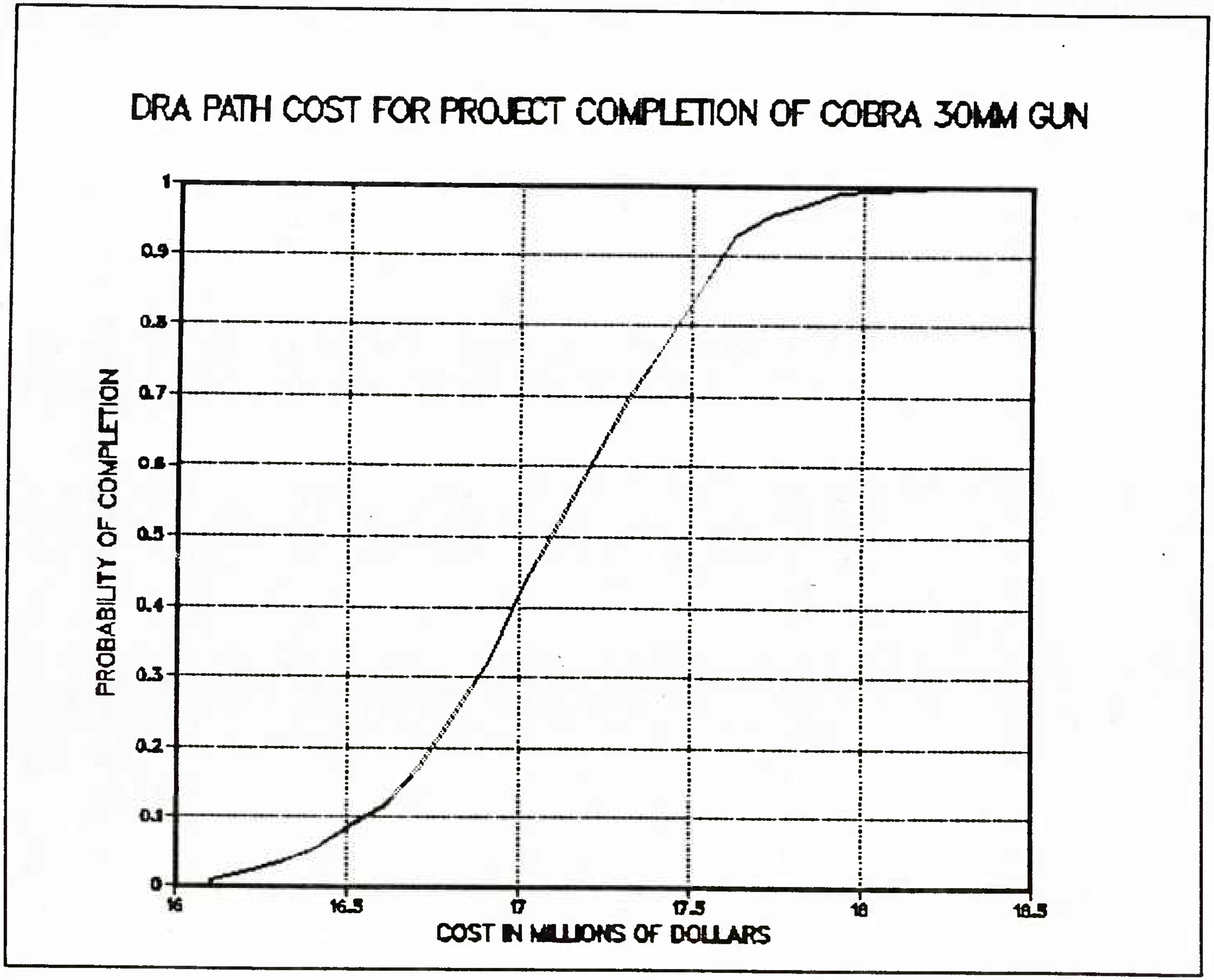
ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'time in months'._


DRA PROJECT COMPLETION SCHEDULE FOR COBRA 30MM GUN
PROBABILITY OF COMPLETION
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
20
21
22
23
24
25
26
27
28
TIME IN MONTHS

END OF TELL-A-GRAF 4.0 — 7764 VECTORS GENERATED IN 1 PLOT FRAMES.
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
COENDTIME$
EDIT:
TOF:
BANKDATA.
COENDPCOST$ ← The fifth graph to be displayed

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'dra path cost for project completion of cobra 30mm gun'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'cost in millions of dollars'._

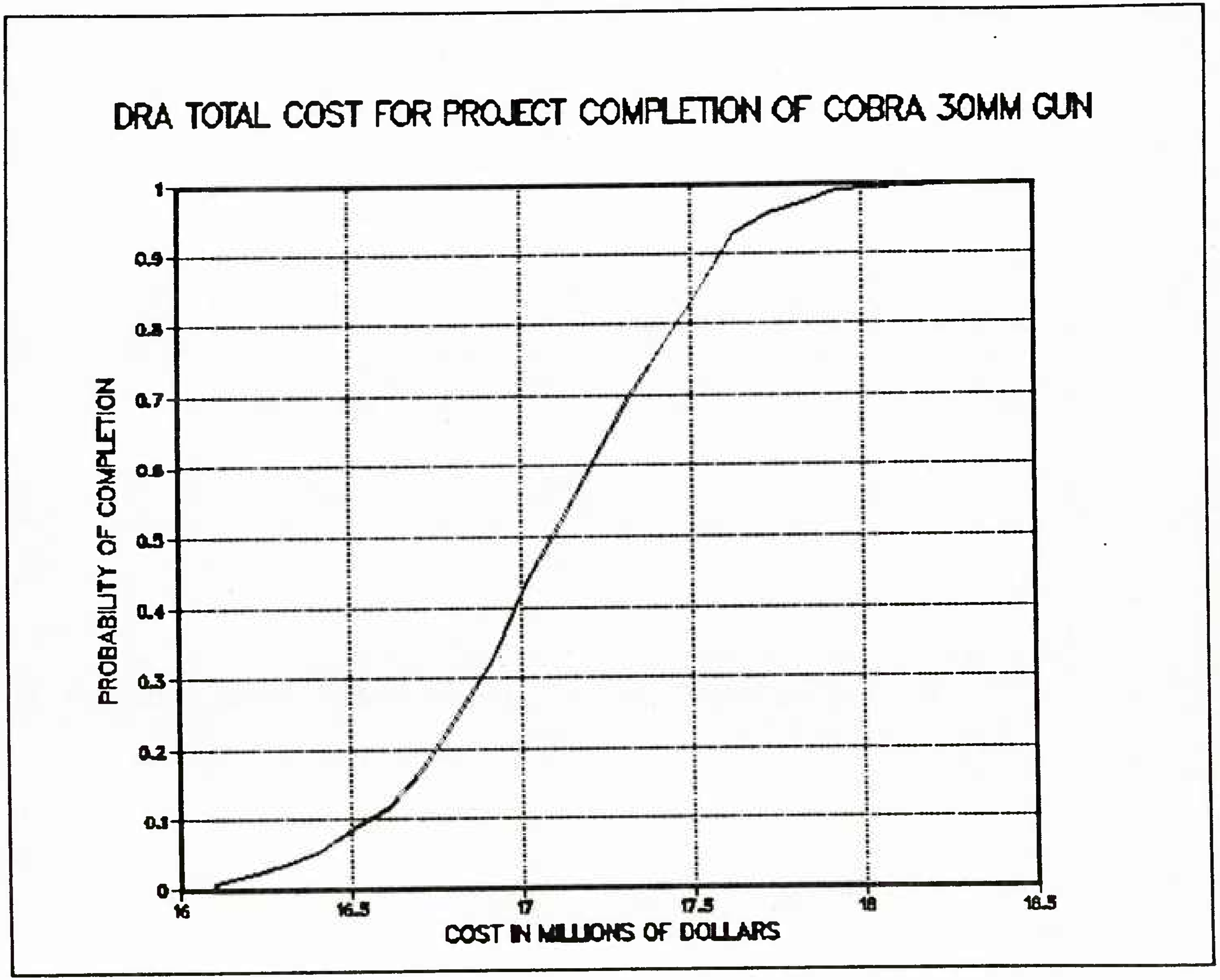

DRA PATH COST FOR PROJECT COMPLETION OF COBRA 30MM GUN
PROBABILITY OF COMPLETION
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
16
16.5
17
17.5
18
18.5
COST IN MILLIONS OF DOLLARS

```
END OF TELL-A-GRAF 4.0 --    7256 VECTORS GENERATED IN    1 PLOT FRAMES.
        PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
COENDPCOST$
EDIT:
TOF:
BANKDATA.
COENDTCOST$
```

The final graph to be displayed

```
ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'dra total cost for project completion of cobra 30mm gun'.


ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'cost in millions of dollars'._
```


DRA TOTAL COST FOR PROJECT COMPLETION OF COBRA 30MM GUN
PROBABILITY OF COMPLETION
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
16
16.5
17
17.5
18
18.5
COST IN MILLIONS OF DOLLARS

```
END OF TELL-A-GRAF 4.0 —     7276 VECTORS GENERATED IN    1 PLOT FRAMES.
         PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
COENDTCOST$
EOF:
INPUT FILE 'VBC030P1 DATA W1' NOT FOUND.
```

← No more graphs to be display for the "VIC030P1" Run

```
DO YOU WANT TO DISPLAY GRAPHS FOR ANOTHER VERT JOB RUN OFFLINE

ENTER YES/NO
.no_
```

A "NO" is Entered since only 2 offline jobs were run

E (194) R/O
SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

1 = DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES

2 = CREATE A VERT GRAPHICS DATA FILE

3 = EDIT AN EXISTING VERT GRAPHICS DATA FILE

4 = DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY

5 = SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS FOR THE COBRA FACTS DRA)

R = RETURN TO THE MAIN MENU LEVEL

END = END THE SESSION

.end The session is concluded

R; Back in CMS "READY" mode

._

```
AWC DRA REVISED NDI LARGE TUG PROGRAM

PROBLEM IDENTIFICATION CARD OPTION------------------------                 1

TYPE OF INPUT OPTION--------------------------------------                 0

TYPE OF OUTPUT OPTION-------------------------------------                 4

COSTING AND PRUNING OPTION--------------------------------                 0

FULL PRINT TRIP OPTION------------------------------------                 0

CORRELATION COMPUTATION AND PLOT OPTION-------------------                 0

COST-PERFORMANCE TIME INTERVAL OPTION---------------------                 1

COMPOSITE TERMINAL NODE MINIMUMS AND MAXIMUMS OPTION-------                0

MEAN PRINT ORDER------------------------------------------                 1

INITIAL SEED----------------------------------------------            435459

NUMBER OF ITERATIONS--------------------------------------               250

YEARLY INTEREST RATE USED FOR INFLATION ADJUSTMENTS--------              0.0

YEARLY INTEREST RATE USED FOR PRESENT VALUE DISCOUNTING----              0.0

TIME FACTOR WHICH CONVERTS PROGRAM TIME TO A YEARLY BASE---              0.0

                                    TIME      COST      PERF

TERMINAL NODE SELECTION WEIGHTS     1.00      0.0       0.0

CRITICAL - OPTIMUM PATH WEIGHTS     1.00      0.0       0.0

INITIAL VALUES                      0.0       0.0       0.0


COST-PERFORMANCE TIME INTERVAL DATA

0.0        6.0
6.0        12.0
12.0       18.0
18.0       24.0
24.0       30.0
0.0        30.0
ENDCTPR


PRSTROC START    APPROC   1.00 PREPARE AND STAFF ROC - TRADOC
PRSTROC DTIME 1           3      150.0      320.0      180.0

LCGRCC  START    APPROC   1.00 COORDINATE AND ESTAB LOG RQMTS - TSARCOM
LCGRCC  DTIME 1           3      150.0      180.0      170.0

IEPTECOMAPPROC   NDIWG1   1.00 PREPARE IEP - TECOM
IEPTECOMDTIME 1           3       30.0      120.0       60.0
```

```
IEPTRADCAPPROC  NDIWG1  1.00 PREPARE IEP - TRADOC
IEPTRADCDTIME 1          3        30.0       90.0       60.0

MKTSVY  NDIWG1  COMPL-MS1.00 CONDUCT MARKET SURVEY AND PREPARE
MKTSVY  DTIME 1          3        30.0       60.0       45.0

USERSVY COMPL-MSCOMPL-US1.00 CONDUCT USER SURVEY AND PREPARE REPORT
USERSVY DTIME 1          3        30.0       60.0       45.0

PREPRPT COMPL-USCOMPLRPT1.00 PREPARE AND COMPLETE MKT/USER SURVEY RESULTS REPORT
PREPRPT DTIME 1          3        60.0      120.0       90.0

EVALLOG COMPLRPTPREIPR  1.00 EVALUATE LOGISTICS CONSIDERATIONS
EVALLOG DTIME 1          3        15.0       60.0       30.0

IERTECOMCOMPLRPTPREIPR  1.00 PREPARE IER - TECOM
IERTECOMDTIME 1          3        15.0       60.0       40.0

IERTRADCCOMPLRPTPREIPR  1.00 PREPARE IER - TRADOC
IERTRADCDTIME 1          3        15.0      120.0       60.0

PPQQPRI APPROC  PREIPR  1.00 PREPARE PROVISIONAL QQPRI
PPQQPRI DTIME 1          3        10.0       45.0       24.0

DRAFTPMPAPPROC  PREIPR  1.00 PREPARE DRAFT ACQUISITION PLAN
DRAFTPMPDTIME 1          3        90.0      210.0      120.0

DRAFTMACAPPROC  PREIPR  1.00 PREPARE DRAFT MACI PROGRAM PLAN
DRAFTMACDTIME 1          3        45.0      120.0       60.0

C&ECHARTAPPROC  C&EEST  1.00 C&E EVALUATION TEAM CHARTERED
C&ECHARTDTIME 1          3        30.0      120.0       60.0

CEEVALPLC&EEST  INITCESY1.00 COMPLETE COMMUNICATION ELECTRONICS EVALUATION PLAN
CEEVALPLDTIME 1          3         5.0       30.0       10.0

C&ESVY  INITCESYCOMPL-CE1.00 PERFORM C&E EVALUATION SURVEY
C&ESVY  DTIME 1          3        60.0      120.0       90.0

C&ERPT  COMPL-CESTARTNDI1.00 PREPARE AND COMPLETE C&E SURVEY REPORT
C&ERPT  DTIME 1          3        15.0       60.0       30.0

R&DPRCG MADP-I  STARTR&D1.00 PREPARE FOR R&D PROGRAM
R&DPRCG DTIME 1          1        30.0
R&DPRCG MTIME 1      0.05                                                 815

MACIPROGMADP-I  STARTMAC1.00 PREPARE FOR MACI PROGRAM
MACIPROGDTIME 1          1        30.0
MACIPROGMTIME 1      0.05                                                 815

NDIDECSNMADP-I  STARTNDI1.00 APPROVE NDI DECISION
NDIDECSNDTIME 1          3        15.0       45.0       30.0
NDIDECSNMTIME 1      0.90                                                 815

IPRPKG  PREIPR  MADP-I  1.00 PREPARE AND STAFF IPR PACKAGE
IPRPKG  DTIME 1          3        45.0       90.0       60.0

PREPFPD STARTNDIPPINPUT 1.00 PREPARE FUNCTIONAL PURCHASE DESCRIPTION
PREPFPD DTIME 1          3        90.0      210.0      150.0
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PREFLCR STARTNCIFFINFUT 1.00 PREPARE LOGISTICS DATA REGUIREMENTS
PREFLCR CTIME 1          3       60.0       90.0       70.0

DRAFTPPKPPINPUT MADP-II 1.00 PREPARE DRAFT PROCUREMENT PACKAGE
DRAFTPPKDTIME 1          3       30.0       60.0       45.0

DRFTMP1 STARTNDIMADP-II 1.00 PREPARE INITIAL DRAFT MATERIEL PLAN
DRFTMP1 DTIME 1          3       50.0       80.0       60.0

UPDIERTESTARTNDIMADP-II 1.00 UPDATE IER - TECOM
UPDIERTEDTIME 1          3       30.0       90.0       60.0

UPDIERTRSTARTNDIMADP-II 1.00 UPDATE IER - TRADOC
UPDIERTRDTIME 1          3       30.0      120.0       90.0

PREPAPP STARTNDIAPINPUT 1.00 PREPARE ADVANCE PROCUREMENT PLAN
PREPAPP DTIME 1          3       90.0      150.0      120.0

FINNETPLSTARTNDIAPINPUT 1.00 FINALIZE NET PLAN
FINNETPLDTIME 1          3       30.0       90.0       60.0

DEPMNTPLSTARTNDIAPINPUT 1.00 FINALIZE DEPOT/CCNTR MAINT SUPPORT PLAN
DEPMNTPLDTIME 1          3       45.0       90.0       60.0

FINPROVPSTARTNDIAPINPUT 1.00 FINALIZE PROVISIONING PLAN
FINPROVPDTIME 1          3       60.0      120.0       90.0

FINQQPRISTARTNDIMADP-II 1.00 UPDATE AND FINALIZE QQPRI
FINQQPRIDTIME 1          3       60.0      180.0      120.0

FINAL-APAPINPUT MADP-II 1.00 FINALIZE AP
FINAL-APDTIME 1          3       30.0       60.0       45.0

DRAFTMFPMADP-II MFPDRAFT1.00 PREPARE DRAFT MATERIEL FIELDING PLAN
DRAFTMFPDTIME 1          3       50.0       80.0       60.0

ESTBNETTMADP-II EST-NETT1.00 ESTABLISH NETT
ESTBNETTDTIME 1          3      120.0      180.0      140.0

FINPPK  MADP-II ISSUERFP1.00 FINALIZE PROCUREMENT PACKAGE
FINPPK  DTIME 1          3      120.0      210.0      180.0

PREPPSLSISSUERFPRECPPSLS1.00 PREPARE PROPOSALS
PREPPSLSDTIME 1          3       30.0       90.0       60.0

EVAL-FFPRECPPSLSINIT-NEG1.00 EVALUATE HARDWARE/SOFTWARE PROPOSALS
EVAL-FFPDTIME 1          3       30.0       90.0       60.0

NEG-FFP INIT-NEGCOMPLNEG1.00 COMPLETE FIRM FIXED PRICE CONTRACT NEGOTIATIONS
NEG-FFP DTIME 1          3       24.0       40.0       30.0

PREAWDSYCOMPLNEGSVYCOMPL1.00 COMPLETE PRE-AWARD SURVEY FFP CONTRACT
PREAWDSYDTIME 1          3       24.0       60.0       30.0

PRCD-AWDSVYCOMPLAWDPROD 1.00 AWARD PRODUCTION FIRM FIXED PRICE (FFP) CONTRACT
PRCD-AWDDTIME 1          3       24.0       45.0       30.0

EVAL-BOASVYCOMPLAWD-BOA 1.00 EVALUATE BOA PROPOSALS
EVAL-BOADTIME 1          3       30.0       60.0       45.0
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EVAL-CLSSVYCOMPLAWD-CLS 1.00 EVALUATE CLS PROPOSALS
EVAL-CLSDTIME 1          3      30.0       60.0       45.0

COMPLTMSAWDPROD DUMMY1  1.00 PREPARE COMMERCIAL TMS
COMPLTMSDTIME 1          3     120.0      210.0      160.0

FABCRF1 AWDPROD DELCRF1 1.00 FABRICATE FIRST CRAFT
FABCRF1 DTIME 1          3     270.0      540.0      420.0

PROVISNGAWDPROD FULL-REL1.00 ACCOMPLISH FULL PROVISIONING
PROVISNGDTIME 1          3     720.0     1440.0     1080.0

ASL/PLL AWD-BOA COMP-ASL1.00 ESTABLISH ASL/PLL
ASL/PLL DTIME 1          3      85.0      120.0       90.0

ESTABCLSAWD-CLS CLSFAC  1.00 ESTABLISH CLS FACILITY
ESTABCLSDTIME 1          3     100.0      180.0      140.0

COORDMFPMFPDRAFTMFPCOORD1.00 COORDINATE MFP
COORDMFPDTIME 1          3      90.0      120.0       90.0

FIN-MFP MFPCOORDMFPCOMPL1.00 PUBLISH  MFP
FIN-MFP DTIME 1          3      80.0      120.0       90.0

TRNCREW1EST-NETTACCPT1  1.00 TRAIN INITIAL CREW
TRNCREW1DTIME 1          1    10.0

SUPPLTMSDUMMY1  ACPT-TMS1.00 SUPPLEMENT COMMERCIAL MANUALS (VERIFICATION)
SUPPLTMSDTIME 1          3      90.0      180.0      150.0

TMLEAD1 DUMMY1  DELCRF1 1.00S90-DAY TM LEAD TIME
TMLEAD1 DTIME 1          1       90.0

TRIALS  DELCRF1 TESTCR1 1.00 CONDUCT DOCK/SEA TRIALS
TRIALS  DTIME 1          3      10.0       30.0       15.0

CORRECTNTESTCR1 ACCPT1  1.00 CORRECT TEST-IDENTIFIED DEFICIENCIES
CORRECTNDTIME 1          3       0.0       90.0       30.0

LTRPTTECTESTCR1 ACCPT1  1.00 PREPARE LETTER REPORT - TECOM
LTRPTTECDTIME 1          3      15.0       90.0       45.0

LTRPTTRATESTCR1 ACCPT1  1.00 PREPARE LETTER REPORT - TRADOC
LTRPTTRADTIME 1          3      30.0      120.0       45.0

ASLLEADTCOMP-ASLACCPT1  1.00S30-DAY ASL LEAD TIME
ASLLEADTDTIME 1          1       30.0

CLSLEADTCLSFAC  ACCPT1  1.00S30-DAY CLS LEAD TIME
CLSLEADTDTIME 1          1       30.0

TMLEAD2 ACPT-TMSCOND-REL1.00S30-DAY TM LEAD TIME
TMLEAD2 DTIME 1          1       30.0

REL-LEADACCPT1  COND-REL1.00 PREPARE MATERIEL RELEASE PKG - CONDITIONAL
REL-LEADDTIME 1          3      30.0       90.0       45.0

MFP-LEADMFPCOMPLIOC     1.00S6-MONTH LEAD TIME
MFP-LEADDTIME 1          1     180.0
```

```
ACCPTREMACCPT1  FINALDEL1.00 ACCEPT REMAINING CRAFT - QUANTITY DEPENDENT (TWO)
ACCPTREMOTIME 1          3     180.0      360.0      270.0

TAG-TMS ACPT-TMSFULL-REL1.00 PREPARE AUTHENTICATED TAG MANUALS
TAG-TMS OTIME 1          3     120.0      310.0      180.0

USE-BOA COMP-ASLFULL-REL1.00 UTILIZE BOA - DUMMY ACTIVITY
USE-BOA OTIME 1          1       1.0

FRELLEADCOND-RELFULL-REL1.00 PREPARE FULL RELEASE PACKAGE
FRELLEADOTIME 1          3      30.0       90.0       45.0

IOCLEAD2COND-RELIOCLEAD 1.00SLEAD TIME FROM COND REL TO IOC - TO FIND SLACK
IOCLEAD2DTIME 1          1       1.0

IOCLEAD1FULL-RELIOCLEAD 1.00SLEAD TIME FROM FULL REL TO IOC - TO FIND SLACK
IOCLEAD1OTIME 1          1       1.0

LEAD-IOCIOCLEAD IOC     1.00SLOGIC TO PERMIT SHORTEST LEAD TIME FROM FULL/CONREL
LEAD-IOCOTIME 1          1       1.0

MTSP-FOEACCPT1  INIT-FOE1.00 PREPARE MTSP FOR FOE
MTSP-FOEDTIME 1          3      60.0      120.0       70.0

IEP-FOE STARTIEPINIT-FOE1.00 PREPARE IEP FOR FOE - TRADOC
IEP-FOE DTIME 1          3      90.0      180.0      120.0

PERF-FOEINIT-FOECOMPLFOE1.00 PERFORM FOE
PERF-FOEDTIME 1          3      30.0       90.0       45.0

FOE-IER COMPLFOECOMPLIER1.00 PREPARE IER FOR FOE - TRADOC
FOE-IER DTIME 1          3      45.0       50.0       65.0

STAFFIERCOMPLIERCOORDCNF1.00 STAFF INDEPENDENT EVALUATION REPORT(IER)
STAFFIERDTIME 1          3      50.0       90.0       60.0

FLDIPRPKCOORDCNFFLDGIPR 1.00 STAFF THE FIELDING IPR PACKAGE
FLDIPRPKDTIME 1          3      75.0      120.0       90.0

FLRELDOCFLDGIPR FULL-REL1.00 STAFF THE FULL-RELEASE DOCUMENTATION
FLRELDOCDTIME 1          3      35.0       75.0       35.0

ENDARC

START    1  2                  START PROGRAM, ROC AND LOGISTICS RQMTS

APPROC   2  2                  APPROVE ROC

NDIWG1   2  2                  CONVENE NDI WORKING GROUP

COMPL-MS2   2                  COMPLETE MARKET SURVEY

COMPL-US2   2                  COMPLETE USER SURVEY

COMPLRPT2   2                  COMPLETE EVALUATION OF FFP CONTRACT PROPOSALS

PREIPR   2  2                  RECEIVE IPR INPUT, START IPR PACKAGE

MADP-I   2  3                  CONVENE MADP-I (IPR)
```

C&EEST	2	2		COMPLETE COMMUNICATIONS & ELECTRONICS (C&E) CHART
INITCESY	2	2		COMPLETE C&E EVALUATION PLANNING
COMPL-CE	2	2		COMPLETE C&E ACTION FOR C&E REPORT
STARTR&O	2	1		COMMENCE R&O PROGRAM
STARTNOI	2	2		COMMENCE NOI PROGRAM
STARTMAC	2	1		COMMENCE MACI PROGRAM
PPINPUT	2	2		COMPLETE INPUTS TO PROCUREMENT PACKAGE
APINPUT	2	2		COMPLETE INPUTS TO ACQUISITION PLAN
MADP-II	2	2		CONVENE MADP-II (IPR)
ISSUERFP	2	2		ISSUE RFP FOR HARDWARE,CLS BOA
RECPPSLS	2	2		RECEIVE PROPOSALS FROM PROSPECTIVE SUPPLIERS
INIT-NEG	2	2		COMPLETE INITIAL NEGOTIATIONS OF FFP CONTRACT
COMPLNEG	2	2		COMPLETE FINAL NEGOTIATIONS OF FFP CONTRACT
SVYCOMPL	2	2		COMPLETE SURVEY OF FFP CONTRACTOR
AWDPROD	2	216	1	AWARD PRODUCTION CONTRACT
AWD-BOA	2	2		AWARD BOA OPTION
AWD-CLS	2	2		AWARD CLS OPTION
DUMMY1	2	2		RECEIVE COMMERCIAL TMS
MFPDRAFT	2	2		COMPLETE DRAFT MATERIEL FIELDING PLAN
DELCRF1	2	216	2	DELIVER CRAFT 1
EST-NETT	2	2		NEW EQPT/IKPT ESTABLISHED
CLSFAC	2	2		CLS FACILITY COMPLETED
ACPT-TMS	2	2		ACCEPT INTERIM MANUALS (VERIFIED & SUPPLEMENTED)
COMP-ASL	2	2		COMPLETE ASL/PLL
TESTCR1	2	2		DOCK/SEA TRIALS COMPLETED
ACCPT1	2	2		ACCEPT FIRST CRAFT
MFPCOORD	2	2		COORDINATION OF MFP COMPLETE
MFPCOMPL	2	2		MFP COMPL
COND-REL	2	2		CONDITIONAL RELEASE
STARTIEP	1	2		TRADOC START IEP FOR FOE

```
FULL-REL2   2                    FULL RELEASE
IOCLEAD 4   2                    DUMMY NODE TO GET TO IOC
IOC      2  116                  INITIAL OPERATIONAL CAPABILITY
FINALDEL2   1                    FINAL CRAFT DELIVERED
INIT-FOE2   2                    INITIATE FOE
COMPLFOE2   2                    COMPLETE FOE
COMPLIER2   2                    COMPLETE IER FOR FOE
COORDCNF2   2                    COMPLETE STAFFING OF INDEPENDENT EVALUATION REPORT
FLDGIPR 2   2                    COMPLETE FIELDING IPR PACKAGE FOR FULL RELEASE
ENDNODE
W A R N I N G  NO.  6100  PARAMETER = FLRELDOC
W A R N I N G  NO.  6135  PARAMETER =
W A R N I N G  NO.  6140  PARAMETER =
W A R N I N G  NO.  6144  PARAMETER =
W A R N I N G  NO.  6166  PARAMETER =
W A R N I N G  NO.  6177  PARAMETER =
```

SLACK TIME FOR ARC TMLEAD1

```
                CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
     21.5085 I----I----I----I----I----I----I----I----I----I----I MIN
             I                                                   0.0
     21.5085 I
             I*                                                  0.014
     35.0253 I
             I**                                                 0.036
     48.5421 I
             I****                                               0.072
     62.0589 I
             I******                                             0.126
     75.5757 I
             I**********                                         0.198
     89.0925 I
             I***********                                        0.221
    102.6093 I
             I***************                                    0.293
    116.1260 I
             I******************                                 0.356
    129.6428 I
             I***********************                            0.455
    143.1596 I
             I***************************                        0.541
    156.6764 I
             I*******************************                    0.617
    170.1932 I
             I**********************************                 0.685
    183.7100 I
             I**************************************             0.766
    197.2267 I
             I*****************************************          0.829
    210.7435 I
             I*******************************************        0.869
    224.2603 I
             I**********************************************     0.910
    237.7771 I
             I***********************************************    0.946
    251.2939 I
             I*************************************************  0.973
    264.8105 I
             I*************************************************  0.986
    278.3271 I
             I**************************************************0.995
    291.8437 I
             I**************************************************0.995
    305.3604 I
             I**************************************************1.000
    318.8775 I
             I                                                   0.0
    318.8779 I----I----I----I----I----I----I----I----I----I----I MAX

             NO OBS------------      222  STD ERROR-         60.9546
             COEF OF VARIATION-     0.40  MEAN------        151.4569
             KURTOSIS (BETA 2)-     2.35  MEDIAN----        148.8708
             PEARSONIAN SKEW---     0.20  MODE------        139.4732
```

```
SLACK TIME FOR ARC ASLLEADT

           CFC  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
191.5183 I----I----I----I----I----I----I----I----I----I----I MIN
         I                                                   0.0
191.5183 I
         I                                                   0.005
205.4261 I
         I                                                   0.009
219.3339 I
         I*                                                  0.023
233.2417 I
         I**                                                 0.036
247.1495 I
         I**                                                 0.045
261.0571 I
         I*****                                              0.108
274.9648 I
         I********                                           0.162
288.8726 I
         I***********                                        0.212
302.7803 I
         I****************                                   0.311
316.6880 I
         I*******************                                0.383
330.5957 I
         I***********************                            0.459
344.5034 I
         I*********************** ***                        0.541
358.4111 I
         I*******************************                    0.626
372.3188 I
         I**********************************                 0.685
386.2266 I
         I*************************************              0.739
400.1343 I
         I****************************************           0.797
414.0420 I
         I*******************************************        0.865
427.9497 I
         I*********************************************      0.896
441.8574 I
         I***********************************************    0.937
455.7651 I
         I************************************************* 0.973
469.6729 I
         I**************************************************0.991
483.5806 I
         I**************************************************1.000
497.4902 I
         I                                                  0.0
497.4902 I----I----I----I----I----I----I----I----I----I----I MAX

         NO OBS------------       222  STD ERROR-         62.7602
         COEF OF VARIATION-      0.18  MEAN------        354.4253
         KURTOSIS (BETA 2)-      2.35  MEDIAN----        348.9656
         PEARSONIAN SKEW---      0.68  MODE------        311.7793
```

SLACK TIME FOR ARC CLSLEADT

```
          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
127.6682 I----I----I----I----I----I----I----I----I----I----I MIN
         I                                                  0.0
127.6682 I
         I                                                  0.005
142.4066 I
         I                                                  0.005
157.1450 I
         I*                                                 0.014
171.8833 I
         I*                                                 0.018
186.6217 I
         I*                                                 0.027
201.3601 I
         I****                                              0.081
216.0984 I
         I*****                                             0.099
230.8368 I
         I*******                                           0.135
245.5752 I
         I***********                                       0.221
260.3135 I
         I**************                                    0.284
275.0518 I
         I*******************                               0.374
289.7900 I
         I************************                          0.482
304.5283 I
         I***************************                       0.550
319.2666 I
         I******************************                    0.604
334.0049 I
         I***********************************               0.698
348.7432 I
         I**************************************            0.757
363.4814 I
         I*****************************************         0.815
378.2197 I
         I********************************************      0.887
392.9580 I
         I***********************************************   0.941
407.6963 I
         I************************************************  0.968
422.4346 I
         I**************************************************0.995
437.1729 I
         I**************************************************1.000
451.9126 I
         I                                                  0.0
451.9126 I----I----I----I----I----I----I----I----I----I----I MAX

         NO O S------------      222  STD ERROR-         62.6817
         COEF OF VARIATION-     0.20  MEAN------        311.9775
         KURTOSIS (BETA 2)-     2.46  MEDIAN----        305.9614
         PEARSONIAN SKEW---     0.28  MODE------        294.3247
```

SLACK TIME FOR ARC TMLEAD2

```
              CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
   63.8196 I----I----I----I----I----I----I----I----I----I----I MIN
           I                                                  0.0
   63.8196 I
           I                                                  0.005
   79.4527 I
           I**                                                0.036
   95.0858 I
           I***                                               0.063
  110.7190 I
           I****                                              0.086
  126.3521 I
           I*******                                           0.144
  141.9852 I
           I**********                                        0.203
  157.6184 I
           I**************                                    0.279
  173.2515 I
           I******************                                0.356
  188.8846 I
           I**********************                            0.432
  204.5178 I
           I****************************                      0.563
  220.1509 I
           I********************************                  0.640
  235.7840 I
           I**********************************                0.680
  251.4172 I
           I**************************************            0.757
  267.0503 I
           I****************************************          0.797
  282.6833 I
           I********************************************      0.878
  298.3164 I
           I**********************************************    0.914
  313.9495 I
           I***********************************************   0.946
  329.5825 I
           I************************************************* 0.973
  345.2156 I
           I**************************************************0.995
  360.8486 I
           I**************************************************0.995
  376.4817 I
           I**************************************************0.995
  392.1147 I
           I**************************************************1.000
  407.7488 I
           I                                                  0.0
  407.7488 I----I----I----I----I----I----I----I----I----I----I MAX

           NO OBS------------     222   STD ERROR-        67.8234
           COEF OF VARIATION-    0.31   MEAN------       216.4868
           KURTOSIS (BETA 2)-    2.48   MEDIAN----       214.1608
           PEARSONIAN SKEW---    0.06   MODE------       212.3343
```

SLACK TIME FOR ARC MFP-LEAD

```
                  CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
     328.0195 I----I----I----I----I----I----I----I----I----I----I MIN
              I                                                   0.0
     328.0195 I
              I*                                                  0.014
     344.2705 I
              I*                                                  0.023
     360.5215 I
              I*                                                  0.027
     376.7725 I
              I**                                                 0.036
     393.0234 I
              I***                                                0.059
     409.2744 I
              I*****                                              0.095
     425.5254 I
              I********                                           0.162
     441.7764 I
              I*************                                      0.252
     458.0273 I
              I*****************                                  0.338
     474.2783 I
              I*********************                              0.419
     490.5293 I
              I**************************                         0.518
     506.7803 I
              I******************************                     0.608
     523.0312 I
              I***********************************                0.698
     539.2822 I
              I****************************************           0.797
     555.5332 I
              I*******************************************        0.865
     571.7842 I
              I*********************************************      0.905
     588.0352 I
              I**********************************************     0.923
     604.2861
              I************************************************   0.950
     620.5371 I
              I************************************************   0.964
     636.7881 I
              I************************************************* 0.982
     653.0391 I
              I**************************************************0.995
     669.2900 I
              I**************************************************1.000
     685.5461 I
              I                                                   0.0
     685.5461 I----I----I----I----I----I----I----I----I----I----I MAX

              NO OBS-----------      222  STD ERROR-          65.9512
              COEF OF VARIATION-    0.13  MEAN------         504.8203
              KURTOSIS (BETA 2)-    3.04  MEDIAN----         505.1665
                                          MULTIMODAL DISTRIBUTION
```

NETWORK TIME FOR NODE AWDPROD

```
                 CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
       1055.3179 I----I----I----I----I----I----I----I----I----I----I MIN
                 I                                                    0.0
       1055.3179 I
                 I                                                    0.005
       1071.4277 I
                 I                                                    0.005
       1087.5376 I
                 I*                                                   0.014
       1103.6475 I
                 I*                                                   0.018
       1119.7573 I
                 I***                                                 0.054
       1135.8672 I
                 I*****                                               0.095
       1151.9771 I
                 I*******                                             0.144
       1168.0869 I
                 I************                                        0.243
       1184.1968 I
                 I*****************                                   0.347
       1200.3066 I
                 I**********************                              0.446
       1216.4165 I
                 I****************************                        0.554
       1232.5264 I
                 I**********************************                  0.671
       1248.6362 I
                 I***************************************             0.788
       1264.7461 I
                 I*******************************************         0.856
       1280.8560 I
                 I*********************************************       0.901
       1296.9658 I
                 I***********************************************     0.941
       1313.0757 I
                 I************************************************    0.964
       1329.1855 I
                 I*************************************************   0.977
       1345.2954 I
                 I*************************************************   0.986
       1361.4053 I
                 I**************************************************0.995
       1377.5151 I
                 I**************************************************0.995
       1393.6250 I
                 I**************************************************1.000
       1409.7366 I
                 I**************************************************1.000
       1409.7366 I----I----I----I----I----I----I----I----I----I----I MAX

                 NO OBS------------        222  STD ERROR-          56.3314
                 COEF OF VARIATION-       0.05  MEAN------        1224.5474
                 KURTOSIS (BETA 2)-       3.27  MEDIAN----        1224.0110
                                                MULTIMODAL DISTRIBUTION
```

NETWORK TIME FOR NODE DELCRF1

```
              CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
   1401.7305 I----I----I----I----I----I----I----I----I----I----I MIN
             I                                                     0.0
   1401.7305 I
             I                                                     0.005
   1422.9551 I
             I*                                                    0.014
   1444.1797 I
             I*                                                    0.014
   1465.4043 I
             I*                                                    0.023
   1486.6289 I
             I**                                                   0.041
   1507.8535 I
             I****                                                 0.081
   1529.0781 I
             I*******                                              0.149
   1550.3027 I
             I***********                                          0.212
   1571.5273 I
             I*****************                                    0.333
   1592.7520 I
             I***********************                              0.459
   1613.9766 I
             I****************************                         0.554
   1635.2012 I
             I********************************                     0.635
   1656.4258 I
             I*************************************                0.743
   1677.6504 I
             I******************************************           0.833
   1698.8750 I
             I********************************************         0.878
   1720.0996 I
             I**********************************************       0.914
   1741.3242 I
             I***********************************************      0.941
   1762.5488 I
             I************************************************     0.964
   1783.7734 I
             I*************************************************    0.986
   1804.9980 I
             I**************************************************0.995
   1826.2227 I
             I**************************************************0.995
   1847.4473 I
             I**************************************************1.000
   1868.6760 I
             I**************************************************1.000
   1868.6760 I----I----I----I----I----I----I----I----I----I----I MAX

              NO OBS-----------      222  STD ERROR-          77.5768
              COEF OF VARIATION-    0.05  MEAN------        1629.7515
              KURTOSIS (BETA 2)-    3.14  MEDIAN----        1624.9163
              PEARSONIAN SKEW---    0.44  MODE------        1595.4348
```

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NETWORK TIME FOR NODE STARTRSD

```
            CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
594.6455 I----I----I----I----I----I----I----I----I----I----I MIN
         I                                                   0.0
594.6455 I
         I****                                               0.077
599.0059 I
         I****                                               0.077
603.3662 I
         I****                                               0.077
607.7266 I
         I****                                               0.077
612.0869 I
         I****                                               0.077
616.4473 I
         I********                                           0.154
620.8076 I
         I********                                           0.154
625.1680 I
         I***************                                    0.308
629.5283 I
         I***************                                    0.308
633.8887 I
         I*******************                                0.385
638.2490 I
         I*******************                                0.385
642.6094 I
         I***********************                            0.462
646.9697 I
         I***********************                            0.462
651.3301 I
         I***************************                        0.538
655.6904 I
         I*******************************                    0.615
660.0508 I
         I***********************************                0.692
664.4111 I
         I***********************************                0.692
668.7715 I
         I***********************************                0.692
673.1318 I
         I***************************************            0.769
677.4922 I
         I***************************************            0.769
681.8525 I
         I*******************************************        0.846
686.2129 I
         I**************************************************1.000
690.5752 I
         I**************************************************1.000
690.5752 I----I----I----I----I----I----I----I----I----I----I MAX

         NO OBS-------------       13  STD ERROR-           29.3294
         COEF OF VARIATION-      0.05  MEAN------          650.9648
         KURTOSIS (BETA 2)-      1.99  MEDIAN----          655.0598
                                       MULTIMODAL DISTRIBUTION
```

NETWORK TIME FOR NODE STARTMAC

```
           CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
 581.2058 I----I----I----I----I----I----I----I----I----I----I MIN
          I                                                   0.0
 581.2058 I
          I***                                                0.067
 585.5492 I
          I*******                                            0.133
 590.6926 I
          I**********                                         0.200
 595.4360 I
          I**********                                         0.200
 600.1794 I
          I*****************                                  0.333
 604.9229 I
          I*****************                                  0.333
 609.6663 I
          I*****************                                  0.333
 614.4097 I
          I*****************                                  0.333
 619.1531 I
          I************ ***************                       0.533
 623.8965 I
          I******************************                     0.600
 628.6399 I
          I******************************                     0.600
 633.3833 I
          I******************************                     0.600
 638.1267 I
          I*********************************                  0.667
 642.8701 I
          I*************************************              0.733
 647.6135 I
          I*************************************              0.733
 652.3569 I
          I****************************************           0.800
 657.1003 I
          I*******************************************        0.867
 661.8437 I
          I*******************************************        0.867
 666.5872 I
          I*******************************************        0.867
 671.3306 I
          I***********************************************    0.933
 676.0740 I
          I***********************************************    0.933
 680.8174 I
          I**************************************************1.000
 685.5630 I
          I**************************************************1.000
 685.5630 I----I----I----I----I----I----I----I----I----I----I MAX

          NO OBS------------      15  STD ERROR-         31.4160
          COEF OF VARIATION-    0.05  MEAN------        627.7573
          KURTOSIS (BETA 2)-    1.52  MEDIAN----        623.8562
          PEARSONIAN SKEW---    0.18  MODE------        621.9990
```

NETWORK TIME FOR NODE IOC

```
                CFC  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
    1525.4026 I----I----I----I----I----I----I----I----I----I----I MIN
              I                                                   0.0
    1525.4026 I
              I                                                   0.005
    1547.9277 I
              I*                                                  0.014
    1570.4529 I
              I*                                                  0.014
    1592.9780 I
              I*                                                  0.014
    1615.5032 I
              I*                                                  0.027
    1638.0283 I
              I***                                                0.063
    1660.5535 I
              I*****                                              0.108
    1683.0786 I
              I*********                                          0.189
    1705.6038 I
              I**************                                     0.284
    1728.1289 I
              I******************                                 0.369
    1750.6541 I
              I************************                           0.482
    1773.1792 I
              I*****************************                      0.586
    1795.7043 I
              I***********************************                0.703
    1818.2295 I
              I****************************************           0.802
    1840.7546 I
              I*******************************************        0.860
    1863.2798 I
              I*********************************************      0.896
    1885.8049 I
              I***********************************************    0.946
    1908.3301 I
              I************************************************   0.959
    1930.8552 I
              I*************************************************  0.977
    1953.3804 I
              I*************************************************  0.982
    1975.9055 I
              I**************************************************0.991
    1998.4307 I
              I**************************************************1.000
    2020.9604 I
              I**************************************************1.000
    2020.9604 I----I----I----I----I----I----I----I----I----I----I MAX

              NO OBS------------         222   STD ERROR-        81.9088
              COEF OF VARIATION-        0.05   MEAN------      1777.5835
              KURTOSIS (BETA 2)-        3.32   MEDIAN----      1775.1792
              PEARSONIAN SKEW---        0.34   MODE------      1805.3579
```

NETWORK TIME FOR THE COMPOSITE TERMINAL NODE

```
                CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
     581.2058 I----I----I----I----I----I----I----I----I----I----I MIN
              I                                                   0.0
     581.2058 I
              I***                                                0.068
     646.6492 I
              I******                                             0.112
     712.0925 I
              I******                                             0.112
     777.5359 I
              I******                                             0.112
     842.9792 I
              I******                                             0.112
     908.4226 I
              I******                                             0.112
     973.8660 I
              I******                                             0.112
    1039.3093 I
              I******                                             0.112
    1104.7527 I
              I******                                             0.112
    1170.1960 I
              I******                                             0.112
    1235.6394 I
              I******                                             0.112
    1301.0828 I
              I******                                             0.112
    1366.5261 I
              I******                                             0.112
    1431.9695 I
              I******                                             0.112
    1497.4128 I
              I******                                             0.124
    1562.8562 I
              I******                                             0.128
    1628.2996 I
              I************                                       0.248
    1693.7429 I
              I************************                           0.476
    1759.1863 I
              I***************************************            0.772
    1824.6296 I
              I**********************************************     0.924
    1890.0730 I
              I************************************************** 0.980
    1955.5164 I
              I**************************************************1.000
    2020.9604 I
              I**************************************************1.000
    2020.9604 I----I----I----I----I----I----I----I----I----I----I MAX

              NO OBS------------     250  STD ERROR-        368.2732
              COEF OF VARIATION-    0.22  MEAN------       1650.0063
              KURTOSIS (BETA 2)-    6.49  MEDIAN----       1764.5093
              PEARSONIAN SKEW---    0.35  MODE------       1780.1775
```

PATH COST FOR THE COMPOSITE TERMINAL NODE

```
NO OBS =             250  AVE =             0.0
```

```
OPTIMUM TERMINAL NODE INDEX - NO. ITERATIONS =  250
                         0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
                    I----+----+----+----+----+----+----+----+----+----+I
STARTR&D 0.0520 I***                                                     I
                    I    +    +    +    +    +    +    +    +    +    +I
STARTMAC 0.0600 I***                                                     I
                    I    +    +    +    +    +    +    +    +    +    +I
ICC      0.8880 I********************************************            I
                    I    +    +    +    +    +    +    +    +    +    +I
                    I----+----+----+----+----+----+----+----+----+----+I
                         0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
```

```
NCDES CRITICAL-OPTIMUM PATH INDEX - NO. PATHS =  250
                        0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
                   I----+----+----+----+----+----+----+----+----+----+I
START     1.0000   I**************************************************I
                   I    +    +    +    +    +    +    +    +    +    +I
AFFROC    1.0000   I**************************************************I
                   I    +    +    +    +    +    +    +    +    +    +I
NDIWG1    1.0000   I**************************************************I
                   I    +    +    +    +    +    +    +    +    +    +I
COMPL-MS  1.0000   I**************************************************I
                   I    +    +    +    +    +    +    +    +    +    +I
COMPL-LS  1.0000   I**************************************************I
                   I    +    +    +    +    +    +    +    +    +    +I
COMPLRPT  1.0000   I**************************************************I
                   I    +    +    +    +    +    +    +    +    +    +I
PREIPR    1.0000   I**************************************************I
                   I    +    +    +    +    +    +    +    +    +    +I
MACF-I    1.0000   I**************************************************I
                   I    +    +    +    +    +    +    +    +    +    +I
STARTR&D  0.0520   I***                                               I
                   I    +    +    +    +    +    +    +    +    +    +I
STARTNDI  0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
STARTMAC  0.0600   I***                                               I
                   I    +    +    +    +    +    +    +    +    +    +I
PPINPUT   0.7480   I*************************************             I
                   I    +    +    +    +    +    +    +    +    +    +I
APINPUT   0.1360   I*******                                           I
                   I    +    +    +    +    +    +    +    +    +    +I
MACF-II   0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
ISSUERFP  0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
RECPPSLS  0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
INIT-NEG  0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
COMPLNEG  0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
SVYCCMPL  0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
AWDFRCD   0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
DELCRF1   0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
TESTCR1   0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
ACCFT1    0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
COND-REL  0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
IOCLEAD   0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
IOC       0.8880   I********************************************      I
                   I    +    +    +    +    +    +    +    +    +    +I
                   I----+----+----+----+----+----+----+----+----+----+I
                        0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
```

ARCS CRITICAL-OPTIMUM PATH INDEX - NO. PATHS = 250

PRSTROC	0.9560
LOGRCC	0.0440
IEFTECCM	0.6520
IEPTRADC	0.3480
MKTSVY	1.0000
USERSVY	1.0000
PREPRPT	1.0000
EVALLCG	0.0800
IERTECOM	0.0560
IERTRADC	0.8240
R&DPRCG	0.0520
MACIFRCG	0.0600
NDIDECSN	0.8880
IPRPKG	1.0000
PREFFFC	0.7480
DRAFTPPK	0.7480
PREPAPP	0.1280
FINFRCVP	0.0080
FINQQPRI	0.0040
FINAL-AP	0.1360
FINFFK	0.8880
PREPPSLS	0.8880
EVAL-FFP	0.8880
NEG-FFF	0.8880
PREAWDSY	0.8880
PRCD-AWD	0.8880
FAECRF1	0.8880
TRIALS	0.8880
CCRRECTN	0.0760

```
                   I    +    +    +    +    +    +    +    +    +    +I
LTRFTTEC 0.2320    I************                                     I
                   I    +    +    +    +    +    +    +    +    +    +I
LTRPTTRA 0.5800    I*****************************                    I
                   I    +    +    +    +    +    +    +    +    +    +I
REL-LEAD 0.8880    I********************************************     I
                   I    +    +    +    +    +    +    +    +    +    +I
ICCLEAC2 0.8880    I********************************************     I
                   I    +    +    +    +    +    +    +    +    +    +I
LEAD-IOC 0.8880    I********************************************     I
                   I    +    +    +    +    +    +    +    +    +    +I
                   I----+----+----+----+----+----+----+----+----+----+I
                       0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0

    LAST RANDOM NUMBER SEED =    1163003243
```

NODES MEAN COMPLETION TIME & REALIZATION FREQUENCY

START	0.0	250
STARTIEP	0.0	250
AFFRCC	216.2597	250
C&EEST	287.2322	250
NDIWG1	291.9277	250
INITCESY	301.9282	250
CCMPL-MS	336.9646	250
CCMPL-US	381.8865	250
COMPL-CE	393.4065	250
COMPLRPT	472.0767	250
PREIPR	540.2439	250
MADF-I	605.1152	250
STARTMAC	627.7573	15
STARTNDI	634.6770	222
STARTR&D	650.9648	13
APINPUT	754.7349	222
PFINPUT	784.2219	222
MADF-II	832.4441	222
MFFDRAFT	896.0195	222
EST-NETT	979.3523	222
MFPCOORD	996.0671	222
ISSUERFP	1002.2319	222
RECPPSLS	1063.0149	222
MFFCOMPL	1092.7534	222
INIT-NEG	1122.6096	222
CCMPLNEG	1154.0891	222
SVYCOMPL	1191.6624	222
AWDPROD	1224.5474	222
AWD-BOA	1236.6448	222

AND-CLS	1237.8040	222
CCMP-ASL	1335.2273	222
CLSFAC	1377.6770	222
DUMMY1	1388.2949	222
ACPT-TMS	1529.0945	222
DELCRF1	1629.7515	222
TESTCR1	1647.8508	222
ACCPT1	1719.6575	222
COND-REL	1775.5835	222
IOCLEAD	1776.5835	222
IOC	1777.5835	222
INIT-FOE	1803.2014	222
CCMPLFOE	1858.8250	222
CCMPLIER	1926.5671	222
FINALDEL	1992.0686	222
COORDCNF	1992.2366	222
FLDGIPR	2087.1562	222
FULL-REL	2321.0044	222

```
CCERA-30MM PROGRAM-PROGRAM ALTERNATIVE 1

PRCBLEM IDENTIFICATION CARC OPTION------------------------          1

TYPE OF INPUT OPTION--------------------------------------          0

TYPE OF OUTPUT OPTION-------------------------------------          4

CCSTING AND PRUNING OPTION--------------------------------          0

FULL PRINT TRIP OPTION------------------------------------          0

CCRRELATION CCMPUTATION ANC PLCT OPTICN-------------------          0

COST-PERFORMANCE TIME INTERVAL OPTION---------------------          1

COMPOSITE TERMINAL NODE MINIMUMS AND MAXIMUMS OPTION------          0

MEAN PRINT ORDER------------------------------------------          0

INITIAL SEED----------------------------------------------     435459

NUMBER OF ITERATIONS--------------------------------------        500

YEARLY INTEREST RATE USED FOR INFLATION ADJUSTMENTS-------        0.0

YEARLY INTEREST RATE USED FOR PRESENT VALUE DISCOUNTING---        0.0

TIME FACTOR WHICH CONVERTS PROGRAM TIME TO A YEARLY BASE--        0.0

                                   TIME      COST      PERF

TERMINAL NODE SELECTION WEIGHTS    1.00      0.0       0.0

CRITICAL - OPTIMUM PATH WEIGHTS    1.00      0.0       0.0

INITIAL VALUES                     0.0       0.0       0.0


CCST-PERFORMANCE TIME INTERVAL DATA

0.0       6.0
6.0       12.0
12.0      18.0
18.0      24.0
24.0      30.0
0.0       30.0
ENDCTPR


D1        START   1       1.

HS2GS     1       18      1.
HS2GS     DTIME 1 3.       5.53      8.13      6.5
HS2GS     M     1 .95

FFS2GS    1       FAIL    1.
FFS2GS    M     1 .05
```

```
M/AG2    18        31        1.
M/AG2    DTIME  1  3.         2.98        4.38        3.5

D15      31        SUCCESS   1.

D2       START     2         1.

BLDG3    2         14        1.
BLDG3    DTIME  1  3.         1.28        1.88        1.5
BLDG3    DCOST  1  3.         .312        .634        .519
BLDG3    M      1  .98

FBLDG3   2         FAIL      1.
FBLDG3   M      1  .02

HSG3     14        19        1.
HSG3     DTIME  1  3.         6.38        9.38        7.5
HSG3     DCOST  1  3.         .312        .634        .519
HSG3     M      1  .995

FHSG3    14        FAIL      1.
FHSG3    M      1  .005

TST/MG3  19        32        1.
TST/MG3  DTIME  1  3.         5.95        8.75        7.0
TST/MG3  DCOST  1  3.         .312        .634        .519
TST/MG3  M      1  .995

FTST/MG319         FAIL      1.
FTST/MG3M       1  .005

D16      32        SUCCESS   1.

D3       START     3         1.

BLDG4    3         22        1.
BLDG4    DTIME  1  3.         9.35        13.75       11.0
BLDG4    DCOST  1  3.         .346        .731        .597
BLDG4    M      1  .985

FBLDG4   3         FAIL      1.
FBLDG4   M      1  .015

D14      18        22        1.

SG4TOGE  22        24        1.
SG4TOGE  DTIME  1  3.         .43         .63         .5

D4       START     4         1.

BLDG5    4         15        1.
BLDG5    DTIME  1  3.         3.4         5.          4.0
BLDG5    DCOST  1  3.         .346        .731        .597
BLDG5    M      1  .985

FBLDG5   4         FAIL      1.
FBLDG5   M      1  .015

TSTG5    15        20        1.
TSTG5    DTIME  1  3.         1.42        2.09        1.67
```

```
TSTG5    DCOST  1 3.       .346      .731      .597
TSTG5    M      1 .99

FTSTG5   15       FAIL     1.
FTSTG5   M      1 .01

D6       START    6        1.

BLDT1    6        16       1.
BLDT1    DTIME  1 3.       4.42      6.5       5.2
BLCT1    DCOST  1 3.       .244      .392      .319
BLCT1    M      1 1.0

FBLCT1   6        FAIL     1.
FBLDT1   M      1 0.0

ST1TOH   16       20       1.
ST1TOH   DTIME  1 3.       .43       .63       .5

TSTG5T1  20       33       1.
TSTG5T1  DTIME  1 3.       8.78      12.91     10.33
TSTG5T1  DCOST  1 3.       .346      .731      .597
TSTG5T1  M      1 .98

FTSTG5T120        FAIL     1.
FTSTG5T1M       1 .02

D17      33       SUCCESS  1.

D5       START    5        1.

BLD3GS   5        23       1.
BLD3GS   DTIME  1 3.       9.35      13.75     11.0
BLD3GS   DCOST  1 3.       1.038     2.193     1.790
BLC3GS   M      1 .995

FBLC3GS  5        FAIL     1.
FBLC3GS  M      1 .005

SG8TOB   23       35       1.
SG8TOB   DTIME  1 3.       .43       .63       .5

D19      35       SUCCESS  1.

D7       START    7        1.

SG6TOB   23       27       1.
SG6TOB   DTIME  1 3.       .43       .63       .5

SG7TOB   23       28       1.
SG7TOB   DTIME  1 3.       .43       .63       .5

BLCT2    7        24       1.
BLCT2    DTIME  1 3.       5.95      8.75      7.0
BLCT2    DCOST  1 3.       .244      .392      .319
BLCT2    M      1 1.0

FBLDT2   7        FAIL     1.
FBLDT2   M      1 0.0
```

```
TSTG4T2 24        34        1.
TSTG4T2 DTIME 1 3.         5.1        7.5        6.0
TSTG4T2 DCOST 1 3.         .244       .392       .319
TSTG4T2 M     1 .98

FTSTG4T224        FAIL      1.
FTSTG4T2M     1 .02

D18     34        SUCCESS 1.

D8      START     8         1.

BLDT3   8         25        1.
BLDT3   DTIME 1 3.         7.65       11.25      9.0
BLDT3   DCOST 1 3.         .244       .392       .319
BLDT3   M     1 1.0

FBLDT3  8         FAIL      1.
FBLDT3  M     1 0.0

ST3TOB  25        27        1.
ST3TOB  DTIME 1 3.         .43        .63        .5

D9      START     9         1.

BLDT4   9         26        1.
BLDT4   DTIME 1 3.         7.65       11.25      9.0
BLDT4   DCOST 1 3.         .244       .392       .319
BLDT4   M     1 1.0

FBLDT4  9         FAIL      1.
FBLDT4  M     1 0.0

ST4TOB  26        28        1.
ST4TOB  DTIME 1 3.         .43        .63        .5

D10     START     10        1.

ENGP    10        17        1.
ENGP    DTIME 1 3.         1.79       2.63       2.1
ENGP    DCOST 1 3.         .972       1.373      1.058
ENGP    M     1 1.0

FENGP   10        FAIL      1.
FENGP   M     1 0.0

FBMODP  17        21        1.
FBMODP  DTIME 1 3.         5.02       7.38       5.9
FBMODP  DCOST 1 3.         .972       1.373      1.058
FBMODP  M     1 1.0

FFBMODP 17        FAIL      1.
FFBMODP M     1 0.0

TSTP    21        36        1.
TSTP    DTIME 1 3.         7.23       10.63      8.5
TSTP    DCOST 1 3.         .972       1.373      1.058
TSTP    M     1 1.0

FTSTP   21        FAIL      1.
```

```
FTSTP    M       1 0.0

D20      36        SUCCESS 1.

D11      START     11        1.

BLDI     11        27        1.
BLDI     DTIME 1 3.           10.2        15.         12.0
BLDI     DCOST 1 3.           .972        1.373       1.058
BLDI     M      1 1.0

FBLDI    11        FAIL      1.
FBLDI    M       1 0.0

INTI     27        29        1.
INTI     DTIME 1 3.           1.23        1.88        1.5
INTI     DCOST 1 3.           .972        1.373       1.058
INTI     M      1 1.0

FINTI    27        FAIL      1.
FINTI    M       1 0.0

TSTI     29        37        1.
TSTI     DTIME 1 3.           2.98        4.38        3.5
TSTI     DCOST 1 3.           .972        1.373       1.058
TSTI     M      1 .95

FTSTI    29        FAIL      1.
FTSTI    M       1 .05

D21      37        SUCCESS 1.

D12      START     12        1.

BLDG     12        28        1.
BLDG     DTIME 1 3.           14.88       21.88       17.5
BLDG     DCOST 1 3.           .972        1.373       1.058
BLDG     M      1 1.0

FBLDG    12        FAIL      1.
FBLDG    M       1 0.0

INTG     28        30        1.
INTG     DTIME 1 3.           .43         .63         .5
INTG     DCOST 1 3.           .972        1.373       1.058
INTG     M      1 1.0

FINTG    28        FAIL      1.
FINTG    M       1 0.0

TSTG     30        38        1.
TSTG     DTIME 1 3.           4.25        6.25        5.0
TSTG     DCOST 1 3.           .972        1.373       1.058
TSTG     M      1 .97

FTSTG    30        FAIL      1.
FTSTG    M       1 .03

D22      38        SUCCESS 1.
```

ENDARC

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

```
30        2  316 1
31        2  2
32        2  2
33        2  2
34        2  2
35        2  2
36        2  2
37        2  2
38        2  2
SUCCESS 2  116
FAIL    4 11
ENDNODE
W A R N I N G  NO.  6135  PARAMETER =
W A R N I N G  NC.  6140  PARAMETER =
W A R N I N G  NO.  6144  PARAMETER =
W A R N I N G  NC.  6166  PARAMETER =
```

POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF   0.0 -   6.00

```
          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
  5.5576 I----I----I----I----I----I----I----I----I----I----I MIN
         I                                                  0.0
  5.5576 I
         I                                                  0.002
  5.8287 I
         I                                                  0.006
  6.0999 I
         I                                                  0.006
  6.3711 I
         I                                                  0.006
  6.6422 I
         I                                                  0.008
  6.9134 I
         I                                                  0.008
  7.1846 I
         I                                                  0.008
  7.4557 I
         I                                                  0.010
  7.7269 I
         I*                                                 0.012
  7.9981 I
         I*                                                 0.012
  8.2692 I
         I*                                                 0.014
  8.5404 I
         I*                                                 0.018
  8.8116 I
         I*                                                 0.024
  9.0827 I
         I**                                                0.040
  9.3539 I
         I****                                              0.074
  9.6250 I
         I*********                                         0.180
  9.8962 I
         I*******************                               0.380
 10.1674 I
         I*******************************                   0.614
 10.4385 I
         I****************************************          0.796
 10.7097 I
         I**********************************************    0.928
 10.9809 I
         I************************************************* 0.986
 11.2520 I
         I**************************************************1.000
 11.5232 I
         I**************************************************1.000
 11.5232 I----I----I----I----I----I----I----I----I----I----I MAX

         NO OBS------------       500  STD ERROR-           0.6250
         COEF OF VARIATION-      0.06  MEAN------          10.2668
         KURTOSIS (BETA 2)-     19.11  MEDIAN----          10.3056
         PEARSONIAN SKEW---      0.01  MODE------          10.2746
```

```
?CSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF      6.00 -       12.00

              CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
      1.0293 I----I----I----I----I----I----I----I----I----I----I MIN
             I                                                  0.0
      1.0293 I
             I                                                  0.002
      1.2028 I
             I                                                  0.004
      1.3763 I
             I*                                                 0.016
      1.5499 I
             I**                                                0.036
      1.7234 I
             I*******                                           0.144
      1.8969 I
             I***************                                   0.308
      2.0705 I
             I******************                                0.360
      2.2440 I
             I************************                          0.478
      2.4175 I
             I*********************************                 0.664
      2.5911 I
             I***************************************           0.784
      2.7646 I
             I*****************************************         0.812
      2.9381 I
             I******************************************        0.850
      3.1117 I
             I*********************************************     0.892
      3.2852 I
             I**********************************************    0.916
      3.4587 I
             I***********************************************   0.948
      3.6323 I
             I************************************************* 0.982
      3.8058 I
             I**************************************************0.992
      3.9793 I
             I**************************************************0.996
      4.1529 I
             I**************************************************0.996
      4.3264 I
             I**************************************************0.996
      4.4999 I
             I**************************************************0.996
      4.6735 I
             I**************************************************1.000
      4.8470 I
             I**************************************************1.000
      4.8470 I----I----I----I----I----I----I----I----I----I----I MAX

             NO OBS------------      500  STD ERROR-          0.5741
             COEF OF VARIATION-     0.23  MEAN------          2.4745
             KURTCSIS (BETA 2)-     3.77  MEDIAN----          2.4405
             PEARSONIAN SKEW---     0.05  MODE------          2.5056
```

POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF 12.00 - 18.00

```
         CFD  0.1  0.2  0.3  0.4   .5  0.6  0.7  0.8  0.9  1.0
  0.9847 I----I----I----I----I----I----I----I----I----I----I MIN
         I                                                   0.0
  0.9847 I
         I****                                               0.088
  1.1654 I
         I*******                                            0.130
  1.3461 I
         I*******                                            0.130
  1.5267 I
         I*******                                            0.130
  1.7074 I
         I*******                                            0.130
  1.8881 I
         I********                                           0.151
  2.0687 I
         I****************                                   0.330
  2.2494 I
         I**************************                         0.519
  2.4301 I
         I****************************                       0.568
  2.6107 I
         I*****************************                      0.572
  2.7914 I
         I*****************************                      0.572
  2.9721 I
         I*****************************                      0.576
  3.1527 I
         I*******************************                    0.625
  3.3334 I
         I***********************************                0.701
  3.5141 I
         I*************************************              0.749
  3.6947 I
         I**************************************             0.752
  3.8754 I
         I**************************************             0.752
  4.0561 I
         I**************************************             0.760
  4.2367 I
         I****************************************           0.802
  4.4174 I
         I*********************************************      0.898
  4.5980 I
         I************************************************* 0.978
  4.7787 I
         I**************************************************1.000
  4.9594 I
         I**************************************************1.000
  4.9594 I----I----I----I----I----I----I----I----I----I----I MAX

         NO OBS------------      491  STD ERROR-          1.1522
         COEF OF VARIATION-     0.40  MEAN------          2.8978
         KURTOSIS (BETA 2)-     1.91  MEDIAN----          2.4032
         PEARSONIAN SKEW---     0.55  MODE------          2.2616
```

```
POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF      18.00 -       24.00

          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
   0.9874 I----I----I----I----I----I----I----I----I----I----I MIN
          I                                                  0.0
   0.9874 I
          I***                                               0.060
   1.0622 I
          I******                                            0.117
   1.1370 I
          I********                                          0.151
   1.2119 I
          I*********                                         0.186
   1.2867 I
          I**********                                        0.202
   1.3615 I
          I**********                                        0.202
   1.4363 I
          I**********                                        0.202
   1.5111 I
          I**********                                        0.202
   1.5859 I
          I**********                                        0.202
   1.6607 I
          I**********                                        0.202
   1.7355 I
          I**********                                        0.202
   1.8103 I
          I**********                                        0.202
   1.8851 I
          I**********                                        0.202
   1.9599 I
          I***********                                       0.211
   2.0347 I
          I*************                                     0.265
   2.1095 I
          I********************                              0.394
   2.1844 I
          I***************************                       0.546
   2.2592 I
          I************************************              0.729
   2.3340 I
          I*********************************************     0.890
   2.4088 I
          I************************************************* 0.972
   2.4836 I
          I************************************************* 0.987
   2.5584 I
          I**************************************************1.000
   2.6332 I
          I**************************************************1.000
   2.6332 I----I----I----I----I----I----I----I----I----I----I MAX

          NO OBS-----------     317  STD ERROR-            0.4745
          COEF OF VARIATION-   0.23  MEAN------            2.0479
          KURTOSIS (BETA 2)-   3.09  MEDIAN----            2.2426
          PEARSONIAN SKEW---   0.54  MODE------            2.3032
```

POSITIVE COST INCURRED BETWEEN THE TIME PERIODS OF 0.0 - 30.00

```
            CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
   7.8023 I----I----I----I----I----I----I----I----I----I----I MIN
          I                                                  0.0
   7.8023 I
          I                                                  0.006
   8.2812 I
          I                                                  0.006
   8.7600 I
          I                                                  0.008
   9.2388 I
          I                                                  0.010
   9.7177 I
          I*                                                 0.012
  10.1965 I
          I*                                                 0.012
  10.6754 I
          I*                                                 0.012
  11.1542 I
          I*                                                 0.014
  11.6331 I
          I*                                                 0.014
  12.1119 I
          I*                                                 0.014
  12.5908 I
          I*                                                 0.014
  13.0696 I
          I*                                                 0.014
  13.5485 I
          I*                                                 0.018
  14.0273 I
          I*                                                 0.022
  14.5061 I
          I*                                                 0.030
  14.9850 I
          I**                                                0.038
  15.4638 I
          I****                                              0.078
  15.9427 I
          I********                                          0.166
  16.4215 I
          I******************                                0.354
  16.9004 I
          I************************************              0.716
  17.3792 I
          I************************************************  0.968
  17.8580 I
          I**************************************************1.000
  18.3369 I
          I**************************************************1.000
  18.3369 I----I----I----I----I----I----I----I----I----I----I MAX

          NO OBS------------     500  STD ERROR-         1.1354
          COEF OF VARIATION-    0.07  MEAN------        16.8849
          KURTOSIS (BETA 2)-   35.54  MEDIAN----        17.0802
          PEARSONIAN SKEW---    0.27  MODE------        17.1937
```

NETWORK TIME FOR NODE 30

```
           CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
  15.6363 I----I----I----I----I----I----I----I----I----I----I MIN
          I                                                   0.0
  15.6363 I
          I*                                                  0.022
  15.9412 I
          I**                                                 0.033
  16.2460 I
          I***                                                0.069
  16.5509 I
          I******                                             0.120
  16.8558 I
          I*********                                          0.171
  17.1606 I
          I***********                                        0.229
  17.4655 I
          I**************                                     0.290
   7.7704 I
          I******************                                 0.361
   8.0752 I
          I***********************                            0.451
  18.3801 I
          I***************************                        0.535
  18.6850 I
          I*******************************                    0.620
  18.9899 I
          I***********************************                0.694
  19.2947 I
          I*************************************              0.743
  15.5996 I
          I***************************************            0.790
  19.9045 I
          I******************************************         0.835
  20.2093 I
          I********************************************       0.876
  20.5142 I
          I*********************************** **********     0.914
  20.8191 I
          I***********************************************    0.937
  21.1239 I
          I************************************************   0.965
  21.4288 I
          I*************************************************  0.976
  21.7337 I
          I*************************************************  0.990
  22.0386 I
          I**************************************************1.000
  22.3434 I
          I**************************************************1.000
  22.3434 I----I----I----I----I----I----I----I----I----I----I MAX

          NO OBS------------      450  STD ERROR-          1.4690
          COEF OF VARIATION-     0.08  MEAN------         18.6462
          KURTOSIS (BETA 2)-     2.47  MEDIAN----         18.5925
          PEARSONIAN SKEW---     0.23  MODE------         18.3039
```

PATH COST FOR NODE 30

```
         CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
  3.4845 I----I----I----I----I----I----I----I----I----I----I MIN
         I                                                    0.0
  3.4845 I
         I                                                    0.004
  3.5490 I
         I                                                    0.006
  3.6135 I
         I*                                                   0.020
  3.6781 I
         I*                                                   0.029
  3.7426 I
         I***                                                 0.059
  3.8071 I
         I*****                                               0.092
  3.8717 I
         I*******                                             0.137
  3.9362 I
         I*********                                           0.180
  4.0007 I
         I*************                                       0.259
  4.0653 I
         I****************                                    0.329
  4.1298 I
         I********************                                0.394
  4.1943 I
         I************************                            0.473
  4.2589 I
         I****************************                        0.569
  4.3234 I
         I*********************************                   0.659
  4.3879 I
         I*************************************               0.733
  4.4525 I
         I*****************************************           0.822
  4.5170 I
         I********************************************        0.886
  4.5815 I
         I**********************************************      0.927
  4.6461 I
         I************************************************    0.951
  4.7106 I
         I*************************************************   0.978
  4.7751 I
         I*************************************************   0.990
  4.8397 I
         I**************************************************1.000
  4.9042 I
         I**************************************************1.000
  4.9042 I----I----I----I----I----I----I----I----I----I----I MAX

         NO OBS------------      490  STD ERROR-            0.2750
         COEF OF VARIATION-     0.06  MEAN------            4.2584
         KURTOSIS (BETA 2)-     2.56  MEDIAN----            4.2735
         PEARSONIAN SKEW---     0.17  MODE------            4.3058
```

OVERALL COST FOR NODE 30

```
         CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
12.5148 I----I----I----I----I----I----I----I----I----I----I MIN
        I                                                  0.0
12.5148 I
        I                                                  0.002
12.7227 I
        I                                                  0.002
12.9307 I
        I                                                  0.002
13.1387 I
        I                                                  0.002
13.3467 I
        I                                                  0.002
13.5546 I
        I                                                  0.008
13.7626 I
        I                                                  0.008
13.9706 I
        I*                                                 0.010
14.1785 I
        I*                                                 0.020
14.3865 I
        I*                                                 0.029
14.5945 I
        I**                                                0.047
14.8024 I
        I****                                              0.078
15.0104 I
        I******                                            0.122
15.2184 I
        I********                                          0.165
15.4263 I
        I*************                                     0.253
15.6343 I
        I*******************                               0.386
15.8423 I
        I***************************                       0.533
16.0502 I
        I************************************              0.722
16.2582 I
        I*******************************************       0.867
16.4662 I
        I************************************************  0.967
16.6741 I
        I************************************************* 0.988
16.8821 I
        I**************************************************1.000
17.0901 I
        I**************************************************1.000
17.0901 I----I----I----I----I----I----I----I----I----I----I MAX

        NO OBS-----------       490  STD ERROR-            0.5806
        COEF OF VARIATION-     0.04  MEAN------           15.8989
        KURTOSIS (BETA 2)-     6.15  MEDIAN----           15.9933
        PEARSONIAN SKEW---     0.44  MODE------           16.1518
```

NETWORK TIME FOR NODE SUCCESS

```
          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
 20.3718 I----I----I----I----I----I----I----I----I----I----I MIN
         I                                                   0.0
 20.3718 I
         I                                                   0.005
 20.7018 I
         I*                                                  0.026
 21.0317 I
         I**                                                 0.043
 21.3616 I
         I***                                                0.069
 21.6916 I
         I*****                                              0.107
 22.0215 I
         I*********                                          0.182
 22.3515 I
         I************                                       0.248
 22.6814 I
         I*****************                                  0.335
 23.0114 I
         I*********************                              0.419
 23.3413 I
         I*************************                          0.501
 23.6712 I
         I*****************************                      0.586
 24.0012 I
         I**********************************                 0.675
 24.3311 I
         I*************************************              0.731
 24.6611 I
         I**************************************             0.770
 24.9910 I
         I******************************************         0.831
 25.3209 I
         I********************************************       0.880
 25.6509 I
         I*********************************************      0.905
 25.9808 I
         I***********************************************    0.934
 26.3108 I
         I***********************************************    0.946
 26.6407 I
         I************************************************   0.957
 26.9706 I
         I**************************************************0.992
 27.3006 I
         I**************************************************1.000
 27.6307 I
         I**************************************************1.000
 27.6307 I----I----I----I----I----I----I----I----I----I----I MAX

         NO OBS------------     391  STD ERROR-           1.5285
         COEF OF VARIATION-    0.06  MEAN------          23.7851
         KURTOSIS (BETA 2)-    2.64  MEDIAN----          23.6707
         PEARSONIAN SKEW---    0.17  MODE------          24.0452
```

PATH COST FOR NODE SUCCESS

```
         CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
16.1015 I----I----I----I----I----I----I----I----I----I----I MIN
        I                                                  0.0
16.1015 I
        I                                                  0.008
16.2031 I
        I*                                                 0.020
16.3047 I
        I**                                                0.036
16.4063 I
        I***                                               0.054
16.5079 I
        I****                                              0.087
16.6095 I
        I******                                            0.118
16.7111 I
        I*********                                         0.174
16.8127 I
        I************                                      0.248
16.9143 I
        I****************                                  0.325
17.0159 I
        I**********************                            0.435
17.1176 I
        I**************************                        0.519
17.2192 I
        I*******************************                   0.611
17.3208 I
        I***********************************               0.698
17.4224 I
        I***************************************           0.775
17.5240 I
        I******************************************        0.849
17.6256 I
        I**********************************************    0.928
17.7272 I
        I************************************************  0.957
17.8288 I
        I************************************************* 0.972
17.9304 I
        I************************************************* 0.990
18.0320 I
        I**************************************************0.992
18.1336 I
        I**************************************************0.995
18.2352 I
        I**************************************************1.000
18.3369 I
        I**************************************************1.000
18.3369 I----I----I----I----I----I----I----I----I----I----I MAX

        NO OBS------------      351  STD ERROR-          0.4061
        COEF OF VARIATION-     0.02  MEAN------         17.1884
        KURTOSIS (BETA 2)-     2.77  MEDIAN----         17.1893
        PEARSONIAN SKEW---     0.28  MODE------         17.0734
```

OVERALL COST FOR NODE SUCCESS

```
          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
 16.1015 I----I----I----I----I----I----I----I----I----I----I MIN
         I                                                   0.0
 16.1015 I
         I                                                   0.008
 16.2031 I
         I*                                                  0.020
 16.3047 I
         I**                                                 0.036
 16.4063 I
         I***                                                0.054
 16.5079 I
         I****                                               0.087
 16.6095 I
         I******                                             0.118
 16.7111 I
         I*********                                          0.174
 16.8127 I
         I************                                       0.248
 16.9143 I
         I****************                                   0.325
 17.0159 I
         I**********************                             0.435
 17.1176 I
         I**************************                         0.519
 17.2192 I
         I*******************************                    0.611
 17.3208 I
         I***********************************                0.698
 17.4224 I
         I***************************************            0.775
 17.5240 I
         I******************************************         0.849
 17.6256 I
         I**********************************************     0.928
 17.7272 I
         I************************************************   0.957
 17.8288 I
         I*************************************************  0.972
 17.9304 I
         I*************************************************  0.990
 18.0320 I
         I**************************************************0.992
 18.1336 I
         I**************************************************0.995
 18.2352 I
         I**************************************************1.000
 18.3369 I
         I**************************************************1.000
 18.3369 I----I----I----I----I----I----I----I----I----I----I MAX

         NO OBS------------       391  STD ERROR-          0.4061
         COEF OF VARIATION-      0.02  MEAN------         17.1884
         KURTOSIS (BETA 2)-      2.77  MEDIAN----         17.1893
         PEARSONIAN SKEW---      0.28  MODE------         17.0734
```

NETWORK TIME FOR NODE FAIL

```
          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
   0.0    I----I----I----I----I----I----I----I----I----I----I MIN
          I                                                  0.0
   0.0    I
          I********************                              0.394
   0.9273 I
          I**********************                            0.431
   1.8545 I
          I**********************                            0.431
   2.7818 I
          I**********************                            0.431
   3.7090 I
          I*************************                         0.495
   4.6363 I
          I**************************                        0.523
   5.5635 I
          I******************************                    0.596
   6.4908 I
          I*******************************                   0.624
   7.4180 I
          I*********************************                 0.661
   8.3453 I
          I**********************************                0.679
   9.2725 I
          I**********************************                0.688
  10.1998 I
          I**********************************                0.688
  11.1270 I
          I**********************************                0.688
  12.0543 I
          I***********************************               0.706
  12.9815 I
          I**************************************            0.752
  13.9088 I
          I********************************************      0.890
  14.8360 I
          I**********************************************    0.917
  15.7633 I
          I***********************************************   0.945
  16.6905 I
          I************************************************  0.963
  17.6178 I
          I************************************************* 0.972
  18.5450 I
          I************************************************* 0.982
  19.4722 I
          I**************************************************1.000
  20.3995 I
          I**************************************************1.000
  20.3995 I----I----I----I----I----I----I----I----I----I----I MAX

          NO OBS-----------      105  STD ERROR-            6.5741
          COEF OF VARIATION-    1.03  MEAN------            6.3619
          KURTOSIS (BETA 2)-    1.72  MEDIAN----            4.8041
          PEARSONIAN SKEW---    0.89  MODE------            0.4862
```

PATH COST FOR NODE FAIL

```
          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
C.0        I----I----I----I----I----I----I----I----I----I----I MIN
           I                                                  0.0
0.0        I
           I********************                              0.394
0.2103     I
           I*********************                             0.413
0.4206     I
           I************************                          0.486
0.6309     I
           I**************************                        0.514
0.8412     I
           I*****************************                     0.587
1.0515     I
           I******************************                    0.596
1.2618     I
           I*******************************                   0.624
1.4720     I
           I*********************************                 0.670
1.6823     I
           I*********************************                 0.670
1.8926     I
           I*********************************                 0.670
2.1029     I
           I*********************************                 0.670
2.3132     I
           I**********************************                0.688
2.5235     I
           I**********************************                0.688
2.7338     I
           I**********************************                0.688
2.9441     I
           I**********************************                0.688
3.1544     I
           I**********************************                0.688
3.3647     I
           I**********************************                0.688
3.5750     I
           I***********************************               0.706
3.7853     I
           I***************************************           0.780
3.9955     I
           I********************************************      0.872
4.2058     I
           I**********************************************    0.927
4.4161     I
           I**************************************************1.000
4.6264     I
           I**************************************************1.000
4.6264     I----I----I----I----I----I----I----I----I----I----I MAX

           NO OBS------------       109  STD ERROR-             1.8174
           COEF OF VARIATION-      1.14  MEAN------             1.6007
           KURTOSIS (BETA 2)-      1.59  MEDIAN----             0.6416
           PEARSONIAN SKEW---      0.82  MODE------             0.1076
```

OVERALL COST FOR NODE FAIL

```
             CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
   0.0        I----I----I----I----I----I----I----I----I----I----I MIN
              I                                                   0.0
   0.0        I
              I********************                               0.394
   0.7410     I
              I********************                               0.394
   1.4820     I
              I********************                               0.394
   2.2230     I
              I********************                               0.394
   2.9639     I
              I********************                               0.394
   3.7049     I
              I********************                               0.394
   4.4459     I
              I********************                               0.394
   5.1869     I
              I********************                               0.394
   5.9279     I
              I********************                               0.394
   6.6689     I
              I********************                               0.394
   7.4099     I
              I*********************                              0.422
   8.1508     I
              I**********************                             0.431
   8.8918     I
              I************************                           0.477
   9.6328     I
              I*******************************                    0.615
  10.3738     I
              I*********************************                  0.661
  11.1148     I
              I*********************************                  0.670
  11.8558     I
              I**********************************                 0.688
  12.5967     I
              I***********************************                0.706
  13.3377     I
              I********************************************       0.881
  14.0787     I
              I**********************************************     0.917
  14.8197     I
              I**********************************************     0.927
  15.5607     I
              I**************************************************1.000
  16.3017     I
              I**************************************************1.000
  16.3017     I----I----I----I----I----I----I----I----I----I----I MAX

              NO OBS-----------        109   STD ERROR-          6.2884
              COEF OF VARIATION-      0.85   MEAN------          7.4072
              KURTOSIS (BETA 2)-      1.31   MEDIAN----          9.8215
              PEARSONIAN SKEW---      1.12   MODE------          0.3705
```

NETWORK TIME FOR THE COMPOSITE TERMINAL NODE

```
          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
   0.0     I----I----I----I----I----I----I----I----I----I----I MIN
           I                                                   0.0
   0.0     I
           I****                                               0.086
   1.2559  I
           I*****                                              0.094
   2.5119  I
           I*****                                              0.096
   3.7678  I
           I******                                             0.110
   5.0238  I
           I******                                             0.124
   6.2797  I
           I*******                                            0.140
   7.5356  I
           I*******                                            0.146
   8.7916  I
           I*******                                            0.150
  10.0475  I
           I*******                                            0.150
  11.3035  I
           I*******                                            0.150
  12.5594  I
           I********                                           0.164
  13.8153  I
           I**********                                         0.196
  15.0713  I
           I**********                                         0.200
  16.3272  I
           I**********                                         0.210
  17.5832  I
           I***********                                        0.214
  18.8391  I
           I***********                                        0.216
  20.0950  I
           I*************                                      0.252
  21.3510  I
           I********************                               0.402
  22.6069  I
           I*********************************                  0.658
  23.8628  I
           I******************************************         0.838
  25.1188  I
           I***********************************************    0.948
  26.3747  I
           I**************************************************1.000
  27.6307  I
           I**************************************************1.000
  27.6307  I----I----I----I----I----I----I----I----I----I----I MAX

           NO OBS------------     500  STD ERROR-         7.9398
           COEF OF VARIATION-    0.40  MEAN------        19.9867
           KURTOSIS (BETA 2)-    4.36  MEDIAN----        23.1189
           PEARSONIAN SKEW---    0.42  MODE------        23.3384
```

PATH COST FOR THE COMPOSITE TERMINAL NODE

```
          CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
   0.0    I----I----I----I----I----I----I----I----I----I----I MIN
          I                                                   0.0
   0.0    I
          I******                                             0.112
   0.8335 I
          I*******                                            0.146
   1.6670 I
          I********                                           0.150
   2.5005 I
          I********                                           0.150
   3.3340 I
          I*********                                          0.188
   4.1675 I
          I***********                                        0.218
   5.0010 I
          I***********                                        0.218
   5.8345 I
          I***********                                        0.218
   6.6680 I
          I***********                                        0.218
   7.5015 I
          I***********                                        0.218
   8.3350 I
          I***********                                        0.218
   9.1685 I
          I***********                                        0.218
  10.0020 I
          I***********                                        0.218
  10.8354 I
          I***********                                        0.218
  11.6689 I
          I***********                                        0.218
  12.5024 I
          I***********                                        0.218
  13.3359 I
          I***********                                        0.218
  14.1694 I
          I***********                                        0.218
  15.0029 I
          I***********                                        0.218
  15.8364 I
          I***************                                    0.296
  16.6699 I
          I*****************************************          0.810
  17.5034 I
          I**************************************************1.000
  18.3369 I
          I**************************************************1.000
  18.3369 I----I----I----I----I----I----I----I----I----I----I MAX

          NO OBS------------       500   STD ERROR-          6.5078
          COEF OF VARIATION-      0.47   MEAN------         13.7901
          KURTOSIS (BETA 2)-      3.09   MEDIAN----         17.0466
          PEARSONIAN SKEW---      0.52   MODE------         17.1481
```

OVERALL COST FOR THE COMPOSITE TERMINAL NODE

```
                 CFD  0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
    0.0           I----I----I----I----I----I----I----I----I----I----I MIN
                  I                                                   0.0
    0.0           I
                  I****                                               0.086
    0.8335        I
                  I****                                               0.086
    1.6670        I
                  I****                                               0.086
    2.5005        I
                  I****                                               0.086
    3.3340        I
                  I****                                               0.086
    4.1675        I
                  I****                                               0.086
    5.0010        I
                  I****                                               0.086
    5.8345        I
                  I****                                               0.086
    6.6680        I
                  I****                                               0.086
    7.5015        I
                  I*****                                              0.094
    8.3350        I
                  I*****                                              0.094
    9.1685        I
                  I******                                             0.118
   10.0020        I
                  I*******                                            0.142
   10.8354        I
                  I*******                                            0.146
   11.6689        I
                  I*******                                            0.150
   12.5024        I
                  I********                                           0.154
   13.3359        I
                  I**********                                         0.194
   14.1694        I
                  I**********                                         0.202
   15.0029        I
                  I**********                                         0.210
   15.8364        I
                  I***************                                    0.296
   16.6699        I
                  I*****************************************          0.810
   17.5034        I
                  I**************************************************1.000
   18.3369        I
                  I**************************************************1.000
   18.3369        I----I----I----I----I----I----I----I----I----I----I MAX

                  NO OBS------------     500  STD ERROR-          5.0031
                  COEF OF VARIATION-    0.33  MEAN------         15.0559
                  KURTOSIS (BETA 2)-    7.18  MEDIAN----         17.0466
                  PEARSONIAN SKEW---    0.42  MODE------         17.1443
```

PATH PERFORMANCE FOR THE COMPOSITE TERMINAL NODE
NO OBS =   500   AVE =   0.0

```
OPTIMUM TERMINAL NODE INDEX - NO. ITERATIONS =  500
                            0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1.0
                       I-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+I
SUCCESS   0.7820 I***************************************                     I
                       I     +     +     +     +     +     +     +     +     +     +I
FAIL      0.2180 I***********                                                  I
                       I-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+I
                            0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1.0
```

```
NODES CRITICAL-OPTIMUM PATH INDEX - NO. PATHS =  500
                              0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
                         I----+----+----+----+----+----+----+----+----+----+I
START     1.0000 I**************************************************I
                         I    +    +    +    +    +    +    +    +    +    +I
1         0.0500 I**                                                I
                         I    +    +    +    +    +    +    +    +    +    +I
2         0.0320 I**                                                I
                         I    +    +    +    +    +    +    +    +    +    +I
3         0.0040 I                                                  I
                         I    +    +    +    +    +    +    +    +    +    +I
4         0.0360 I**                                                I
                         I    +    +    +    +    +    +    +    +    +    +I
5         0.0200 I*                                                 I
                         I    +    +    +    +    +    +    +    +    +    +I
6         0.0140 I*                                                 I
                         I    +    +    +    +    +    +    +    +    +    +I
7         0.0100 I                                                  I
                         I    +    +    +    +    +    +    +    +    +    +I
11        0.0340 I**                                                I
                         I    +    +    +    +    +    +    +    +    +    +I
12        0.8000 I****************************************          I
                         I    +    +    +    +    +    +    +    +    +    +I
14        0.0120 I*                                                 I
                         I    +    +    +    +    +    +    +    +    +    +I
15        0.0240 I*                                                 I
                         I    +    +    +    +    +    +    +    +    +    +I
16        0.0140 I*                                                 I
                         I    +    +    +    +    +    +    +    +    +    +I
18        0.0040 I                                                  I
                         I    +    +    +    +    +    +    +    +    +    +I
19        0.0040 I                                                  I
                         I    +    +    +    +    +    +    +    +    +    +I
20        0.0220 I*                                                 I
                         I    +    +    +    +    +    +    +    +    +    +I
22        0.0040 I                                                  I
                         I    +    +    +    +    +    +    +    +    +    +I
23        0.0160 I*                                                 I
                         I    +    +    +    +    +    +    +    +    +    +I
24        0.0140 I*                                                 I
                         I    +    +    +    +    +    +    +    +    +    +I
27        0.0500 I**                                                I
                         I    +    +    +    +    +    +    +    +    +    +I
28        0.8000 I****************************************          I
                         I    +    +    +    +    +    +    +    +    +    +I
29        0.0500 I**                                                I
                         I    +    +    +    +    +    +    +    +    +    +I
30        0.8000 I****************************************          I
                         I    +    +    +    +    +    +    +    +    +    +I
38        0.7820 I***************************************           I
                         I    +    +    +    +    +    +    +    +    +    +I
SUCCESS   0.7820 I***************************************           I
                         I    +    +    +    +    +    +    +    +    +    +I
FAIL      0.2180 I***********                                       I
                         I----+----+----+----+----+----+----+----+----+----+I
                              0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
```

```
ARCS CRITICAL-OPTIMUM PATH INDEX - NO. PATHS =  500
                           0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0
                         I----+----+----+----+----+----+----+----+----+----+I
D1           0.0500 I**                                                    I
HS2GS        0.0040 I                                                      I
FHS2GS       0.0460 I**                                                    I
D2           0.0320 I**                                                    I
BLDG3        0.0120 I*                                                     I
FBLDG3       0.0200 I*                                                     I
HSG3         0.0040 I                                                      I
FHSG3        0.0080 I                                                      I
FTST/MG3     0.0040 I                                                      I
D3           0.0040 I                                                      I
FBLDG4       0.0040 I                                                      I
D14          0.0040 I                                                      I
SG4TCGE      0.0040 I                                                      I
D4           0.0360 I**                                                    I
BLDG5        0.0240 I*                                                     I
FBLDG5       0.0120 I*                                                     I
TSTG5        0.0080 I                                                      I
FTSTG5       0.0160 I*                                                     I
D6           0.0140 I*                                                     I
BLDT1        0.0140 I*                                                     I
ST1TOH       0.0140 I*                                                     I
FTSTG5T1     0.0220 I*                                                     I
D5           0.0200 I*                                                     I
BLD3GS       0.0160 I*                                                     I
FBLD3GS      0.0040 I                                                      I
D7           0.0100 I                                                      I
SG6TOB       0.0160 I*                                                     I
BLDT2        0.0100 I                                                      I
FTSTG4T2     0.0140 I*                                                     I
```

```
                 I    +    +    +    +    +    +    +    +    +    +I
D11       0.0340 I**                                                I
                 I    +    +    +    +    +    +    +    +    +    +I
BLDI      0.0340 I**                                                I
                 I    +    +    +    +    +    +    +    +    +    +I
INTI      0.0500 I**                                                I
                 I    +    +    +    +    +    +    +    +    +    +I
FTSTI     0.0500 I**                                                I
                 I    +    +    +    +    +    +    +    +    +    +I
D12       0.8000 I****************************************          I
                 I    +    +    +    +    +    +    +    +    +    +I
BLDG      0.8000 I****************************************          I
                 I    +    +    +    +    +    +    +    +    +    +I
INTG      0.8000 I****************************************          I
                 I    +    +    +    +    +    +    +    +    +    +I
TSTG      0.7820 I***************************************           I
                 I    +    +    +    +    +    +    +    +    +    +I
FTSTG     0.0180 I*                                                 I
                 I    +    +    +    +    +    +    +    +    +    +I
D22       0.7820 I***************************************           I
                 I----+----+----+----+----+----+----+----+----+----+I
                     0.1  0.2  0.3  0.4  0.5  0.6  0.7  0.8  0.9  1.0

     LAST RANDOM NUMBER SEED =     302426683
```

APPENDIX H

SAMPLE SESSION NUMBER 3:

CREATE A VERT INPUT DATA FILE,

DEBUG, AND GRAPH

(Tektronix 4054 Graphics Terminal)[1]

[1] The Tektronix 4054 Graphics Terminal emulates a Tektronix 4014 Graphics Terminal.

CALL "RATE",2400,0,2 Set baud rate
CHARSIZE 3 set character size to 80 characters per line.
CALL "TERMIN"

enter class 116611
class 161 start
CMS6
READY-TO-IBM

S+E VM/SP ONLINE
! Depress "RETURN" button

.LOG FPKERLY
restart
.LOG FPKERLY
ENTER PASSWORD: Enter userid and password
.[redacted]
LOGMSG - 09:58:45 CDT TUESDAY 07/20/82
*THE 3705 WILL BETAKEN OFFLINE AT 1200 HRS CDT 7/20/82. UNTIL
*FURTHER NOTICE ALL LINES WILL GO THRU THE COMTEN. THE ONLY
*VALID PACX CLASSES ARE 160-162: 160 = 300-1800 BPS, 161 = 2400-4800 BPS
,
* AND 162 = 9600 BPS.
LOGON AT 06:31:49 CDT THURSDAY 07/22/82
MIDWEST S+E COMPUTER CENTER
. Depress "RETURN" button
Y (19E) R/O
CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.
CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.
DASD 291 DEFINED
'19E' REPLACES ' Y (19E) '
Y (19E) R/O
E (194) R/O
R; CMS "READY" mode

.

THIS PAGE DEPICTS LOGGING ON THE COMPUTER TERMINAL (TEKTRONIX 4054 COMPUTER GRAPHICS TERMINAL) AND GETTING INTO CMS "READY" MODE.

UNLESS OTHERWISE STATED ALL PAGES IN THIS SESSION WERE CREATED BY MANUALLY DEPRESSING THE "PAGE" BUTTON ON THE COMPUTER TERMINAL. EACH PAGE IS AN ACTUAL PICTURE OF THE COMPUTER GRAPHICS TERMINAL CRT SCREEN.

```
VERTEX
E (194) R/O
```

Enter the name of the executive file which runs the menu technique.

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1    =  RUN VERT ONLINE

    2    =  RUN VERT OFFLINE (CMS BATCH)

    3    =  VIEW VERT OUTPUT

    4    =  CREATE A VERT INPUT FILE

    5    =  EDIT AN EXISTING VERT INPUT FILE

    6    =  GET VERT NETWORK PLOT MENU

    7    =  GET VERT GRAPH MENU

   LIST  =  GET VERT DATASETS DISPLAY LISTING MENU

   END   =  END THE SESSION

.4
```

Item 4 is selected

NOTE: Be sure to wait for the period before entering data at all times. The period is a CMS convention for signalling the user that the computer is waiting for data to be entered by the user.

NOTE: IN ORDER TO BE ABLE TO RUN VERT OFFLINE, THE FIRST TWO LETTERS OF THE VERT INPUT FILENAME MUST BEGIN WITH VI. THE REMAINING SIX MAX ALPHANUMERIC CHARACTERS MAY BE ANYTHING YOU WISH.

DO YOU WISH TO USE FREE FORM OR FIXED FORM FORMAT FOR CREATING YOUR VERT INPUT FILE ? ENTER THE OPTION NUMBER LISTED BELOW:

1 -> FREE FORM (FIELDS ARE SEPARATED BY COMMAS. THUS ARC OR NODE NAMES MUST NOT CONTAIN COMMAS IN THE NAME. WHEN A FIELD IS NOT USED IT'S ABSENCE MUST BE INDICATED BY A COMMA IF IT IS FOLLOWED BY ANOTHER FIELD. THE PROGRAM WILL PROMPT THE USER FOR DATA)

2 -> FIXED FORM (USE THE TABSET COMMAND TO AID INPUT)

.1 ← Free form format is selected (Depress "PAGE" button before Depressing the "RETURN" button on your terminal to complete the entry of the value "1")

```
ENTER VERT INPUT FILE NAME
.VIFACTS ←  Name selected for the new VERT input file to be created

 ENTER THE CONTROL CARD

 THE NEXT LINE OF DATA IS LINE NUMBER   1
.1,4,,,,,,,,435459,2,,,,1.Ø,,,1.Ø

 ENTER THE PROBLEM IDENTIFICATION CARD

 THE NEXT LINE OF DATA IS LINE NUMBER   2
.SHORT VERSION OF FACTS/ITMS RUN

 ENTER THE MASTER AND SATELLITE ARC CARDS, FINISH WITH "ENDARC"

 THE NEXT LINE OF DATA IS LINE NUMBER   3
.DEL FACT,START,FACEPTED,1.Ø,,DELIVER FACTS ←  Master arc card

 THE NEXT LINE OF DATA IS LINE NUMBER   4
.DEL FACT,DTIME,1,1.Ø,3.5 ←  Satellite arc card

 THE NEXT LINE OF DATA IS LINE NUMBER   5
.DEL ITMS,START,IACEPTED,1.Ø,,DELIVER ITMS

 THE NEXT LINE OF DATA IS LINE NUMBER   6
.DEL ITMS,DTIME,1,1.Ø,3.5

 THE NEXT LINE OF DATA IS LINE NUMBER   7
.DEL AC,START,BHTACPT,1.Ø,,DELIVER AIRCRAFT

 THE NEXT LINE OF DATA IS LINE NUMBER   8
.DEL AC,DTIME,1,1.Ø,5.Ø
```

Only 2 iterations is requested to save time since this data file has not been debugged.

THE NEXT LINE OF DATA IS LINE NUMBER 9
.FDESGN,FACEPTED,FIJOINED,1.0,,DEVELOP AND DESIGN FACTS

THE NEXT LINE OF DATA IS LINE NUMBER 10
.FDESGN,DTIME,1,3.0,9.0,18.0,12.0

THE NEXT LINE OF DATA IS LINE NUMBER 11
.FDESGN,M,1,.99 "M" should have been followed by 4 blank spaces (Mbbbb). This omission here and elsewhere in the file will cause the computer to bomb the run.

THE NEXT LINE OF DATA IS LINE NUMBER 12
.FDESGNF,FACEPTED,FAIL,1.0,,FAIL FACTS DEVELOPMENT AND DESIGN

THE NEXT LINE OF DATA IS LINE NUMBER 13
.FDESGNF,M,1,.01

THE NEXT LINE OF DATA IS LINE NUMBER 14
.HACSUB,IACEPTED,HACWINS,1.0,,CONTRACTOR 1 SUBMITS ITMS DESIGN PROPOSAL

THE NEXT LINE OF DATA IS LINE NUMBER 15
.HACSUB,M,1,.75

THE NEXT LINE OF DATA IS LINE NUMBER 16
.TISUB,IACEPTED,TIWINS,1.0,,CONTRACTOR 2 SUBMITS ITMS DESIGN PROPOSAL

THE NEXT LINE OF DATA IS LINE NUMBER 17
.TISUB,M,1,.25

THE NEXT LINE OF DATA IS LINE NUMBER 18
.HACIDES,HACWINS,DESCOMP,1.0,,CONTRACTOR 1 DESIGNS ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 19
.HACIDES,DTIME,1,3.0,10.0,20.0,14.0

```
 THE NEXT LINE OF DATA IS LINE NUMBER  20
.HACIDES,M,1,.9

 THE NEXT LINE OF DATA IS LINE NUMBER  21
.HACFAIL,HACWINS,FAIL,1.0,,CONTRACTOR 1 ITMS DESIGN FAILS

 THE NEXT LINE OF DATA IS LINE NUMBER  22
.HACFAIL,M,1,.1

 THE NEXT LINE OF DATA IS LINE NUMBER  23
.TIDES,TIWINS,DESCOMP,1.0,,CONTRACTOR 2 DESIGNS ITMS

 THE NEXT LINE OF DATA IS LINE NUMBER  24
.TIDES,DTIME,1,3.0,8.0,16.0,10.0

 THE NEXT LINE OF DATA IS LINE NUMBER  25
.TIDES,M,1,.95

 THE NEXT LINE OF DATA IS LINE NUMBER  26
.TIFAIL,TIWINS,FAIL,1.0,,CONTRACTOR 2 ITMS DESIGN FAILS

 THE NEXT LINE OF DATA IS LINE NUMBER  27
.TIFAIL,M,1,.07

 THE NEXT LINE OF DATA IS LINE NUMBER  28
.DOCUMNT,BHTACPT,DRWACPT,1.0,,DEVELOP INTERFACE CONTROL DOCUMENT

 THE NEXT LINE OF DATA IS LINE NUMBER  29
.DOCUMNT,DTIME,1,1.0,3.5

 THE NEXT LINE OF DATA IS LINE NUMBER  30
.DOCUMNT,M,1,.99

 THE NEXT LINE OF DATA IS LINE NUMBER  31
.DOCFAIL,BHTACPT,FAIL,1.0,,FAIL DEVELOPMENT OF INTERFACE CONTROL DOCUMENT
```

An error will occur since it is required that these 2 numbers must sum to 1.0

```
 THE NEXT LINE OF DATA IS LINE NUMBER  32
.DOCFAIL,M,1,.01

 THE NEXT LINE OF DATA IS LINE NUMBER  33
.ICOMBND,DESCOMP,FIJOINED,1.0,,ITMS DESIGN IS COMPLETED

 THE NEXT LINE OF DATA IS LINE NUMBER  34
.IDRAWDEL,FIJOINED,DRWACPT,1.0,,ITMS DRAWINGS DELIVERED

 THE NEXT LINE OF DATA IS LINE NUMBER  35
.IDRAWDEL,DTIME,1,1.0,2.0

 THE NEXT LINE OF DATA IS LINE NUMBER  36
.DUMMY1,FIJOINED,STFAB,1.0,,DUMMY ARC FOR COMPUTER PURPOSES ONLY

 THE NEXT LINE OF DATA IS LINE NUMBER  37
.FAB,STFAB,FABCOMP,1.0,,FABRICATE FACTS/ITMS

 THE NEXT LINE OF DATA IS LINE NUMBER  38
.FAB,DTIME,1,1.0,10.0

 THE NEXT LINE OF DATA IS LINE NUMBER  39
.FAB,M,1,.9

 THE NEXT LINE OF DATA IS LINE NUMBER  40
.FABFAIL,STFAB,FAIL,1.0,,FABRICATION FAILS

 THE NEXT LINE OF DATA IS LINE NUMBER  41
.FABFAIL,M,1,.1

 THE NEXT LINE OF DATA IS LINE NUMBER  42
.BTEST,FABCOMP,BTCOMP,1.0,,BENCH/QUALIFICATION TESTING

 THE NEXT LINE OF DATA IS LINE NUMBER  43
.BTEST,DTIME,1,3.0,3.0,4.0,10.0
```

The word "QUALIFICATION" should not have been included to the description of this arc and will be removed from this description later in this appendix.

```
 THE NEXT LINE OF DATA IS LINE NUMBER  44
.BTEST,M,1,.9

 THE NEXT LINE OF DATA IS LINE NUMBER  45
.REDSGN,FABCOMP,RDCOMP,1.Ø,,REDESIGN FACTS/ITMS

 THE NEXT LINE OF DATA IS LINE NUMBER  46
.REDSGN,DTIME,1,1.Ø,5.5

 THE NEXT LINE OF DATA IS LINE NUMBER  47
.REDSGN,M,1,.1

 THE NEXT LINE OF DATA IS LINE NUMBER  48
.RTEST,RDCOMP,BTCOMP,1.Ø,,RE-DBSBEBENCTEST
```

Since this computer terminal is a "storage-Tube" device, corrections are overwritten.

```
 THE NEXT LINE OF DATA IS LINE NUMBER  49
.RTEST,DTIME,1,1.Ø,3.25

 THE NEXT LINE OF DATA IS LINE NUMBER  50
.QTEST,BTCOMP,QTCOMP,1.Ø,,QUALIFICATION TESTING OF FACTS/ITMS

 THE NEXT LINE OF DATA IS LINE NUMBER  51
.QTEST,DTIME,1,1.Ø,6.Ø

 THE NEXT LINE OF DATA IS LINE NUMBER  52
.QTEST,M,1,.9

 THE NEXT LINE OF DATA IS LINE NUMBER  53
.QTFAIL,BTCOMP,FAIL,1.Ø,,FAIL QUALIFICATION TESTING

 THE NEXT LINE OF DATA IS LINE NUMBER  54
.QTFAIL,M,1,.1

 THE NEXT LINE OF DATA IS LINE NUMBER  55
.DELPROT,QTCOMP,ISTART,1.Ø,,DELIVER PROTOTYPE
```

```
 THE NEXT LINE OF DATA IS LINE NUMBER  56
.DELPROT,DTIME,1,1.0,2.5

 THE NEXT LINE OF DATA IS LINE NUMBER  57
.DELPROT,M,1,.9

 THE NEXT LINE OF DATA IS LINE NUMBER  58
.SHIPFAIL,OTCOMP,FAIL,1.0,,FAIL TO SHIP PROROTYPE

 THE NEXT LINE OF DATA IS LINE NUMBER  59
.SHIPFAIL,M,1,.1

 THE NEXT LINE OF DATA IS LINE NUMBER  60
.A/C MOD,DRWACPT,ISTART,1.0,,MODIFY AIRCRAFT TO ACCEPT FACTS/ITMS

 THE NEXT LINE OF DATA IS LINE NUMBER  61
.A/C MOD,DTIME,1,1.0,4.0

 THE NEXT LINE OF DATA IS LINE NUMBER  62
.A/C MOD,M,1,.9

 THE NEXT LINE OF DATA IS LINE NUMBER  63
.MODFAIL,DRWACPT,FAIL,1.0,,FAIL AIRCRAFT MODIFICATION

 THE NEXT LINE OF DATA IS LINE NUMBER  64
.MODFAIL,M,1,.1

 THE NEXT LINE OF DATA IS LINE NUMBER  65
.INTGON,ISTART,ICOMP,1.0,,INTEGRATE FACTS/ITMS INTO AIRCRAFT

 THE NEXT LINE OF DATA IS LINE NUMBER  66
.INTGON,DTIME,1,1.0,3.0

 THE NEXT LINE OF DATA IS LINE NUMBER  67
.INTGON,M,1,.9
```

```
THE NEXT LINE OF DATA IS LINE NUMBER  68
.INTFAIL,ISTART,FAIL,1.0,,FAIL INTEGRATION

THE NEXT LINE OF DATA IS LINE NUMBER  69
.INTFAIL,M,1,.1

THE NEXT LINE OF DATA IS LINE NUMBER  70
.DT/OT,ICOMP,DTCOMP,1.0,,DEVELOPMENT/OPERATIONAL TESTING

THE NEXT LINE OF DATA IS LINE NUMBER  71
.DT/OT,DTIME,1,3.0,300,8.0,4.5

THE NEXT LINE OF DATA IS LINE NUMBER  72
.DT/OT,M,1,.1

THE NEXT LINE OF DATA IS LINE NUMBER  73
.ENDARC <------  "ENDARC" terminates the arc entries

ENTER THE MASTER AND SATELLITE NODE CARDS, FINISH WITH "ENDNODE"

THE NEXT LINE OF DATA IS LINE NUMBER  74
.START,1,2,,,,,,,BEGIN NETWORK

THE NEXT LINE OF DATA IS LINE NUMBER  75
.FACEPTED,2,3,,,,,,,FACTS ACCEPTED

THE NEXT LINE OF DATA IS LINE NUMBER  76
.IACEPTED,2,3,,,,,,,ITMS ACCEPTED

THE NEXT LINE OF DATA IS LINE NUMBER  77
.BHTACPT,2,3,,,,,,,AIRCRAFT ACCEPTED

THE NEXT LINE OF DATA IS LINE NUMBER  78
.HACWINS,2,3,,,,,,,CONTRACTOR 1 WINS DESIGN CONTRACT
```

THE NEXT LINE OF DATA IS LINE NUMBER 79
.IIWINS,2,3,,,,,,,CONTRACTOR 2 WINS DESIGN CONTRACT

THE NEXT LINE OF DATA IS LINE NUMBER 80
.DESCOMP,4,2,,,,,,,ITMS DESIGN COMPLETED
07:46:43

MSG FROM OPERATOR: HAVE TO IPL AGAIN

Fortunately, this message from the computer operator turned out to be a mistake. Had it not been, I would have been thrown out of this program and also out of CMS. After re-logging on, I then would have 2 options: One would be to start all over again. The other would be to rename the old data file and then continue inputting data where I had been forced to leave off when the computer went down. When finished, I could then merge the two data files together.

THE NEXT LINE OF DATA IS LINE NUMBER 81
.FIJOINED,2,2,,,,,,,FACTS AND ITMS COMBINED

THE NEXT LINE OF DATA IS LINE NUMBER 82
.DRWACPT,2,3,,,,,,,DRAWINGS ACCEPTED

THE NEXT LINE OF DATA IS LINE NUMBER 83
.STFAB,2,3,,,,,,,BEGIN FABRICATION OF FACTS/ITMS

THE NEXT LINE OF DATA IS LINE NUMBER 84
.FABCOMP,2,3,,,,,,,FABRICATION COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 85
.RDCOMP,2,2,,,,,,,RE-DESIGN COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 86
.BTCOMP,4,3,,,,,,,BENCH TESTING COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 87
.QTCOMP,2,3,,,,,,,QUALIFICATION TESTING COMPLETED

THE NEXT LINE OF DATA IS LINE NUMBER 88
.ISTART,2,3,,,,,,,BEGIN FACTS/ITMS INTEGRATION INTO AIRCRAFT

```
THE NEXT LINE OF DATA IS LINE NUMBER  89
.ICOMP,2,3,,,,,,,INTEGRATION COMPLETED

 THE NEXT LINE OF DATA IS LINE NUMBER  90
.DTCOMP,2,1,,,,,,,DT/OT TESTING COMPLETED

 THE NEXT LINE OF DATA IS LINE NUMBER  91
.ENDNODE
```

← "ENDNODE" terminates the creation of the data file

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1     =  RUN VERT ONLINE

    2     =  RUN VERT OFFLINE (CMS BATCH)

    3     =  VIEW VERT OUTPUT

    4     =  CREATE A VERT INPUT FILE

    5     =  EDIT AN EXISTING VERT INPUT FILE

    6     =  GET VERT NETWORK PLOT MENU

    7     =  GET VERT GRAPH MENU

   LIST   =  GET VERT DATASETS DISPLAY LISTING MENU

   END    =  END THE SESSION
```

If you desire to have this menu appear on a separate page, then depress the "PAGE" button on your terminal before completing the "ENDNODE" entry above.

```
.5
```

← Item 5 is selected

```
ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
.VIFACTS
EDIT:
TOF:
./BTEST
BTEST    FABCOMP BTCOMP    1.0 BENCH/QUALIFICATION TESTING
.C%/QUALIFICATION%%
BTEST    FABCOMP BTCOMP    1.0 BENCH TESTING
.FILE
```

The file just created is now being edited

OLD RECORD

NEW RECORD

The word "QUALIFICATION" is removed from the description of this arc

"FILE" makes the change permanent

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

   1    =  RUN VERT ONLINE

   2    =  RUN VERT OFFLINE (CMS BATCH)

   3    =  VIEW VERT OUTPUT

   4    =  CREATE A VERT INPUT FILE

   5    =  EDIT AN EXISTING VERT INPUT FILE

   6    =  GET VERT NETWORK PLOT MENU

   7    =  GET VERT GRAPH MENU

  LIST  =  GET VERT DATASETS DISPLAY LISTING MENU

  END   =  END THE SESSION

.1
```

← *Item 1 is selected*

```
DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO
.NO
ENTER VERT INPUT FILE NAME
.VIFACTS
FI 05 DISK VIFACTS DATA A1
FI 06 DISK VOUTPUT AAAA A
FI 07 DISK VERTPUN AAAA A
FI 08 DISK VERT1 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 09 DISK VERT2 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 10 DISK VERT3 AAAA A ( LRECL 96 BLKSIZE 964 RECFM VBS )
FI 11 DISK VERT4 AAAA A ( LRECL 444 BLKSIZE 444 RECFM VBS )
VERTNEW
&CONTROL OFF
08:04:00

MSG FROM FPKERLY :  YOUR JOB HAS FINISHED
.
```

The file will now be debugged

Less than 30 seconds was required

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.3

The output from the debugging run just completed will be reviewed

```
DID YOU RUN VERT ONLINE ?
ENTER YES/NO
.YES
EDIT:
 ENDNODE
EDIT:
.TOP
TOF:
./E R R O R          Find out if any errors occurred
Ø   1.  E R R O R  NO.  1777     Error Number 1777 indicates that something is wrong
.T5                                with the control card of the VERT input data file
Ø   1.  E R R O R  NO.  1777       "VIFACTS". Others errors could still be hidden by
 DELFACT START   FACE DEL 1.Ø DELIVER FACTS   this error.
 DELFACT DTIME 1          Ø        3.5
 DELITMS START   IACE DEL 1.Ø DELIVER ITMS
 DELITMS DTIME 1          Ø        3.5
.QUIT
ENTER YES/NO FOR ROUTING       Either "QUIT" or "FILE" can be used since this output
.NO                            file will not be edited.

        I don't need a hardcopy listing of the output during debugging (usually)
```

```
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

   1    =  RUN VERT ONLINE

   2    =  RUN VERT OFFLINE (CMS BATCH)

   3    =  VIEW VERT OUTPUT

   4    =  CREATE A VERT INPUT FILE

   5    =  EDIT AN EXISTING VERT INPUT FILE

   6    =  GET VERT NETWORK PLOT MENU

   7    =  GET VERT GRAPH MENU

  LIST  =  GET VERT DATASETS DISPLAY LISTING MENU

  END   =  END THE SESSION

.5
```

Item 5 is selected in order to correct the error found in the control card from the debugging run just completed

```
ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
.VIFACTS
EDIT,
TOF,
.T2
TOF,
14             435459    2              1.0       1.0
.C/4 / 4/
1 4            435459    2              1.0       1.0
.FILE
```

RECORD

NEW RECORD

The "4" (VERT Output Type Option) was entered incorrectly as column 2 instead of column 3 during file creation

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

```
  1    =  RUN VERT ONLINE
  2    =  RUN VERT OFFLINE (CMS BATCH)
  3    =  VIEW VERT OUTPUT
  4    =  CREATE A VERT INPUT FILE
  5    =  EDIT AN EXISTING VERT INPUT FILE
  6    =  GET VERT NETWORK PLOT MENU
  7    =  GET VERT GRAPH MENU
 LIST  =  GET VERT DATASETS DISPLAY LISTING MENU
 END   =  END THE SESSION
```

.1

VIFACTS is again being run to continue debugging

```
DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO
.NO
ENTER VERT INPUT FILE NAME
.VIFACTS
FI 05 DISK VIFACTS DATA A1
FI 06 DISK VOUTPUT AAAA A
FI 07 DISK VERTPUN AAAA A
FI 08 DISK VERT1 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 09 DISK VERT2 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 10 DISK VERT3 AAAA A ( LRECL 96 BLKSIZE 964 RECFM VBS )
FI 11 DISK VERT4 AAAA A ( LRECL 444 BLKSIZE 444 RECFM VBS )
VERTNEW
&CONTROL OFF
08:14:54

MSG FROM FPKERLY :  YOUR JOB HAS FINISHED
```

← Again, less than 30 seconds was required to run the program due to the fact that only 2 iterations are being used during the debugging.

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1     =  RUN VERT ONLINE

    2     =  RUN VERT OFFLINE (CMS BATCH)

    3     =  VIEW VERT OUTPUT

    4     =  CREATE A VERT INPUT FILE

    5     =  EDIT AN EXISTING VERT INPUT FILE

    6     =  GET VERT NETWORK PLOT MENU

    7     =  GET VERT GRAPH MENU

   LIST   =  GET VERT DATASETS DISPLAY LISTING MENU

   END    =  END THE SESSION

 .3
```

The output file from the run just completed is to be reviewed

```
DID YOU RUN VERT ONLINE ?
ENTER YES/NO
.YES
EDIT:
0W A R N I N G  NO.  6100  PARAMETER = INTFAIL
EDIT:
.TOP
TOF:
./E R R O R
0   1.  E R R O R  NO.  4500  PARAMETER = FDESGN
.T20
0   1.  E R R O R  NO.  4500  PARAMETER = FDESGN
0   2.  E R R O R  NO.  3033  PARAMETER = FDESGNF
0   3.  E R R O R  NO.  4500  PARAMETER = FDESGNF
0   4.  E R R O R  NO.  4500  PARAMETER = HACSUB
0   5.  E R R O R  NO.  4500  PARAMETER = TISUB
0   6.  E R R O R  NO.  4500  PARAMETER = HACIDES
0   7.  E R R O R  NO.  3033  PARAMETER = HACFAIL
0   8.  E R R O R  NO.  4500  PARAMETER = HACFAIL
0   9.  E R R O R  NO.  4500  PARAMETER = TIDES
0  10.  E R R O R  NO.  3033  PARAMETER = TIFAIL
0  11.  E R R O R  NO.  4500  PARAMETER = TIFAIL
0  12.  E R R O R  NO.  4500  PARAMETER = DOCUMNT
0  13.  E R R O R  NO.  3033  PARAMETER = DOCFAIL
0  14.  E R R O R  NO.  4500  PARAMETER = DOCFAIL
0  15.  E R R O R  NO.  4500  PARAMETER = FAB
0  16.  E R R O R  NO.  3033  PARAMETER = FABFAIL
0  17.  E R R O R  NO.  4500  PARAMETER = FABFAIL
0  18.  E R R O R  NO.  4500  PARAMETER = BTEST
0  19.  E R R O R  NO.  3855  PARAMETER = BTEST
0  20.  E R R O R  NO.  4500  PARAMETER = REDSGN
.DO
0  21.  E R R O R  NO.  4500  PARAMETER = OTEST
.
```

All 4500 Errors were caused by failing to enter "M" as "Mbbbb" during file creation. Consequently, these are entries were shifted out of the proper columnar order by the free form program.

All 3033 Errors were caused by failure to enter the node "FAIL" during file creation.

This error was caused by getting the value "4" (Most Likely Time) and "10" (Maximum Time) in reverse order on the Satellite arc for arc "BTEST".

EOF:

EDIT:
.T*

```
0  21.  E R R O R  NO.  4500  PARAMETER = OTEST
0  22.  E R R O R  NO.  3033  PARAMETER = OTFAIL
0  23.  E R R O R  NO.  4500  PARAMETER = OTFAIL
0  24.  E R R O R  NO.  4500  PARAMETER = DELPROT
0  25.  E R R O R  NO.  3033  PARAMETER = SHIPFAIL
0  26.  E R R O R  NO.  4500  PARAMETER = SHIPFAIL
0  27.  E R R O R  NO.  4500  PARAMETER = A/CMOD
0  28.  E R R O R  NO.  3033  PARAMETER = MODFAIL
0  29.  E R R O R  NO.  4500  PARAMETER = MODFAIL
0  30.  E R R O R  NO.  4500  PARAMETER = INTGON
0  31.  E R R O R  NO.  3033  PARAMETER = INTFAIL
0  32.  E R R O R  NO.  4500  PARAMETER = INTFAIL
0  33.  E R R O R  NO.  4500  PARAMETER = DT/OT
0  34.  E R R O R  NO.  5788  PARAMETER = FDESGN
0  35.  E R R O R  NO.  5788  PARAMETER = HACSUB
0  36.  E R R O R  NO.  5788  PARAMETER = DOCUMNT
0  37.  E R R O R  NO.  5788  PARAMETER = HACIDES
0  38.  E R R O R  NO.  5788  PARAMETER = TIDES
0  39.  E R R O R  NO.  5788  PARAMETER = A/CMOD
0  40.  E R R O R  NO.  5788  PARAMETER = FAB
0  41.  E R R O R  NO.  5788  PARAMETER = BTEST
0  42.  E R R O R  NO.  5788  PARAMETER = OTEST
0  43.  E R R O R  NO.  5788  PARAMETER = DELPROT
0  44.  E R R O R  NO.  5788  PARAMETER = INTGON
0  45.  E R R O R  NO.  5388  PARAMETER = ICOMP
0  46.  E R R O R  NO.  5788  PARAMETER = DT/OT
0W A R N I N G  NO.  6100  PARAMETER = FDESGNF
0W A R N I N G  NO.  6100  PARAMETER = HACFAIL
0W A R N I N G  NO.  6100  PARAMETER = TIFAIL
0W A R N I N G  NO.  6100  PARAMETER = DOCFAIL
0W A R N I N G  NO.  6100  PARAMETER = FABFAIL
0W A R N I N G  NO.  6100  PARAMETER = OTFAIL
0W A R N I N G  NO.  6100  PARAMETER = SHIPFAIL
0W A R N I N G  NO.  6100  PARAMETER = MODFAIL
0W A R N I N G  NO.  6100  PARAMETER = INTFAIL
```

All 5788 Errors were also caused by failing to enter "M" as "Mbbbb" during file creation.

This error was caused by failing to enter the master and satellite arc cards for "DTFAIL" during file creation.

Warnings can be ignored.

```
EDIT:
.QUIT
ENTER YES/NO FOR ROUTING
.NO
E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1    =  RUN VERT ONLINE

    2    =  RUN VERT OFFLINE (CMS BATCH)

    3    =  VIEW VERT OUTPUT

    4    =  CREATE A VERT INPUT FILE

    5    =  EDIT AN EXISTING VERT INPUT FILE

    6    =  GET VERT NETWORK PLOT MENU

    7    =  GET VERT GRAPH MENU

  LIST   =  GET VERT DATASETS DISPLAY LISTING MENU

  END    =  END THE SESSION

.5
```

If so desired, depressing the "PAGE" button before completing the entry "NO" above will place this menu on a separate page.

Item 5 is selected to correct the errors just found in "VIFACTS".

```
ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
.VIFACTS
EDIT:
TOF:
./FDESGN
FDESGN   FACEPTEDFIJOINED 1.0 DEVELOP AND DESIGN FACTS
.T3
FDESGN   FACEPTEDFIJOINED 1.0 DEVELOP AND DESIGN FACTS
FDESGN   DTIME 1        3.0          9.0          18.0          12.0
FDESGN   M           1          .99
.ZONE 9 28
.C/M     /M/*
FDESGN   M      1         .99
FDESGNF  M      1         .01
HACSUB   M      1         .75
TISUB    M      1         .25
HACIDES  M      1          .9
HACFAIL  M      1          .1
TIDES    M      1         .95
TIFAIL   M      1         .07
DOCUMNT  M      1         .99
DOCFAIL  M      1         .01
FAB      M      1          .9
FABFAIL  M      1          .1
BTEST    M      1          .9
REDSGN   M      1          .1
OTEST    M      1          .9
OTFAIL   M      1          .1
DELPROT  M      1          .9
SHIPFAILM       1          .1
A/CMOD   M      1          .9
MODFAIL  M      1          .1
INTGCON  M      1          .9
INTFAIL  M      1          .1
DT/OT    M      1          .1
EOF:
.
```

Find the first 4500 Error

Use the CMS Zone and Change commands to line up the columns which were out of order. 2 passes are required.

The "*" indicates that every occurrence within the data file will be so changed.

```
EDIT:
.TOP
TOF:
.ZONE 1 80
./FDESGN
FDESGN  FACEPTEDFIJOINED 1.0 DEVELOP AND DESIGN FACTS
.DO2
FDESGN  M     1        .99
.ZONE 9 15
.C/M    1 /M     1/*
FDESGN  M      1        .99
FDESGNF M      1        .01
HACSUB  M      1        .75
TISUB   M      1        .25
HACIDES M      1         .9
HACFAIL M      1         .1
TIDES   M      1        .95
TIFAIL  M      1        .07
DOCUMNT M      1        .99
DOCFAIL M      1        .01
FAB     M      1         .9
FABFAIL M      1         .1
BTEST   M      1         .9
REDSGN  M      1         .1
OTEST   M      1         .9
OTFAIL  M      1         .1
DELPROT M      1         .9
SHIPFAILM      1         .1
A/CMOD  M      1         .9
MODFAIL M      1         .1
INTGON  M      1         .9
INTFAIL M      1         .1
DT/OT   M      1         .1
EOF:
.
```

2nd Pass

At this point all 4500 and 5788 Errors have been corrected

```
EDIT:
.TOP
TOF:
.ZONE 1 80
./BTEST
BTEST    FABCOMP BTCOMP    1.0 BENCH TESTING
.DOWN
BTEST    DTIME 1        3.0        3.0        4.0        10.0
.C/10.0/ 4.0/
BTEST    DTIME 1        3.0        3.0        4.0         4.0   Error Number 3855
.C/ 4.0/10.0/
BTEST    DTIME 1        3.0        3.0       10.0         4.0   is corrected
./OT    M
DT/OT    M      1        .1
.I
INPUT:
.DTFAIL   ICOMP    FAIL      1.0 FAIL DT/OT TESTING   Error Number 5388 is Corrected
.DTFAIL   DTIME 1          .1
.
EDIT:
./DTCOMP
DTCOMP   2   1                    DT/OT TESTING COMPLETED
.I
INPUT:
.FAIL     4 11                    SINK FOR FAILED ACTIVITIES   Error Numbers 3033
.                                                                are corrected
EDIT:
.FILE
```

The changes are made permanent

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :
     1    =  RUN VERT ONLINE
     2    =  RUN VERT OFFLINE (CMS BATCH)
     3    =  VIEW VERT OUTPUT
     4    =  CREATE A VERT INPUT FILE
     5    =  EDIT AN EXISTING VERT INPUT FILE
     6    =  GET VERT NETWORK PLOT MENU
     7    =  GET VERT GRAPH MENU
   LIST   =  GET VERT DATASETS DISPLAY LISTING MENU
   END    =  END THE SESSION

.1
```

VIFACTS is again to be run to continue the debugging

```
DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO
.NO
ENTER VERT INPUT FILE NAME
.VIFACTS
FI 05 DISK VIFACTS DATA A1
FI 06 DISK VOUTPUT AAAA A
FI 07 DISK VERTPUN AAAA A
FI 08 DISK VERT1 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 09 DISK VERT2 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 10 DISK VERT3 AAAA A ( LRECL 96 BLKSIZE 964 RECFM VBS )
FI 11 DISK VERT4 AAAA A ( LRECL 444 BLKSIZE 444 RECFM VBS )
VERTNEW
&CONTROL OFF
09:31:06

MSG FROM FPKERLY :  YOUR JOB HAS FINISHED
```

← Again, less than 30 seconds was required

.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.3 ← The output from the last VIFACTS run is reviewed for errors

```
DID YOU RUN VERT ONLINE ?
ENTER YES/NO
.YES
EDIT:
Ø   2.  E R R O R  NO.  5922  PARAMETER = ICOMP
EDIT:
.UP
Ø   1.  E R R O R  NO.  5922  PARAMETER = TIWINS
.QUIT
ENTER YES/NO FOR ROUTING
.NO
```

Error 5922 indicates the nodes "ICOMP" and "TIWINS" have respectively, 2 or more arcs proceeding from these nodes whose probabilities of occurrence do not sum to 1.0.

E (194) R/O

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.5

Edit VIFACTS to correct 5922 Errors

```
ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
.VIFACTS
EDIT:
TOF:
./TIWINS
TISUB    IACEPTEDTIWINS    1.0 CONTRACTOR 2 SUBMITS ITMS DESIGN PROPOSAL
.=
TIDES    TIWINS  DESCOMP   1.0 CONTRACTOR 2 DESIGNS ITMS
.T5
TIDES    TIWINS  DESCOMP   1.0 CONTRACTOR 2 DESIGNS ITMS
TIDES    DTIME 1       3.0        8.0        16.0        10.0
TIDES    M     1       .95
TIFAIL   TIWINS  FAIL      1.0 CONTRACTOR 2 ITMS DESIGN FAILS
TIFAIL   M     1       .07
.C/7/5/
TIFAIL   M     1       .05
```

This change corrects the second 5922 Error

```
./ICOMP
INTGON   ISTART  ICOMP     1.0 INTEGRATE FACTS/ITMS INTO AIRCRAFT
.=
DT/OT    ICOMP   DTCOMP    1.0 DEVELOPMENT/OPERATIONAL TESTING
.T5
DT/OT    ICOMP   DTCOMP    1.0 DEVELOPMENT/OPERATIONAL TESTING
DT/OT    DTIME 1       3.0        3.0        8.0        4.5
DT/OT    M     1        .1
DTFAIL   ICOMP   FAIL      1.0 FAIL DT/OT TESTING
DTFAIL   M     1        .1
.UP2
DT/OT    M     1        .1
.C/.1/.9/
DT/OT    M     1        .9
```

This change corrects the first 5922 Error

```
.FILE
```

The changes are made permanent

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :
     1     =  RUN VERT ONLINE
     2     =  RUN VERT OFFLINE (CMS BATCH)
     3     =  VIEW VERT OUTPUT
     4     =  CREATE A VERT INPUT FILE
     5     =  EDIT AN EXISTING VERT INPUT FILE
     6     =  GET VERT NETWORK PLOT MENU
     7     =  GET VERT GRAPH MENU
   LIST    =  GET VERT DATASETS DISPLAY LISTING MENU
   END     =  END THE SESSION

.1
```

VIFACTS is again to be run to continue the debugging

```
DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO
.NO
ENTER VERT INPUT FILE NAME
.VIFACTS
FI 05 DISK VIFACTS DATA A1
FI 06 DISK VOUTPUT AAAA A
FI 07 DISK VERTPUN AAAA A
FI 08 DISK VERT1 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 09 DISK VERT2 AAAA A ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 10 DISK VERT3 AAAA A ( LRECL 96 BLKSIZE 964 RECFM VBS )
FI 11 DISK VERT4 AAAA A ( LRECL 444 BLKSIZE 444 RECFM VBS )
VERTNEW
&CONTROL OFF
09:41:33


MSG FROM FPKERLY :   YOUR JOB HAS FINISHED
```

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :
    1     =  RUN VERT ONLINE
    2     =  RUN VERT OFFLINE (CMS BATCH)
    3     =  VIEW VERT OUTPUT
    4     =  CREATE A VERT INPUT FILE
    5     =  EDIT AN EXISTING VERT INPUT FILE
    6     =  GET VERT NETWORK PLOT MENU
    7     =  GET VERT GRAPH MENU
   LIST   =  GET VERT DATASETS DISPLAY LISTING MENU
   END    =  END THE SESSION

.3
```

The Output from the last VIFACTS run is to be reviewed

```
DID YOU RUN VERT ONLINE ?
ENTER YES/NO
.YES
EDIT:
Ø     LAST RANDOM NUMBER SEED =   2113587123 ←——
EDIT:
.FILE
ENTER YES/NO FOR ROUTING
.NO
```

This line indicates that VIFACTS has been sucessfully debugged

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :
    1     =  RUN VERT ONLINE
    2     =  RUN VERT OFFLINE (CMS BATCH)
    3     =  VIEW VERT OUTPUT
    4     =  CREATE A VERT INPUT FILE
    5     =  EDIT AN EXISTING VERT INPUT FILE
    6     =  GET VERT NETWORK PLOT MENU
    7     =  GET VERT GRAPH MENU
   LIST   =  GET VERT DATASETS DISPLAY LISTING MENU
   END    =  END THE SESSION

.5
```

Since the last run was sucessful, I am now ready to change VIFACTS to begin analysis runs

```
ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
.VIFACTS
EDIT:
TOF:
.T2
TOF:
1 4             435459    2              1.0        1.0
.ZONE 9 9
.C/ /1/
1 4        1    435459    2              1.0        1.0
.ZONE 1 80
.C/    2/1000/
1 4        1    435459 1000              1.0        1.0
./ENDARC
ENDARC
./ICOMP
ICOMP    2   3                   INTEGRATION COMPLETED
.ZONE 13 16
.C/    /16 1/
ICOMP    2  316 1                INTEGRATION COMPLETED
.DO
DTCOMP   2   1                   DT/OT TESTING COMPLETED
.C/    /16  /
DTCOMP   2  116                  DT/OT TESTING COMPLETED
.FOLE
```

This CMS Command allows me to concern myself with only the 9th column of every record in the data file

I changed the VIFACTS data file to 1000 iterations for subsequent analysis runs

This change enables me to get a "camera-ready" graph of the output from this node (ICOMP).

Reset the Zone to its normal setting

Since "DTCOMP" is a terminal node (column 12 of this record has the value "1"), Columns 15 and 16 of this record should be left blank.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.2

I am now ready to do analysis runs

```
BATCH1 NOT LOGGED ON

IS BATCH1 "DSC" ? ENTER YES/NO
.NO

YOU CAN'T RUN VERT OFFLINE AT THIS TIME BECAUSE BATCH1 IS NOT LOGGED ON

I HAVE SENT A MESSAGE TO THE OPERATOR TO LOG BATCH1 ON

WAIT UNTIL THE OPERATOR TELLS YOU THAT BATCH1 IS LOGGED ON
BEFORE YOU USE MENU ITEM NO.2 AGAIN

.
```

Depress the "RETURN" button to continue

The CMS Batch Facility was not logged on. The executive file will not let me run VERT offline since the Batch facility is not available.

NOTE: The new Batch System is called "BATCHDV" instead of Batch1. This sample session was completed before the new Batch System became operational.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.5

Since I can't run VERT offline, I decided to run the VIFACTS data file online, but first, I need to lower the number of monte carlo iterations so that I won't tie up the terminal as long.

```
ENTER FILENAME OF VERT INPUT FILE TO BE EDITED
.VIFACTS
EDIT:
TOF:
.T2
TOF:
1 4      1      435459 1000             1.0        1.0
.C/1000/ 250/
1 4      1      435459  250             1.0        1.0
.FILE
```

I changed the number of iterations to 250. The output graphs will not have as smooth as a curve as it would have had with 1000 iterations, but I will still be able to see the overall trend of the curve.

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.1

I am now ready to run VIFACTS online

```
DO YOU WANT TO CREATE TELEGRAF FILES WITH THIS RUN ? ENTER YES/NO
.YES
ENTER VERT INPUT FILE NAME
.VIFACTS
GLOBAL TXTLIB FORTMOD2 MOD2EEH TTXTCS TTXAGII SANDESUB TELELIB CMSLIB
FI Ø1 DISK VBANKNAM DATA A1 ( RECFM FB LRECL 8Ø
VBANKNAM


ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 1Ø CHARCTERS MAX>
.ICOMP$


DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.Y


ENTER THE BANKDATA FILENAME FOLLOWED BY A DOLLAR SIGN
    < NO SPACES, 1Ø CHARCTERS MAX>
.DTCOMP$


DO YOU WANT TO ENTER ANOTHER FILENAME
  ENTER Y FOR YES OR N FOR NO
.N
```

"ICOMP" and "DTCOMP" are the names I chose to give to the filenames of the graph data files for the two nodes that I selected to get graph output on. "ICOMP" and "DTCOMP" also happen to be the names given to the two nodes. It is not required that they be the same.

```
FI 01 DISK VBANKNAM DATA A1 ( RECFM FB LRECL 80
FI 05 DISK VIFACTS DATA A1
FI 06 DISK VOUTPUT AAAA A1
FI 07 DISK VERTPUN AAAA A1
FI 08 DISK VERT1 AAAA A1 ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 09 DISK VERT2 AAAA A1 ( LRECL 88 BLKSIZE 884 RECFM VBS )
FI 10 DISK VERT3 AAAA A1 ( LRECL 96 BLKSIZE 964 RECFM VBS )
FI 11 DISK VERT4 AAAA A1 ( LRECL 444 BLKSIZE 444 RECFM VBS )
VERTNEW1
CP MSG * YOUR JOB HAS FINISHED
10:05:21

MSG FROM FPKERLY :  YOUR JOB HAS FINISHED

&READ ARGS
'
```

Notice the different name used here. This module has the interface with TELLAGRAF; the other (VERTNEW) does not.

Depress the "RETURN" button to continue

MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

1	=	RUN VERT ONLINE
2	=	RUN VERT OFFLINE (CMS BATCH)
3	=	VIEW VERT OUTPUT
4	=	CREATE A VERT INPUT FILE
5	=	EDIT AN EXISTING VERT INPUT FILE
6	=	GET VERT NETWORK PLOT MENU
7	=	GET VERT GRAPH MENU
LIST	=	GET VERT DATASETS DISPLAY LISTING MENU
END	=	END THE SESSION

.7

I am now ready to lock at the graphs

```
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

    1     =  DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES

    2     =  CREATE A VERT GRAPHICS DATA FILE

    3     =  EDIT AN EXISTING VERT GRAPHICS DATA FILE

    4     =  DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY

    5     =  SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS
                                             FOR THE COBRA FACTS DRA)

    R     =  RETURN TO THE MAIN MENU LEVEL

  END     =  END THE SESSION

.1
```

Item 1 is selected

```
ARE YOU USING A 4027 COLOR GRAPHICS TERMINAL ? ENTER YES/NO
.NO

DID YOU RUN VERT ONLINE ? ENTER YES/NO
.YES
EDIT:
TOF:
BANKDATA.
ICOMP$
```

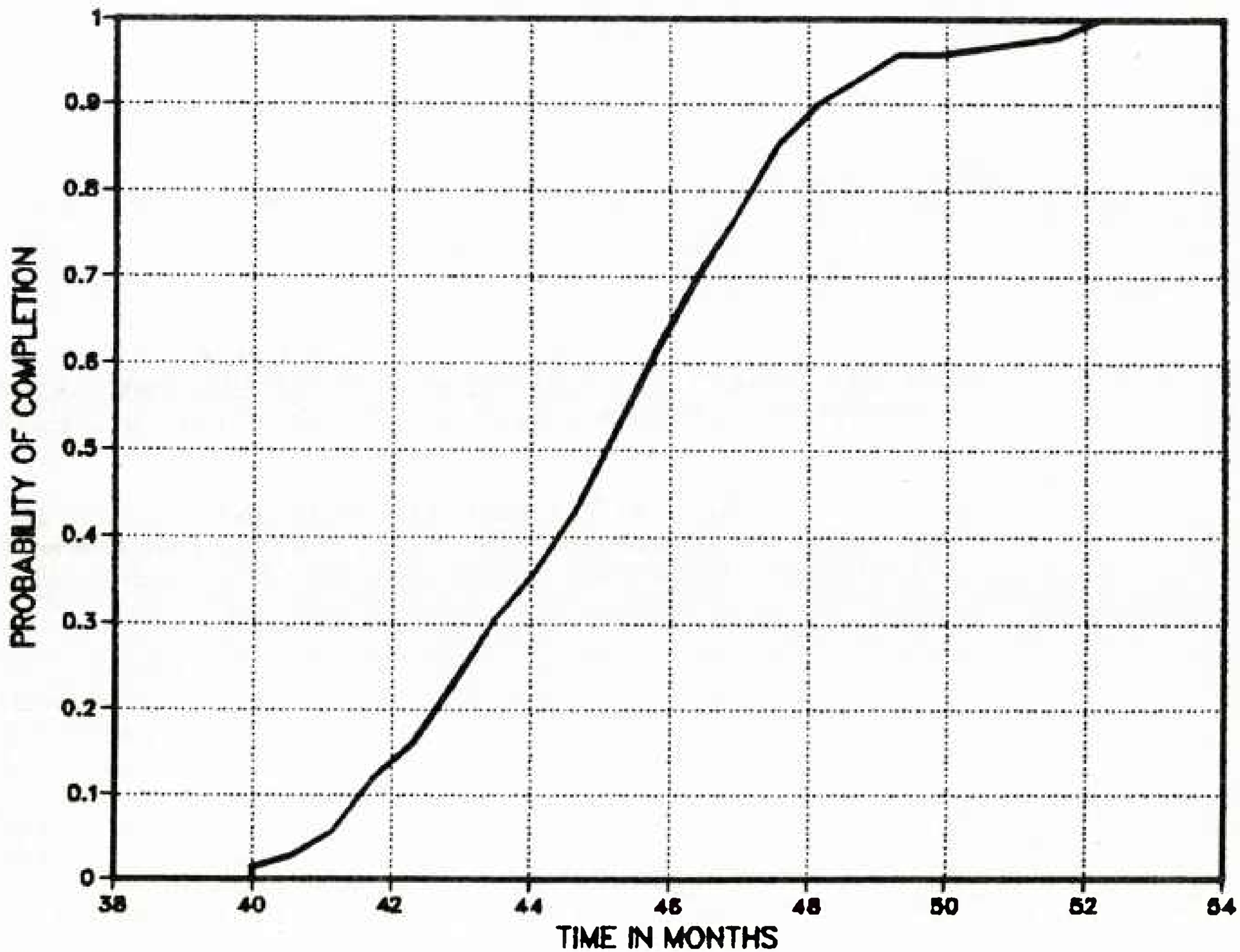
The name of the first graph data file to be displayed is shown

```
ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'FACTS/ITMS SYSTEM INTEGRATION SCHEDULE'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'TIME IN MONTHS'.
```

After depressing the "RETURN" button to complete this entry, the screen will automatically clear and the graph will be displayed.

Depress the "RETURN" button to continue

FACTS/ITMS SYSTEM INTEGRATION SCHEDULE



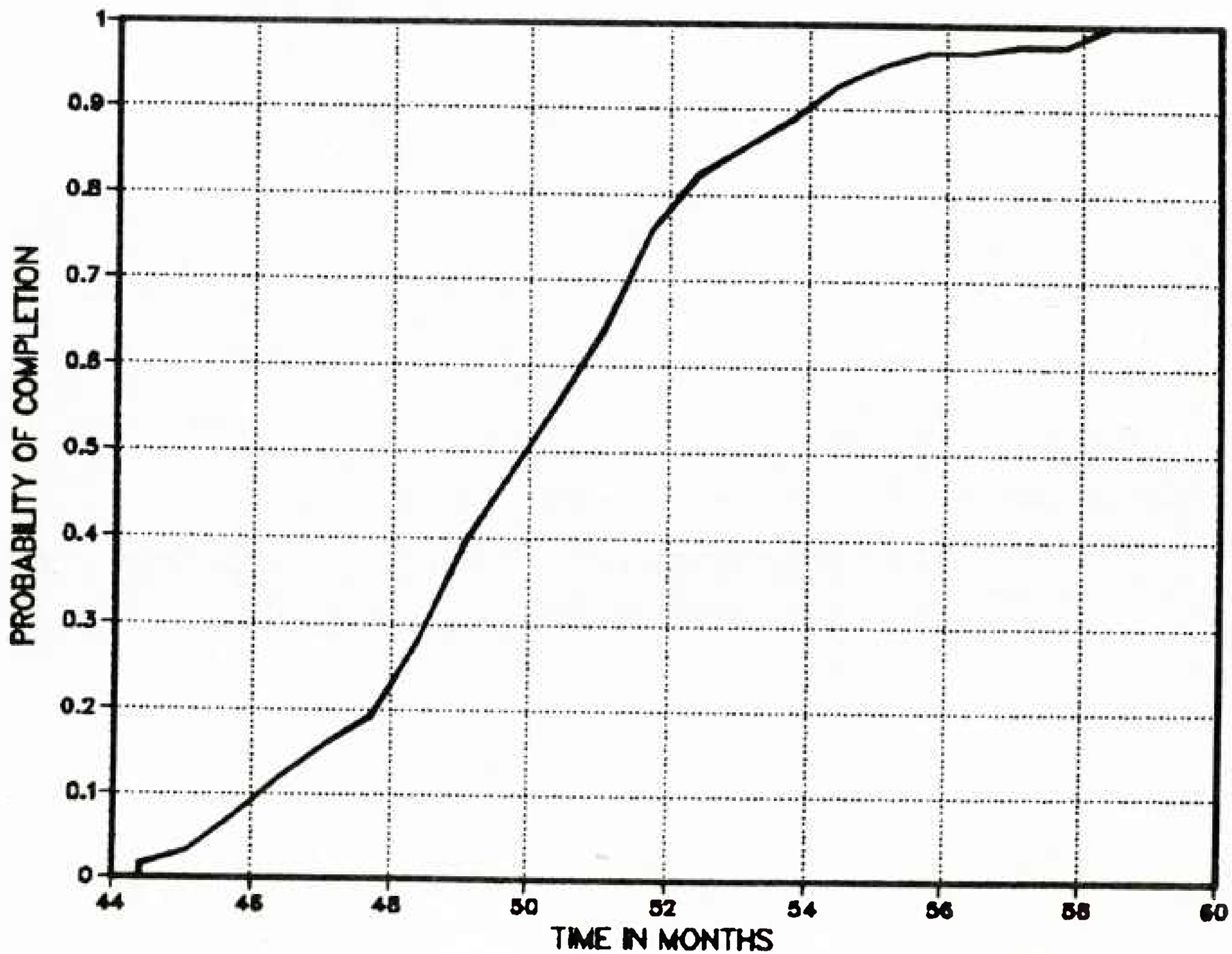
END OF TELL-A-GRAF 4.0 --   7450 VECTORS GENERATED IN   1 PLOT FRAMES.
PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
EDIT:
TOF:
BANKDATA.
DTCOMP* ← The name of the second graph data file to be displayed is shown

ENTER THE TITLE FOR THE GRAPH ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <68 CHARACTERS MAX>
.'DT/OT TESTING SCHEDULE FOR FACTS/ITMS'.

ENTER THE TITLE OF THE X-AXIS ENCLOSED IN SINGLE
QUOTES AND END IT WITH A PERIOD <60 CHARACTERS MAX>
.'TIME IN MONTHS'.

← Depress the "RETURN" button to continue

DT/OT TESTING SCHEDULE FOR FACTS/ITMS



```
END OF TELL-A-GRAF 4.0 --     7544 VECTORS GENERATED IN     1 PLOT FRAMES.
          PROPRIETARY SOFTWARE PRODUCT OF ISSCO, SAN DIEGO, CA.
EDIT:
EDIT:
INPUT FILE 'VBANKNAM DATA A1' NOT FOUND.
SECONDARY MENU LEVEL:  ENTER THE OPTION DESIRED :

    1     =  DISPLAY VERT GRAPHICS DATA FILES USING TELEGRAF BANKDATA FILES

    2     =  CREATE A VERT GRAPHICS DATA FILE

    3     =  EDIT AN EXISTING VERT GRAPHICS DATA FILE

    4     =  DISPLAY A VERT GRAPHICS DATA FILE WHICH WAS CREATED MANUALLY

    5     =  SAMPLE VERT GRAPHS (SCHEDULE, COST, AND PERFORMANCE CHARTS
                                     FOR THE COBRA FACTS DRA)

    R     =  RETURN TO THE MAIN MENU LEVEL

  END     =  END THE SESSION

.END
R;
.
```

Since only 2 nodes were requested and since Network Time is the only parameter used in VIFACTS, only 2 graphs are displayed.

I am now out of "VERTEX" and back in CMS "READY" mode

APPENDIX I

SAMPLE SESSION NUMBER 4:

PLOT USING AN EXISTING VERT

PLOT DATA FILE

(Tektronix 4054 Graphics Terminal)[1]

[1] The Tektronix 4054 Graphics Terminal emulates a Tektronix 4014 Graphics Terminal.

THIS PAGE DEPICTS LOGGING ON THE COMPUTER TERMINAL (TEKTRONIX 4054 COMPUTER GRAPHICS TERMINAL) AND GETTING INTO CMS READY MODE.

UNLESS OTHERWISE STATED ALL PAGES IN THIS SESSION WERE CREATED BY MANUALLY DEPRESSING THE "PAGE" BUTTON ON THE COMPUTER TERMINAL. EACH PAGE IS AN ACTUAL PICTURE OF THE COMPUTER GRAPHICS TERMINAL CRT SCREEN.

```
CALL "RATE",9600,0,2   ← Set baud rate
CALL "TERMIN"

enter class 116622
 USACC DATA NUMBERS ARE: AV693-3582 OR 314-263-3582
class 162 start
CMS6
READY-TO-IBM

S+E VM/SP ONLINE
!   ← Depress "RETURN" button

.LOG FPKERLY
restart
.LOG FPKERLY      \
ENTER PASSWORD:    } ← Enter userid and password
.[redacted]       /
DASD 190 LINKED R/O; R/W BY MAINT; R/O BY 018 USERS
DASD 19E LINKED R/O; R/W BY MAINT; R/O BY 017 USERS
DASD 196 LINKED R/W; R/O BY FTBACKUP
FILES: 002 RDR,  NO PRT,  NO PUN
LOGON AT 06:18:54 CDT MONDAY 08/02/82
MIDWEST S+E COMPUTER CENTER
.   ← Depress "RETURN" button
Y (19E) R/O
CMSZER SYSTEM NAME 'CMSZER' NOT AVAILABLE.
CMSSEG SYSTEM NAME 'CMSSEG' NOT AVAILABLE.
DASD 291 DEFINED
'19E' REPLACES ' Y (19E) '
Y (19E) R/O
E (194) R/O
R;   ← CMS "READY" mode

.
```

```
CMS
.VERTEX
E (194) R/O
```

Enter the name of the executive file which runs the menu technique.

```
MAIN MENU LEVEL: ENTER THE OPTION DESIRED :

    1     =  RUN VERT ONLINE

    2     =  RUN VERT OFFLINE (CMS BATCH)

    3     =  VIEW VERT OUTPUT

    4     =  CREATE A VERT INPUT FILE

    5     =  EDIT AN EXISTING VERT INPUT FILE

    6     =  GET VERT NETWORK PLOT MENU

    7     =  GET VERT GRAPH MENU

  LIST    =  GET VERT DATASETS DISPLAY LISTING MENU

  END     =  END THE SESSION

.6
```

Item 6 is selected

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

1 = CREATE A VERT PLOT DATA FILE

2 = EDIT AN EXISTING VERT PLOT DATA FILE

3 = DISPLAY A VERT PLOT

4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED ROUTINE ECP PROCESS -PHASE 1)

R = RETURN TO THE MAIN MENU LEVEL

END = END THE SESSION

.3

ENTER FILENAME
.VPLTUGN1

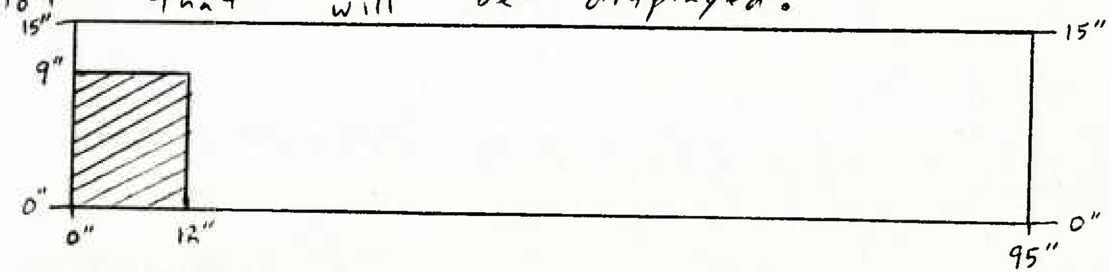
A VERT plot data file already created is being selected for display. After entering the name of the VERT plot data file, the CRT screen will automatically be cleared.

START OF TAPE
OPTIONS?

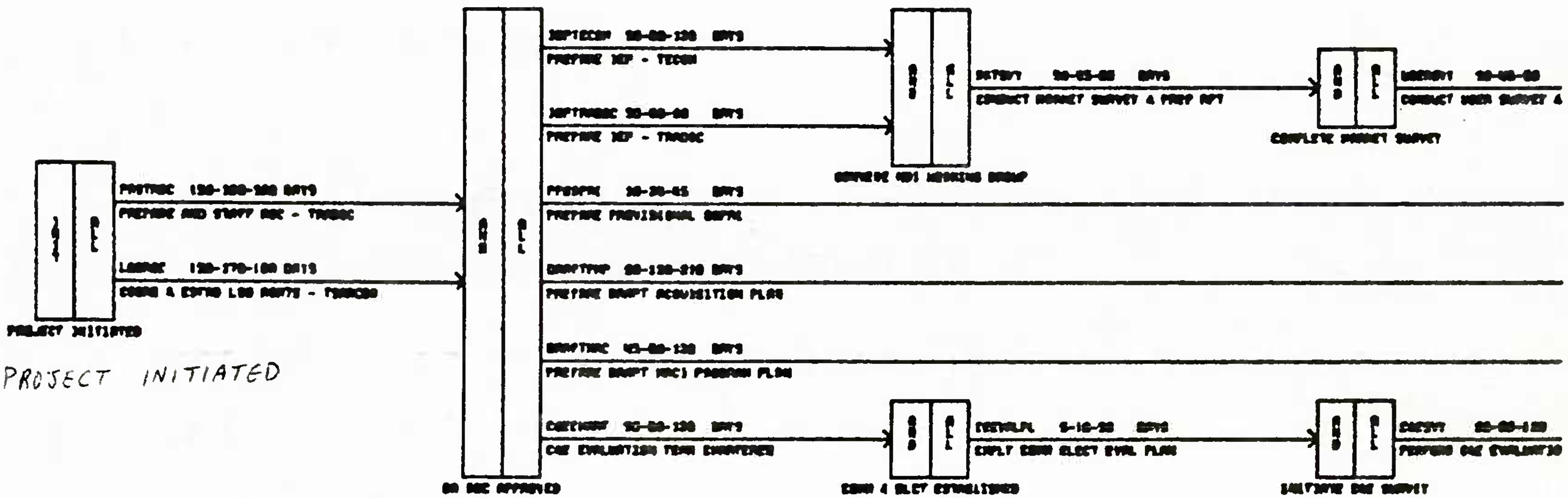
E=ERASE
H=HARDCOPY
W=SET SCREEN SIZE
S=SKIP FRAMES
R=RESET OFFSET
C=CONTINUE
O=STOP PROGRAM
?=THIS MESSAGE
.W ← "Set Screen Size" is selected

WHERE WOULD YOU LIKE ORIGIN?(X,Y)
.Ø.
.Ø.
ENTER SIZE (WIDTH,HEIGHT)
.12.
.9.
.C ← After entering the "C", the CRT screen will automatically be cleared

NOTE: The "VPLTUGNI" plot is approximately 95 inches wide and 15 inches tall. The schematic below (not to scale) shows that portion of the total plot that will be displayed.



← Depress "RETURN" button to continue.
Depress "PAGE" button on terminal
before depressing "RETURN" button.



PROJECT INITIATED

DA ROC APPROVED

SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

1 = CREATE A VERT PLOT DATA FILE

2 = EDIT AN EXISTING VERT PLOT DATA FILE

3 = DISPLAY A VERT PLOT

4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED ROUTINE ECP PROCESS -PHASE 1)

R = RETURN TO THE MAIN MENU LEVEL

END = END THE SESSION

.3

ENTER FILENAME
.VPLTUGN1

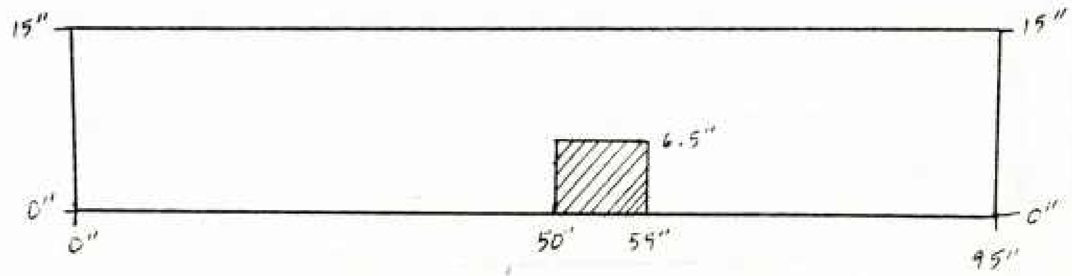
Another portion of the "VPLTUGN1" plot is to be displayed.

CRT screen will automatically clear after completing the entry "VPLTUGN1".

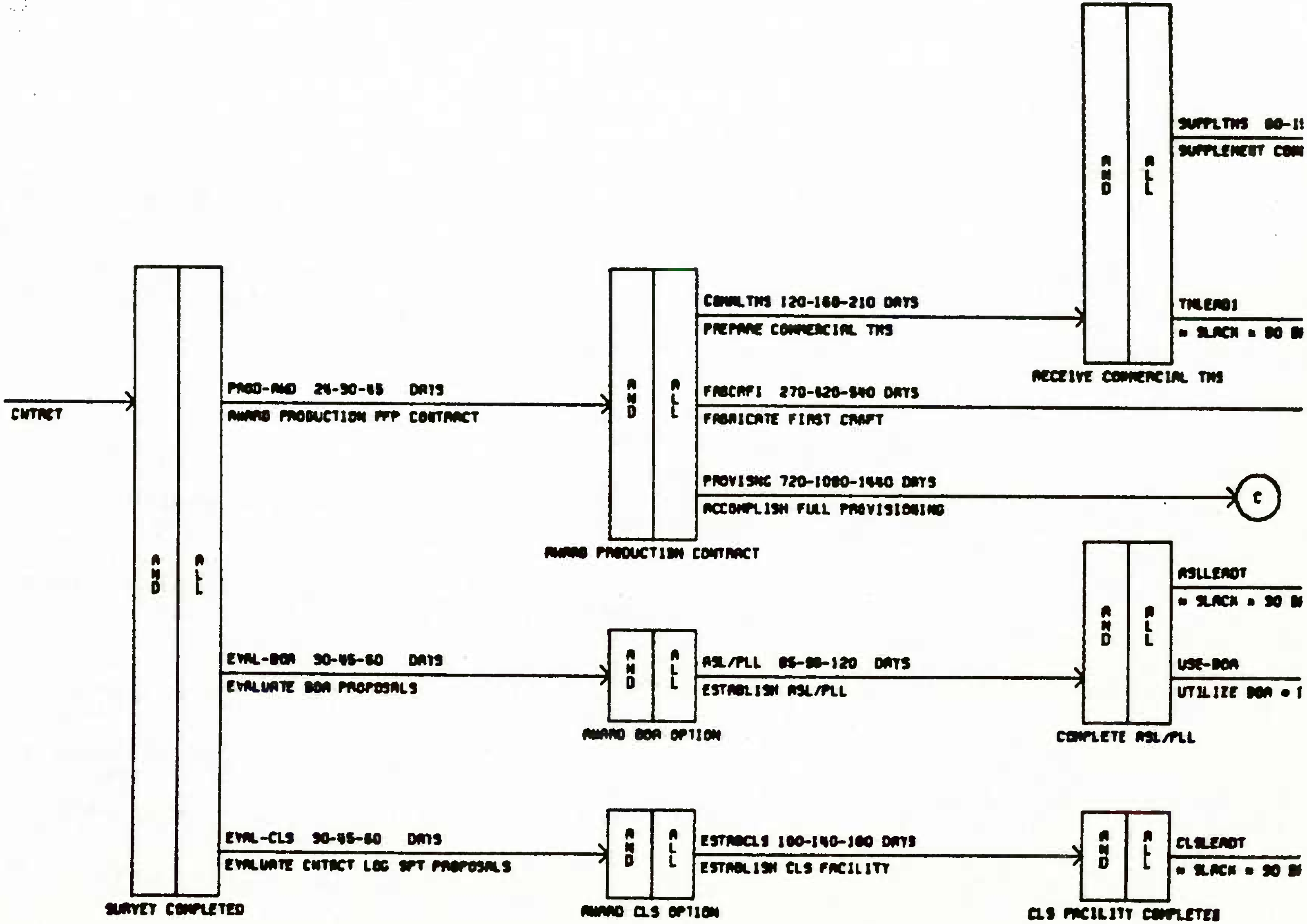
```
START OF TAPE
OPTIONS?

E=ERASE
H=HARDCOPY
W=SET SCREEN SIZE
S=SKIP FRAMES
R=RESET OFFSET
C=CONTINUE
O=STOP PROGRAM
?=THIS MESSAGE
.W

WHERE WOULD YOU LIKE ORIGIN?(X,Y)
.50.
.Ø.
ENTER SIZE (WIDTH,HEIGHT)
.9.
.6.5
.C
```

CRT Screen will automatically clear after entering the "C" and depressing the "RETURN" button to complete the entry.

NOTE: The schematic below shows that portion of the total plot which will be displayed. Since a smaller portion has been chosen than previously, the text on the plot should be more clear.



Depress "PAGE" button and then "RETURN" button.



SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

1 = CREATE A VERT PLOT DATA FILE

2 = EDIT AN EXISTING VERT PLOT DATA FILE

3 = DISPLAY A VERT PLOT

4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED ROUTINE ECP PROCESS -PHASE 1)

R = RETURN TO THE MAIN MENU LEVEL

END = END THE SESSION

.3

ENTER FILENAME
.VPLTUGN1

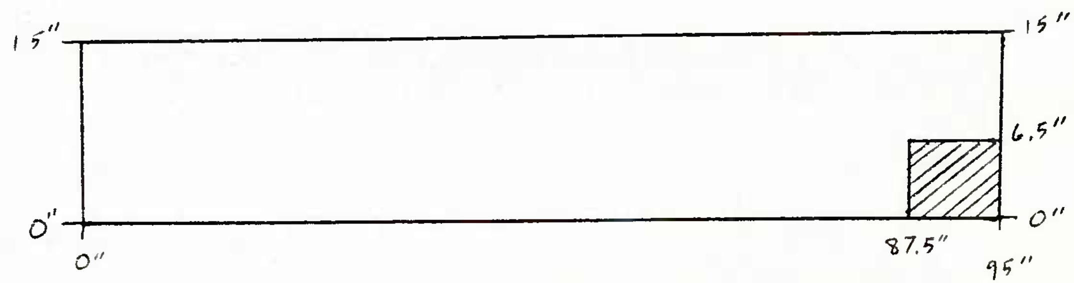
Another portion of the "VPLTUGN1" plot is to be displayed.

CRT screen will automatically clear after completing the entry "VPLTUGN1".

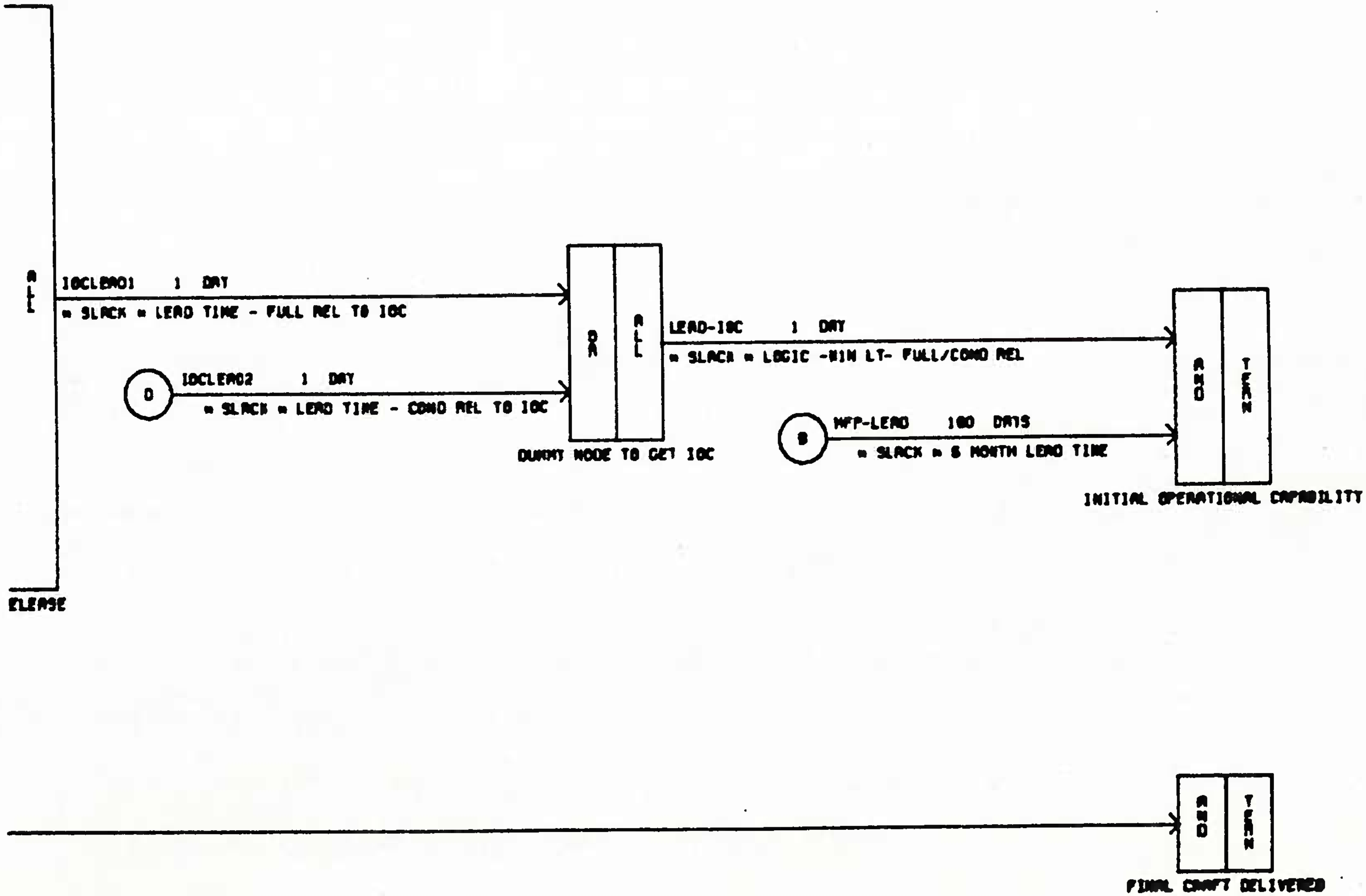
```
START OF TAPE
OPTIONS?

E=ERASE
H=HARDCOPY
W=SET SCREEN SIZE
S=SKIP FRAMES
R=RESET OFFSET
C=CONTINUE
O=STOP PROGRAM
?=THIS MESSAGE
.W

WHERE WOULD YOU LIKE ORIGIN?(X,Y)
.87.5
.0.
ENTER SIZE (WIDTH,HEIGHT)
.9.
.6.5
.C
```

CRT screen will automatically clear after completing the entry

NOTE: The schematic below shows that portion of the total plot which will be displayed.



Depress "PAGE" button and then "RETURN" button.



SECONDARY MENU LEVEL: ENTER THE OPTION DESIRED :

1 = CREATE A VERT PLOT DATA FILE

2 = EDIT AN EXISTING VERT PLOT DATA FILE

3 = DISPLAY A VERT PLOT

4 = SAMPLE VERT PLOT (TROOP SUPPORT LEVEL II MANAGED ROUTINE ECP PROCESS -PHASE 1)

R = RETURN TO THE MAIN MENU LEVEL

END = END THE SESSION

```
.END
R;
.
```

No more plotting and no more activity with the menu technique is desired.

In CMS "READY" mode Again