

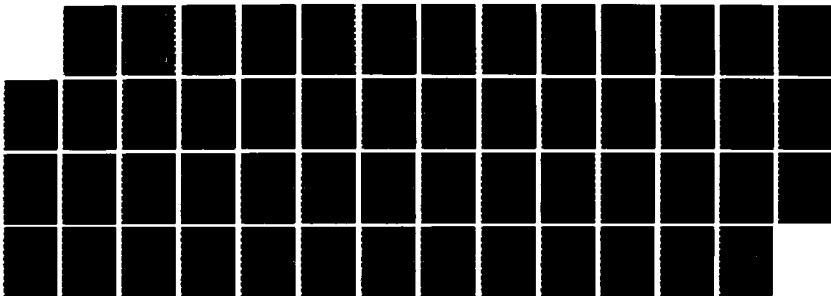
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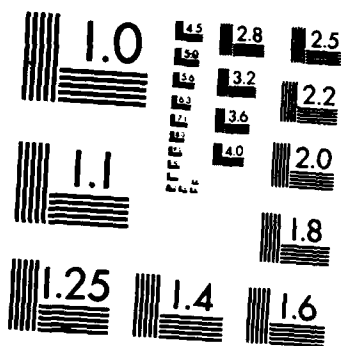
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CENTRAL COMPUTER FACILITY  
SOFTWARE DIRECTORY

by

MARY C. KIMBALL

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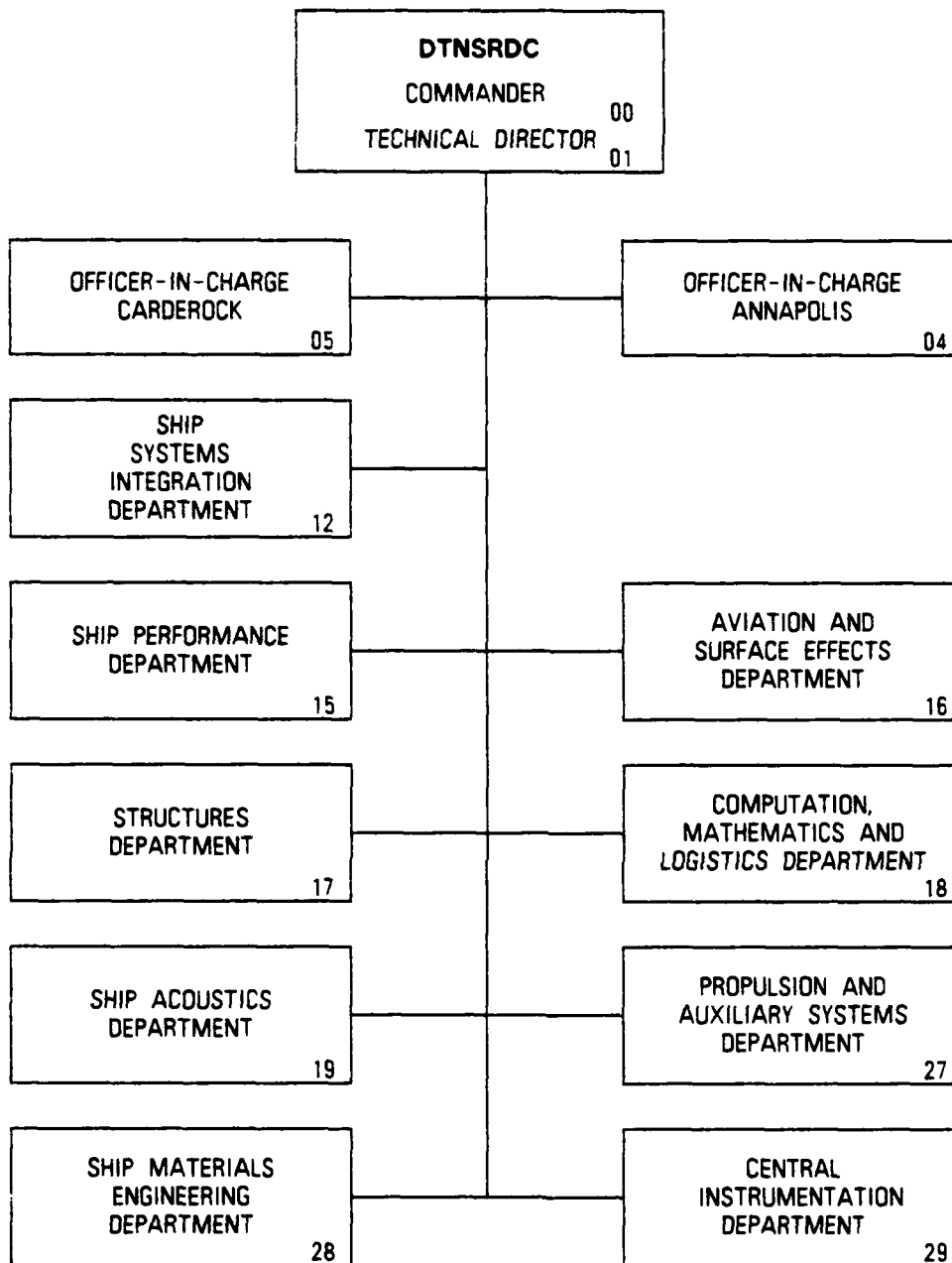
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Departmental Report

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This document contains a brief discussion of the function and operating requirements of the software currently supported by the Central Computer Facility.		

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## CHAPTER 1

### Introduction

The Central Computer Facility (CCF), Code 189, of the Computation, Mathematics and Logistics Department at the David W. Taylor Naval Ship Research and Development Center (DTNSRDC) has two large Control Data Corporation (CDC) digital computers, a Digital Equipment Corporation (DEC) super-mini computer system, and a Mass Storage System.

The large computers include a CDC CYBER 176 and a CDC CYBER 170 model 750. The operating system for both of the CDC CYBER computers at DTNSRDC is the Network Operating System/Batch Environment, version 1.5 (NOS/BE 1.5 - level 552). Throughout this document, the term 'CDC' refers to any of the CDC computers, unless otherwise specified.

The DEC super-mini computer system is the Virtual Address Extension (VAX) cluster, which contains two VAX-11/780 computers. The operating system for the VAXcluster is the Virtual Memory System (VMS), version 4.3.

The Mass Storage System (MSS), which is driven by a CDC CYBER 170 model 825, is a secondary disk archival system and is connected to the CDC and the VAX computers.

The software currently supported by the CCF is presented in the following pages. Each entry, which falls into one of seven major categories, contains a title, the machine(s) and operating system(s) under which the software operates, from where the software was acquired or developed if applicable, a description of the software, and how to use the software.

This document is a survey of the available software and is not intended to be the sole reference for any of the entries. In many instances, more information is required to actually use the software and can be obtained through User Services, (202) 227-1907 or Autovon 287-1907.



## CHAPTER 2

### Editors and Text Processors

Two fundamental tools for processing text are editors and text processors. Editors are used to create and modify files; text processors format text according to special commands embedded in the file.

There are essentially two types of editors: line editors and full-screen editors. Line editors normally use a pointer or line number to the basic unit of text - the line. Position within the file is controlled by this pointer or line number. Lines of text are edited through the use of commands. Full-screen editors enable one to view a screenful of text at one time. In this case, text is edited by physically moving through the file. In both line and full-screen editors, text may be inserted, deleted, moved or copied. In addition, all or part of a file may be saved or discarded.

Text processors take as input a file of text with embedded commands and yield a formatted file as output. These commands enable one to adjust the size of pages, right or left margins, line spacing and the arrangement of items in lists. Other capabilities include filling and justifying, chaptering, sectioning and, in some cases, a table of contents or an index.

### Digital Standard Runoff (VAX)

OPERATING SYSTEM: VMS

#### DESCRIPTION

Digital Standard Runoff (DSR) is a text processor consisting of commands, flags, a table of contents utility and an indexing utility. The commands enable one to specify the size of pages, uneven or justified right margins, spacing between lines and the arrangement of items in lists. Flags are used to indicate text emphasis, case of characters and spacing. Many command qualifiers allow one to adjust the amount of text on a page, process all or part of a file or create an intermediate binary file for indexes and a table of contents.

#### USAGE

RUNOFF filename.ext

### Editor (CDC)

OPERATING SYSTEM: NOS/BE

#### DESCRIPTION

Editor is CDC's early implementation of a line editor. Lines to be edited must have sequence numbers and can be up to 512 characters in length. An added feature of Editor allows operating system commands to be executed when not in create mode; therefore, it is possible to compile and execute the program currently being edited without leaving the editor.

#### CONSTRAINTS

Editor may require excessive memory and processing time.

#### USAGE

EDITOR.

## EDT (VAX)

OPERATING SYSTEM: VMS

### DESCRIPTION

EDT, an interactive text editor, has three different editing modes - keypad, nokeypad and line. Keypad mode provides full-screen editing capabilities through a minimal number of keystrokes. Nokeypad mode also provides full-screen editing with EDT processing commands only after <RETURN> is entered. Line mode provides a powerful line editor. Many features are included in addition to normal editing capabilities. The start up file facility allows one to customize the characteristics of an editing session. The use of macros and key definitions enables one to extend the editor. An extensive on-line help facility gives information on editing commands and a journal facility lets the user recover an editing session in the case of a system interrupt or line disconnect. Only VT52, VT100 and VT200 compatible terminals may be used with EDT.

### USAGE

To access line mode, enter

ED filename.ext

Then, keypad is accessed by entering at the \* prompt

CHANGE

or nokeypad is accessed by entering at the \* prompt

SET NOKEYPAD

CHANGE

## EVE (VAX)

OPERATING SYSTEM: VMS

### DESCRIPTION

The Extensible VAX Editor, EVE, is a full-screen interactive text editor that has many features to make editing text efficient. Commands can be entered through a combination of keypad and line modes. Files and buffers allow one to work with as many files as needed during an EVE session. In addition, operating system commands may be issued from within EVE. Multiple windows lets one view two files on the screen at a given time. Section files can be used to customize the characteristics of an editing session. Key definitions and VAXTPU procedures can be used to tailor EVE. An extensive on-line help gives information on editing commands and a journal facility allows recovery of an editing session in the case of a system interrupt or line disconnect. Eve is designed for use with VT100 and VT200 compatible terminals.

### USAGE

EVE filename.ext

NETED (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Ed Fourt of Lawrence Berkeley Labs

DESCRIPTION

NETED is an interactive text line editor modelled after the standard Arpanet editor. It is relatively inexpensive to run and requires only a small amount of memory. Line numbering is not required; instead, position within the file is controlled by a pointer. NETED allows files to have a maximum of 140 characters per line. It also allows the merging of files. Local additions include commands to add text to the right and left of a line as well as some word processing-related commands. A help facility gives a list of editing commands.

USAGE

ATTACH,NETED.  
NETED,lfn.

PROSE (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: University of Minnesota

DESCRIPTION

PROSE is one of two CDC text processors. It is derived from the RUNOFF text processor and provides pagination, margin justification, filling, chaptering and sectioning. In addition, it provides discretionary hyphenation and automatic sorted indexing.

USAGE

MSACCES,<password>.  
MSFETCH,PROSE,UN=CSYS.  
PROSE,lfn.

RNF (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: University of Illinois

DESCRIPTION

RNF is one of two CDC text processors. It is derived from the RUNOFF text processor and provides line filling, pagination, margin justification, chaptering and sectioning. In addition, RNF also provides numbered lists, sublists and an easy-to-use macro facility.

USAGE

MSACCES,<password>.  
MSFETCH,RNF,UN=CSYS.  
RNF,lfn.

## CHAPTER 3

### Compilers and Interpreters

This chapter describes the compilers and interpreters currently supported by the CCF. Each of these provides a means for executing a program written in a high level language.

Both compilers and interpreters accept as input a particular high level language program. An interpreter will translate and execute this source as it progresses through the program. This process must be repeated every time the program is executed. Compilers, on the other hand, produce object code to be run at a later time; hence, the program need only be run, not recompiled.

The compilers and interpreters range from general purpose programming languages such as Fortran and Pascal to special purpose programming languages such as Simscript 11.5 and GPSS.

APL (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Control Data Corporation

DESCRIPTION

A Programming Language had its origins in the book "A Programming Language" by Kenneth E. Iverson (John Wiley and Sons, New York, 1962). One line of APL input is equivalent to many lines of input in other languages; hence, programs can be written in less time with less chance of error. CDC's APL version 2.2 is almost identical to APLUM (APL - University of Massachusetts).

USAGE

APL, ID=XXXX.



BASIC (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

DESCRIPTION

The CDC version, BASIC 3.5, conforms to the ANSI Minimal Basic. The VAX version of BASIC conforms to the ANSI Minimal Basic with VAX extensions.

USAGE

On the CDC:

To execute immediately, enter

BASIC,l=lfnl.

To create an object file, lfn2, and then execute, enter

BASIC,l=lfnl,B=lfn2.  
lfn2.

On the VAX:

To access immediate mode, enter

BASIC

or to compile, link, and run, enter

BASIC <source file>  
LINK <object file>  
RUN <executable file>

COBOL (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

DESCRIPTION

There are currently two versions of COBOL on the CDC machines. COBOL 4 conforms to ANSI 1968 Cobol and COBOL 5 conforms to ANSI 1974 Cobol, each with some CDC extensions. VAX COBOL conforms to ANSI 1974 Cobol with some VAX extensions.

USAGE

On the CDC:

For Cobol 4, enter

COBOL,<params>.  
LGO.

For Cobol 5, enter

COBOL5,<params>.  
LGO.

On the VAX:

To compile, link, and run, enter

COBOL <source file>  
LINK <object file>  
RUN <executable file>

## FORTRAN (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

### DESCRIPTION

There are currently two versions of FORTRAN on the CDC machines. FTN 4 conforms to ANSI 1966 Fortran and FTN 5 conforms to ANSI 1977 Fortran, each with some CDC extensions. VAX FORTRAN conforms to ANSI 1977 Fortran with some VAX extensions.

### USAGE

On the CDC:

For Fortran 4, enter

FTN4,<params>.  
LG0.

For Fortran 5, enter

FTN5,<params>.  
LG0.

On the VAX:

To compile, link, and run, enter

FORTRAN <source file>  
LINK <object file>  
RUN <executable file>

GPSS (CDC)

OPERATING SYSTEM: NOS/BE

DESCRIPTION

GPSS is a general purpose discrete event simulation package compatible with IBM System/360 GPSS V.

CONSTRAINTS

GPSS version 1.3 needs 70000 octal words of central memory while version 1.2 needs 130000 octal words.

USAGE

To use version 1.3:

MSACCES,<password>.  
MSFETCH,GPSS,UN=CSYS.  
GPSS,<parameters>.

To use version 1.2:

MSACCES,<password>.  
MSFETCH,GPSS,GPSS12,UN=CSYS.  
GPSS,<parameters>.

PASCAL (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

DESCRIPTION

On the CDC machines, the Pascal 6000 Release 3 compiler was obtained from the University of Minnesota. It is closely related to the accepted standard. VAX Pascal is an extension of the standard for the Pascal programming language by the International Organization for Standardization.

USAGE

On the CDC:

```
ATTACH,PASCAL.  
PASCAL(<parameters>)  
ATTACH,PASCLIB.  
LGO.
```

On the VAX:

```
PASCAL <source file>  
LINK <object file>  
RUN <executable file>
```

PL/1 (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

DESCRIPTION

PL/1 is a general purpose programming language. The current version of PL/1 on the CDC machines is a subset of the ANSI PL/1 standard. VAX PL/1 is an extension of this standard.

USAGE

On the CDC:

```
PL1,<parameters>.  
LGO.
```

ON the VAX:

```
PL1 <source file>  
LINK <object file>  
RUN <executable file>
```

SIM11.5 (CDC)

OPERATING SYSTEM: NOS/BE

DESCRIPTION

Simsript 11.5 is a general purpose discrete event simulation language. It supports recursion, dynamic storage allocation, the filing of items into or out of sets and automatic collection of statistics. We are currently running version 4.5 of Simsript 11.5.

USAGE

```
ATTACH,SIM115.  
SIM115,I=1fn.  
ATTACH,SIM2LIB.  
LGO.
```

## SNOBOL (CDC)

OPERATING SYSTEM: NOS/BE

### DESCRIPTION

Snobol is a string manipulation interpretive programming language. The basic element of Snobol is a string of characters. Operations exist for joining and separating strings, testing their contents, and making replacements in them. Currently, Version 3.10 of Snobol 4 is available.

### USAGE

MSACCES,<password>.  
MSFETCH,SNOBOL,UN=CSYS.  
SNOBOL,<parameters>.

## CHAPTER 4

### Data Base Management Systems

This chapter deals with the various data management systems currently supported by the CCF. In general, data management provides the user with a way to logically group related data items without knowing the underlying physical structure.

Related data fields are grouped into record structures, which are defined when the data base is constructed. A combination of similar records yields a data file that can be manipulated through a set of English-like commands. Most of these systems also have the ability to produce formatted reports containing headers, footers, and the data sorted on any field.

The above process is normally done interactively. In some cases, the data base may be accessed through an application program interface.



DATATRIEVE (VAX)

OPERATING SYSTEM: VMS

DESCRIPTION

DATATRIEVE is an interactive query and report system that allows both novice and experienced users to retrieve, modify, store or delete data without any regard to the internal storage method. DATATRIEVE can be called from programs written in any VAX language. Other capabilities include sharing a data base, creating formatted reports and changing field definitions.

USAGE

Contact: User Services  
telephone (202) 227-1907  
Autovon 287-1907

DMS170 (CDC)

OPERATING SYSTEM: NOS/BE

DESCRIPTION

Control Data's implementation of a data management system is DMS170. It provides high level features such as data security and transparency of data definitions. The English-like language allows retrieval, manipulation and updating of data base elements through both batch and interactive processing. Also included are report writing capabilities as well as logging and data base recovery utilities.

USAGE

Contact: User Services  
telephone (202) 227-1907  
Autovon 287-1907

RIM (VAX)

OPERATING SYSTEM: VMS

ACQUIRED FROM: The Boeing Company

DESCRIPTION

The Relational Information Management System is based on the relational algebra model for data management. It includes a powerful, easy-to-use English-like command language. A menu mode allows a novice user to interactively define and load a RIM data base. The program interface allows access to RIM through FORTRAN, COBOL, or Pascal application programs. Also included is a report writer option that provides the capability to create, modify, and delete report definitions for formatted output.

USAGE

To use interactively, type

RIM

SHARP (CDC, VAX)

OPERATING SYSTEMS: NOS/BE, VMS

DESCRIPTION

SHips Analysis And Retrieval Program is designed to allow non-technical persons to define, build, maintain, and interrogate data bases. SHARP, which allows both interactive and batch access to data bases, has English-like commands that are used for both retrieval and report generation. Although SHARP is suited for interactive use, it can also be accessed through application program interfaces.

USAGE

To access SHARP, type

SHARP

For assistance,

Contact: Code 1822  
telephone (202) 227-1533  
Autovon 287-1533

SYSTEM 2000 (CDC)

OPERATING SYSTEM: NOS/BE

DESCRIPTION

System 2000, version 3.0, is a general purpose data base management system including the ability to define new data bases, modify existing data bases, and to retrieve and update values in these data bases. Immediate access provides an English-like language which a non-programmer may use interactively. System 2000 supports application programming interfacing via programming language extension (PLEX) statements. A report writer enables the user to prepare formatted reports.

USAGE

BEGIN,S2K30.  
S2K30.

## CHAPTER 5

### Engineering Tools

This chapter deals with the various engineering tools currently supported by the CCF. Most of these packages are intended to aid the engineer with the mathematical calculations necessary to analyze a given problem.

These packages are capable of many types of analyses when given a description of the structure being analyzed and a list of the requested output. The program generates answers to frequently occurring mathematical problems; hence, the engineer need only be concerned with the analysis of the problem.

Since most large engineering systems produce a large amount of data, they are both time and memory consuming. As a result, many of these packages cannot be run interactively.

ABAQUS (CDC, VAX)

OPERATING SYSTEMS: NOS/BE, VMS

ACQUIRED FROM: Hibbitt, Karlsson and Sorenson, Inc.

DESCRIPTION

Abaqus is a family of modeling capabilities based on the finite element method, designed to provide solutions to a wide range of mostly non-linear structural problems, and programmed around a common data management structure. The code is designed in a way to provide reliable solutions to difficult problems when used by engineers who are responsible for design analysis and who are not necessarily experts in numerical methods.

CONSTRAINTS

When running Abaqus on the CDC, 330000 CM words are needed.

USAGE

Contact: Pete Matula, Code 1844  
telephone (202) 227-1936  
Autovon 287-1936

#### APT (CDC)

OPERATING SYSTEM: NOS/BE

#### DESCRIPTION

The Automatically Programmed Tools (APT) system is used to prepare input for numerically controlled machine tools. The input language describing a part to be machined generates the detailed commands necessary to direct the motions of a NC machine tool. An extension of APT, FMILL, can be used to machine arbitrarily shaped 3-D surfaces. There are currently two versions of APT available, APT3 and APT4.

#### CONSTRAINTS

APT3 requires 65200 octal words of central memory and APT4 requires 122000 octal words of central memory.

#### USAGE

ATTACH,APT<sub>x</sub>. x=3 or x=4  
APT<sub>x</sub>.

#### ECAP (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Control Data Corporation

#### DESCRIPTION

ECAP (Electronic Circuit Analysis Program) is an integrated system of programs designed to aid the electrical engineer in the design and analyses of electronic circuits. This system of programs can produce AC, DC, and/or transient analyses of electrical networks from a description of the connections of the network (the circuit topology), a list of corresponding circuit element values, a selection of the type of analysis desired, a description of the circuit excitation, and a list of output desired.

#### USAGE

MSACCES,<password>.  
MSFETCH,ECAMP,UN=CSYS.  
ECAMP.

### ELBOW (CDC)

OPERATING SYSTEM: NOS/BE

DEVELOPED BY: Oak Ridge National Laboratory

#### DESCRIPTION

Elbow calculates the stresses, stress indices, and flexibility factors for in-plane and out-of-plane bending of elbows and curved pipe subjected to internal pressure. Comparison with experiments indicates that the results accurately represent the maximum stresses which occur at the center of the bend.

#### USAGE

MSACCES,<password>.  
MSFETCH,ELBOW,UN=CSYS.  
ELBOW.

### FLANGE (CDC)

OPERATING SYSTEM: NOS/BE

DEVELOPED BY: Oak Ridge National Laboratory

#### DESCRIPTION

Flange calculates appropriate loads, stresses, and displacements for the flanges, bolts, and gaskets that comprise a flanged piping joint for internal pressure or moment loading on the pipe, temperature difference between the flange hub and ring, and variations in bolt load that result from pressure, hub-ring temperature gradient and/or bolt-ring temperature differences. Flanges considered may be tapered-hub, straight or blind.

#### USAGE

MSACCES,<password>.  
MSFETCH,FLANGE,UN=CSYS.  
FLANGE.

NASTRAN (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

ACQUIRED FROM: Cosmic

DESCRIPTION

NASTRAN is a general purpose finite element structural analysis program, capable of performing a wide range of analysis on models of complex structures. Some of the capabilities of NASTRAN include static stress analysis, natural frequency analysis, buckling analysis, frequency response analysis, and transient response analysis.

CONSTRAINTS

NASTRAN requires a minimum of 170000 octal words of central memory on the CDC machines.

USAGE

On the CDC:

See Computer Center Reference Manual, pp. 20-10,20-11.

On the VAX, type:

NASTRAN

PATRAN (VAX)

OPERATING SYSTEM: VMS

ACQUIRED FROM: PDA Engineering

DESCRIPTION

PATRAN is an interactive graphics program capable of solid geometric modeling, finite element modeling, and post processing of finite element analysis results. It is currently at release 2.0 and is only available on node DT2 of the VAXcluster.

USAGE

@PATRAN\$DIR: PATNAMES  
PATRAN



STRESS (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Massachussets Institute of Technology

DESCRIPTION

The STRESS system is presently implemented to perform the linear analysis of elastic, statically loaded, framed structures. Analysis includes the computation of joint displacements, member distortions, member end forces and reactions for a structure given the makeup and orientation of all the members, and the type, position, and magnitude of all the applied loads, displacements, and distortions.

USAGE

MSACCES,<password>.  
MSFETCH,STRESS,UN=CSYS.  
STRESS.

## CHAPTER 6

### Graphics

The following pages contain a description of the available graphics packages currently supported by the CCF. Most of these packages consist of FORTRAN subroutines that are called from a driver program written by the user.

Using these routines, the user can produce anything from simple bar graphs to 3-D surface graphs. The color, page size, and point of view may be altered in many cases.

Many of these packages may be used interactively if a graphics terminal is available.

CALCOMP (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

ACQUIRED FROM: Calcomp Corporation

DESCRIPTION

The Calcomp Host Computer Basic Software (HCBS) package for off-line plotters includes the following FORTRAN routines:

PLOTS	Initialize plot subroutine; set output device.
PLOT	Convert pen movement specifications from inches to actual plotter commands.
AXIS	Draws an axis line with scale annotations and titles.
FACTOR	Enlarge or reduce plot size.
LINE	Plots the sets of data points defined by x and y coordinate arrays.
NEWPEN	Select a new pen.
NEWPLT	Control starting position of each plot. Available only on the VAX.
NUMBER	Plots the decimal equivalent of an internal floating point number.
SCALE	Examine a data array to determine starting and scale value and convert from inches to actual plotter commands.
SYMBOL	Draw any sequence of alphanumeric characters.
WHERE	Returns current pen location.

USAGE

On the CDC, enter

ATTACH,CALC936.  
LIBRARY,CALC936.

On the VAX, enter

LINK <object file>,VSYSCALC1051/LIBRARY

DISSPLA (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

ACQUIRED FROM: Integrated Software Systems Corp, Inc.

DESCRIPTION

The Display Integrated Software System and Plotting Language is a system of user-callable FORTRAN subroutines. It is a highly flexible, integrated software system that is capable of plotting any type of data. Included as standard features are:

- \* a set of the most widely used axis systems
- \* prolific annotation facilities
- \* interrupted grid lines and data curves
- \* curve interpolation
- \* 3-D projection of any plot or surface with or without hidden lines
- \* a set of business plotting routines
- \* continental map coastlines to 0.5 degree resolution
- \* 15 map projections and user defined projections
- \* high speed polygonal area blanking
- \* self-scaling routines
- \* automatic graphic typesetting
- \* user supplied transformation
- \* base transformation
- \* full user interaction

USAGE

On the CDC, enter

```
ATTACH,DISSPLA.  
ATTACH,NSRDC.  
LIBRARY,DISSPLA,NSRDC.
```

On the VAX, enter

```
DISLINK <object file>
```

MOVIE.BYU (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Brigham Young University

DESCRIPTION

MOVIE.BYU is an interactive graphics package of FORTRAN programs capable of displaying 3-D mathematical, topographical, or finite element models as line drawings or as continuous tone-shaded color images.

USAGE

Contact: Robert Lipman, Code 1844  
telephone (202) 227-1660  
Autovon 287-1660

PLOT10 (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

ACQUIRED FROM: Tektronix, Inc

DESCRIPTION

The PLOT10 package includes both the Terminal Control System (TCS) and Advanced Graphing II (AGII). The TCS package provides bright and dark vectors and points, a choice of linear, logarithmic, or polar coordinate systems, automatic scaling of graphic data and buffered input and output for faster, more efficient character handling. AGII does the actual plotting of the data. It provides calls to plot simple line, curve and bar graphs.

USAGE

On the CDC, enter

ATTACH,TEK30.  
LIBRARY,TEK30.

On the VAX, enter

LINK <object file>,VSY: PLOT10/LIBRARY

## CHAPTER 7

### Mathematics and Statistics

The numerous mathematical and statistical packages that are currently supported by the CCF are presented in the following pages. They provide solutions to a wide variety of frequently encountered mathematical and statistical problems.

These packages come in one of two forms - as a library of subprograms or as a program. In the first instance, the library must be linked (either through the LINK command on the VAX or the LIBRARY or LDSET commands on the CDC) to the user's driver program and then the program must be executed. If the package is a program, then the program simply needs to be executed.

Many of the following packages have routines that overlap. The similar routines may have different execution procedures; hence, the user should pay close attention to the documentation for the particular routine.

ARLNALG (CDC)

OPERATING SYSTEM: NOS/BE

DEVELOPED BY: Aerospace Research Laboratory

DESCRIPTION

ARLNALG (Aerospace Research Laboratory Linear Algebra Library) is a collection of 34 subroutines for solutions to linear systems and determination of eigenvalues and eigenvectors of real symmetric matrices.

USAGE

MSACCES,<password>.  
MSFETCH,ARLNALG,UN=CSYS.  
LIBRARY,ARLNALG.

ARRIBA (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: VIM

DESCRIPTION

ARRIBA is an all-integer programming system that facilitates the solution of small integer programming problems. The present system includes:

- \* IPSC - A Gomory cutting plane code using a row-ordering pivot choice rule.
- \* PRIMAL - A primal cutting plane code based on the Harris algorithm.
- \* BALASG - A version of the original Balas zero-one algorithm with Glover's suggested changes.

USAGE

MSACCES,<password>.  
MSFETCH,ARRIBA,UN=CSYS.  
.  
.  
ARRIBA.

BIMEDP (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Northwestern University

DESCRIPTION

BIMEDP is a collection of 44 statistical programs in the following areas:

- \* data description
- \* frequency tables
- \* regression analysis
- \* ANOVA
- \* multivariate analysis
- \* life tables and survival tables
- \* multipass transformations
- \* nonparametric statistics
- \* univariate, bivariate analysis
- \* Box-Jenkins time series analysis

USAGE

MSACCES,<password>.  
MSFETCH,BMDPxx,UN=CSYS.  
BMDPxx,....

BOXJENKINS (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: The Ohio State University

DESCRIPTION

BOXJENKINS was written in early 1977 for the analysis of time series using the Box-Jenkins philosophy. The following may be analyzed:

- \* univariate model
- \* transfer function model
- \* intervention model
- \* transfer function intervention model

USAGE

MSACCES,<password>.  
MSFETCH,BOXJENK,UN=CSYS.  
BOXJENK.



DECALC (VAX)

OPERATING SYSTEM: VMS

DESCRIPTION

DECalc is essentially an electronic worksheet with commands and functions to manipulate data and perform complex mathematical calculations. This package allows one to reformat all or part of a grid as well as duplicate, insert, delete or move entries anywhere in the grid. In addition, one may issue Datatrieve and DCL commands from within DECAlc.

USAGE

DECALC

EISPACK (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

ACQUIRED FROM: Argonne National Laboratory

DESCRIPTION

The Eigensystem Package is a collection of 70 FORTRAN subroutines to solve eigenvalue and eigenvector problems in the following classes of matrices:

- \* complex general
- \* complex Hermitian
- \* real general
- \* real symmetric
- \* real symmetric tridiagonal
- \* special real tridiagonal

USAGE

On the CDC:

MSACCES,<password>.  
MSFETCH,EISPACK,UN=CSYS.  
LIBRARY,EISPACK.

On the VAX:

LINK,<object file>,VSY: EISPACK/LIB

FUNPACK (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Argonne National Laboratory

DESCRIPTION

FUNPACK is a collection of 24 user-callable routines  
for the following:

- \* Bessel functions
- \* Dawson's integral
- \* elliptic integrals of 1st and 2nd kind
- \* exponential integral

USAGE

MSACCES,<password>.  
MSFETCH,FUNPACK,UN=CSYS.  
LIBRARY,FUNPACK.

IMSL (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

ACQUIRED FROM: IMSL

DESCRIPTION

The International Mathematical and Statistical Libraries package contains 517 subroutines in the following areas:

- \* analysis of experimental design data
- \* generation and testing of random numbers
- \* statistics, basic, nonparametric and special functions
- \* differential equations, interpolation, approximation, smoothing
- \* linear algebraic equations
- \* vector matrix arithmetic

USAGE

On the CDC:

ATTACH,IMSL.  
LIBRARY,IMSL.

On the VAX:

For single precision arithmetic,

LINK <object file>,VSYS:IMSLS/LIBRARY

or for double precision arithmetic,

LINK <object file>,VSYS:IMSLD/LIBRARY

LINPACK (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Argonne National Laboratory

DESCRIPTION

LINPACK is a collection of 40 subroutines that analyze and solve classes of systems of simultaneous linear algebraic equations. Versions exist for single, double and complex arithmetic. Routines for the following are included:

- \* general, banded, symmetric indefinite, symmetric positive definite, triangular, tridiagonal square, Hermitian indefinite matrices
- \* orthogonal-triangular and single value decompositions of rectangular matrices
- \* least squares problems
- \* basic linear algebra problems

USAGE

MSACCES,<password>.  
MSFETCH,LINPACK,UN=CSYS.  
LIBRARY,LINPACK.

LINWOOD (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: VIM

DESCRIPTION

LINWOOD is a linear least-squares curved fitting program that allows the user to transform data to an appropriate form, fit the transformed data using least-squares, and provide both statistics and plots to aid in evaluation. The available transformations include reciprocals, sums, differences, products, quotients, logarithms and exponentials. The maximum and minimum value of each variable, the range, the relative influence and the weighted squared standardized distance of each observation from the centroid of all observations are provided in addition to the normal statistics.

USAGE

MSACCES,<password>.  
MSFETCH,LINWOOD,UN=CSYS.  
LINWOOD.

MINPACK (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Argonne National Laboratory

DESCRIPTION

MINPACK is a group of 11 user-callable FORTRAN subroutines for use in the solution of systems of non-linear equations and non-linear least squares problems.

USAGE

MSACCES,<password>.  
MSFETCH,MINPACK,UN=CSYS.  
LIBRARY,MINPACK.

OMNITAB (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: National Bureau of Standards

DESCRIPTION

OMNITAB is a relatively easy-to-use program that allows the non-programmer to perform basic data, statistical and numerical analysis without having a prior knowledge of computers.

CONSTRAINTS

OMNITAB requires 170000 octal words of central memory.

USAGE

MSACCES,<password>.  
MSFETCH,OMNITAB,UN=CSYS.  
OMNITAB.

SANDIA (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: SANDIA Laboratories

DESCRIPTION

SANDIA is a collection of routines that currently contains:

- \* DE - ordinary differential equation solver
- \* DEROOT - integrates an initial value problem for ordinary differential equations until a root is located
- \* STEP - Adam's integration

USAGE

MSACCES,<password>.  
MSFETCH,SANDIA,UN=CSYS.  
LIBRARY,SANDIA.

SMP (VAX)

OPERATING SYSTEM: VMS

ACQUIRED FROM: Inference Corporation

DESCRIPTION

SMP (Symbolic Manipulation Program) is an interactive computer algebra program that allows one to perform complex mathematical operations symbolically. It can solve both linear and non-linear equations, perform matrix and tensor algebra, and differentiate and integrate most mathematical expressions. In addition, SMP can numerically evaluate mathematical expressions as well as generate two- and three-dimensional graphical representations.

USAGE

SMP

SPSS (CDC)

OPERATING SYSTEM: NOS/BE

ACQUIRED FROM: Northwestern University

DESCRIPTION

The Statistical Package for the Social Sciences is an integrated system of statistical programs embedded in a single control program. This package is versatile in that many statistical analyses may be performed on the same set of data in one run. Current programs include:

- \* descriptive statistics
- \* cross tabulation
- \* pearson and rank order correlation
- \* partial correlation
- \* multiple regression analysis
- \* nonlinear regression analysis
- \* Guttman scale analysis
- \* Joreskog factor analysis
- \* canonical correlation
- \* bivariate printer plotting
- \* T-test
- \* one-way ANOVA
- \* n-way ANOVA
- \* multivariate analysis of variance and covariance
- \* discriminant analysis
- \* nonparametric statistical tests
- \* item and scale reliability analysis
- \* tetrachoric correlations
- \* general and three-stage least squares
- \* spectral analysis of time series
- \* survival analysis
- \* multiple response frequency and cross tabulation
- \* Box-Jenkins

USAGE

ATTACH, SPSS.  
SPSS(<param>).



## CHAPTER 8

### Data Manipulation

The following pages present some data manipulation packages. Included in this group are file transfer, forms management and sort/merge packages.

File transfer software allows the transfer of data between personal computers and the mainframes of the CCF. A reciprocal file transfer program must reside on the host computer. The forms management package allows the user to create menus with a variety of visual effects. Sort/merge packages allow the user to combine and/or sequence his data.

FMS (VAX)

OPERATING SYSTEM: VMS

DESCRIPTION

FMS, Forms Management System, allows the creation of video forms. It provides techniques for input validation and processing of input to be done by the application program. A variety of visual effects, including double high or double wide characters, boldface type or reverse video screen, are available with just a few keystrokes. Also included is an interface to the video forms from many VAX languages.

USAGE

Contact: User Services  
telephone (202) 227-1907  
Autovon 287-1907

KERMIT (VAX)

OPERATING SYSTEM: VMS

ACQUIRED FROM: The University of New Orleans

DESCRIPTION

KERMIT, version 5.0, is a communications package implementing the KERMIT file transfer protocol. It allows the transfer of data files between a personal computer and the VAX computer over ordinary serial communication lines. A reciprocal KERMIT program must reside on the personal computer.

USAGE

Enter

KERMIT

Kermit has an extensive on-line help.

SORT/MERGE (CDC, VAX)

OPERATING SYSTEM: NOS/BE, VMS

DESCRIPTION

Sort/Merge is a flexible system routine for sequencing and combining files. In addition to the usual alphanumeric fields, floating-point, fixed-point (integer) and logical type fields may be sorted. The sort sequence may be changed through a user option. There are currently two versions of Sort/Merge available on CDC - Sort/Merge 4 and Sort/Merge 5 and one on the VAX.

USAGE

On the CDC:

See the Computer Center Reference Manual, pp. 20-15 thru 20-22 for CDC.

On the VAX:

See the VAX/VMS Sort/Merge Utility Reference Manual.



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