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1985-02-20

## Computer Center Newsletter / February 20, 1985

Monterey, California, Naval Postgraduate School

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# Computer Center Newsletter



Naval Postgraduate School Monterey, California

February 20, 1985

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#### MID-QUARTER USER SERVICES TALKS

The User Services Group will give four talks during last part of the Winter Quarter to help familiarize new users with some of the various facilities of the VM/CMS timesharing system available on the IBM 3033 mainframe.

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The talks will be all given in the In-122 auditorium. Anyone interested in these introductory presentations is invited to attend. They are particularly suitable for new 'refresher' students who want to get started on the Center's system before their first quarter. Signup is not required.

#### Introduction to VM/CMS

#### 1310 Wednesday 20 February Speaker: June Favorite

This talk assumes no prior knowledge of the NPS computer. Topics to be covered include the use of the 3278 terminal, how to logon and logoff, use of the function keys, the HELP facility, and various generalpurpose commands. It is strongly recommended for all new users of the Center, and covers information which may not be provided in an introductory programming class. Be sure to bring a copy of Technical Note VM-01, User's Guide to VM/CMS at NPS (this publication is included in the Computer Center User's Manual).

#### Introduction to XEDIT

1310 Wednesday 27 February Speaker: June Favorite

This talk provides elementary information about the XEDIT full screen editor. The main emphasis is on methods for creating and changing programs and other files. Use of the PF keys and HELP facility in XEDIT are mentioned. This talk assumes little or no familiarity with XEDIT, but prior attendance at "Introduction to VM/CMS" is recommended.

#### Intermediate Topics in XEDIT

1310 Wednesday 13 March Speaker: Larry Frazier

This talk is intended for the VM/CMS user who is familiar with the XEDIT editor and is looking for ways to make editing easier and more efficient. Topics covered include extended usage of PF keys, creating a PROFILE XEDIT file, editing multiple files, and exploring XEDIT commands such as SET, ARB, and ZONE.

Introduction to SPSS-X, Minitab and SAS

1310 Tuesday 19 March Speaker: Dennis Mar

These three popular statistical packages are available on the NPS mainframe. The speaker will present a brief introduction to each of them for potential new users.

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### VS FORTRAN RELEASE 4.0 ANNOUNCED

VS FORTRAN Release 4.0 (known in the IBM nomenclature as VS FORTRAN Version 1, Release 4.0 or Level 1.4.0) will be installed as the default Fortran compiler on both the MVS and CMS systems on Monday, 4 March 1985. Release 4.0 includes Full American National Standard (ANSI) Fortran plus IBM extensions and has been revised to correct several compiler and library faults. Fortran H Extended (FORTHX) will also remain for a short time. However, every Fortran programmer should begin using VS Fortran now.

## Changes

Significant improvements have been made in VS FORTRAN over Release 3.0. Among these are:

- run time loading of library routines to increase performance for compile-link-go users and reduce storage requirements,
- automatic precision increase (AUTODBL),
- improved I/O support, including improvements in sequential unformatted I/O, internal I/O (familiar to CDC programmers as ENCODE and DECODE), and several extensions to the NAMELIST,
- VSAM (Virtual Sequential Access Method) KSDS (Key-sequenced data sets) are now accessible from VS FORTRAN,
- reentrant object code may be produced (normally of use only to systems programmers),
- faster character string handling by automatic inclusion of in-line code, and
- improved diagnostic support.

In this article, we will take up the subjects of run time loading of library routines and automatic precision increase under CMS. Future articles will investigate other significant new features of VS FORTRAN Release 4.0.

#### Run Time Loading of Libraries

There are now two distinct ways to load and execute VS FORTRAN programs:

- 1) the load mode and
- 2) the link mode.

In the following we will discuss selection of a mode appropriate to your application. The casual or student FORTRAN programmer not interested in creating application packages stored in load modules (filetype MODULE) may wish to skip the following section and go directly to the section entitled *The Load Mode*.

#### Selecting a Mode for Your Program

All library modules other than mathematical routines may be included either as a part of your executable program along with compiler generated code or loaded dynamically when your program is executed. Run time loading has the advantage of fractionally reducing the time required to create an executable program and of reducing disk space required to store load modules.

If you choose to have all the necessary library routines included in your executable program, you will be operating in *link* mode. On the other hand, if you choose to have the library routines used by your program loaded as necessary during execution, then you will be operating in *load* mode. You make the choice of link or load mode by making the the appropriate combination of libraries available when you create your executable program from your compiled object code (TEXT) files.

#### Creating an Executable Program and Running It

There are three ways to create an executable program under VM/CMS:

- 1) By using the LOAD, and possibly INCLUDE, commands to produce an executable program within your virtual storage. You execute the program using the START command. No permanent copy of the executable program is made on your minidisk. Execution may be in either link or load mode. This is the most common method of executing a program for the student programmer.
- 2) By using the LOAD, and possibly INCLUDE, and the GENMOD commands to build an executable program which is stored as a nonrelocatable MODULE file on a CMS minidisk. You may execute the program by issuing a CMS command with the same name as the MODULE file. Execution can be in either link or load mode.

3) By using the LKED command to create (that is, link-edit) an executable program which is stored as a load module in a member of a CMS LOADLIB. You may execute the program later by using the OSRUN command. Execution may be done only from load mode.

#### Libraries

Three libraries have been made available to provide the appropriate subprograms required in the link and load modes:

- VLNKMLIB, a text library (TXTLIB) containing library modules for programs to be run in link mode.
- VFORTLIB, a text library (TXTLIB) containing library modules for programs to be run in load mode.
- VFLODLIB, a CMS LOADLIB containing library modules for programs which will be loaded into virtual storage during execution in load mode.

The Link Mode

In order to run a program in link mode, you must issue the following commands:

GLOBAL TXTLIB VLNKMLIB VFORTLIB CMSLIB ...user libraries... LOAD myprog (...options... INCLUDE subprog (...options... START \*

If you wish to create a MODULE which may be executed as a CMS command, issue:

GLOBAL TXTLIB VLNKMLIB VFORTLIB CMSLIB ...user libraries... LOAD myprog (...options... INCLUDE subprog (...options... GENMOD modname (...options...

You may invoke your program then by issuing the name of the MODULE from the command line or within an EXEC.

The Load Mode

In order to run a program in load mode, you must issue the following commands:

GLOBAL TXTLIB VFORTLIB CMSLIB ...user libraries... LOAD myprog (...options... INCLUDE subprog (...options... GLOBAL LOADLIB VFLODLIB

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#### START \*

If you wish to create a MODULE which may be executed as a CMS command, issue:

GLOBAL TXTLIB VFORTLIB CMSLIB ...user libraries... LOAD myprog (...options... INCLUDE subprog (...options... GENMOD modname (...options...

You may invoke your program by first issuing the command

GLOBAL LOADLIB VFLODLIB

and then issuing the name of the MODULE.

Note that the INCLUDE statement is shown only for the sake of generality in the examples above and is not required by the majority of users.

#### The Alternate Math Library

Before leaving the subject of libraries, the VALTLIB alternate math library should be mentioned. This library contains several extended mathematical subprograms which may extend the accuracy of certain calculations involving the sin, cos, tan, and log functions, among others. The algorithms have been extended to give more accurate results when presented with arguments at or near the extremes of the valid argument range. Unless your program produces such arguments, it is not worthwhile to include VALTLIB. Execution speed may be slightly degraded due to the more exhaustive checking required by the algorithms.

In order to give your program access to this library, its name must be included in the GLOBAL TXTLIB statement as below:

GLOBAL TXTLIB VLNKMLIB VALTLIB VFORTLIB CMSLIB ...

if using link mode and

GLOBAL TXTLIB VALTLIB VFORTLIB CMSLIB ...

if using load mode.

Note, please, the order of the libraries declared in the GLOBAL TXTLIB statement. VALTLIB must appear in the command *prior* to VFORTLIB or references to the mathematical subprograms will be resolved using the less accurate functions.

#### Using VS FORTRAN with the RUN or DISSPLA Commands

The CMS commands RUN and DISSPLA have been modified to run in the load mode. Other than a slight decrease in time required to load a program you should see no apparent differences.

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#### Automatic Precision Increase

Another new feature provided in VS FORTRAN Release 4.0 is *automatic* precision increase or AUTODBL. AUTODBL provides an automatic means of converting single precision, floating-point calculations to double precision, and double precision calculations to extended precision. AUTODBL may be invoked globally as a compiler parameter or locally using the @PROCESS compiler directive statement. There are several options available under AUTODBL.

No recoding of source programs is necessary to take advantage of the facility. Conversion is requested by use of the AUTODBL compiler option. The automatic precision increase facility should be considered only a tool for increasing the precision of existing programs, especially those from sources external to NPS, specifically those created on machines with larger word sizes such as CDC or CRAY computers. New programs should specify the desired precision in the source code itself.

#### AUTODBL Options

The AUTODBL compiler option indicates the form that precision increase will take. The option has the following format:

FORTVS progname (AUTODBL(value) ... other options...

or no belease dry alterno at avairable and and and and the she tores and

@PROCESS AUTODBL(value) ...other options...

where value can be:

#### NONE

Indicates no conversion is to be performed. This is the default condition.

DBL

Indicates promotion of single and double precision quantities is to take place. That is, REAL\*4 and COMPLEX\*8 items will be promoted to REAL\*8 and COMPLEX\*16 and REAL\*8 and COMPLEX\*16 items will be promoted to REAL\*16 and COMPLEX\*32. Caution should be used when specifying this option as REAL\*16 and COMPLEX\*32 arithmetic opera-

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tions are performed in software rather than hardware on the NPS computer and, as such, degrade machine and program performance to ALTER AND A STATE ADDRESS OF SCIENCES AND A STATE ADDRESS OF SCIENCES ADDRESS ADDRE a large degree.

#### DBL4

Only single precision quantities are promoted.

#### DBL8

Only double precision quantities are promoted.

#### DBLPAD

Precision promotion is as in DBL but other items sharing storage with the promoted items are padded. An example would be a single precision value EQUIVALENCEd with an INTEGER.

#### DBLPAD4

Precision promotion is as in DBL4 but other items, sharing storage with the promoted items are padded.

#### DBLPAD8

Precision promotion is as in DBL8 but other items sharing storage with the promoted items are padded.

## Cautions When Using AUTODBL

As mentioned above, indiscriminate promotion of double precision values to extended precision may increase program size significantly. Users are cautioned that unless the requirement is critical to the application, the DBL or DBLPAD options should not be used where double precision val-ues are already in existence in source code. Use DBL4 or DBLPAD4 instead.

When using the @PROCESS compiler directive to compile only selected program units with AUTODBL no automatic conversion of arguments from a calling program takes place when a subprogram is called. For example, in the code fragment shown below:

REAL\*4 X

CALL SUB(X)

END

@PROCESS AUTODBL(DBL) SUBROUTINE SUB(ARG) REAL\*4 ARG

END

the argument X is not automatically promoted to double precision when passed to the subroutine. The compiler always assumes that arguments passed to a subprogram are of the correct number and type. In this case, although X takes only 4 bytes of storage, the subroutine will assume that it is 8 bytes in length. Thus, the least significant 4 bytes of ARG will be unpredictable and unexpected modification of the values of constants or variables in the calling program and incorrect numerical results in the subroutine are likely.

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#### References (Available in In-146)

VS FORTRAN Language and Library Reference, Program Numbers 5748-FO3 (Compiler and Library) 5748-LM3 (Library Only) Release 4.0 (SC26-4119-0), IBM Corporation, October 1984.

VS FORTRAN Programming Guide, Program Numbers 5748-FO3 (Compiler and Library) 5748-LM3 (Library Only) Release 4.0 (SC26-4118-0), IBM Corporation, October 1984.

IBM Virtual Machine/System Product: CMS Command and Macro Reference, Program Number 5664-167 (SC19-6209-1), Second Edition, IBM Corporation, April 1982.

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#### PC NETWORK FOR WORDPERFECT PROCESSING

The Center's IBM PC network will become available in In-151 for general use on Monday, 11 March. Each work station will provide the user with two 360KB drives. The A drive will contain the boot disk, which will ordinarily remain in place. The B drive is where you would place your disk, to store your files. A "C" disk will be a 500KB virtual disk residing on the network's hard disk.

Three printers will be available to the network initially: two Epson RX100 dot matrix printers, and one NEC 3350 Spinwriter (providing letter-quality printout). Files to be printed out are sent to the network server, which directs them to the desired printer.

The word processing software we are making available is WordPerfect, which resides on your 500KB virtual disk. WordPerfect works quite a bit differently than the Script word formatter on the main computer. In Script, you use the editor to type in various commands, which are later read by Script to produce a file that shows the results of the commands. In WordPerfect, as you key in your paper, you press various two-key combinations that take effect immediately. If you give the instruction to center text, the next text you type is centered as you type it, while

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you watch. On the other hand, Script has features that make the production of major papers like theses much easier.

In general, those familiar only with main-frame computers will be pleasantly surprised to see how much the instructions and documentation for personal computers differ from those for large computers.

Coming shortly will be the ability to send files to the main frame lineprinter, and to remote printers; soon after, authorized persons will be able to send files to the Sherpa laser printer.

To use one of the IBM PCs in In-151, simply boot the system: press three keys, Ctrl Alt Del, all at once, as in using the SHIFT or ALT keys on the main computer. This room is locked during all hours except 0800-1630 weekdays. The combination is available from any computer operator.

The work involved in creating and installing this network and adapting the vendors' software was performed by Steve Lamont of the Center's staff.

#### NEW VERSION OF WATERLOO PASCAL

Version 3.1 of Waterloo Pascal has been installed on VM/CMS. It will be accessed from now on when you enter:

PW <fn>

This version has some functional enhancements. The standard procedure PAGE has been improved to generate the control sequence necessary to clear the screen so subsequent output will begin at the top of the screen. It will continue to give you control character "1" in the first column to page the output.

The file attributes for the optional parameters in the RESET and REWRITE commands have changed. The parameters must be in the following format:

(<type>:<record-length>)<CMS-filename>

where

<type> is the type of the file. Specified as t for textfiles, or f for non-textfiles (fixed record length files)

<record length> is an integer number representing the length of the records in the file. For textfiles, this number represents the maximum length of a line, and for non-textfiles it represents the actual record length to be used.

<CMS-filename> represents a standard CMS filename.

Both <type> and <record-length> are optional parameters. For example,

'(t:200)some file a'

denotes a CMS file called 'some file a' which is to be used as a Pascal textfile, with a maximum line length of 200 characters.

Note: Because of these new file attributes the Pascal compiler now always expects your file to have a record length of 80.

The Pascal Compiler will now attempt to read from the terminal if it cannot first find an \$entry line in the source file and, second, if it cannot find the CMS file "fname input \*" to read the data. ("fname" is the CMS filename of the Pascal source file.) This removes the requirement for the statement:

### RESET( input, 'terminal');

With respect to their connection to CMS, files are now classified into two general categories: internal files and external files. The distinction between internal files and external files is made via the program parameter list of the PROGRAM statement. Files which are to be considered as external files must be mentioned in the program parameter list and exist outside the context of a program. That identifier must subsequently be declared as a global variable. All other variables declared as text will be considered as internal files and will only exist during execution of a program.

There is a new option used to control 'trailing blanks' on lines read from textfiles. The option specification (\* t + \*) means that lines read from textfiles will not be modified in any way. The default setting, (\* t - \*) implies that trailing blanks are to be stripped from the lines.

The standard procedure RtoS has been enhanced to allow more control over the format of the string. The procedure makes a decision about the format of the string depending upon the various combinations of parameters. See the information on the bulletin board in the consulting office, In-146, for further information.

If you have any problems with using this version see Patricia Collins in In-163.

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#### NPS HOBBY COMPUTER CLUB LIBRARY EXEC

A new EXEC file has been added to the NPS Hobby Computer Club public disk. It can be accessed by typing

#### LIBRARY

It will allow users to link to the Knox Library's disks to search selected index files for information. This is a "quick and dirty" keyword search of the library's previously conducted database searches, GAO reports, CIA reports (unclassified), geographical cross-reference files and periodicals. However, the periodicals searches are not fully implemented yet.

Complete information can be obtained by typing LIBRARY; this will include the proper format for using this EXEC. It is flexible enough to access any disk with a READ/ONLY password and any file on that disk without A0 filemode. Professors noting potential application of this EXEC for their students as well as users having difficulty with this EXEC should contact Jerry Hill (SMC 2882 or Userid 2263P).

For users who have not accessed the NPSHCC disk, (mandatory before using LIBRARY) simply type:

#### NPSHCC

This will add disk "D" to your virtual machine, giving you access to several commands that are especially helpful if you have experience using CP/M. It is strongly recommended that:

EXEC NPSHCC

be added to your PROFILE EXEC. This will automatically give you access to the NPSHCC disk everytime you log on.

#### GETTING HELP DURING AN XEDIT SESSION

CMS XEDIT has an extensive built-in online HELP facility available. PF1 and PF13 are the default XEDIT HELP keys. However, if you have typed the command

#### HELP

from the command line or pressed PF1 or PF13 while in XEDIT since VM Release 2 has been installed, you will have noticed that all you get is the annoying:

HELP CAN NOT FIND THE INFORMATION YOU REQUESTED. IF NOT MISSPELLED, PLEASE ENTER 'HELP' FOR MENU SELECTION OR 'HELP HELP' FOR THE HELP COMMAND unless you remember to type the prefix EXEC as well. For example:

## EXEC HELP XEDIT.

However, there is a way to avoid this aggravation. Add the XEDIT command

#### SET SYNONYM HELP 1 COMMAND EXEC HELP XEDIT

to your PROFILE XEDIT (note: NOT your PROFILE EXEC). This will set the synonym for HELP to the single character H, HE, HEL, or HELP and invoke the CMS help facility for XEDIT via the HELP EXEC. You may then type HELP (or its abbreviation) alone or followed by an XEDIT command and receive on-line documentation. Pressing PF1 or PF13 would perform in a similar manner.

If you wish to get documentation for other CMS functions while in XEDIT, you may wish to set up your SYNONYM a bit differently. For example, say that you would like to get information on XEDIT commands and also have access to the other portions of the HELP facility as well. You could put two synonyms into your PROFILE XEDIT.

SET SYNONYM HELP 1 COMMAND EXEC HELP MENU

and

## SET SYNONYM HX 2 COMMAND EXEC HELP XEDIT

Then, issuing HELP (or its abbreviation) would invoke the CMS HELP facility, bringing up the menu, and issuing HX would give you documentation on the XEDIT facility.

There are obviously a considerable number of other ways that you may wish to approach the problem and customize your XEDIT environment and HELP facility and the examples shown above are only included for purposes of illustration.

## MINIMUM AUTOSAVE VALUE SPECIFIED

Computer Center literature and IBM manuals concerning Xedit often mention the 'SET AUTOSAVE n' command. We recommend its use to save frustration on those exceedingly infrequent occasions that the VM system suddenly crashes. It is also very helpful if your attention is diverted during an editing session, so that you get automatically logged off before issuing a FILE or SAVE command. In either of these situations you can lose all the work you have put into an editing session.

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However, it's easy to guard against this. Recall that when 'SET AUTOSAVE n' has been issued, either explicitly or in your PROFILE XEDIT, that the editor will automatically issue a SAVE after every n changes in your file. You get to choose the value of n.

The choice of n can be critical in system performance. We want you NEVER to use an n less than 12, since frequent use of SAVE by dozens of Xedit users can significantly degrade system performance. A small n also slows you down, because each SAVE requires a wait when the system is loaded. If you have a PROFILE XEDIT, please check it and change this value if it is smaller than 12.

Center staff will be investigating the feasibility of altering the SET AUTOSAVE command, so that the above rule will be enforced automatically. In the interim we ask for your cooperation.

#### CARE OF MAGNETIC TAPES

Research data is often stored on tapes, and tapes play a valuable role in batch processing at NPS, but many tape owners are not aware of the routine care needed to preserve the life and dependability of their tapes.

No matter where magnetic tapes are kept, the environment plays an important part in the tape's lifespan. Tapes should be kept in a relatively dry environment at about 50-75 degrees Fahrenheit.

Tapes should be stored hanging from the hook of the strap, preferably on a tape rack to eliminate pressure on the tape reel. If you must temporarily store a tape on its side, do not place anything on top of it. This can crimp the tape. Crimping can also occur if you place a label on the side of the reel, then write on it with pressure. Normally, the label should be filled out *before* application to the reel. Any changes to the label after it is on the reel should be done with felt tip pen, never pencil or ballpoint. Carry tapes using the hold in the middle, rather than grasping both sides.

The strap or cannister enclosing the reel should close securely to prevent contamination. The reel should not be cracked, broken, or separated from the opposite side, as humid air, dirt, and liquids can easily ruin the tape. Tapes on broken reels should be copied to undamaged tape reels as soon as possible.

Tapes need to 'breathe.' Efforts should be made to run each tape through a read program yearly. Without this exposure, the tape will stick to itself eventually, stripping the surface and becoming unusable.

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Following these guidelines for tape care will guard the integrity of your data on tape, and may save you a lot of frustration.

#### NOTES FROM OPERATIONS

Additional 3277 IBM Graphic Units

IBM Graphic terminals with TEXTRONIX 618 Display Monitor and 4631 Hardcopy unit have been added to Computer Center's public areas in room 126, Halligan Hall, and to the thesis study area, Bldg 223.

#### Terminal Cleaning Material

betrailtrail - Diattinuted Windex and wiper towels have been placed in the Computer Center's public terminal areas for anyone wanting to clean screens and/or keyboards. The material has been placed near each Newsletter distribution box. Permanent, wall-fixed containers are on order.

#### SHERPA Printer Thesis Output

Sherpa printout has gotten a lot of attention lately. The announced policy has been that Sherpa printout be restricted to faculty and their coworkers. Until recently, it has not been necessary to enforce that rule strictly. Henceforth, to print your thesis on the laser printer, you will have to obtain written permission from your thesis advisor, and submit it to Ed Donnellan, In-109, Manager, Computer Operations.

#### NEW RELEASE OF BIMEDS

Version 83 of BMDP (Biomedical Statistical Package) has been installed on the MVS system. This release replaces Version 82. The EXEC statements to use 83 version should appear:

	11	EXEC	BIMED83, PROG=BMDPxx
and	11	EXEC	BIMEDT83, PROG=BMDPxx

The BIMEDT83 cataloged procedure uses the VS Fortran compiler. We will be keeping the previous cataloged procedures and BMDP version. If you must use the Fortran HX compiler, you can continue with your present control statements.

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This new Version has improvements and corrections to all the programs. See the bulletin board in the consulting office for the changes. If there are any problems with Version 83 see Patricia Collins in In-163.

#### CONSULTING HOURS

Mon - Fri 0900-1130 and 1315-1545 in In-146

#### HOURS OF OPERATION

Normal Service Unattended

Normal service Unattended

Normal service Mini-disk backup

Mon-Fri Sat

Mon

Sun

Normal Service

0800-2400

0000-0800

0800-2400

0000-0800 0800-2130

2130-2400 0000-0800

VM/MVS available. Operator on duty.

Mini-disk backup

Unattended

VM/MVS available. No operator on duty. Center's high-speed printers secured. Remote printers available.

Mini-Disk Backup

No VM. MVS available for card input only.

Note: Preventive maintenance is normally performed 0700-1400 hours, first Sunday of each month.

Systems work can preempt this schedule during 0700-1200 on Saturdays. Sufficient warning will be posted in the VM log message.

The Center's two high-speed printers will be secured 30 minutes prior to a change to unattended mode.

Call 646-2713 for recorded system status.

#### Information on Printed Output

1. Don't request output using mylar ribbon until you are certain it will be your last printing of a file that will go to the print shop. All requests for the use of mylar must go to the Operations Manager, In-109, or the Shift Supervisor, In-140.

2. Special permission is also required for printing multiple copies of printed output. Budgetary and scheduling constraints make this policy necessary. Special forms, such as upper/lower case output, are printed between midnight and 0700, Monday through Friday.

The Newsletter appears semiquarterly and is written by members of the staff, W. R. Church Computer Center (Code 0141), Naval Postgraduate School, Monterey, California 93943. Requests for further information or suggestions for articles for the Newsletter may be addressed to the User Services Manager, Code 0141 (In-133), ext. 2752 (or ext. 2573 for messages).

The Center operates a multiprocessor configuration consisting of an IBM 3033 Attached Processor System (16 Megabytes) lopsely coupled with an IBM 3033 Model S (8 Megabytes). Interactive computing is provided under VM/SP CMS and batch-processing service under MVS with JES3 Networking.

Distribution: List 3, plus:

s: 1-A5, 225-B2, 3-B3, 1-B13, 6-F3, 1-F4, 1-F5, 1-F6, 3-F14, 1-Code 49,