

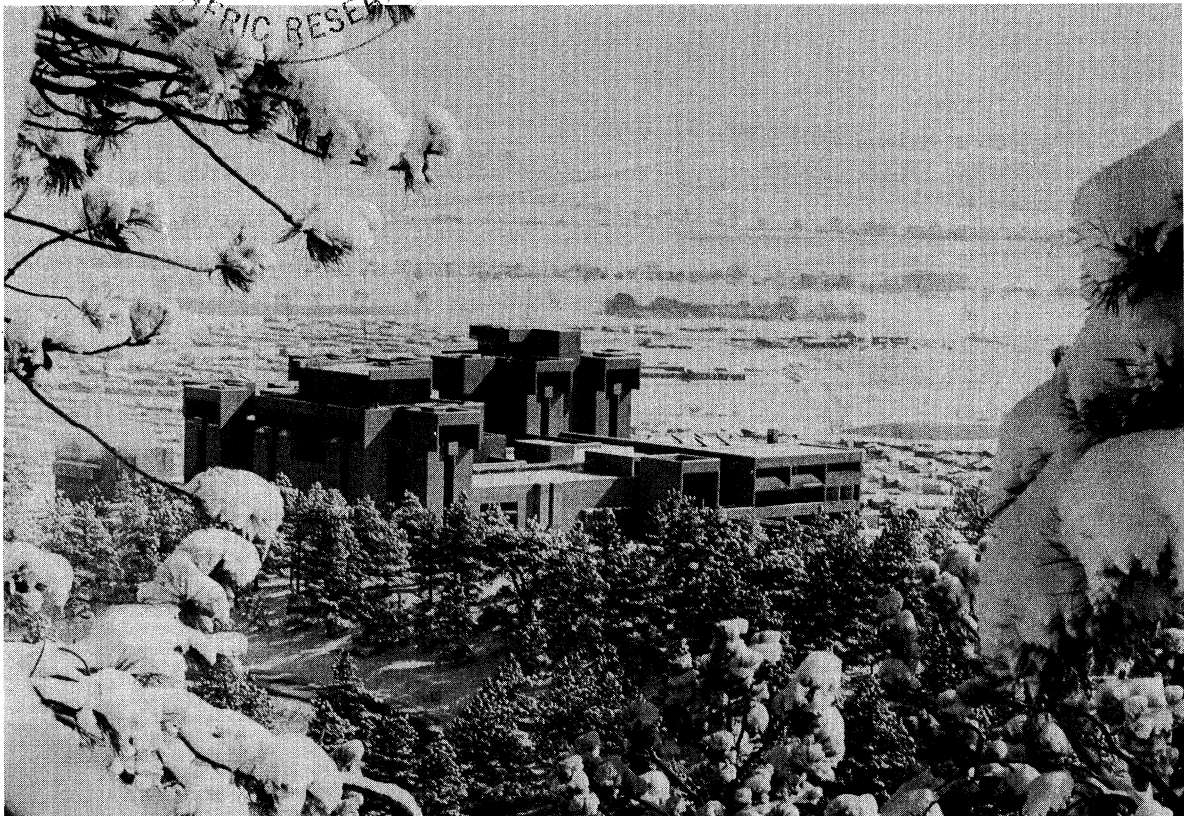


Volume 8
Number 12

A Newsletter of the Scientific Computing Division
National Center for Atmospheric Research

December 1,
1987

Happy Holidays from the Staff of SCD



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Services Directory
 Direct dial prefix: (303) 497-
 NCAR Operator: (303) 497-1000

	Contact	Extension	Room #
General Information			
SCD Consulting Office	Consultant on Duty	1278	17
Visitor/User Information	Frieda Garcia	1254	17
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Consulting Office Schedule

Consulting Office hours are 08:30-11:30 and 13:00-16:00 daily (Mountain Time Zone), Monday through Friday (except holidays). You can reach the consultants by calling (303) 497-1278. You can also send electronic mail TO CONSULT1 on the IBM 4381 (IO) front-end computer.

Schedule of Computer Unavailability

Check the SCD Daily Bulletin for up-to-date information on equipment status. All computers may be down from 07:00 until 08:30 daily for Systems Checkout. In addition, computers will be down for Preventive Maintenance as follows:

CRAY,C1 Computer: 06:00-08:00, Monday and Wednesday
 CRAY,CX Computer: 06:00-09:00, Tuesday and Thursday
 IBM 4381 (IO) Front-end Computer: 07:00-08:30, as needed

The Record is published monthly by the Scientific Computing Division of the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. NCAR is operated by the University Corporation for Atmospheric Research (UCAR) and is sponsored by the National Science Foundation. Reference to a company or product name does not imply approval or recommendation of that company or product to the exclusion of others.

Robert Nicol, Editor
 Nancy Dawson, Associate Editor
 Diane Huntrods, Editorial Assistant
 Betty Thompson and Karen Hack, SCDUG Minutes
 JoAn Knudson, Computer Resources Allocated

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Cover Graphic

The photograph on the cover of this issue shows the NCAR Mesa Laboratory (Boulder, Colorado) in a snowy setting. The photographic work was done by the NCAR Photographics staff: Bob Bumpas, Charlie Semmer, and Ginger Hein. Our thanks to them for their help in wishing all of you a happy holiday season.

The SCD Users Conference: January 11-14, 1988

by Karen Friedman

SCD is hosting the sixth annual Users Conference from January 11-14 in Boulder. The theme for this year's conference is "Technology at Work," highlighting the latest developments in supercomputing technology. Sessions will also include a review of the current status of NCAR supercomputing and SCD's plans for the future.

The conference will include the following invited speakers:

- Robert Brammer, The Analytic Science Corp. (TASC)
- Francis Bretherton, NCAR Senior Scientist, Climate and Global Dynamics Division
- Bob Ewald, Vice President of Software Development, Cray Research, Inc.
- Paul Rotar, NSF Division of Advanced Scientific Computing
- Albert Semtner, Dept. of Oceanography, Naval Postgraduate School

Prior to the conference, NSF will award the contract for managing the NSFnet backbone network to one of the organizations that submitted proposals. SCD will invite an officer from the winning organization to speak at the conference.

A number of speakers from NCAR will also appear at the conference:

- Bill Buzbee, Director of SCD
- Cliff Murino, President of the University Corporation for Atmospheric Research (UCAR)
- Rick Anthes, Director of NCAR
- Ginger Caldwell (SCD User Services Manager); Margaret Drake (SCD Deputy Director); Joe Choy (SCD Distributed Computing Manager); and Roy Jenne (SCD Data Support Manager).

Some of the major topics to be addressed are:

- The Global Change Program
- Trends and Directions in Supercomputing
- Plans and Services for SCD Users
- Distributed Computing
- Data Management
- Graphics Software and Hardware

Conference sessions will be held at the NCAR Mesa Laboratory. SCD has arranged accommodations nearby at the Appletree Inn (formerly the Rodeway Inn).

If you have not yet registered for the SCD User Conference, you can do so until December 15, 1987. The conference fee is \$75.00, which includes materials, refreshments, a reception, and a dinner. For more details, contact:

Betty Thompson
SCD Users Conference
NCAR
P.O. Box 3000
Boulder, CO 80307-3000
Telephone: (303) 497-1208

The staff of SCD looks forward to seeing you in January.

Karen Friedman is the SCD Technical Communication Coordinator.

The MSS Advisory Committee: Issues and Recommendations

by Robert Nicol

Last month's issue of *The Record* announced the formation of an advisory committee to provide user input on Mass Storage System (MSS) issues to help SCD staff provide better MSS services. The MSS Advisory Committee is chaired by SCD Systems programmer Marc Nelson and includes representatives from the scientific divisions. The representatives, their divisions and their telephone extension numbers are:

Linda Bath (CGD, x1326)
Paul Bailey (ACD, x1410)
Alice Lecinski (HAO, x1523)
Carl Mohr (MMM, x8968)
Dick Oye (ATD, x8809)
Ken Hansen (SCD, 303-497-1294)

Important Note: SCD Consultant Ken Hansen has been selected to represent remote university users. Ken is also the contact for questions and suggestions about the Import/Export Facility (see below).

Committee Recommendations

One of the major functions of the committee is to provide a forum for users to raise problems about MSS functions and policies and to make suggestions about improving them. A number of users have already done so through their representatives, and the committee met on November 3 to discuss the following issues:

Retention Periods Users have requested an increase in the maximum retention period for files on public media. They feel that valuable archived data should, in effect, be retained forever, even on public media. The committee approved that suggestion and the recommendation has already been implemented. (Note that the policies for MSS files on *private* media have not changed.)

The new maximum retention period for files on public media is 32,767 days, or approximately 90 years. However, you must create the MSS file first (with a retention period of up to 367 days) and then use the MSCHANGE command to specify any retention period greater than 367 days.

For example, the maximum allowable retention value in the DISPOSE command has not been increased. When using the DISPOSE command to create MSS files from the CRAY computers or via the NCAR Local Network, you cannot specify a retention period of more than 367 days. In practical terms, MSS files with maximum retention periods will never be purged; to prevent overuse of this feature, users must take the trouble to run a separate MSCHANGE job to increase the retention period from 367 days.

File Listings

The MSINFO command allows MSS users to list a variety of information about their files. However, MSINFO currently has a maximum "hard" limit of 1500 files for which it can retrieve such information; the practical or "soft" limit varies according to the information requested, but it averages about 750 files. This restriction has caused problems for users with large numbers of MSS files.

The committee has recommended a substantial increase in the file listing capacity of MSINFO. According to Marc Nelson, SCD staff are creating a new version of MSINFO that runs in batch mode on the the CRAY computers that can handle listings of up to 100,000 files. Although an MSINFO interactive display capability on front-end computers such as the IBM 4381 (IO) front-end computer is not feasible at this time, users will be able to print listings or transfer them to another computer.

MSINFO Interface

Users have also requested additional enhancements to the MSINFO interface, such as greater flexibility in listing file information and the ability to use "wild cards" in listing requests. (The term "wild card" refers to the use of metacharacters that are expanded to operate on sets of files with common characteristics.) The committee supports these requests, and SCD staff are considering ways to implement such enhanced capabilities.

In addition to the items listed above, the committee has also forwarded some lower-priority suggestions to be dealt with as staff becomes available. For example, users would like to be able to rename directories as is done in UNIX[™]. Also, they would like the MSUPDATE and MSCHANGE commands enhanced to handle operations on entire directories and sets of files. If you have other suggestions for this "wish list," please contact your representative.

Identifying and Resolving Problems

Users who access SCD systems via the VAX Gateway computer recently informed their divisional representatives on the committee that they were not receiving purge notices for their MSS files scheduled for purging. Upon investigating the problem after it was raised at the last meeting, Marc Nelson found that the purge notices were disappearing into a "bit bucket."

[™] UNIX is a trademark of Bell Laboratories.

The IBM 4381 Mass Storage Control Processor (MSCP) does not currently store e-mail addresses for users; instead, it generates an address from the user ID in the User Master File (UMF). As a temporary solution, many of the purge notices have been re-routed to the IBM 4381 (IO) front-end computer; however, SCD staff are working on ways to allow the MSCP to associate e-mail addresses with the user ID information in the UMF.

The Import/Export Facility

SCD is in the process of creating a facility on the Mass Storage Control Processor (MSCP) to provide importing and exporting capabilities for user data. The facility will definitely support the standard IBM 3480 cartridge format and standard ½-inch tape formats. However, there are a number of new, developing, and experimental formats that provide high-capacity storage on small form-factor devices (*form factor* refers to the physical size and shape of the devices). For example, several companies are testing devices that use standard video cassette cartridges to store data in high densities. Various kinds of optical media are also under evaluation.

SCD would like to support high-capacity, small form-factor devices with Small Computer System Interface (SCSI) capability. These devices promise to provide back-up and storage for data gathered in the field and at remote sites, so SCD anticipates that researchers will want to use them and then transfer the data to the MSS. Since many of these devices are new or not yet released, SCD staff have no way to identify those that users would like the facility to support.

User Input Urgently Needed About...

The Import/Export Facility

SCD needs recommendations from you about the devices described above in order to make intelligent decisions about which to support. Please express your opinions by contacting Ken Hansen at (303) 497-1294 or by sending e-mail TO HANSEN on the IBM 4381 (IO) computer. (Ken is also the representative for remote users.) Ken will forward your suggestions to the committee and will also be happy to answer any questions you have about the Import/Export facility and the devices under consideration.

Remote User Concerns

The SCD programmers who work on the MSS are not large MSS users themselves. They do not perform research using MSS data files, so their experience with the day-to-day needs of researchers is limited. In addition, the MSS Advisory Committee members are all local users, so their perspective is different from that of remote users. Because of these factors, it is extremely important that remote university users provide input to the committee about their needs and desires regarding the MSS.

At this time, the MSS holds 237,000 files totaling 4.3×10^{13} bits on 33,500 IBM 3480 cartridges, each containing about 194 megabytes. Approximately 58% of those files have never been read since they were sent to the MSS for storage. The overhead of managing a system like the MSS is considerable, so it is important that users manage their data efficiently and that they provide feedback to SCD to help them do so.

Setting Priorities

The MSS Advisory Committee is relying on comments from users to help them prioritize the recommendations passed on to SCD staff. For example, the committee considered two suggestions for the Import/Export Facility: conversion capability for EBCDIC (IBM mainframe) character files, or conversion capability for COS transparent format files. Committee members considered the second capability more important, so they gave that recommendation a higher priority.

If you would like to provide input on setting priorities, your representative can provide agenda information and present your comments to the committee. This is your opportunity to play a part in the ongoing development of the MSS, and any help that you can give the committee will be greatly appreciated.

Robert Nicol is the Editor of The Record.

Accessing the NCAR Library Catalog On-line

by Gayl Gray

Patrons of the NCAR Library can now browse through the library catalog on-line by using the IBM 4381 (IO) front-end computer. The NCAR Online Library Access (NOLA) system enables you to search for titles in a variety of ways from a terminal in your office or in the library.

Editor's Note: The NOLA system is not to be confused with the NCAR *Software* Library Catalog, which deals with applications software.

NOLA Overview

A state-of-the-art library involves the computer in everything from circulation to the dissemination of facts in order to provide library users with services that are faster and better than before. The computer is particularly well-suited to help users search the library catalog for titles, topics and authors. The on-line catalog is a phenomenon of the '80s, and the NCAR Library is pleased to announce the advent of the NOLA system. However, making an entire catalog available on-line was not a project that could be completed overnight.

NCAR Librarian Carol Fey Chatfield is responsible for bringing NOLA to life. As the Library's automation specialist, Carol has been working with software leased from Stanford University to create an on-line system appropriate for NCAR's needs. Her efforts involved several follow-up trips to Stanford as well as consultation with other librarians using the same software. She has also received continuing support from the staff of NCAR's Administrative Computing and Systems Group and from the Scientific Computing Division.

A major requirement of this effort was assigning an appropriate format to citations for the entire library collection of 18,000 volumes. After these citations were complete, 30 NCAR staff members, representing all of NCAR's local sites, tested NOLA's searching capabilities and contributed a number of refinements. As the project came to fruition, NCAR scientists Don Lenschow (MMM) and Ron Schwiesow (ATD) created the acronym NOLA, which won the Library's catalog-naming contest.

NOLA Features

NOLA provides complete access to bibliographic information for every book in the NCAR Library, including the branch where the text is located. Using the catalog searching system, you can specify any word or words in a title to retrieve the citation you need. You can also search by author, subject, and date, or combine these elements using logical (and/or) constructs. NOLA also allows truncation and "wild cards."

If you want a bibliography of all Library books in a certain category, NOLA lists them on demand. If you want a list of all books in the category published in certain years, NOLA can produce that too. In addition, according to Library Director Karon Kelly, the catalog will soon be able to tell you whether an item is checked out. In future, periodicals and technical reports will also be accessible through NOLA.

Using NOLA

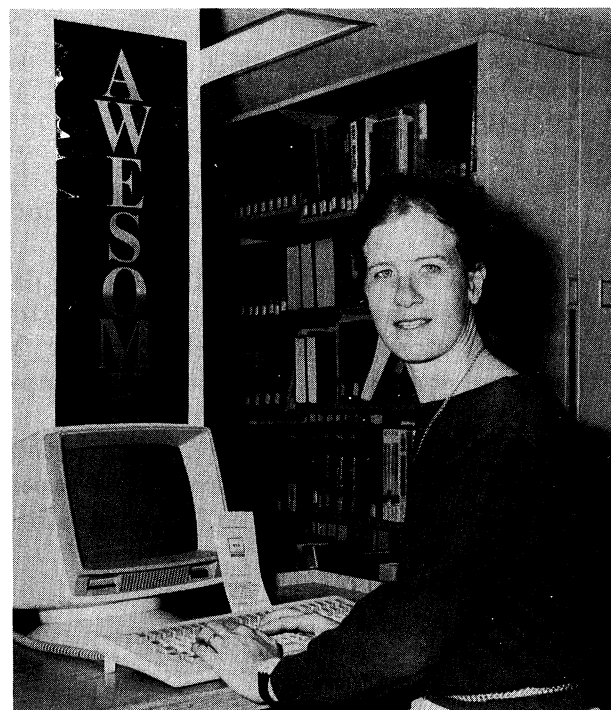
If you already have a logon on the IBM 4381 (IO) computer, you can display information about the NOLA facility by entering:

HELP NOLA

The Library has also set up divisional logons for NCAR staff who are not IBM users. Each NCAR division has been allocated two such logons and can request more if needed. In the future, non-NCAR staff will be able to request books for check-out through their home institutions' interlibrary loan procedures. The following table lists NCAR divisional representatives and their phone numbers for those NCAR staff members who do not have their own IBM 4381 accounts. Contact your divisional representative for logon information.

Divisional Accounts for NOLA and ANA

<u>Division</u>	<u>Contact Person</u>	<u>Phone</u>
UCAR	Susan Stilwell	X 1653
ACD	Kent Sieckman	X 1438
ASP	Barb McDonald	X 1601
ATD	Bob Snow	X 8675
CGD	Holly Howard	X 1323
DIR	Carole Zolnick	X 1110
HAO	Kathy Strand	X 1516
MMM	Sudie Kelly	X 8951
SCD	Betty Thompson	X 1208



Carol Chatfield demonstrates how to use NOLA.

The Library staff has created one brochure that tells you how to log on to the IBM 4381 (IO) computer and a second brochure that describes how to use NOLA and perform searches. A terminal has been installed in the Library for NOLA users. If you are interested in using NOLA, call the Library at (303) 497-1180 for copies of these brochures.

Accessing Other Collections

In addition to the services NOLA provides, you can also search on-line for materials in the NCAR Archives by using the IBM 4381 (IO) computer. The Access to NCAR Archives (ANA) facility allows you to find materials relating to the history of NCAR and UCAR. ANA and NOLA use the same software and similar IBM logon procedures. You can access NCAR Archivist Nancy Gauss' abstracts describing the Archives collections by entering any word or words in their contents. Like NOLA, you can also search in ANA using subjects or authors. The NOLA brochure mentioned above also describes how to use ANA.

The High Altitude Observatory also maintains a library that specializes in materials for solar physics and astrophysics. On-line searching facilities are available on the HA computer, which is accessible via the PACX. Contact HAO Librarian Kathy Strand at (303) 497-1516 to learn how to search the HAO Library's collection via computer.

Gayl Gray is the NCAR Public Services Librarian.

Tape Services Provided by SCD

by Robert Nicol

Sue Long, SCD's Tape Librarian, provides a variety of services for both local and remote users who have data on ½-inch magnetic tape. Sue also assigns private virtual volumes on the Mass Storage System (MSS) upon request by users. Sue's office is in Room 5, near the Computer Room viewing area in the first basement of the Mesa Laboratory; her telephone number is (303) 497-1245.

Half-inch Tape Services

Sending data to NCAR: If you have data for use on SCD computer systems, you may send it on ½-inch magnetic tape to Sue for storage. Sue assigns an identification number to each tape and stores it until further notice. You can then use commands on the IBM 4381 (IO) front-end computer or the CRAY,C1 computer to request that the tape be mounted and read.

When mailing tapes, be sure to pack them tightly in sturdy containers. Also, try to avoid using IBM EZLOAD seals around the tapes; these seals often break, resulting in damage to the tape. You must include the following information with your tapes:

User Name
User Number
Project Number
Site (Address)
Telephone Number
Electronic Mail Address

Sue will send confirmation of arrival and notify you of the identification numbers assigned to your tapes. She prefers to use electronic mail, so please include an e-mail address if you have one.

Important Note: If you are preparing data for use on NCAR computers and you have questions about data formats and densities, please contact the SCD Consulting Office at (303) 497-1278.

On-site data storage: SCD provides data storage on ½-inch tape free of charge and also provides library services for individually-owned tapes for use on SCD systems. SCD tapes use a 9-track format; you can specify any standard density. Sue keeps records on tape identification numbers and tape owners.

Note: If your data is to be used on computer systems that SCD does not support (divisional or university front-end computers, for example), then you must purchase tapes for individual use (see below) and arrange for other storage space.

Tape sales: If you wish to transport data from SCD-supported systems, you can purchase ½-inch tapes from Sue for that purpose. The price is \$15.00 per tape, or \$20.00 per tape including shipping (UPS). Sue can also arrange for overnight shipping of tapes at additional charges.

Tape testing, cleaning, and packing: If the condition of your tape is questionable, Sue has equipment to test and clean it. She replaces defective, SCD-owned tapes free of charge and also recycles unneeded tapes.

If you are mailing tapes from NCAR, Sue will be happy to package them for you so they are not damaged in transit. She has extensive experience with packaging and mailing magnetic tapes, so take advantage of this service to avoid problems. If you are an NCAR user, she will charge mailing costs to your account.

Would You Like IBM 3480 Cartridge Service?

At this time, SCD does not provide services for IBM 3480 magnetic tape cartridges for individual use; however, SCD is evaluating plans to provide such services in the future. Because of limited storage capacity, it is unlikely that SCD will be able to provide storage services for cartridges like those for ½-inch tape.

The MSS Import/Export Facility now in development will support IBM 3480 cartridges (see the article on the MSS Advisory Committee above). SCD has not determined the level of service or the sale price for these cartridges. If you are interested in services for IBM 3480 cartridges, please contact Sue Long to indicate your preferences.

Robert Nicol is the Editor of The Record.

1-800 Service for Microcom 9600 BPS Modem Users

by Marla Meehl

SCD announces a new service for all remote users who access NCAR computers using Microcom 9600 bit-per-second (bps) modems. In January 1988, SCD will implement 1-800 service connections to a set of Microcom 9600 bps modems at NCAR. This enhancement will allow remote users who have purchased a matching Microcom 9600 bps modem to access NCAR's modems without incurring a long distance phone charge. The numbers will be announced in the Daily Bulletin and *The Record* when they become available.

Important Note: This service will be available for 9600 bps access only. However, you can still use Telenet for 1200 or 2400 bps communications to NCAR.

If you have questions about this service or about how to obtain an appropriate modem, please contact Marla Meehl at (303) 497-1301 or send electronic mail TO MARLA on the IBM 4381 (IO) front-end computer or to marla@scdsw1.ucar.edu on the Internet.

Marla Meehl is a telecommunications specialist in the Distributed Computing Section of SCD.

Data Communications Package Update

by Marla Meehl

This is an update about SCD-supported data communications packages for personal computer (PC) users who use asynchronous communications to access NCAR computing facilities. The tables on the following pages summarize the package features and costs.

At this time, SCD staff are providing support for six of these packages, including testing, documentation, and software updates.

Software for IBM-compatible PCs: SCD supports EM4010, MS-DOS Kermit (two versions), Procomm, SIMPC, and YTERM.

Software for Apple Macintosh[™] PCs: SCD supports the VersaTerm package for the various Apple Macintosh models. This is the only supported package for Macintosh PCs.

Software for displaying graphics: For graphics display on IBM-compatible PCs, obtain the EM4010 package, which emulates a TEKTRONIX[®] 4010 graphics terminal. Note: You must have a suitable graphics card installed in your PC before displaying graphics.

For graphics display on Apple Macintosh PCs, obtain the VersaTerm package, which can emulate a TEKTRONIX 4014 graphics terminal. No graphics card is required.

[™] Apple and Macintosh are trademarks of Apple Computer, Inc.

[®] TEKTRONIX is a registered trademark of Tektronix, Inc.

SCD-Supported Data Communications Software November 1987			
Features	Packages		
Package Name	EM4010 V3.41-2.46	MS-DOS Kermit V2.27	MS-DOS Kermit V2.29
Terminal Emulation	VT220 VT102 VT100 VT52 TEKTRONIX 4010	Heath 19	VT100
Graphics Support	Yes	No	No
File Transfer Protocol	ASCII Kermit XMODEM	Kermit	Kermit
Systems To Emulate On	IBM 3725 IBM 4381 UNIX VAX/VMS	IBM 3725	IBM 3725 IBM 4381 UNIX VAX/VMS
Systems Transfer With	IBM 3725 IBM 4381 UNIX VAX/VMS	IBM 3725	IBM 3725 IBM 4381 UNIX VAX/VMS
Package Cost	\$69 Purchase \$35 Update	Public Domain (no charge)	Public Domain (no charge)

How to Obtain These Packages

EM4010: SCD staff evaluated EM4010 and five other graphics packages for the standard PC; EM4010 was again rated the package best-suited for NCAR users. In addition, the vendor of EM4010 has recently updated the software and fixed many existing bugs. The major new feature of EM4010 is the addition of Kermit file-transfer facilities.

SCD staff have tested the new version and created documentation on using the package for access to NCAR. If you are an NCAR user, you can purchase the updated version for \$69.00; if you already have a version of EM4010, you can buy an upgrade for \$35.00. Please contact Diversified Computer Systems at (303) 447-9251 with questions and purchase requests. Be sure to identify yourself as an NCAR user to receive a discount.

MS-DOS Kermit: The new full-screen Version 2.29 of MS-DOS Kermit has been tested and documented by SCD staff and is now available as a public-domain package from:

Kermit Distribution
Columbia University Center for Computing Activities
612 W. 115th St.
New York, NY 10025

SCD-Supported Data Communications Software (cont.) November 1987				
Features	Packages			
Package Name	Procomm V2.3 V2.4.2	SIMPC V2.2E	VersaTerm V3.1	YTERM V1.3
Terminal Emulation	IBM 3101 VT100 VT52 TV 910/920 TV 925/950 ADM3/5 Heath 19 ANSI-BBS ADDS Viewpoint Wyse 100	IBM 3720 VT100	VT100 TEKTRONIX 4014 Data General D200	IBMPC VT100
Graphics Support	No	No	Yes	No
File Transfer Protocol	XMODEM Kermit ASCII	SIMPC TTY	Kermit XMODEM Screen Trap	YTERM
Systems to Emulate On	IBM 3725 IBM 4381 UNIX VAX/VMS	IBM 3725	IBM 3725 IBM 4381 UNIX VAX/VMS	IBM 4381
Systems Transfer With	IBM 4381 UNIX Telemail VAX/VMS	IBM 3725	IBM 3725 IBM 4381 UNIX VAX/VMS	IBM 4381
Package Cost	Registration Fee \$25	\$250 Purchase	\$99 Purchase	No charge (\$10.00 copy fee)

How to Obtain These Packages

Procomm: The Procomm package is available for copying from various bulletin boards and other sources; however, you must pay a \$25.00 registration fee after you obtain the software. You can also obtain a copy from Marla Meehl for a \$10.00 disk-copying fee (see contact information below), but you are then responsible for paying the registration fee to:

Data Storm Technology, Inc.
P.O. Box 1471
Columbia, MI 65205
Telephone: (314) 449-9401

SIMPC: You can purchase the SIMPC package for \$250.00 from:

Simware
20 Colonnade Rd.
Ottawa, Ontario K2E7M6
CANADA
Telephone: (613) 727-1779

VersaTerm: You should be able to obtain the VersaTerm package from your local computer store. If not, contact:

Peripherals Computers and Supplies, Inc.
2457 Perkiomen Ave.
Mt. Penn, PA 19606
Telephone: (215) 779-0522

YTERM: NCAR has a site license for the YTERM software. If you are an NCAR computer user, you can obtain the YTERM software from Marla Meehl for a \$10.00 disk-copying fee (see contact information below).

Contact Marla Meehl at (303) 497-1301 or send electronic mail TO MARLA on the IBM 4381 (IO) front-end computer or to marla@scdsw1.ucar.edu on the Internet.

If you have questions about these packages, please contact the SCD Consulting Office at (303) 497-1278 or send electronic mail on the IBM 4381 (IO) front-end computer TO CONSULT1. If the consultants are unavailable, you can contact Marla Meehl as described above.

You can obtain copies of all SCD-produced data communications documentation from the SCD User Support Specialist, Frieda Garcia. Contact Frieda at (303) 497-1254 or send electronic mail TO FRIEDA on the IBM 4381 (IO) front-end computer or to frieda@scdsw1.ucar.edu on the Internet.

Marla Meehl is a telecommunications specialist in the Distributed Computing Section of SCD.

Changing Multiple MSS Files from the IBM 4381 (IO) Computer

by Lynne Andrade

Introduction

The MASS EXEC on the IBM 4381 (IO) front-end computer allows you to generate a CRAY job that will effect changes on a large number of Mass Storage System (MSS) files. Using the MASS EXEC, you can list, update, change or delete numerous MSS files by submitting a single job.

The MASS EXEC is particularly useful when you wish to perform file maintenance on a large number of MSS files. For example, if you need to update the retention period parameter on a number of MSS files because they are scheduled for purging, or if a former colleague has left MSS files that you would like to save for your use, the MASS EXEC provides you with a quick method for making the necessary changes.

Note on command names: You can access MSS files from the IBM 4381 (IO) computer and from the CRAY computers with similar commands. However, CRAY command names are limited to seven characters, so the names have been truncated. The MASS EXEC generates CRAY commands for batch submission.

MSS Command Equivalents	
IBM	CRAY
MSCHANGE	MSCHANG
MSDELETE	MSDELET
MSINFO	MSINFO
MSUPDATE	MSUPDAT

How to Use the MASS EXEC

Creating An Input File: You must supply an input file to MASS and specify the file name when invoking the command. The file contains the names of the MSS files that you wish to access. You can create the file yourself in the editor by typing in the pathnames, or you may have an existing list that you update periodically.

Important Note: To avoid problems, the files should be specified with *full pathnames*. A full pathname is one that begins with a slash (/) followed by the the user ID of the owner (for example, /SMITH). If you are not familiar with the Mass Storage System, see the SCD UserDoc "The Mass Storage System," August 1986.

For your convenience, the MASS EXEC is designed to handle output from the MSINFO command. You can use the MSINFO command on the IBM 4381 (IO) computer to generate listings of your MSS files. If you are not familiar with MSINFO, see the SCD UserDoc "IBM Utilities for Accessing the Mass Storage System," April 1986. You can also access HELP files for the IBM versions of the MSS commands by entering:

```
HELP command_name
```

Replace *command_name* with the name of the command in question.

As an example, assume that you sent the following MSINFO command to the MSS:

```
MSINFO NAME=/JONES3 SELECT=NAME LEVELS=4 OUT=A/SAMPLE.MSINFO
```

Your MSINFO output file, called SAMPLE MSINFO A, might contain the following list of MSS pathnames:

```
/JONES3
/JONES3/FOOD
/JONES3/FOOD/LUNCH
/JONES3/FOOD/DINNER
/JONES3/FOOD/DINNER/SALAD
/JONES3/FOOD/DINNER/ENTREE
/JONES3/FOOD/DINNER/DESSERT
```


You can edit any such files generated by MSINFO and change or delete filenames to produce the appropriate list. Note that the MASS EXEC recognizes the difference between directories and files and automatically generates commands for files only. This means that you do not have to delete all the directory names in the file to avoid command errors.

Linking to the CONSULT1 Disk: Before using the MASS EXEC, you must execute the following link command and specify the read password as READ:

```
LINKTO CONSULT1
```

Invoking the MASS EXEC: After you have prepared the input file and performed the link, you can enter the MASS command with the appropriate parameters (see below for details). Note that MASS performs only one MSS command for the entire set of files; for example, you cannot list information using MSINFO and update files using MSUPDAT with the same MASS command.

Important Note: All of the MSS files you wish to access must share the appropriate attributes for the command that you select. For example, if you wish to delete a series of MSS files that have passwords and you specify one set of passwords in the MASS command, all the MSDELETE commands that MASS generates specify the same password. If some of those files actually have different passwords, you must edit the job file created by MASS and change the password parameters for those files. The command syntax and parameters are not checked until the job file is sent to the CRAY computers, so you must ensure that they are correct before sending the job file.

Editing the Command File: Before sending the file to the CRAY computer for execution, you can edit the contents using XEDIT and adjust the commands as needed. You may wish to alter parameters such as passwords, retention periods, selected fields, and so on.

Submitting the Job: Once the file is ready, you can submit it to the CRAY computers using C1JOB or CXJOB as you would with any other CRAY job. The MASS EXEC generates the appropriate CRAY Job Control Language (JCL) automatically.

The MASS Command Format

To produce a CRAY job to manipulate the files you have included in your MASS input file, use the following command format:

```
MASS flnm flty flmd (MSS_command MSS_command_options)
```

The parameter definitions are:

- *flnm flty flmd*

Replace the string above with the filename, filetype, and filemode of the file to use for input to MASS. This is a required parameter.

- *MSS_command*

You must replace the above string with one of the four MSS file maintenance commands: MSCHANG, MSDELETE, MSINFO, or MSUPDAT. This is a required parameter.

- *MSS_command_options*

With the exception of MSUPDAT, each of the MSS file maintenance commands has its own options. The CRAY MSS commands and options are fully documented in "Mass Storage File Maintenance from the CRAY," December 1986.

In addition, you can use XEDIT to access the same documentation in on-line files stored on the CONSULT1 disk:

```
MSINTRO CRAYDOC
MSCHANG CRAYDOC
MSDELET CRAYDOC
MSINFO CRAYDOC
MSUPDAT CRAYDOC
```

The CRAY MSS command options are summarized below, but you should check the detailed documentation if you are unfamiliar with their use.

Replace *MSS_command_options* with the desired options, each separated by a blank space. The commands and options are:

```
MSCHANG          PASSWD=read_password,write_password
                 NEWNAME=new_directory=old_directory
                 NEWPASS=new_read_password,new_write_password
                 COMMENT=new_comment
                 RETPD=new_retention_period

MSDELET          NAME=name
                 PASSWD=read_password,write_password

MSINFO           TYPE=name_type
                 SELECT=field_names
                 LEVELS=directory_levels
                 OUT=dataset_name

MSUPDAT          There are no optional parameters for MSUPDAT.
```

Important Note: The options you specify are simply passed to the MSS maintenance command. To avoid problems when the options are processed, you should ensure that the options are legal and correct before you submit the job to the CRAY computers. If you specify faulty parameters, they are not detected until the command is actually processed on the CRAY computers.

Example of Updating MSS Files Using MASS

The following example shows how to update multiple MSS files using the MASS EXEC by generating an input file with MSINFO, listing the file, generating a job file with MASS, listing that file, and then submitting the job.

The commands that you type are shown in **boldface**; the responses from the IBM 4381 computer are shown in plainface.

R;

LINKTO CONSULT1ENTER READ PASSWORD: **READ**

DMSACC723I C (120) R/O

*** CONSULT1'S 191-DISK LINKED AS DASD 120 WITH FILEMODE C ***

R;

MSINFO /SMITH SELECT=NAME LEVELS=8 OUT=A/MOVE.MSFILES

0001 FILE CHANGED

RDR FILE 4236 TRANSFERRED TO NETQMS

0001 FILE TRANSFERRED

Information - MSINFO: Waiting for requested information from the Mass Store.

RDR FILE 4247 TRANSFERRED FROM NETQMS

RDR FILE 4248 TRANSFERRED FROM NETQMS

0001 FILE ORDERED

File \$MS\$ \$192712\$ D received from NETQMS at NCARIO sent as \$MS\$ \$192712\$ D

R;

TYPE MOVE MSFILES A

/SMITH

/SMITH/GAMES

/SMITH/GAMES/MONOPOLY

/SMITH/GAMES/HEARTS

/SMITH/GAMES/RISK

/SMITH/DRINKS

/SMITH/DRINKS/HOT

/SMITH/DRINKS/COLD

R;

MASS MOVE MSFILES A (MSUPDAT

DASD 500 DEFINED 0005 CYL

*** 5 CYLINDER TEMPDISK ACCESSED AS 500 D ***

An output file, MASS CRAYJOB, has been saved on your D-Disk

R;

TYPE MASS CRAYJOB D

JOB, JN=MASSRN, US=123412345678, T=12C, *MS.

ACCOUNT, AC=123412345678.

*.

DISPOSE, DN=\$OUT, DEFER, ME=IO, DC=ST, ^

TEXT='USER=JONES3, FLNM=MASS, FLTY=PROUT'.

*.

MSUPDAT (NAME=/SMITH/GAMES/MONOPOLY)

MSUPDAT (NAME=/SMITH/GAMES/HEARTS)

MSUPDAT (NAME=/SMITH/GAMES/RISK)

MSUPDAT (NAME=/SMITH/DRINKS/HOT)

MSUPDAT (NAME=/SMITH/DRINKS/COLD)

*.

EXIT.

\EOF

R;

CXJOB MASS CRAYJOB D

```
NET JOBONCX ACK=NOACK FLNM=MASS ELTY=CRAYJOB MINI=500 (REMOTE NAME=ANDRADE
DASD 500 DETACHED
COMMAND COMPLETE
0001 FILE CHANGED
RDR FILE 8626 TRANSFERRED TO NETQCX
0001 FILE TRANSFERRED
NETWK001 - SEQUENCE NUMBER ASSIGNED IS I08626
R;
```

Note that the MASS EXEC ignored directory names when generating commands and inserted appropriate CRAY JCL automatically.

More MASS Examples

Changing File Retention Periods: To change the retention periods for multiple MSS files, use the following format:

```
MASS SAMPLE MSINFO A (MSCHANG RETPD=90
```

This example specifies a new retention period of 90 days for every file listed in SAMPLE MSINFO A.

Deleting MSS Files: To delete multiple MSS files with one job, use the following format:

```
MASS DELETE FILES A (MSDELET
```

This example deletes all of the files listed in DELETE FILES A (assuming that the files have no passwords).

Example of Renaming Files with MASS

Suppose you formerly had a colleague in your group with the user ID SMITH who left some files on the MSS that you need to use. You want to rename the files to bring them into your own directory structure for your convenience.

The following example shows the sequence of commands you would need to change the names of all the MSS files belonging to SMITH. Note the two character strings separated by equal signs (=) shown in the NEWNAME option of the MASS command. Only the first parts of the current and future pathnames are specified. The MASS EXEC automatically performs character string substitution for all the pathnames that match the first string. This feature works for multiple levels of directory names as long as all the levels are the same. You merely specify the string you wish to alter, delimited with equal signs, and then the new string; MASS then creates the entire pathnames automatically.

Important Note: Renaming an MSS file does not change the ownership of the file or the address to which purge notices about the file are sent. To change the ownership of an MSS file, you must restage and recreate the file just as if it were a new file.

R;

LINKTO CONSULT1

ENTER READ PASSWORD:READ

DMSACC723I C (120) R/O

*** CONSULT1'S 191-DISK LINKED AS DASD 120 WITH FILEMODE C ***

R;

MSINFO /SMITH SELECT=NAME LEVELS=6 OUT=A/MOVE.MSFILES

OOO1 FILE CHANGED

RDR FILE 4236 TRANSFERRED TO NETQMS

OOO1 FILE TRANSFERRED

Information - MSINFO: Waiting for requested information from the Mass Store.

RDR FILE 4247 TRANSFERRED FROM NETQMS

RDR FILE 4248 TRANSFERRED FROM NETQMS

OOO1 FILE ORDERED

File \$MS\$ \$192712\$ D received from NETQMS at NCARIO sent as \$MS\$ \$192712\$ D

R;

TYPE MOVE MSFILES A

/SMITH

/SMITH/GAMES

/SMITH/GAMES/MONOPOLY

/SMITH/GAMES/HEARTS

/SMITH/GAMES/RISK

/SMITH/DRINKS

/SMITH/DRINKS/HOT

/SMITH/DRINKS/COLD

R;

MASS MOVE MSFILES A (MSCHANG NEWNAME=/JONES3=/SMITH

DASD 500 DEFINED 0005 CYL

*** 5 CYLINDER TEMPDISK ACCESSED AS 500 D ***

An output file, MASS CRAYJOB, has been saved on your D-Disk

R;

TYPE MASS CRAYJOB D

JOB, JN=MASSRN, US=123412345678, T=120, *MS.

ACCOUNT, AC=123412345678.

*.

DISPOSE, DN=\$OUT, DEFER, MF=IO, DC=ST, ^

TEXT='USER=JONES3, FLNM=MASS, FLTY=PROUT'.

*.

MSCHANG (NAME=/SMITH/GAMES/MONOPOLY NEWNAME=/JONES3/GAMES/MONOPOLY)

MSCHANG (NAME=/SMITH/GAMES/HEARTS NEWNAME=/JONES3/GAMES/HEARTS)

MSCHANG (NAME=/SMITH/GAMES/RISK NEWNAME=/JONES3/GAMES/RISK)

MSCHANG (NAME=/SMITH/DRINKS/HOT NEWNAME=/JONES3/DRINKS/HOT)

MSCHANG (NAME=/SMITH/DRINKS/COLD NEWNAME=/JONES3/DRINKS/COLD)

*.

EXIT.

\EOF

R;

If you have questions or problems regarding the MASS EXEC, please contact the SCD Consulting Office at (303) 497-1278 or send electronic mail TO CONSULT1 on the IBM 4381 (IO) computer (be sure to include your full name and telephone number).

Lynne Andrade is a consultant in the User Services Section of SCD.

Hints from SCD Consultants

by Barbara Horner-Miller

Tips for IBM 4381 (IO) Computer Users

Correction: Last month's column (page 21) incorrectly described the command

```
TERMINAL DELCHAR |
```

The actual command is

```
TERMINAL CHARDEL |
```

Our apologies for any inconveniences caused by the error.

Performing Operations on Multiple IBM Files

Do you need to perform the same command on a large number of IBM files? One easy way you can accomplish this is by using the EXEC option of the LISTFILE command. This option creates a CMS EXEC on your A-disk with one record for each file that satisfies the LISTFILE specification. Assume that you have lots of files on your A-disk with the filetype of TEMP and that you want to erase many, but not all, of them.

Issue the command

```
LISTFILE * TEMP A (EXEC
```

This command creates a CMS EXEC file on your A-disk that contains records with the following format:

```
&1 &2 file1 TEMP A  
&1 &2 file2 TEMP A  
: : : : :  
&1 &2 fileN TEMP A
```

You can edit this file to remove file names that you do NOT want to erase. Then execute the ERASE command using the file by entering:

```
CMS ERASE
```

ERASE is just one of the commands you can specify for the file. You can execute any CMS command of one or two words in a similar manner: for example, enter CMS DISK DUMP to write copies of files onto a previously mounted tape; enter CMS TYPE to display the contents of each file on the terminal screen; and enter CMS PRINT to print all of the files listed. The files do not print with carriage control unless you further modify those lines by adding "(cc" to the appropriate lines.

Please do not use the PRINT command unless you first spool the files to the printer to prevent printing a header and trailer page for each file. Use the SPOOL command as shown below to begin and end print spooling. To begin spooling, enter:

SPOOL PRT CONT

To end spooling, enter

SPOOL PRT NOCONT

This sequence specifies that while spooling is enabled, each file is to begin at the top of a page, but only one header and one trailer sheet is to be produced for the entire set of printed files.

Barbara Horner-Miller leads the SCD Consulting Group in the User Services Section of SCD.

SCD Advisory Panel Meeting Schedule

Requests for a total of more than 50 GAUs on the NCAR CRAY computers must be considered by the SCD Advisory Panel, which will meet March 24-25, 1988. University users should submit these large requests to John Adams of the Scientific Computing Division by January 13, 1988. Nine to ten weeks are needed for the preliminary review of requests and for the preparation, printing and distribution of Panel materials. Please note that requests for 50 GAUs or less can be processed at any time.

Minutes of the SCD Users Group Meeting

October 26, 1987

Chairman Ray Bovet (HAO) called the meeting to order. The representatives made the following corrections to the previous meeting minutes: in the sixth paragraph on page 26, "Foreground 1" should read "Foreground 2."

There was one correction made to the list of SCD Users Group Members: under the ADMIN section, the extension for Dennis Hunter is 8882. Dennis Hunter was also introduced as the new head of ADMIN Computing.

Bovet asked that anyone who has a conflict with the 1988 SCDUG Meeting Schedule please contact him.

Report from SCD — Pete Peterson

SCD Administrator Pete Peterson presented the report for SCD. On October 1-2, the SCD Advisory Panel met for the first time since Bill Buzbee became Director of SCD. Buzbee presented an in-depth report on current activities and future plans for SCD. Based on this presentation, the panel members took special interest in a number of topics and asked that SCD present a progress report on these items at the next meeting. These items included plans for graphics and plans for providing 9600 bit-per-second (bps) service to remote users via Watts lines.

Panel members also asked SCD to evaluate the possibility of developing on-line documentation and expressed interest in recent performance measurements made on the CRAY X-MP computer. The panel urged SCD to continue examining system performance so that additional information could be presented at the next meeting, and also wanted a report on the migration to UNIX. The members recognize the need to make the transition to UNIX, but they wish to ensure that the migration be accomplished in the least disruptive way possible.

In addition, the panel asked SCD to report on plans for justifying the next generation computer and discussed the implementation of the Large Model (LM) classes. However, the members felt they did not have enough information to make any comment on these classes. Therefore, they requested the SCD Systems Section to provide additional information to a subcommittee established by the Panel to review the present implementation.

A purchase order has been issued to purchase a color DICOMED graphics system and a purchase order for the color processor is being prepared. SCD is developing plans for setting up multiplexed T1 (1.544 million bps) communications service from the Mesa Laboratory to the NCAR sites at 30th St. and Jeffco and 56 kbps service to Marshall. Finally, the TBM has now been physically removed from the NCAR machine room.

Questions

Paul Bailey (ACD) — When do you think it would be appropriate to present the path-to-UNIX plan to the SCD Users Group?

Peterson — This could be an agenda item for the next meeting.

Bovet — I think this group would be very interested in hearing about those plans.

Report from the Computer Output Committee — Ray Bovet

Committee Members are: Paul Bailey (ACD); Ray Bovet (HAO); Joe Klemp (MMM); and Steve Chapel, Fred Clare, Darrell Holley, B. Lynn Irwin, Robert Lackman and Andy Robertson (SCD).

Bovet summarized the draft of the Phase I report. The committee is charged with making specific recommendations to relieve the immediate backlogs on graphics devices and is also charged with looking into what new hardware and software should be acquired to provide new capabilities. So far, the committee has made much progress in working on relieving the backlogs on the graphics devices.

The committee came up with a number of immediate recommendations. The first calls for an immediate upgrade to the DICOMED controller. A DEC PDP 11/84 minicomputer was selected to provide more processor power. This will permit downtimes for testing a new translator system on a new controller without causing large backlogs. No software changes are required to transport the current translator and the 11/84 will improve throughput immediately. SCD has already ordered this equipment.

The second recommendation calls for a permanent solution to the above problem: a new controller computer to drive three DICOMED processors, possibly a MicroVAX 3 or a Sun 4. This change will require substantial changes in software, some of which must be made anyway. The old style Metacode translator will change to one that supports a subset of the CGM facilities.

Color support is recommended. SCD has put out a purchase order for a color DICOMED. After examining what was commercially available, it was concluded that color film capability is highly desirable and long overdue. Buzbee has been very supportive of this effort. There were a couple of other alternatives, but none were better than a DICOMED, so the committee decided to stay with something familiar and proven. There are some problems with providing color; for example, creating filled areas with labels or overlaying graphs. These are not easy problems to solve; the two solutions available use up large amounts of computer time and memory. Another problem with color is that raster images can require as much as 64 megabytes of data per frame and making a movie with them is essentially impossible. A considerably lower resolution of 1000 x 1000 elements is satisfactory for most raster images. SCD worked closely with Dicomed and did tests that indicated that very good results are obtainable by only exposing every eighth element horizontally and vertically. Other tests included defocusing the spot and using fewer spots.

Much software needs to be developed for the color DICOMED. Since this will take some time, the 11/84 appears to be a good investment for use as an interim machine. A new CGM translator running at a suitable speed is also needed. The non-optimized SCD CGM translator is dramatically slower than the highly-optimized, finely-tuned translator that is running on the current controller. SCD is looking at a translator from the University of Pittsburgh. The committee has also identified a need for additional capability in the NCAR translator to support things like color fill on devices that don't have hardware instructions to perform such operations (such as the DICOMED processors).

The committee also recommended that SCD thoroughly consider the possibility of converting one of the present black-and-white film recorders to fiche. Historical data suggests more fiche and less film is being used. From a cost perspective, fiche is much cheaper than film even when only one page is printed; one plot on film generates 73 frames for the header, trailer, titles, and so on. For high quality, either laser printer plots or color film are an alternative. As for the availability of film reader/printers versus fiche reader/printers, the fiche reader/printers are becoming increasingly cheaper and there are conversion kits for the film reader/printers. It was suggested that the color DICOMED first be installed and put into operation before evaluating this conversion.

Regarding the Xerox laser printers, there was some concern when the friendly user group started using them for graphics because it slowed response on the Mass Storage System (MSS). The MSS and the Xerox printers are both driven by the IBM 4381 Mass Storage Control Processor (MSCP). However, the MSCP has been upgraded and hopefully it now has the power to handle both tasks. It has become quite clear that rasterizing graphics for the Xerox laser printers is a computationally-intensive process; SCD may have to find some other long-term solution for the problem. There are some alternatives, such as a rasterizer hardware box. Unfortunately, the details of the rasterization process are tied into how the Xerox software works, and since Xerox is constantly changing that software, a hardware solution might be vulnerable.

The last recommendation is to encourage user efficiency. Educating users about alternatives, such as the ability to preview frames before actually printing them, could significantly improve efficiency.

The committee hopes to finish the Phase I report in the very near future. The next step is Phase II, which involves taking a much broader look at graphics at NCAR and making specific recommendations about hardware and software acquisitions. The committee would like to

hear opinions from a broad representation of people on the following topics: graphics preview capability, more workstation utilities, presentation graphics, graphics editors, animation facilities, videotape, high-speed communications to move graphics data around more easily, software acquisition and support, and high-quality typesetting capabilities. A typesetter can be obtained for about \$30,000. It costs about \$1 per page and takes about a minute a page, but for high-quality, camera-ready figures for journals, it is a reasonable investment. It also uses PostScript so there wouldn't be much software development involved.

Questions

Bob Nicol (SCD) — Justin Kitsutaka's Graphics group in ADMIN is actively looking into purchasing a typesetter with a PostScript interface.

Bovet — This poses the problem of how to make sure it is used appropriately; I would be unhappy if only the graphics group could use it.

Marc Nelson (SCD) — Is anyone going to interface Troff to such a thing?

Bovet — Yes. We have purchased software called "Transcript" that should be arriving soon. It is from Adobe Systems and converts Troff to PostScript; SCD, ACD and HAO are splitting the cost of this software. It should work for both the old and new Troff.

Carl Mohr (MMM) — How about converting TEX to PostScript?

Bovet — That comes with the UNIX standard distribution, and I would be surprised if the VMS one doesn't have it.

Woods — Regarding the purchase of a Sun 4 or a MicroVAX, is that decision going to be made before you make your recommendation or are you going to leave that up to Buzbee?

Bovet — It is unlikely that we will have a sole source on something like this, so we have concentrated on putting together some of the points that we think will form the basis for an RFP and will let a selection committee take it from there. The trade-offs between those two particular machines are that the Sun 4 is faster, they are both relatively similar in price, and the MicroVAX would allow you to run VMS, which has a more powerful queueing system.

Suggestions and Problems

Nelson — The Mass Storage System (MSS) Committee met for the first time this month and we have a tentative agenda of things to discuss. If you want to include something in the list, either see your division representative or me. The next meeting is on November 3rd at 13:30 in the Chapman Room. My management's attitude toward committee suggestions has been very positive.

Bovet — It would be really nice if there were some way of finding out a current up-to-date status of the computers.

O'Lear — SCD has already procured a gridded color monitor that will have a chart that shows which machine is up. Gene Schumacher and Marc Nelson are looking into some ways to report that information back to users. Staff at Lawrence Livermore National Labs have built a

special monitor for systems work and we have ordered it. The color monitor will give the operators more immediate information about different problems. I assume users will be notified when the system will be down for extended maintenance.

Holley — Ray, how hard is it for people on your system to use OPCOM to find out if their network is up?

Bovet — It is easy to use OPCOM, but when OPCOM says the machine is logged off, it isn't known if it is because the network software has failed on our end or your end or if the X-MP is down for testing. It seems SCD could buy something like DECTalk where, if it notices no messages in 10 minutes, it says this machine is down. I would suggest connecting it to a phone line accessible both from within NCAR and for remote users.

Future Agenda

Marc Nelson offered to give a talk on the MSS Advisory Group's meeting results.

Pete Peterson suggested a talk about the path to UNIX be given in the future.

Bernie O'Lear suggested a talk be given on the Exabyte cartridge and the types of media that researchers might want to be using. He suggested that a survey of users needs be made on collecting data either with their PCs or with VM programs in order to develop some sort of standard at NCAR. Ray offered to give a talk on HAO's plans for media used for data interchange.

Computer Resources Allocated in October 1987

SCIENTIST	PROJECT TITLE	GAU	
		Request	Alloc.
Stephen C. Riser (OCE) University of Washington	Lagrangian studies of quasigeostrophic ocean circulation	20.0	20.0
William M. Gray Colorado State University	Tropical cyclone FGGE, and MONEX research activities	10.0	10.0
John E. Walsh University of Illinois	Sea ice sensitivities of CFM forecasts	15.0	15.0
Paola M. Rizzoli (OCE) Massachusetts Institute of Technology	Modeling of the Eastern Mediterranean general circulation under different driving forces	20.0	20.0
David J. Erickson (OCE) Scripps Institution of Oceanography	Air-sea exchange of gases and particles	50.0	50.0
Michael A. Arthur (OCE) The University of Rhode Island	Origin of Milankovitch-like cycles	42.0	42.0
A. B. Barakat Utah State University	Effect of H ⁺ beams on the stability of polar wind	19.0	19.0
John R. Garratt Colorado State University	Mesoscale modeling of atmospheric gravity currents	17.4	17.4
Richard Wolfson Middlebury College	Current sheet formation in the solar corona	10.0	10.0

SCIENTIST	PROJECT TITLE	GAU	
		Request	Alloc.
* Robert G. Gallimore David D. Houghton University of Wisconsin at Madison	Variability in an interactive ocean-atmosphere climate system	194.0	194.0
* V. N. Bringi Colorado State University	Study of microburst and non-microburst thunderstorms	100.0	100.0
* Richard Grotjahn University of California at Davis	Surface processes effects upon frontal cyclones	130.0	130.0
* Tsing-Chang Chen Iowa State University	Numerical study of the Indian monsoon	80.0	80.0
* John E. Kutzbach University of Wisconsin at Madison	Modeling experiments with paleoclimatic forcing (COHMAP group project)	490.0	490.0
* Albert J. Semtner, Jr. (OCE) Naval Postgraduate School	Interannual variability of the tropical Pacific Ocean	300.0	300.0
Ernest M. Agee Purdue University	Heat flux transitions in thermal convection	40.0	40.0

(OCE) These allocations were made from the 10% of SCD's computing resources earmarked for University Oceanography.

* These requests were reviewed by the Scientific Computing Division Advisory Panel on October 1-2, 1987.

Note: A request may be supported at a lower level than requested because:

- a. It exceeds the 50 GAU limit (roughly equivalent to 25 CPU hours in the Foreground 2 class) above which Panel review is required; or
- b. Reviewers consider the amount of time requested to be excessive.

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