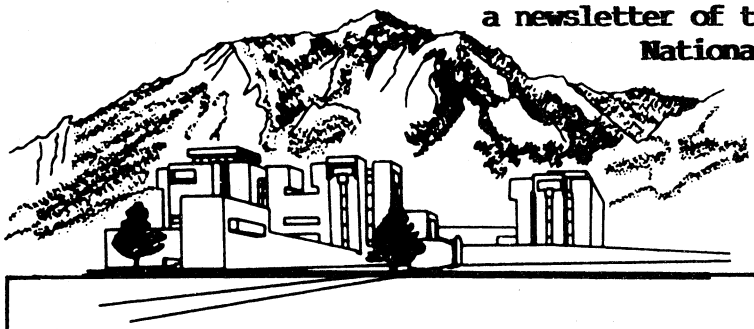
Volume 3, Number 6
June 1, 1982

The Record

a newsletter of the Scientific Computing Division,
National Center for Atmospheric Research



NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
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SEP 2 1982

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(303) 494-5151 - FTS prefix 322-5

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CONSULTING OFFICE

To leave a message when the 579 extension is busy, or to hear the the present status of the hardware, call 313. The consulting office is closed Wednesdays from 13:30 to 14:30 for consulting staff meetings.

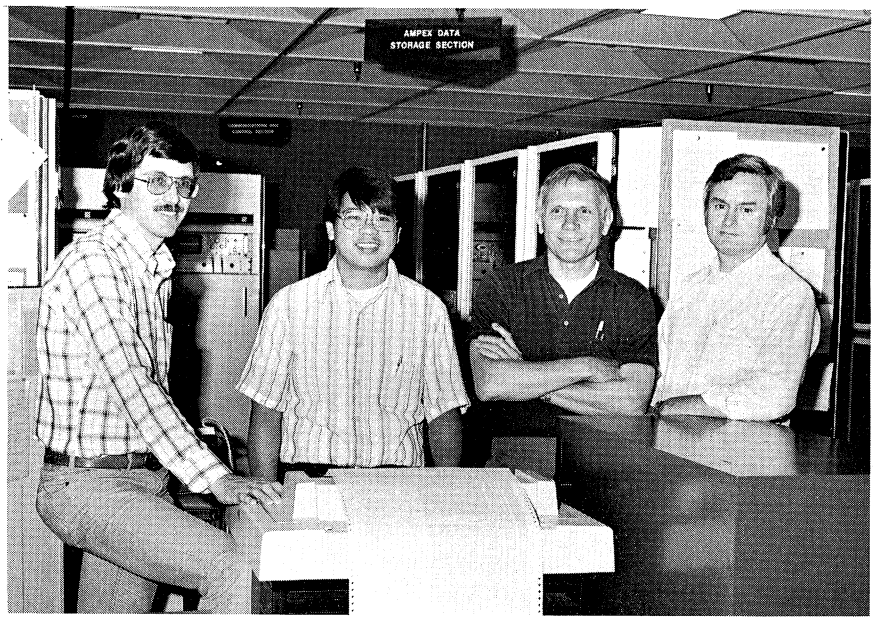
	08:30-12:30	13:00-17:00
MONDAY	Barb Horner	Dan Anderson
TUESDAY	Harsh Anand Passi	Dan Anderson
WEDNESDAY	Ken Hansen	Dave Kennison
THURSDAY	Barb Horner	Harsh Anand Passi
FRIDAY	Ken Hansen	Dave Kennison

SCHEDULE OF MACHINE UNAVAILABILITY

All machines may be down from 07:00 until 08:30 daily for Systems Checkout. In addition, some machines will be down for Preventive Maintenance as follows: 7600, 06:00-07:00 (M T W Th F); CRAY-1, 06:00-07:00 (M Th), 06:00-07:30 (T), 06:00-06:30 (F); TMS-4, 06:00-07:00 (daily); MODCOMP, 08:00-12:00 (1st Monday of month).

The Record is published monthly by the Scientific Computing Division of the National Center for Atmospheric Research. NCAR is operated by the University Corporation for Atmospheric Research and is sponsored by the National Science Foundation. Reference to a company or product name does not imply approval or recommendation of the product to the exclusion of others. David Maxey, Editor; Ann Cowley, Head, User Interfaces; Astrik Deirmendjian, Trouble/Design Reports; Sylvia Darmour, Summary of NCAR Computer Use; Mary Bartels, Computer Resources Allocated.

THE MASS STORE GROUP
Left to right--John Merrill, Joe Choy Group Head), Dave Kitts, Bill Ragin.



Mass Storage Group

(This is the third in a series of articles on the SCD Systems Department.)

Within the Large-Scale Systems section of the Systems Department is the Mass Storage Group comprised of Joe Choy (Group Head), Dave Kitts, John Merrill and Bill Ragin. The purpose of the Group is to provide mass storage for the vast amounts of model and experimental data collected by the users of the NCAR computing facility as well as for user programs.

The primary responsibility of the Group is the maintenance and functional development of the AMPEX Terabit Memory System, referred to as TMS-4. The system currently manages approximately 8 trillion bits of data and moves nearly 2.25 trillion bits a month to/from the CRAY-1 and the CDC 7600 computers. The data capacity and usage of the system continues to grow, which requires that new functions be added while others are streamlined. These modifications provide the necessary system performance in response to user needs. Utilities are developed and maintained to permit the Tape Librarian to manage the data in the TMS-4 and for users to manage their own data. The Group is also involved in user consulting and interaction with the Operations Group, the Computer Maintenance Group and with AMPEX Field Engineers and representatives.

In an effort to increase the number of data paths to the TMS-4 data storage system and thereby increase the availability of the data, the AMPEX TMS-3 system, procured from Computer Corporation of America, is being upgraded and integrated into the TMS-4 system. This AMPEX hardware will be connected and used in new configurations to provide equipment redundancy and enhanced throughput. The Group is concentrating on major software changes to bring the benefits of this hardware to the user.

by Joe Choy

Hardware Release Reminder

All users of the Scientific Computing Division are reminded that two pieces of hardware will be retired in the near future. Please note the effective dates.

July 1, 1982	The dd80 microfilm system
August 1, 1982	The 7600 card punch

Details of the dd80 retirement may be found in the April issue of The Record, and information concerning the removal of the 7600 card punch is located in the May issue.

NCAR Software Catalog Now Available

The NCAR Software Catalog (NCAR/TN-192+IA, April 1982) is now available. This is a published version of the online Software Catalog that has been available to users of NCAR computers since 1980. It contains short descriptions of over 2000 user-level library routines from 18 libraries classified by 120 software categories. Information needed to access online documentation and to use routines from each library is also included. Copies of the NCAR Software Catalog may be obtained from the SCD Consulting Library or by calling ext. 579.

A Fast Byte Manipulation Package on CRAYLIB and $NCARLB

The CRAY-1 byte manipulation package BYTES has been entirely rewritten by David Kitts of the NCAR Systems Group, and executes about 2.5 times faster than the previous version. This package contains user entries GBYTE, SBYTE, GBYTES and SBYTES, and these have the same purpose and calling sequences as their 7600 and previous CRAYLIB counterparts. The package has been tested, and resides on libraries CRAYLIB and $NCARLB.

Documentation: Available as comment cards within the package; hardcopy available from the Consulting Office (ext. 579). The following 7600 job obtains BYTES documentation:

```
*JOB,...
*EDIT,OL
FETCH 12,45,S=(CRAYLIB),SN=BYTES
FETCH 68,102,S=(CRAYLIB),SN=BYTES
FETCH 155,194,S=(CRAYLIB),SN=BYTES
FETCH 240,281,S=(CRAYLIB),SN=BYTES
*END
```

CRAY-1 Access: None, since the package resides on CRAY-1 default library $NCARLB.

Comments: Please direct questions to the Consulting Office (ext. 579).

Modification of EZMAP Software

EZMAP on CRAYLIB and $NCARLB has been modified to access CRAY-1 permanent dataset MAPDAT with ID=V110. Previously, it accessed MAPDAT with no ID. This modification affects only those users who have copied a previous version of EZMAP and are now using it rather than the library version.

Corrections in Non-Separable Elliptic PDE Solvers

Users of the CRAY-1 elliptic PDE solvers LIPTIC and CROSEL (prior to May 5, 1982) should note that these two codes could generate incorrect results when used in a marching (time dependent) problem. This could only happen if either is called with the parameter INTL non-zero and if the coefficients of the second-order partial derivatives contain time dependence. The problem has been corrected, and the changes should be transparent to users. The calling sequences have not changed. Questions can be addressed to John Adams at ext. 573.

New File Added to XLIB

A new file, called FILL, has been added to XLIB. It contains a set of routines allowing the user to fill specified areas of the plotter frame (defined by a set of vertices), with parallel lines drawn at a specified angle and a specified distance apart. The lines may be solid or dotted. If the lines are dotted, the dots may be distributed according to a user-specified dot-pattern array, and each "dot" may be just a dot or a selected single character.

A write-up of FILL may be obtained from the Consulting Office or by running the following 7600 job:

```
*JOB,...
*RUN,BS=XLIB,BN=DOCLIST,EM,FD
 FETCH P=XLIB,SN=FILL
*END
```

New Locally-Developed Commands Available on the CRAY-1

GETSRC--To Retrieve Specified Library Source Files

The GETSRC command may be used to access library source files from the CRAY-1 for the libraries CRAYLIB, ULIB, XLIB, TESTLIB, $SCILIB, $SYSLIB, LINPACK, FUNPACK, EISPACK, and AMOSLIB.

To access and list source for the file RG from EISPACK include the following command in the CRAY-1 job:

```
GETSRC,LIB=EISPACK,FILE=RG,L=$OUT,NR.
        or
GETSRC,LIB=EISPACK,FILE=RG.
(Since $OUT is the default output dataset.)
(NR - No Rewind. If this parameter is omitted, the default
      is to rewind the output dataset except when L=$OUT.)
```

To access, compile and get FORTRAN listings for the subprograms SGEFA and SGESL from LINPACK, include the following control statements in the CRAY-1 job:

```
GETSRC,LIB=LINPACK,FILE=SGEFA,L=DSNAME,NR.
GETSRC,LIB=LINPACK,FILE=SGESL,L=DSNAME.
CFT,I=DSNAME.
CFT,I=DSNAME.
```

Sources for the CRAYLIB, ULIB, XLIB, TESTLIB, $SCILIB and $SYSLIB libraries are stored in the form of Update-decks on the CRAY-1. Source Update-deck names for the libraries CRAYLIB, ULIB, XLIB and TESTLIB may not always be the same as the name of the files because Update-deck names may only be eight characters long and cannot include periods, while CDC7600 library file names may be up to ten characters long. The rules used to map file names that are longer than 8 characters on to eight characters names are:

1. A period, if included in a file name as a character, is eliminated.

2. The file name is truncated to eight characters, if necessary, by eliminating vowels from the right.

For example, for file name PLOT.8.8, source deck name is PLOT88, for file name CONRECSMTH, source deck name is CNRCSMTH, for file name PLOT.META, source deck name is PLOTMETA etc.

To access and list the source for the subprogram CONRECSMTH from CRAYLIB, include the following command in the CRAY-1 job:

```
GETSRC,LIB=CRAYLIB,FILE=CNRCSMTH,L=$OUT,NR.
```

To access, compile and get FORTRAN listings for the subprograms CONRECSMTH and CONRECQCK from ULIB include the following control statement in the CRAY JCL:

```
GETSRC,LIB=ULIB,FILE=CNRCSMTH,L=DSNAME,NR.
GETSRC,LIB=ULIB,FILE=CONRCQCK,L=DSNAME.
CFT,I=DSNAME.
CFT,I=DSNAME.
```

To access and list the source for FILTERG on SCILIB use the following command in the CRAY-1 job:

```
GETSRC,LIB=SCILIB,FILE=FILTERG,NR.
```

GETDOC--To List Documentation of Libraries and Source files

The GETDOC command may be used to list online documentation for EISPACK, NAG, FITPACK, IMSL, CRAYLIB, LINPACK, FUNPACK, MINPACK, ULIB, XLIB, TESTLIB and AMOSLIB, as well as sections of the online NCAR library catalog.

For example, to list DOCLIB files LIBHELP and CATEGORIES on the CRAY-1, include the following command in the CRAY-1 job:

```
GETDOC,LIB=DOCLIB,DOC=(LIBHELP:CATEGORIES),L=$OUT,NR.
        or
GETDOC,DOC=(LIBHELP:CATEGORIES).
(Since DOCLIB is the default library and $OUT is the default
 output dataset.)
(NR - No Rewind. If this parameter is omitted, the default
      is to rewind the output dataset except when L=$OUT.)
```

To list online documentation for FITPACK subprograms CURV1 and KURV on the CRAY-1, include the following command in the CRAY-1 job:

```
GETDOC,LIB=FITPACK,DOC=(CURV1:KURV),L=$OUT,NR.
        or
GETDOC,LIB=FITPACK,DOC=(CURV1:KURV).
(Since $OUT is the default output dataset.)
(Since L=$OUT, NR need not be specified.)
```

To copy online documentation for subprogram BESI in AMOSLIB and AMEANS in IMSL on the output dataset DSNAME, include the following commands in the CRAY-1 job:

```
GETDOC,LIB=AMOSLIB,DOC=BESI,L=DSNAME,NR.
GETDOC,LIB=IMSL,DOC=AMEANS,L=DSNAME.
```

REMOVE--To Delete Specific Version or All Existing Versions of a Permanent Dataset

The REMOVE command may be used to delete a specific version or all existing versions of a permanent dataset on the CRAY disk.

To delete all versions of the dataset DSNAME include the following command in the CRAY-1 job:

```
REMOVE,PDN=DSNAME.
```

To delete version 3 of the dataset DSNAME include the following command in the CRAY-1 job:

```
REMOVE,PDN=DSNAME,ED=3.
```

If, at the time of creation of the dataset, permission control words (ID - user identification and/or M - maintenance) were specified, then they must be specified on the command REMOVE. For example, if the dataset DSNAME has ID=V110 and M=ABC then the command:

```
REMOVE,PDN=DSNAME,ID=V110,M=ABC.
```

will delete all existing versions of the dataset DSNAME from the CRAY-1 disk.

by Harsh Anand Passi and Russ K. Rew

The IFTRAN Preprocessor

The IFTRAN preprocessor is a FORTRAN program which reads an input file containing a program written in the IFTRAN language (FORTRAN plus extensions) and writes two output files, one containing an indented, easy-to-read listing of the input file, and the other containing a FORTRAN translation of the input file.

IFTRAN was originally written by E. F. Miller of General Research Corporation. In July, 1975, John Gary, of NCAR, received an improved version of it from Martin J. Cohen, of Technology Service Corporation, and gave a copy to Tom Wright, who implemented it at NCAR, made several improvements, and was largely responsible for its popularity here. Lofton Henderson assumed responsibility for the maintenance of IFTRAN sometime in 1977, corrected several errors, and compiled a write-up. Most of that write-up is still correct for the current IFTRAN; it contains many useful examples. In 1981, Dave Kennison completely re-wrote the code, fixing errors, making it cleaner, faster, and smaller and adding many new features. One feature, the ability to "trace" string

replacements as they were done, was removed; it was principally of interest to the person maintaining IFTRAN. The new version was recently made the standard version on the 7600, the CRAY-1, and the 4341. Work with IFTRAN is continuing and suggestions are solicited.

The IFTRAN language is easier to write and to read than basic FORTRAN. The code to solve a given problem can be expressed in a way more closely resembling the logical description of the solution. Some of the annoying bookkeeping details of FORTRAN can be avoided. Various features allow one to parameterize one's code and to express variant versions of the code in the same master deck, thus simplifying maintenance. The time required to check out an IFTRAN program is normally considerably less than that required by an equivalent FORTRAN program.

Because the IFTRAN preprocessor is highly portable, code written in the IFTRAN language is also highly portable.

In the following paragraphs are outlined the many useful capabilities of IFTRAN.

String Replacement

The ability to specify string replacements makes it possible to define "pre-compile-time variables" and to parameterize one's code. For example, the basic dimensions of a model can be declared once and for all by a few string replacements at the beginning of the input file.

Arithmetic Evaluation

Expressions involving "pre-compile-time variables" to be evaluated by IFTRAN may be used.

Conditional Compilation

Two types of conditional compilation are provided. First, input lines with a particular alphabetic character in column 1 may be "activated" (character replaced by a blank), "deactivated" (character replaced by a C), or "eliminated" (entire line ignored); the state of any alphabetic character may easily be changed. Second, a construct is provided to allow blocks of code to be included or excluded based on the value of relational expressions which are evaluated at pre-compile time.

Code-Block Definition

Blocks of code may be defined and saved for later insertion at selected points in the subsequent code. For example, a COMMON block can be defined in one place and then used as necessary. This has the advantage that a change in the definition need only be made in one place.

FORTRAN Language Extensions

Various "structured programming" constructs are provided: DO/ENDDO, FOR/ENDFOR, IF/ORIF/ELSE/ENDIF, LOOP/ENDLOOP, REPEAT/UNTIL, WHILE/ENDWHILE,

BLOCK/ENDBLOCK/INVOKE.

Free-form Input

"Tab" and "continuation" characters may be defined, allowing the use of somewhat more free-form input than that required by the rigid FORTRAN conventions.

Extended Comments

An extended-comment character may be defined, allowing comments to be placed at the end of FORTRAN statements.

Alternate Input Units

Input may be included from alternate input units.

Print Output Controls

Various controls allow one to modify the appearance of the print output file.

FORTRAN Output Controls

Various controls allow one to modify the appearance of the FORTRAN output file.

Treatment of Unknown Commands

Unknown commands may be treated as errors or as comments.

Complete documentation of IFTRAN is available in the Consulting Library. Call ext. 579 if you wish a copy mailed to you.

by Dave Kennison

Listing of Inactive Project Numbers

As of May 10, 1982 the following project numbers are inactive, or out of CRUs. On June 25, 1982 the connection between the project number and the associated P04XXX VSN will be terminated. After that time files may be accessed by:

```
*VOLUME,3,VSN=P04XXX,STAGEIN=MA
   (Use this volume card if you wish to access the volume from the MSD)
*VOLUME,3,VSN=P04XXX,TAPE=16,9,R,STAGEIN=RT,DS=600,CONV=TB
   (or, use this volume card if you wish to access your physical tape)
*FORTRAN,S=3,SN=FILENAME,FL
```

1	05013404	P05112	ROTHERMEL
2	13013043	P04984	COFFEY
3	14013005	P04508	ROBL/PARK
4	14013013	P04982	IZUR
5	15010000	P04397	CRUTZEN
6	15012001	P04396	SOLOMON
7	15012003	P04667	GIDEL
8	15013003	P04902	CICERONE
9	29150055	P04941	ROBERTS
10	31232143	P04893	CARNEVALE
11	33113000	P05097	WADE
12	35081049	P04617	VONDERHAAR
13	35089022	P05109	VONDAR HAA
14	35141013	P04832	SOONG
15	35191006	P04675	NGHIEM-PHU
16	35201034	P04881	K ZAHNLE
17	35251008	P04839	MOLINARI
18	35341006	P04758	KLAASSEN
19	35351007	P04565	PAEGLE-J
20	36011005	P04967	CANFIELD
21	36121010	P04784	JACOBS
22	36461000	P04947	LUTHER

Zot - The Next VSN Purge from the TMS-4

The next regular quarterly purge of VSNs from the TMS-4 will occur on July 10, 1982 (a week later than usual because of the holiday), and will affect VSNs not accessed since April 4, 1982.

Purges affecting VSNs not accessed during a calendar quarter take place regularly at or near the beginning of the following calendar quarter.

Users are responsible for accessing wanted VSNs during the current quarter, to prevent them from being purged. As usual, VSNs on Dedicated or Archival reels and PLIB (P04xxx or P05xxx) VSNs will not be purged.

For information on:

1. How to save needed VSNs;

2. How to use the XLIB utility program, TBMVSN, to get detailed information about your VSNs;

3. How to initiate longterm storage for archival VSNs;

Consult pages 16-18 of the February 1, 1982 issue of The Record (Volume 3, No. 2).

Meeting of the SCD Advisory Panel Scheduled

Requests from outside users for a total of more than five hours on the Control Data 7600 and on the CRAY-1 must be considered by the Advisory Panel for the Scientific Computing Division. The next meeting is scheduled for September 20, 1982. University users should submit large requests to John Adams or to Cicely Ridley of the Scientific Computing Division by July 16, 1982. Eight to nine weeks are needed for the pre-review of requests and for the preparation and printing of Panel materials.

Summary of Daily Bulletin Items

Below is a summary of some items which have appeared in the Daily Bulletin (the NEWS file for remote entry users). These items concerned systems changes, operations procedures, and other news of general interest. They may still be of interest to users and are listed below by topic and date.

CRAY-1:

May 3, 1982
The Monday morning system is COS 1.10 version 14. This version has a change to allow for checkout of the data management support package. TMBCONV has a change to allow up to 100010 files on a dataset. New faster versions of SBYTES and GBYTES are also being used by TBMCONV.

May 4, 1982
The COS 1.10 Bugfix-versions set of fixes is scheduled for installation on Monday, May 17, 1982. These fixes usually take care of problems that were found in the CRAY issued software. New features are not usually installed with Bugfix versions. A complete list of fixes affecting users is in the Consulting Office.

May 10, 1982
The following library routines have minor BUGFIX 2 changes as of this morning:

$SCILIB	CHARGES
$SYSLIB	ACCOUNT
AUDIT	ACCTDEF
JCSDEF	

7600:

April 19, 1982
The Monday morning system tape (D88) has changes for the first phase of the dd80 retirement. Output that went to the dd80 for various defaults will be transmitted to the DICOMED and produced as microfiche. There are three default cases:

1. *ASSIGN, DD80=PR
2. *TRAP
3. Page limits exceeding maximum allowable settings, 75 pages daytime and 250 pages at night.

TMS-4:

April 26, 1982
Users who are running many jobs to convert VSNs from 7600 format to CRAY-1 format and rewriting the VSNs on the Mass Store are requested to contact Mary Trembour (ext. 450), as it may be possible to expedite your runs and save TBM tape space at the same time.

May 3, 1982
The TMS-4 has a new system which has changes necessary for the hardware upgrade to be installed. This system also has other features which should improve throughput.

RJE:

May 4, 1982
INCOTERM RJE STATION: Effective Monday, May 10, 1982 the INCOTERM RJE station (located in the Keypunch Room) will be connected to the IBM 4341. A complete set of "How to Use" instructions will be posted by the INCOTERM as well as in the Consulting Office.

Summary of NCAR Computer Use for April 1982

7600 COMPUTER	APRIL Total	APRIL Average	FISCAL YTD Total	FISCAL YTD Average
Clock Hours in the Month	720.00	24.000	5088.00	24.000
less Scheduled PM	22.48	.749	146.81	.692
less Hardware Downtime	9.05	.302	86.55	.408
less Software Downtime	.13	.004	2.60	.012
less Environmental Downtime	0.00	0.000	9.13	.043
less Operations Use	19.67	.656	113.91	.537
less Other Causes	0.00	0.000	0.00	0.000
Clock Hours Up	668.67	22.289	4729.00	22.307
less Systems Checkout	9.23	.308	108.09	.510
Clock Hours Avail. to Users	659.44	21.981	4620.91	21.797
less Idle Time	136.95	4.565	818.04	3.859
Clock Hours in Use	522.49	17.42	3802.87	17.938
% Available Hours Used	79.23 %		82.30 %	

CRAY-1 COMPUTER	APRIL Total	APRIL Average	FISCAL YTD Total	FISCAL YTD Average
Clock Hours in the Month	720.00	24.000	5088.00	24.000
less Scheduled PM	18.78	.626	118.35	.558
less Hardware Downtime	.93	.031	69.26	.327
less Software Downtime	2.30	.077	16.17	.076
less Environmental Downtime	0.00	0.000	11.01	.052
less Operations Use	1.47	.049	28.42	.134
less Other Causes	0.00	0.000	0.00	0.000
Clock Hours Up	696.52	23.217	4844.79	22.853
less Systems Checkout	3.95	.132	57.82	.273
Clock Hours Avail. to Users	692.57	23.086	4786.97	22.580
less Idle Time	1.01	.034	94.53	.446
Clock Hours in Use	691.56	23.052	4692.44	22.134
% Available Hours Used	99.85 %		98.03 %	

Computer Resources Allocated in April 1982

SCIENTIST	PROJECT TITLE	CCU		KCRU	
		Request	Alloc.	Request	Alloc.
J. M. Wallace Univ. of Wash.	General circulation studies	0.0	0.0	2.0	2.0
Robert Schlesinger Univ. of Wisc.	Weather prediction with mesoscale satellite data	2.8	2.8	0.0	0.0
Julius London Univ. of Colo.	Observed and theoretical variations of atmospheric ozone	0.0	0.0	6.0	6.0
Kuo-Nan Liou Univ. of Utah	Radiative equilibrium in cirrus cloudy atmospheres	0.0	0.0	7.5	7.5
Henry Selkirk M.I.T.	Teleconnections in FGGE analysis	0.0	0.0	20.0	20.0
Petr Chylek SUNY	Light scattering by nonspherical particles	0.0	0.0	5.0	5.0
Clifford F. Mass Univ. of Wash.	Mesoscale modeling in regions of complex terrain	4.5	4.0	0.0	4.5
S. T. Wu Univ. of Alabama	Solar atmosphere dynamics	0.5	0.5	0.0	0.0
John Molinari SUNY	Numerical prediction of hurricane landfall	4.5	4.5	2.25	2.25
Hans Pruppacher UCLA	Scavenging of gaseous and particulate air pollution by clouds and precipitation	5.0	5.0	0.0	0.0
Lance F. Bosart SUNYA	Prognostic studies of middle latitude tropical systems	3.0	3.0	0.0	0.0

Note: Resources requested and granted may differ for several reasons.

1. During the processing of a request for computer time, the applicant may decide to switch from one machine to the other.

2. The applicant may not have requested the resources on the Control Data 7600 necessary for access to the CRAY-1.

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

   a. It exceeds the five-hour limit above which Panel review is required; or

   b. Reviewers consider the amount of time requested to be excessive.

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The Record

Issued by the
National Center for Atmospheric Research
Scientific Computing Division
P.O. Box 3000
Boulder, Colorado 80307

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