European Centre
for Medium Range Weather Forecasts

COMPUTER NEWSLETTER

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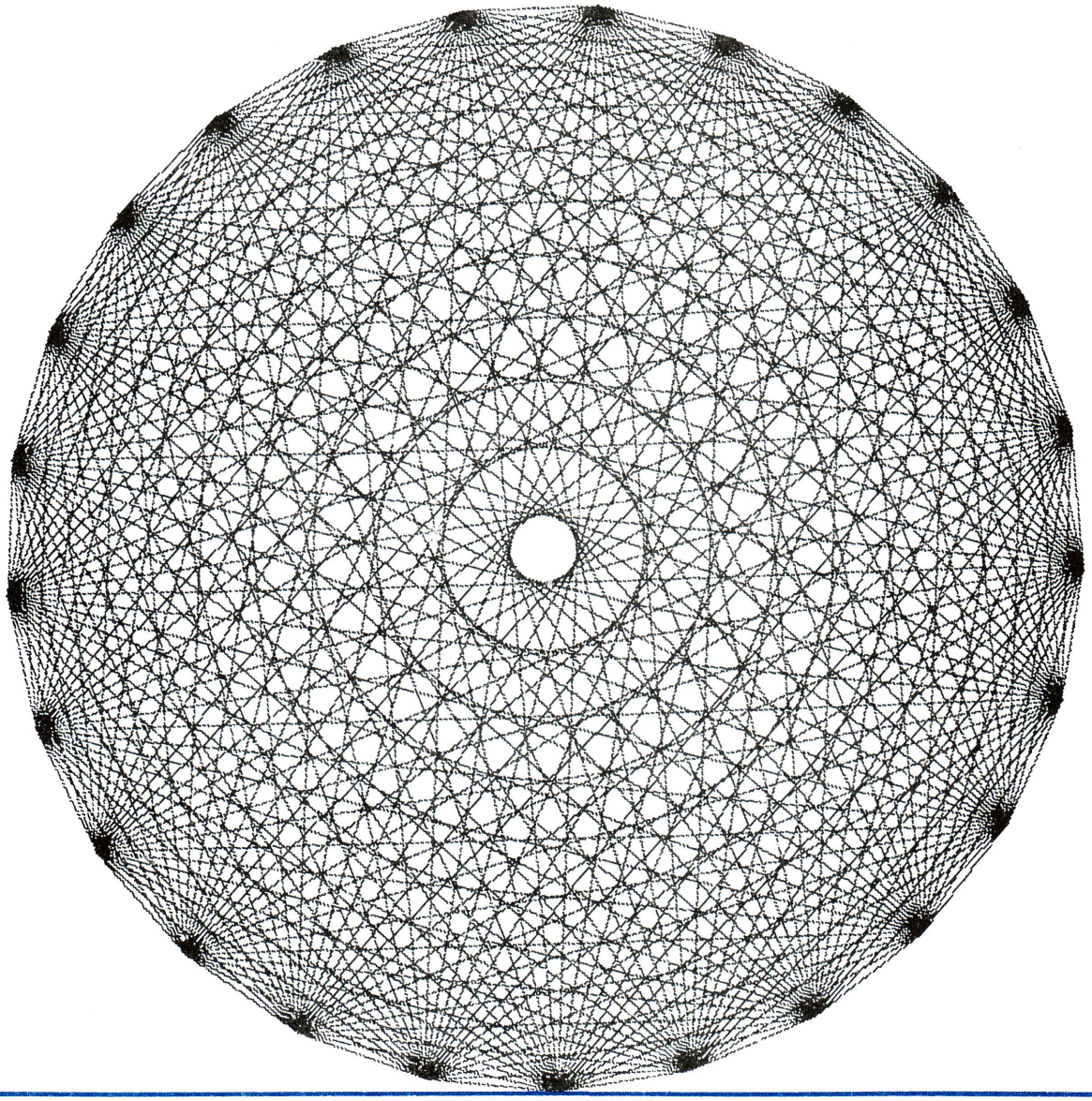

COMPUTER SERVICE AT RUTHERFORD

The time schedule for the start of the Rutherford operations is rather clear for the CRAY-1 and somewhat vague for the CYBER 175.

The CRAY-1 is expected to arrive in the UK on 24 October, and the Cray staff expect to be ready for the acceptance test by 7 November. The week's delay is due to some necessary extra checkout in Chippewa, but also to the fact that the compressor which was shipped early October has been seriously damaged during transport at Heathrow. The CRAY-1 passed a dry run of the acceptance test in Chippewa on 8 October 1977.

The delivery of the CYBER is still planned for January, but dependent on the final approval of the contract by Finance Committee or Council.

Facilities at Rutherford

Although the arrangements have not been finalised, we can expect to have some facilities next to the computer room for our permanent staff, Cray and CDC engineers, analysts and for some visitors. A disadvantage is that the only access to these facilities seems to be through the computer room! The computer room is about 150 sq. m., which is just enough for all the equipment which has to be installed and the additional facilities are about 250 sq.m.

Access to CYBER and CRAY

Funds permitting, it is planned to arrange access to CYBER and CRAY at Rutherford via terminals in the various offices in Bracknell. With these terminals and the spooling system described further on, the need to travel to Rutherford to use the system will be reduced considerably.

When both the CYBER and CRAY are installed at Rutherford, we hope to have two remote job entry (RJE) terminals operating, one in Fitzwilliam House and one in John Scott House, both at double the speed of the present one in Fitzwilliam House. Both terminals will be connected to the CYBER and can be used to submit jobs to the CYBER or via the CYBER to the CRAY.

In addition to the RJE terminals we hope to have some interactive display terminals in all three offices in Bracknell, which can be used to develop programs using the Editor, to submit jobs to the CYBER or to CRAY via the CYBER, and to receive output.

The number of terminals is dependent on the financial situation, but the plan is to have two or three in John Scott House and Fitzwilliam House in addition to the RJE terminal and six in Brandon House where no RJE terminal will be installed.

Spooling System

Presently, a system is being developed which will enable users to submit jobs to CRAY via the CYBER. The idea is that by placing a CYBER jobcard with a special parameter in front of a CRAY-1 card deck, the job will remain in the CYBER input queue. Every 25 - 30 minutes the queue will be scanned and jobs waiting for CRAY will be dumped to tape. These jobs then can be transferred to the CRAY by reading the tape on the Eclipse (the CRAY operator station). Output will be handled similarly, the CRAY output will be dumped to tape on the Eclipse, then transferred to the CYBER and shipped back to the originator.

The spooling system will also allow permanent files to be transmitted between CYBER and CRAY, at the request of the user. The transfer of permanent files will be restricted to coded files and the size will be limited. These coded files may then be translated to binary on the destination system.

This method of jobfile transfer has several advantages:

- it enables the Bracknell staff to submit jobs to CRAY easily via remote job entry or display/keyboard terminals;
- it helps to ease the discomfort and space restriction at Rutherford by minimising the need to travel to Rutherford;
- it provides a better operational environment at Rutherford.

However, it is realised that there will be occasional times during development, when the lack of CRAY diagnostic facilities will necessitate "hands-on" debugging. Special periods will be set aside for this "hands-on" debugging at the same time as other work is processed.

.../cont.

Prior to the installation of the CYBER at Rutherford, this spooling system can be used for job spooling via the 6600, but the response time will be dependent on the transport arrangements, of course the transport facilities could also be used for transfer of card decks. During this initial period the number of people at Rutherford has to be limitied because of the reconstruction activities which have to be finished and the CYBER will be installed during that period.

Service Schedule

During the initial period, we will have to face many problems. We will have to operate the CDC 6600 in Bracknell, and the CRAY at Rutherford. The Rutherford site will probably not have been finished completely yet. CDC will arrive at Rutherford to install the CYBER and last but not least, there will be little experience of how to use, operate and debug the CRAY.

Therefore, the number of people using the CRAY on-site has to be limited and most users have to be patient and either not user the CRAY, use the spooling system on 6600/175 or use the dedicated sessions for specific projects.
The three types of services are:

- dedicated sessions, especially in the first months a few days will be set aside for this service. The sessions are only for specific projects which will have absolute priority during that session. The projects using these dedicated sessions have to be approved beforehand and the sessions have to be booked at least one day in advance. During the session, the system will be operated by the operators and not by the analysts. The sessions will gradually be phased out early in 1978 in favour of an improved batch service.
- batch service - the main use of the batch service will be via the spooling system on 6600/175. For reasons explained above, it is not recommended to travel to Rutherford. In the first months the best solution may be for one staff member to travel to Rutherford to run and debug programs for several colleagues.
- hands-on sessions - these sessions are mainly intended for system staff to maintain and debug the system.

Some Guidelines for use of the CRAY

Given the immature state of the CRAY software and the limited experience with the system, there will be many problems and user assistance is going to be a major problem. Therefore it is recommended:

- to use the CRAY only if it is essential for the project;
- to use only basic simple CRAY facilities;
- to develop and compile jobs on the 6600 or CYBER prior to attempts on the CRAY;
- not to use the CFT vectorisation option until the job is proved to compile and execute correctly.

It should be remembered that the CRAY is only about 10 times the speed of the CYBER. After taking into account the difficulties of developing jobs on the CRAY, there will be many cases initially where the problem will be solved more quickly on the CYBER!

For jobs longer than, say, 30 minutes, it is recommended to follow the same practice as on the 6600 for long jobs by creating an initial deck and a restart deck, so that jobs can be restarted after interruptions without user interruption.

November / December 1977

During November and December, we will operate a 2 shift service on both the CRAY and the 6600. As previously done, the 6600 can run at night unattended. I do not expect it will be possible to use the CRAY this way initially. At the time the 6600 will be replaced by the CYBER 175, the CRAY/CYBER at Rutherford will be operated on a three shift basis. Special arrangements will have to be made for the weekends, if necessary.

.../cont.

More operators will be recruited early next year, and after a training period it will be possible to arrange a regular weekend cover.

The following schedules only cover the weekdays and it is assumed that the 6600 will be replaced by the CYBER 175 on 1 January 1978.

November / December CRAY

0730 - 0930	preventative maintenance
0930 - 1500	batch service
1500 - 1830	dedicated session
1830 - 2000	hands-on session
2000 - 2100	housekeeping (dump files, etc)

It may be possible to operate the CRAY until 2200 or 2300 hrs. by operators who live near Rutherford.

January onwards CRAY		CYBER
0730 - 0930	preventative maintenance	p.m.
0930 - 1730	batch service	service
1730 - 1900	hands-on session	
1900 - 2000	housekeeping	
2000 - 0700	batch service	service

Irregularly, hands-on sessions have to be scheduled for the CYBER.

From April to July it is estimated that 4 hours per day dedicated time will be required on CRAY and CYBER for link development and check-out.

Transport

Some time ago, it was decided that the Centre would arrange transport facilities and that own transport arrangements will only be reimbursed after mission orders have been approved. Provisional transport schedules are as follows:

November / December

from Bracknell	arr. Rutherford	
0830	0930	day shift in, users in
1200	1300	work and/or users
1400	1500	evening shift in, session users
1730	1830	work, hands-on session users
2000	2100	pick-up evening shift

from Rutherford	arr. Bracknell	
0930	1030	return
1300	1400	users, work return
1530	1630	users, day shift, work return
1830	1930	session users return
2100	2200	evening shift, hands-on session users, return

January onwards

from Bracknell	arr. Rutherford	
0630	0730	pick-up night shift
0830	0930	day shift in
1200	1300	users in
1600	1700	evening shift, hands-on session users,in
2230	2330	night shift in

from Rutherford	arr. Bracknell	
0730	0830	night shift return
0930	1030	return
1300	1400	return users
1700	1800	day shift, users return
2330	0030	evening shift, hands-on users, return

Detailed Arrangements

During the first week of November, more detailed arrangements will be announced.

-- Rob Brinkhuysen

INTRODUCTORY TALKS ON WEATHER FORECASTING

In order to inform those staff members of the Centre with non-meteorological backgrounds about the scientific work and and problems of the Centre, the Research Department will organise a series of introductory lectures on weather forecasting.

The following lecture will be given in The Lecture Theatre, Berkshire College of Further Education:

Thursday, 10th November at 15.30hrs.	"Forecasting the weather by computers" Introductory talk by L. Bengtsson.

Subsequent lectures will be held in the Conference Room at Fitzwilliam House as follows:

Tuesday, 22 November at 16.00hrs.	"The equation of motion for the atmosphere" A. Hollingsworth
Tuesday, 29 November at 16.00hrs.	"The global observing system and the analysis of meteorological data" G. Larsen
Tuesday, 6 December at 16.00hrs.	"The design and programming structure of the forecasting model" D. Burridge

The first and third talk can mainly be followed without any deep background in mathematics. The second talk would require elementary knowledge of calculus and matrices and the fourth, system and programming knowledge.

-- L. Bengtsson

STATUS REPORT ON CRAY SOFTWARE

Minneapolis, 4 October 1977.

UPDATE is in operation and in regular use at NCAR.
CFT: PARAMETER statements in a simple form (no expressions) may be used. ENCODE/DECODE is NOT yet available (contrary to Newsletter 2), 64 bit integer arithmetic is currently being implemented and will be used by default for all integers except those involved in DO LOOP control. Multiply and divide of integers will be expensive. Plans are to allow a SHORT INTEGER declaration for use where this expense cannot be tolerated. Short integer computation would be done in the address functional units.

Although there is as yet no Fortran random I/O capability, system macros have been written to allow files to be accessed randomly, effectively at the record level. These macros are now being incorporated into a package with user interface similar to the 'Frank Stephens' package on the CDC 6600.

-- David Dent

AN EVENT IN THE COURSE OF A TYPICAL WORKING DAY!

In the early hours of the 3rd October, a Boeing 747 flew over Heathrow on schedule from New York, carrying cargo. Amongst this cargo was the long-awaited and very precious Condensing Unit for the CRAY-1 computer which weighs about one and a half tons. To the surprise of those who had meticulously arranged the careful handling of this unit, the freight agency, understanding that we were in a hurry to take delivery, devised a speedy method of unloading the said precious article. This method was devised to refresh the expertise of those members of the 747's crew who had been on active service. It was decided to have a bomb aiming practice on the unloading bay, using our Condensing Unit for the bomb! - Appropriate as the unit was charged with a gas. The mission was a success and the bomb arrive dead on target, all 1½ tons of it. Alas the pains of this mission were too much for the poor Condensing Unit which burst at the seams and transformed itself into a tangle of twisted metal.

The enemy on the ground were taken by surprise as the gas leaked and evaporated. The next move was for the ground staff to manoeuvre the tangled mess into a hanger where it was left to exhaust its gases, the hanger was then evacuated. Alas, there happened to be a 747 wishing to start its engines but this was not a good idea due to the presence of the gas. At this stage it became clear that the mission had not been such a success after all.

However, the story has a good ending as 3 whole weeks later, another Condensing Unit arrived safely together with the interim CRAY-1 system which was transferred to the Rutherford Laboratory without a single hitch - unbelievable!

-- Eric Walton

CDC 6600 PERFORMANCE STATISTICS

Week ending	11/9	18/9	25/9	2/10	9/10
Jobs central site	854	1127	1230	828	510
Jobs remote	180	179	246	166	176
Plots	108	97	124	70	65
CP hours	89	113	57	77	43
MTBF (hours)	34	56	84	34	24
Scheduled availability	99.3	97.9	96.5	94.5	88.3
Overall availability	93.9	92.4	92.4	88.2	82.0

-- Eric Walton
