

# **CSAR Service**

## **Consolidated Management Report**

### **4<sup>th</sup> Quarter & Year End 2000**

#### **Management Summary**

The system continues to be the flagship HPC facility for UK Academia and Industry, enabling World-Class research and development.

The number of users has grown to a total of 492 to date.

The Cray T3E (Turing) system continued to run almost to full capacity again this quarter.

The first Intel IA64 prototype system has been installed and is being proved with single processor code optimisation work being carried out.

New Guest Systems are now available. There is a Compaq cluster in the Manchester University Data and a NEC SX4 based in CSC's Maidstone Data Centre.

CfS remains active in the UK Grid Forum.

## Introduction

This Management Report includes a section for each of the main service functions:

1. Service Quality
2. HPC Services
3. Science Applications Support Services
4. Training & Education Services
5. User Registration & New User Services
6. Value-Added Services

Each section includes a status report for the period, including notable achievements and problems, also noteworthy items for the next period.

### 1. Service Quality

This section covers overall Customer Performance Assessment Ratings (CPARS), HPC System availability and usage, Service Quality Tokens and other information concerning issues, progress and plans for the CSAR Service.

#### 1.1 CPARS

Table 1 gives the measure by which the quality of the CSAR Service is judged. It identifies the metrics and performance targets, with colour coding so that different levels of achievement against targets can be readily identified. Unsatisfactory actual performance will trigger corrective action.

#### CSAR Service - Service Quality Report - Performance Targets

Service Quality Measure	Performance Targets					
	White	Blue	Green	Yellow	Orange	Red
<b>HPC Services Availability</b>						
Availability in Core Time (% of time)	> 99.9%	> 99.5%	> 99.2%	> 98.5%	> 95%	95% or less
Availability out of Core Time (% of time)	> 99.8%	> 99.5%	> 99.2%	> 98.5%	> 95%	95% or less
Number of Failures in month	0	1	2 to 3	4	5	> 5
Mean Time between failures in 52 week rolling period (hours)	>750	>500	>300	>200	>150	otherwise
<b>Fujitsu Service Availability</b>						
Availability in Core Time (% of time)	> 99.9%	> 99.5%	> 99.2%	> 98.5%	> 95%	95% or less
Availability out of Core Time (% of time)	> 99.8%	> 99.5%	> 99.2%	> 98.5%	> 95%	95% or less
<b>Help Desk</b>						
Non In-depth Queries - Max Time to resolve 50% of all queries	< 1/4	< 1/2	< 1	< 2	< 4	4 or more
Non In-depth Queries - Max Time to resolve 95% of all queries	< 1/2	< 1	< 2	< 3	< 5	5 or more
Administrative Queries - Max Time to resolve 95% of all queries	< 1/2	< 1	< 2	< 3	< 5	5 or more
Help Desk Telephone - % of calls answered within 2 minutes	>98%	> 95%	> 90%	> 85%	> 80%	80% or less
<b>Others</b>						
Normal Media Exchange Requests - average response time	< 1/2	< 1	< 2	< 3	< 5	5 or more
New User Registration Time (working days)	< 1/2	< 1	< 2	< 3	< 4	otherwise
Management Report Delivery Times (working days)	< 1	< 5	< 10	< 12	< 15	otherwise
System Maintenance - no. of sessions taken per system in the month	0	1	2	3	4	otherwise

**Table 1**

Table 2 gives actual performance information for the period. Overall, the CPARS Performance Achievement was the year 2000 was satisfactory (see Table 3), i.e. Green measured against the CPARS performance targets.

**CSAR Service - Service Quality Report - Actual Performance Achievement**

Service Quality Measure	2000											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>HPC Services Availability</b>												
Availability in Core Time (% of time)	100%	96.11%	99.70%	100%	100%	99.70%	100%	100%	100%	100%	100%	94.90%
Availability out of Core Time (% of time)	99.70%	98.52%	99.50%	99.5%	99.40	99.40	100%	100%	100%	100%	99.40	98.49%
Number of Failures in month	1	4	2	1	1	2	0	0	0	0	2	4
Mean Time between failures in 52 week rolling period (hours)	563	230	486	437	515	461	461	626	730	1095	673	584
<b>Fujitsu Service Availability</b>												
Availability in Core Time (% of time)	100%	100%	100%	100%	100%	100%	100%	98.4%	100%	100%	100%	100%
Availability out of Core Time (% of time)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Help Desk</b>												
Non In-depth Queries - Max Time to resolve 50% of all queries	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Non In-depth Queries - Max Time to resolve 95% of all queries	<1	<1	<2	<1	<2	<1	<2	<2	<2	<1	<3	<3
Administrative Queries - Max Time to resolve 95% of all queries	<0.5	<0.5	<2	<1	<2	<0.5	<0.5	<2	<2	<0.5	<0.5	<5
Help Desk Telephone - % of calls answered within 2 minutes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Others</b>												
Normal Media Exchange Requests - average response time	0	0	0	0	0	0	0	0	<0.5	0	<0.5	<0.5
New User Registration Time (working days)	0	0	0	0	0	0	0	0	0	0	0	0
Management Report Delivery Times (working days)	10	10	10	10	10	10	10	10	10	10	10	10
System Maintenance - no. of sessions taken per system in the month	2	2	2	1	1	2	2	2	2	1	2	1

**Table 2**

**Notes:**

- HPC Services Availability has been calculated using the following formulae, based on the relative NPB performance of Turing and Fermat at installation: [ Turing availability x 122 / (122 + 3.5) ] + [ Fermat availability x 3.5 / (122 + 3.5) ]
- Mean Time Between Failures for Service Credits is formally calculated from Go-Live Date.

Table 3 gives Service Credit values for each month to date. These are accounted on a quarterly basis, formally from the Go-Live Date. The values are calculated according to agreed Service Credit Ratings and Weightings.

**CSAR Service - Service Quality Report - Service Credits**

Service Quality Measure	2000											
	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept	Nov	Dec
<b>HPC Services Availability</b>												
Availability in Core Time (% of time)	-0.058	0.078	-0.039	-0.058	-0.058	-0.039	-0.058	-0.058	-0.058	-0.058	-0.058	0.195
Availability out of Core Time (% of time)	-0.039	0	-0.039	-0.039	0	0	-0.047	-0.047	-0.047	-0.047	0	0
Number of Failures in month	-0.008	0.008	0	-0.008	-0.008	0	-0.009	-0.009	-0.009	-0.009	0	0
Mean Time between failures in 52 week rolling period (hours)	-0.008	0.008	0	0	-0.008	0	0	-0.008	-0.008	-0.009	-0.008	-0.008
<b>Help Desk</b>												
Non In-depth Queries - Max Time to resolve 50% of all queries	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019
Non In-depth Queries - Max Time to resolve 95% of all queries	-0.016	-0.016	0	-0.016	0	-0.016	0	0	0	-0.016	0.016	0.016
Administrative Queries - Max Time to resolve 95% of all queries	-0.019	-0.019	0	-0.016	0	-0.019	-0.019	0	0	-0.019	-0.019	0.046
Help Desk Telephone - % of calls answered within 2 minutes	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004
<b>Others</b>												
Normal Media Exchange Requests - average response time	0	0	0	0	0	0	0	0	-0.002	0	0	0
New User Registration Time (working days)	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019	-0.019
Management Report Delivery Times (working days)	0	0	0	0	0	0	0	0	0	0	0	0
System Maintenance - no. of sessions taken per system in the month	0	0	0	-0.003	-0.003	0	0	0	0	-0.003	0	-0.003
Monthly Total & overall Service Quality Rating for each period:												
	-0.09	0.01	-0.06	-0.09	-0.06	-0.06	-0.09	-0.08	-0.08	-0.10	-0.06	0.11
Quarterly Service Credits:												
			-0.14			-0.21			-0.25			-0.05

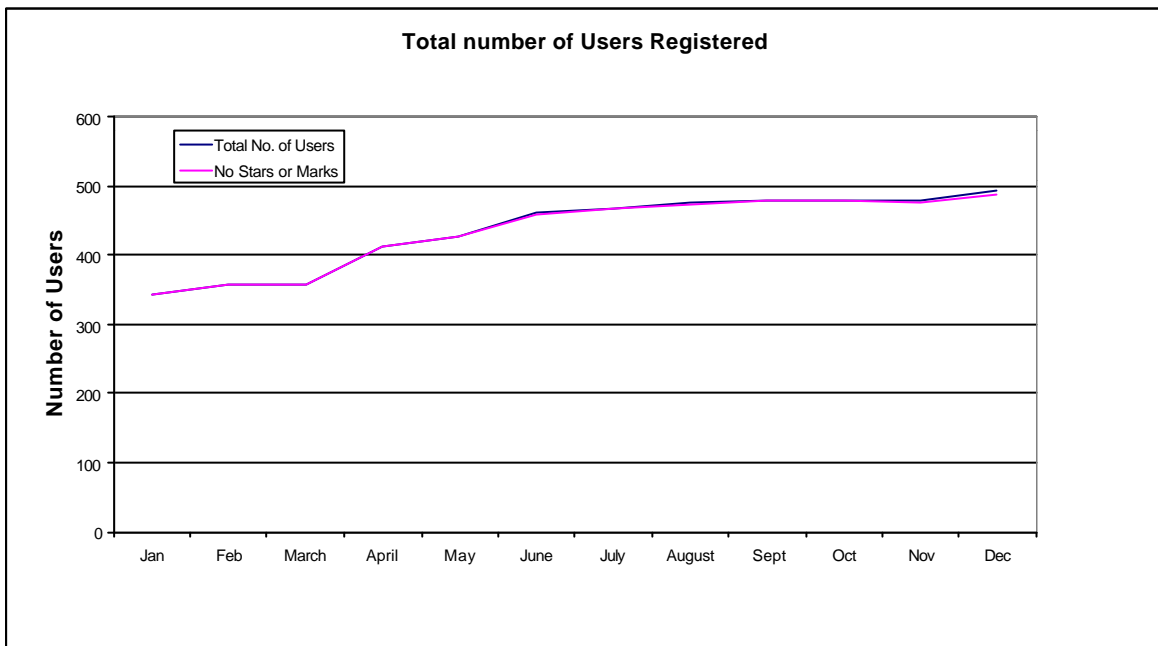
**Table 3**



### 1.2 No. Of Registered Users

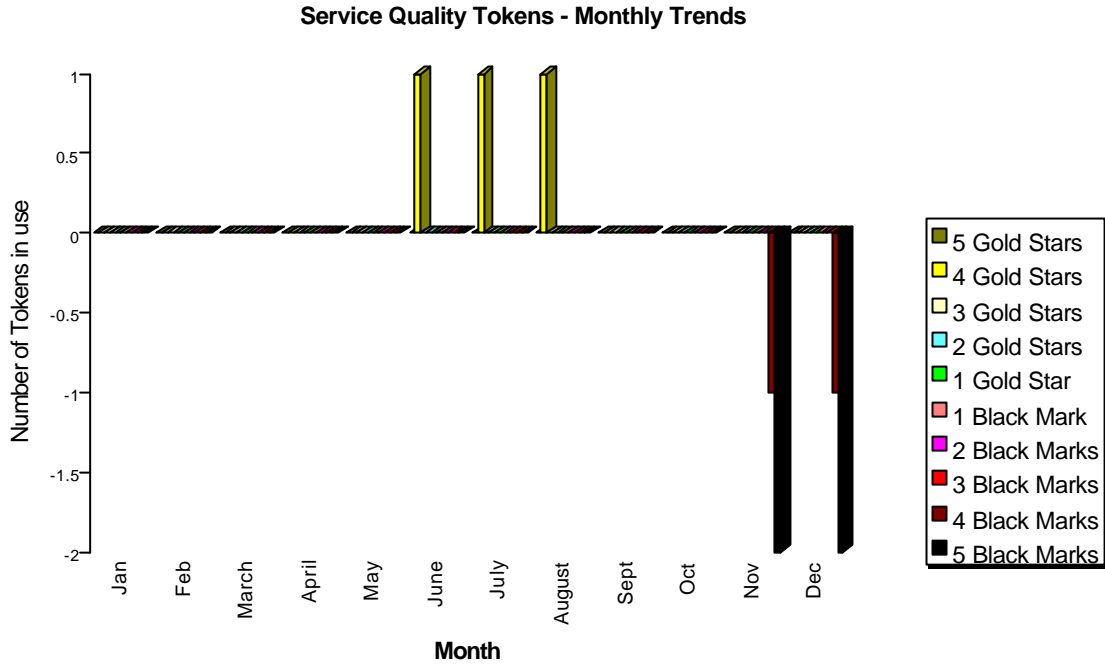
The current position at the end of the quarter is that there are 492 registered users of the CSAR Service.

It can be seen from the chart below that the number of users continues to grow steadily.



### 1.3 Service Quality Tokens

The graph below illustrates the monthly usage trend of Service Quality Tokens:



Over the course of the quarter the position is that as a management tool the Service Quality Tokens have been available to enable the users to provide qualitative feedback about all aspects of the service. This feedback is used as a mechanism to initiate change in the service where appropriate.

There are, at the end of the year, marks allocated to the service as per the chart below.

#### SUMMARY OF SERVICE QUALITY TOKEN USAGE

No of Stars or Marks	Consortia	Date Allocated	Reason Given
5 Black Marks	CSN003	27/11/00	Excessive Queue times
5 Black Marks	CSN003	27/11/00	Excessive Queue times
4 Black Marks	CSN003	24/11/00	Excessive Queue times

## 2. HPC Services Usage

Usage information is given in tabular form, and in graphical format. The system usage information covers:

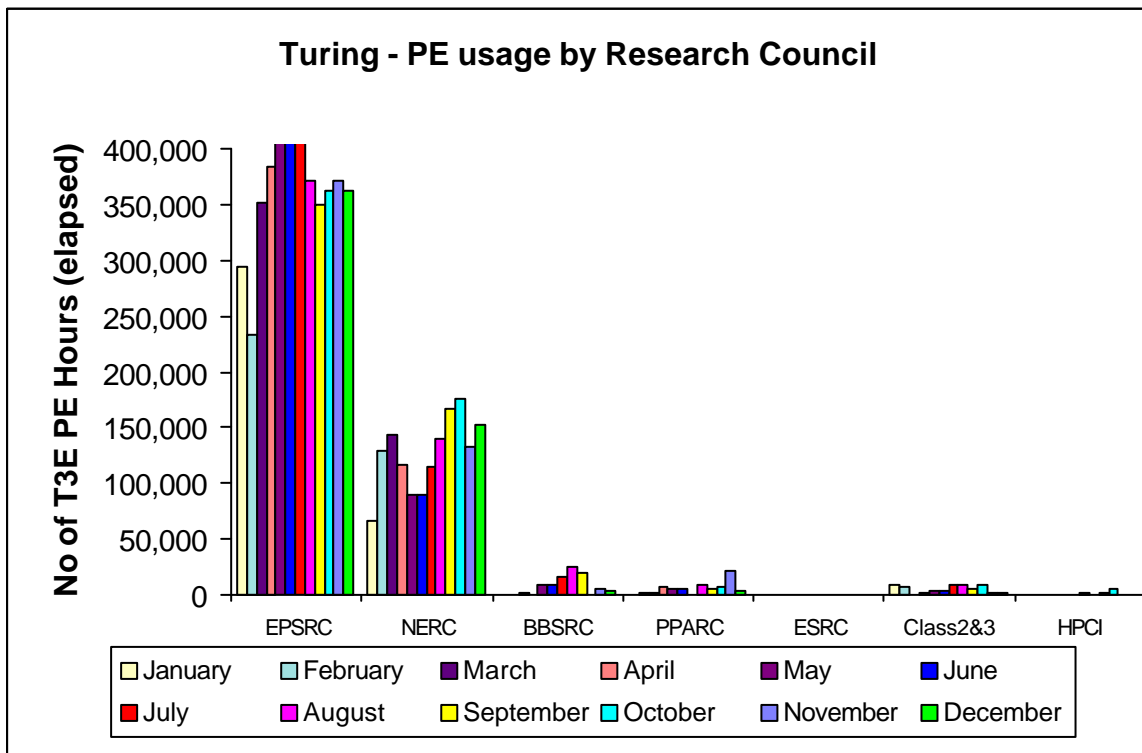
- CPU usage
- User Disk allocation
- HSM/tape usage

This is illustrated in a number of graphs including;

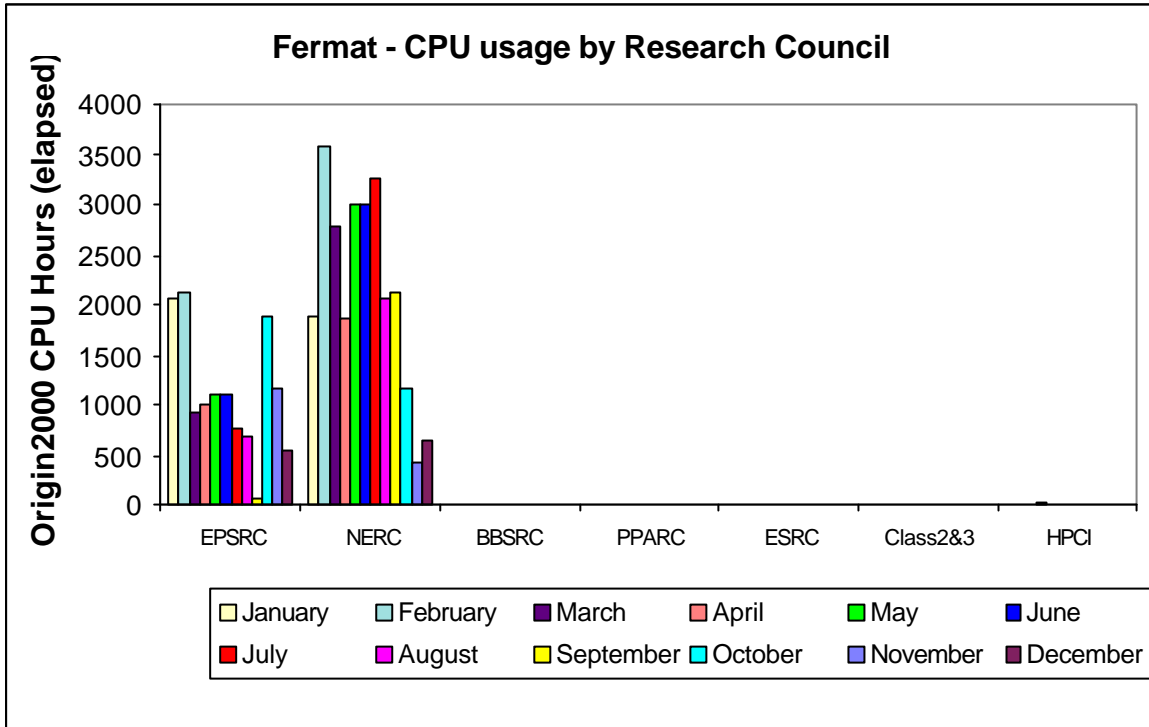
- MPP (T3E) Usage by month, showing usage each month of CPU (T3E PE Elapsed Hours), split by Research Council and giving the equivalent GFLOP-Years as per NPB. The Baseline Capacity is shown by an overlaid horizontal line.
- SMP (Origin) Usage by month, showing usage each month in CPU Hours, split by Research Council and giving the equivalent GFLOP-Years as per NPB. The Baseline Capacity is shown by an overlaid horizontal line.
- High Performance Disk (T3E) allocated for User Data by month, showing the allocated space each month in GBytes, split by Research Council. The Baseline Capacity (1 Terabyte) is shown by an overlaid horizontal line.
- Medium Performance Disk (Origin) allocated for User Data by month, showing the allocated space each month in GBytes, split by Research Council. The Baseline Capacity (1.5 Terabytes) is shown by an overlaid horizontal line.
- HSM/Tape Usage (T3E) by month, showing the volumes held each in GBytes, split by Research Council. The Baseline Capacity (16 Terabytes) available will be shown by an overlaid horizontal line.

### 2.1 Service Usage Charts

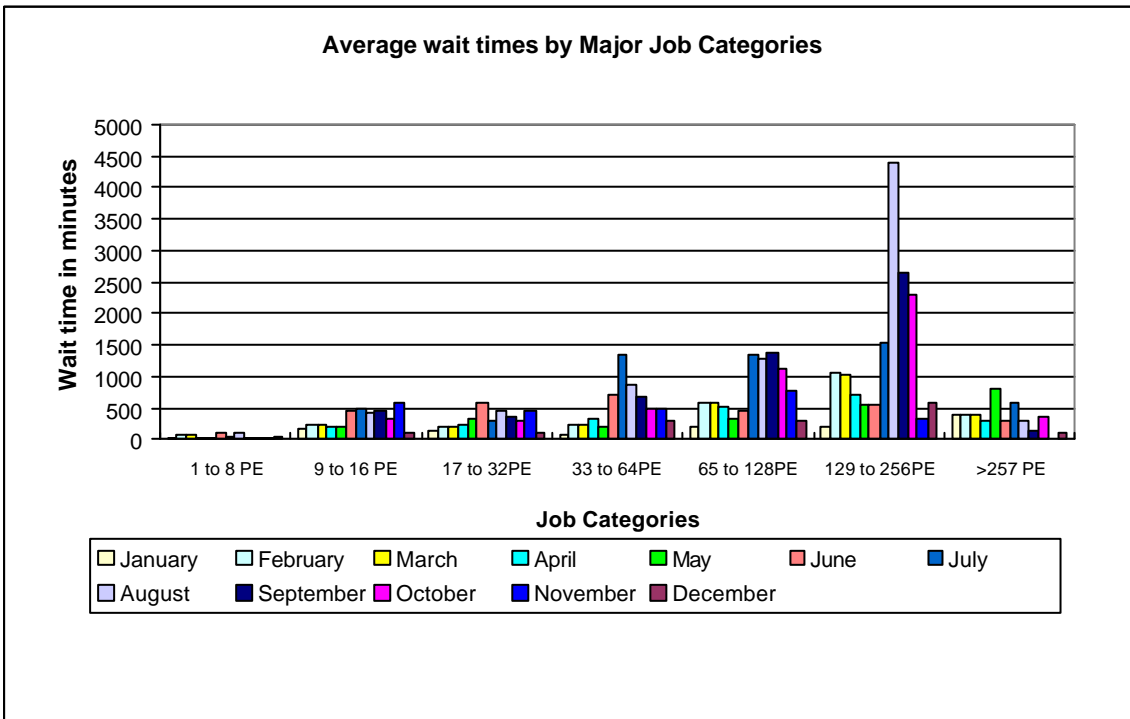
The graphs below show recent monthly CPU, PE, disk and HSM allocations and usage.



Turing PE usage is shown by Research Council during the last 12 months of service is shown in the above chart.

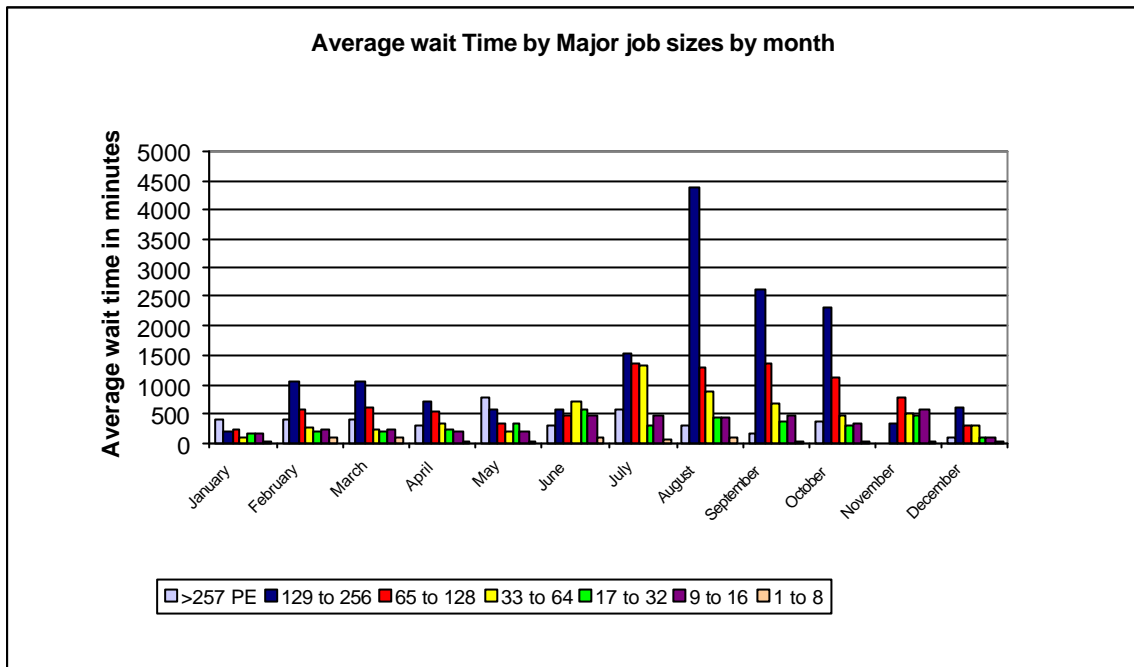


Origin2000 CPU usage is shown by Research Council during the last 12 months of service is shown in the above chart.



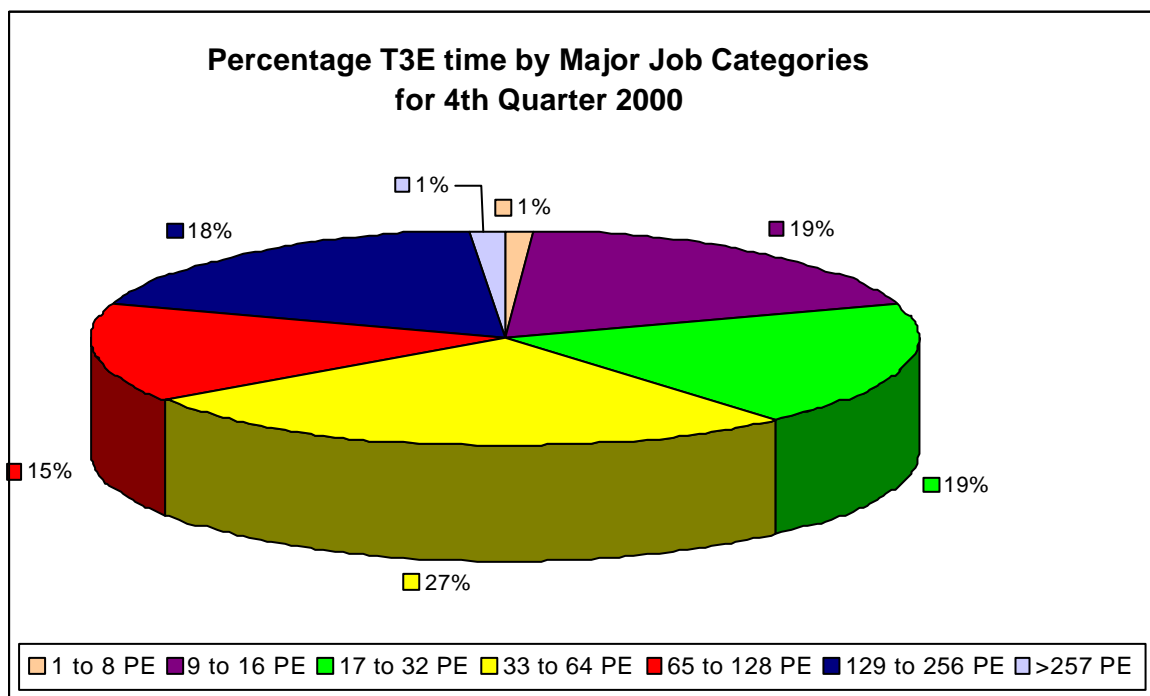
The above chart shows the wait time trend on the Turing system. The trend is towards rising wait times. This is an unfortunate side effect of an over-full machine. The situation should however be alleviated as the new machines come on stream during 2001.





It can be seen from the above graph that enhancements to the scheduling on Turing did reduce the average wait times for a short period but increased demand in July through to September has increased queuing times again. CfS needs to ensure sufficient head room exists in the system to reduce wait times to more satisfactory levels. It is intended that the provision of the planned SGI IA-64 systems will assist in better meeting the growth in user demands. In addition to this, the upgrade to Fermat should relieve the load on Turing while the migration of codes to the IA 64 platform is carried out.

The next chart shows the percentage PE time utilisation by the major job categories on the Turing system for the year end 2000.



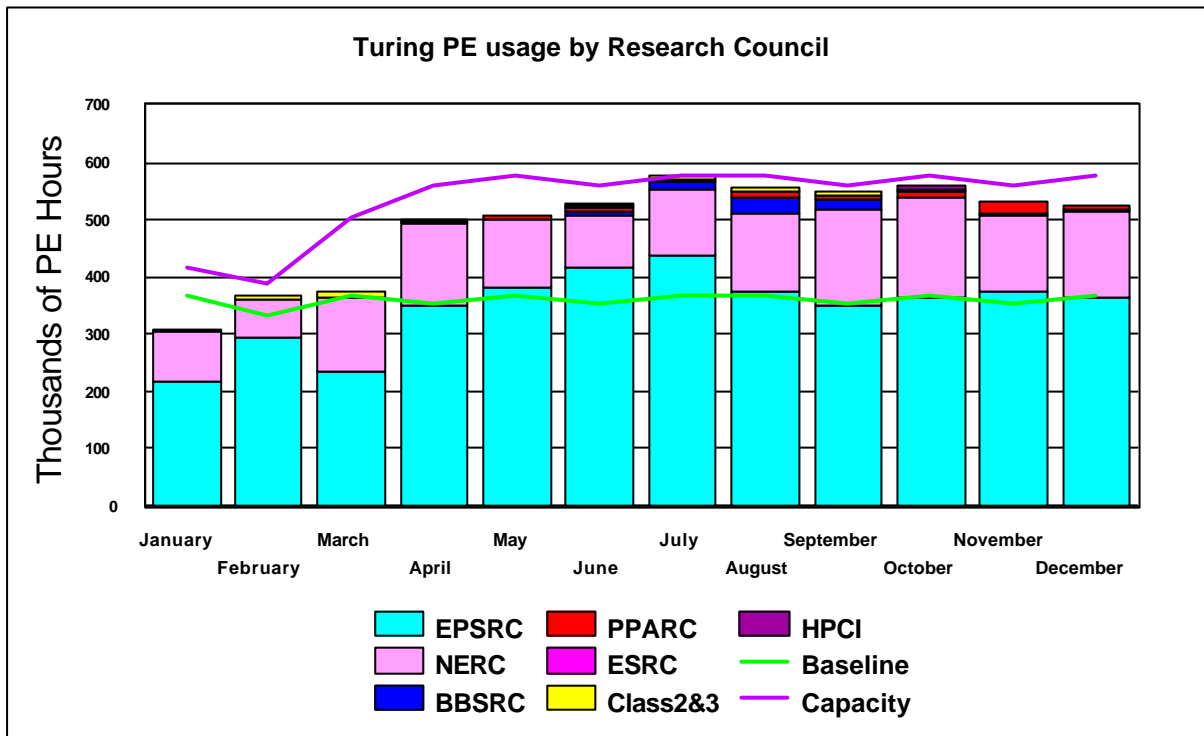
The trend on job size has shifted and now the predominant job size is in the mid range.

## .2 System Usage Graphs

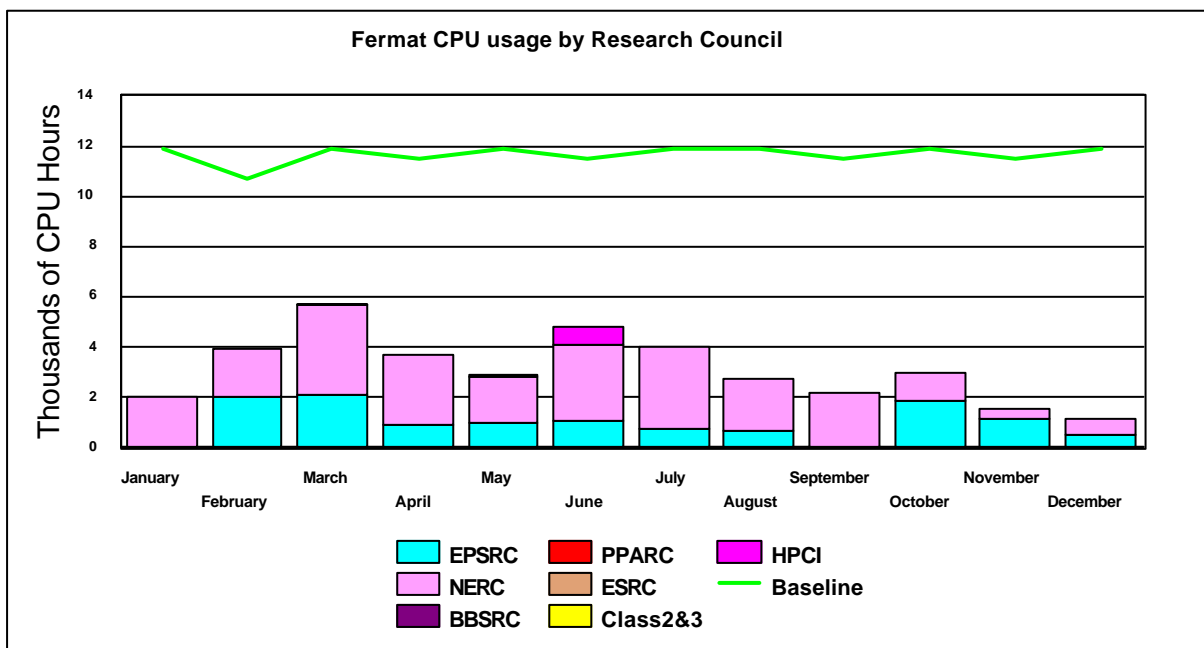
In all the Usage Charts, the baseline varies dependant on the number of days in each month, within a 365-day year.

### 2.2.1 Baseline System

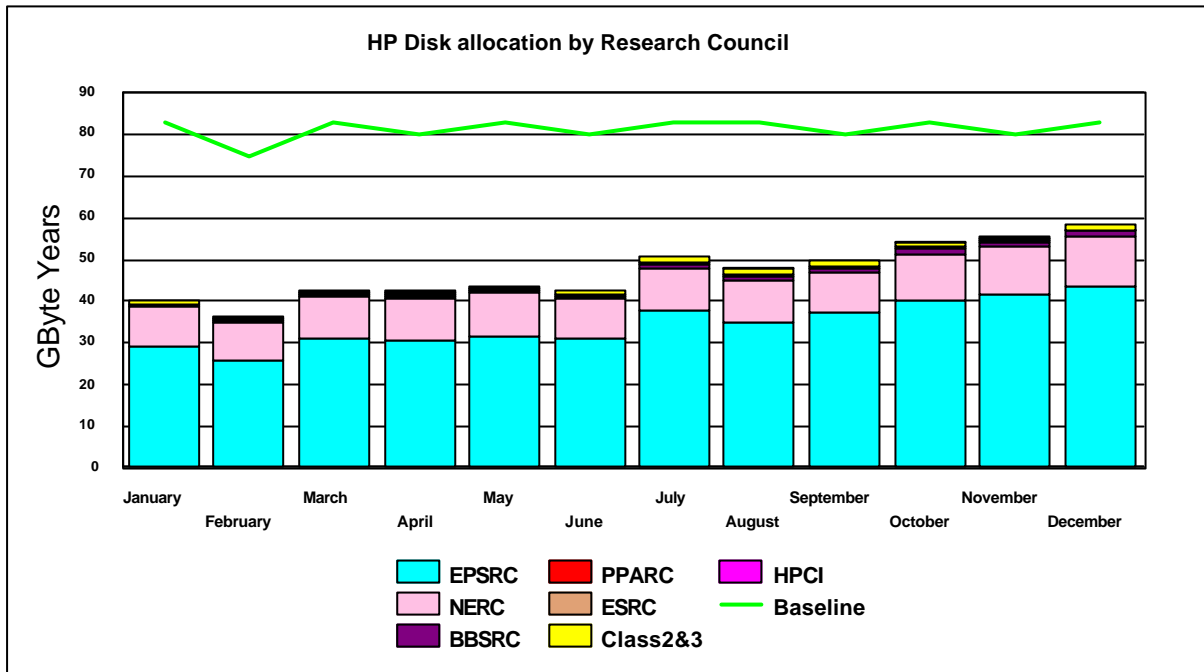
The graph below shows the PE hour's utilisation on Turing by Research Council from January 2000.



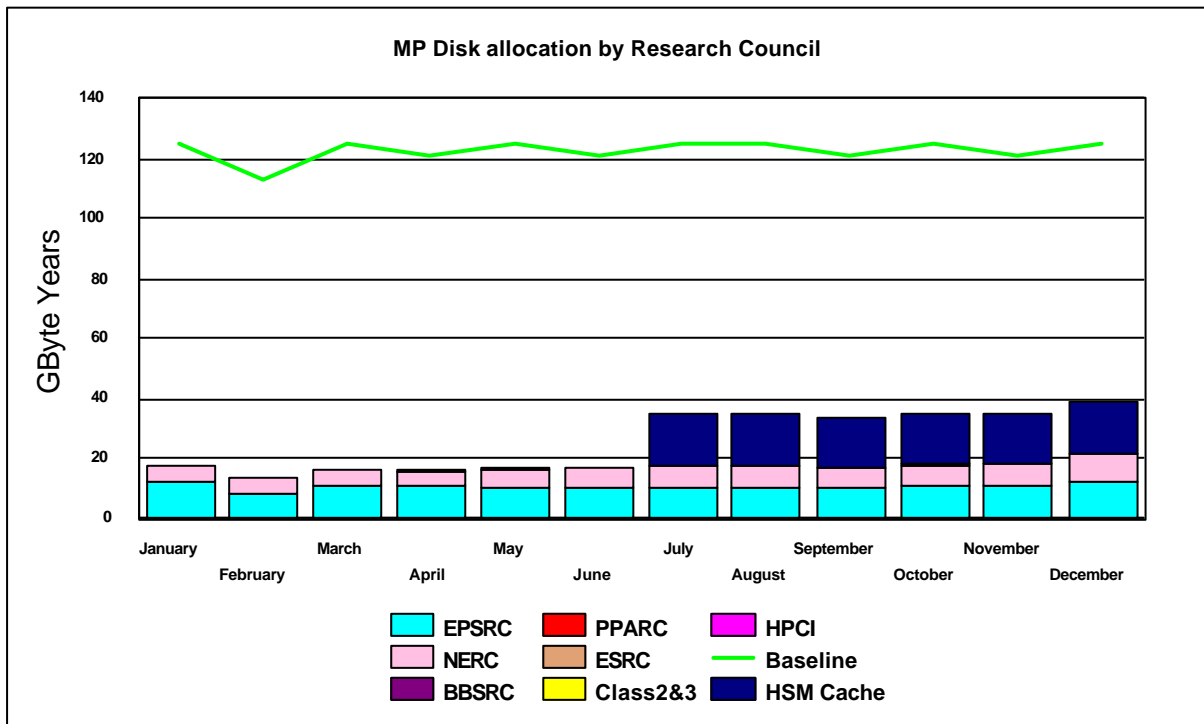
The graph below shows the historic CPU usage on Fermat by Research Council from January 2000.



The next series of graphs illustrates the usage of the disk and HSM resources of the system.

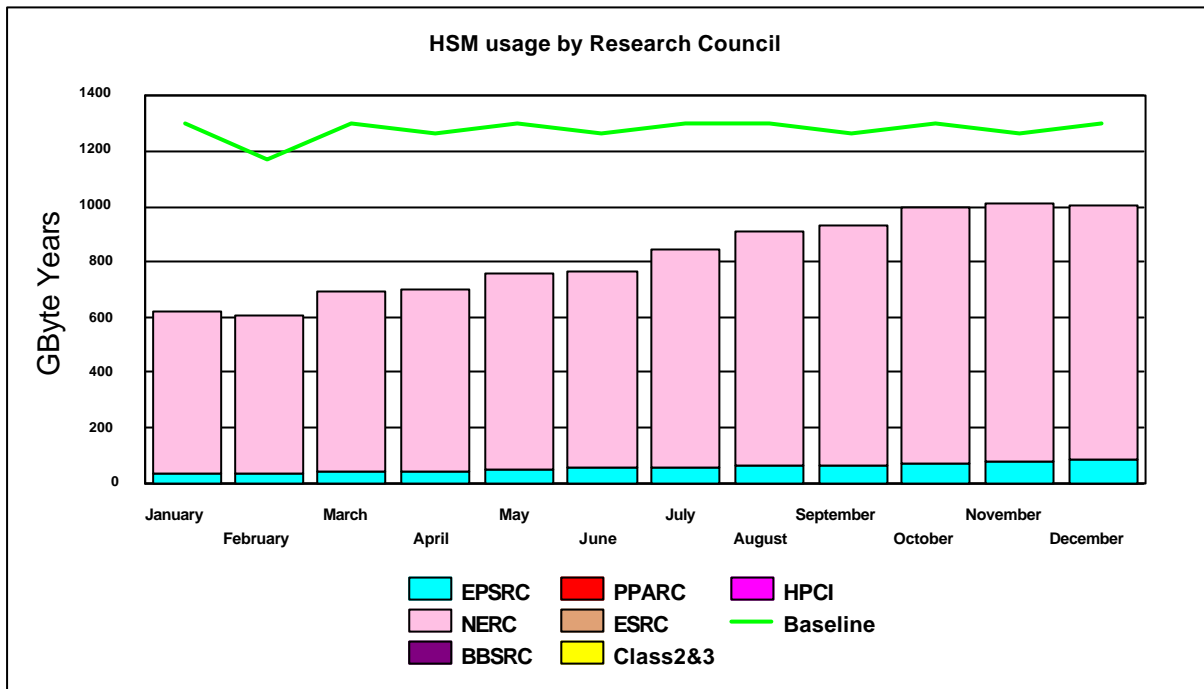


The preceding graph illustrates the historic allocation of the High Performance Disk on Turing.

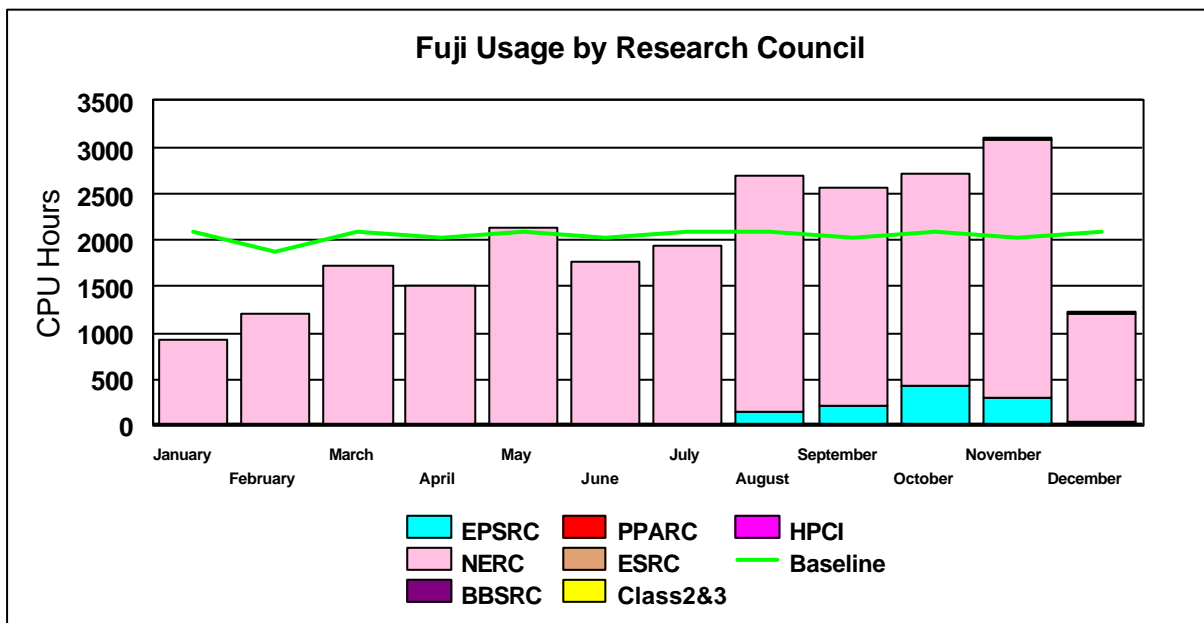


The graph above illustrates the historic allocation of the Medium Performance Disk on Fermat. From July 2000, 200 Gbytes has been used as a data cache for the enhanced HSM system.

The graph below shows the historic HSM usage by Research Council funded projects. The primary usage is for NERC.



### 2.2.2 Fujitsu System Usage Graph



The above graph shows the current CPU usage on the Fujitsu VPP 300 NERC system based at the University of Manchester. The Fujitsu usage exceeded the baseline in two months of the quarter.

### 2.2.3 Guest System Usage Graphs

A Compaq ES40 cluster is now situated at Manchester. A NEC SX4 vector system is available through CSC's Maidstone Data Centre.

## **2.3 Service Status, Issues and Plans**

### **Status**

The service continues to be heavily used.

The IA64 prototype system is now being used for single CPU code optimisation work and is soon to be upgraded to the next phase.

The new Origin 2000 128CPU 400MHz (Fermat), is fully installed and in the final stages of software proving before being fully released as a production batch engine.

### **Issues**

Wait times can still be excessive at times due to the time demands on the machine, however these are being carefully managed where at all possible.

### **Plans**

The code optimisation work continues on the Intel IA 64 cluster. It is also planned that 1<sup>st</sup> quarter 2001 a MIPS based Origin 3000 will be added into the service.

## **3 Project Management, Documentation and User Feedback**

This section covers aspects relating to the registration of projects and users, the management of projects and resources, and topics associated with documentation and user feedback.

### **3.1 Conditions of use**

With respect to the 'conditions of use of the CSAR systems', (Wassenar agreement), to which all CSAR users have been asked to agree, there are still some people who have not responded. After discussion with EPSRC, it was agreed that CSAR would provide a list of email addresses to EPSRC, who will then send out a reminder to all outstanding users.

### **3.2 Project Management**

A significant amount of project management work has been carried out in restructuring subprojects on behalf of two major consortia

### **3.3 User Registration**

The Compaq EV67 16 processor Guest System (Kelvin), has now been fully integrated into the registration system, and is available for use.

### **3.4 Resource Calculator/Trading Pool**

New versions of the resource calculator have been released and updates to the trading pool made to reflect the upgrade to Fermat with more powerful processors, and to include guest systems.

### **3.5 User Survey**

The User Survey for the year 2000 has been carried out. Minimal changes were made to the survey form in order to allow as much comparison as possible with that for 1999. A summary of the results will be published on the CSAR web pages.

### **3.6 CSAR Audit**

Substantial progress has been made with the CSAR Audit, carried out by Professor Clark at the University of Salford.

### **3.7 CSAR User Liaison Forum/User Steering Group**

The Chairman of the User Liaison Forum issued the quarterly email requesting feedback about the service and suggested holding a meeting of the ULF in December, to discuss in particular the Technology Refresh. The response was insufficient to justify a meeting on this occasion.

The User Steering group met in December to discuss the Technology Refresh in detail. This was a very successful meeting, and a number of suggestions about disseminating information about the CSAR Technology Refresh were suggested at this meeting.

### **3.8 CSAR Focus**

The 6<sup>th</sup> CSAR Focus has been produced and will be distributed early in 2001.

### **3.9 Documentation**

There have been numerous updates to the CSAR web pages, particularly related to new services. An Introductory User Guide for the ASCI prototype IA64 based system (Fourier) is being prepared.

## **4 Science Application Support Services**

### **4.1 Consortia Support**

Additional work has been performed on the VIPAR code to provide parallel visualisation facilities using the latest versions of AVS/Express.

Installation of the seismic tomography work on a departmental platform has been carried out on behalf of the Terra Consortium.

Some exploratory work for optimisation/parallelisation has been carried out on behalf of one consortium, prior to more extensive work.

Optimisation and parallelisation is being performed with a new class 3 project from Earth Sciences, that is developing numerical models for fault evolution in 2 and 3 dimensions. Results from this work have been included in a paper (see section 5), presented at the American Geophysical Union in December 2000.

It should be noted that all of this support work has been curtailed because of the other commitments, as in the following sections.

### **4.2 Training and Education**

Courses given:

- Using CSAR
- Fortran 90
- OpenMP
- Introduction to MPI
- Advanced MPI

Revisions have been made to the following courses:

- Fortran 90
- HPC for Java
- Fujitsu VPP
- Using CSAR

The course schedule for the second semester of 2000/2001 is now being prepared. The first IA 64 based courses (for the Technology Refresh) will be scheduled in this semester. It has been agreed that the annual two-week summer school will be replaced this year by two one-week workshops related to the Technology Refresh, and based on using the IA64 systems, Fourier and Napier.

## **4.3 Service Developments**

### **4.3.1 Fermat**

The upgrade to Fermat, from a 16 processor 250 MHz Origin 2000, to a 128 processor 400MHz Origin 2000 with 128 GB of memory has taken place. Testing and tuning is being performed prior to a full announcement and release to users.

Application packages, previously available only on Turing are now being installed on Fermat. These include Gaussian and Amber, with AVS/Express 5.1 also being installed.

### **4.3.2 Fourier**

Experience from the MRCCS Summer School on 'Linux for HPC' has been put into practice on Fourier for the testing of some of the new system administration tasks. Third party software has been installed, including the ATLAS software (self-tuning BLAS libraries). The latter resulted in substantial testing of both SGI and gcc compilers, and the submission of bug reports.

### **4.3.3 Fuji**

The ATLAS software as noted above has also been installed on the Fujitsu VPP system.

### **4.3.4 Kelvin**

The following software packages have been installed on the Compaq Guest System:

- ATLAS
- Netcdf
- Pgplot
- bzip2.

Help has been provided in system configuration and the installation of compilers.

## **5 Collaboration and Conferences**

### **5.1 Visualisation Case Studies**

The visualisation case studies of geoseismology data and the CT scan data of a mummy, carried out by Jo Leng, formed part of a joint AVS/SGI presentation of the multi-pipe edition of AVS at Super Computing 2000. Terry Hewitt presented this on the floor of the SC2000 conference.

### **5.2 UKHEC GRID Work**

The University of Manchester presented the eGrid experiments at Supercomputing 2000. This raised the profile of CfS in European GRID computing. The University of Manchester was also joint entrants in the NetChallenge at SC2000 with Stuttgart, Pittsburgh, ETL and Jaeri (Japan) and NCHC (Taiwan), and gained an Honourable Mention. The global metacomputing experiments were successful, and we should record our thanks to CfS for devoting a considerable amount of T3E time for these experiments.

John Brooke attended the GRID2000 workshop in Bangalore in December. He presented an MRCCS paper on the concept of a "Mini-GRID", that is to say a complex system which is a subcomponent of the global GRID but which can nonetheless stand as a entity in its own right. The thesis advanced in the paper is that many such Mini-GRIDs will evolve to suit the needs of particular communities and that the global GRID will arise out of a federation of such GRIDs. The CSAR service is used as a primary example of such a Mini-GRID and the paper was entirely authored by MRCCS staff (Brooke, Foster, Pickles and Taylor).

This paper was very well received and aroused considerable interest. As a result an international collaboration with the EcoGrid project was established. This project is an attempt to provide the infrastructure for an economically self-supporting GRID and has collaborative experiments with 70 sites in the US, Australia and Japan. They are seeking European partners of which CSAR will be the first. The CSAR resource tokens model is an important element in the search for a self-supporting GRID.

Following the workshop was the HiPC conference, which provided a link between the rapidly developing HPC community in India and the more established communities in the US, Europe and the Pacific Rim. A report on this has been written and will be available on the UKHEC and CSAR WWW sites.

### **5.3 MRCCS Projects**

MRCCS has been awarded funding for two major projects to develop scientific applications for a computational GRID and to develop tools for eScience.

#### **5.3.1 EuroGrid**

The official start date of this project was November 2000. John Brooke attended a project meeting on behalf of MRCCS and gave a presentation of Workpackage 5 (Technology Provision) in which MRCCS is the lead partner. The advertised post for this project is currently open.

At the meetings in Bangalore, contact was established with developers working on the Data Grid project which will start in January 2001. Close cooperation between these two major EU projects will benefit UK science as complementary technologies develop. UKHEC and MRCCS are ideally placed to bring early benefits of GRID technology to UK researchers.

#### **5.3.2 Establishing a Global Supercomputer**

This is a one year project funded by JISC to develop links between Internet2 in the US and SuperJanet4 in the UK. The first demonstration of the global supercomputer, involving these links was given at SC2000. There were a series of meetings between the project staff, John Brooke and Mike Robson of Manchester Computing and the US contacts maintaining trans-Atlantic links between SuperJanet4 and the US research networks. This information will be made available in a report on the project WWW pages on the MRCCS WWW site

[http://www.man.ac.uk/mrccs/global\\_supercomputing](http://www.man.ac.uk/mrccs/global_supercomputing)

MRCCS staff also attended the launch of SC2001 Global, which will bring Access Grid technology to enable remote sites to participate in the next SC2001 Conference in Denver. Mike Robson will attend the Access Grid tutorial in January 2001 and John Brooke is preparing a bid for a UK SC2001 Constellation site based around the eight UK Internet2/SuperJanet4 projects. Access Grid technology is important for eScience collaborative working.

#### **5.3.3 North West Centre for Advanced Virtual Prototyping**

MRCCS is part of a consortium from the Universities of Manchester, Salford, Lancaster and UMIST, which has been awarded £1.7M from the OST North West Science Funds to set-up a Research Centre in Advanced Virtual Prototyping. The vision of this Centre is to become a world class research centre in virtual prototyping technology for engineering design. The role of the MRCCS/CSAR team is in the development of computational steering techniques and parallel algorithm development, with the emphasis on interaction within the design process.



### **5.3.4 New project Proposal**

Preparatory work has been done for a large EU grant proposal: "Multi-Sense Tensor User Interface" to be submitted 15th January 2001.

### **5.3.5 Other Project Work – Support Tokens Report**

As part of the preparation for the CSAR Technology refresh, Keith Taylor has compiled a report on the CSAR projects that have outstanding support tokens. The aim is to investigate the scientific and computational needs of such projects and to see if they will need support around the time of the technology refresh.

This report has been completed and circulated to the CSAR applications support team leaders.

## **5.4 MRCCS Research**

MRCCS is conducting research into questions of interest to computational scientists. The following areas have been the focus of the last quarter's work.

### **5.4.1 Job Scheduling on multiprocessor systems**

Fumie Costen has been investigating the loading profile of jobs on the SGI Origin systems Fermat and Kilburn. The aim of the research is to derive a reliable statistical modelling of the job profile. This can then be used to provide multiple copies of job loads with similar statistical properties to the real data (these are called "quasi-workloads"). These would then be used to test simulations of different job scheduling schemas on real systems. This work has now been completed and a paper will be submitted to Europar 2001 based on this work.

## **5.5 Publications, Presentations, Conferences etc**

### **5.5.1 Events at Manchester**

Jo Leng organised a UKHEC visualization seminar at Manchester on December 4th. The keynote speaker was David Bullivant from Auckland New Zealand. He presented the work of his group on the Virtual Human, combining visualisation with High Performance Computing. Other speakers were Nick Avis from the Virtual Reality Centre at Salford, Helen Wright from the University of Hull and Ming Chen from the University of Swansea. Jo Leng and Dan Kidger from MRCCS also gave talks

John Brooke organised the UKHEC Annual seminar which took place the day after on December 5th and gave a joint presentation with Jo Leng entitled "The role of Visualisation and Virtual Reality in eScience". David Bullivant of Auckland gave the main talk on the relationship between visualization and HPC. There were talks from Mark Bull and David Henty of EPCC and Rob Allan and Martyn Guest of Daresbury. The attendance at this event was disappointing, only 15 people attended. The reasons for this were discussed, clearly publicity needs to be improved. It would also be good to associate the UKHEC Annual Seminar with some high-profile event at which there will already be a good attendance.

### **5.5.2 SC2000 Research Exhibit**

The University of Manchester exhibited at SC2000 with a research booth presenting work from CSAR, UKHEC, European GRID projects and the MIMAS Datasets service. The SC2000 Research Exhibit was well attended this year.

Contacts were made with other HPC sites worldwide and in particular the US Tri-Labs involved in the ASCI program. MRCCS is currently evaluating the possibility of exchange visits for UK researchers entering the field of computational science via mutual exchanges.

It should be mentioned that Kaukab Jaffri of CSAR Frontline organised the UoM Research Exhibit that was the largest in terms of size and range of activities of any UK organisation. We are discussing with European partners

the possibility of grouping the European exhibits next year to match the scale and level of presentation routinely attained by US HPC sites. Kaukab has made notes of the important lessons learned this year in what is a very competitive arena.

### **5.5.3 Presentations/Publications**

CSAR staffs were either sole or major authors/presenters of the following:

“Performance of BLAS matrix-matrix kernels” presented at the Fujitsu Supercomputer Users Meeting in Munich, 9th-11<sup>th</sup> October 2000.

“Visualization of Seismic Data in Geophysics and Astrophysics”. SGI Users Conference, 11th-14th October 2000 at Krakow, Poland. The paper was selected for submission to the journal Scientific Computing after the oral presentation.

“What have the Earth’s Mantle & an Egyptian Mummy in Common?” Visualization Conference, 27th October 2000 in Tokyo.

“Using C++ for HPC”, UKHEC Seminar on Object-Oriented Programming, Edinburgh, October 2000.

“Visualization As Part of a HPC Service”, UKHEC Seminar on Visualization, Manchester, December 2000.

"Mini-Grids: Effective Test-Beds for Grid Applications", John Brooke, Martyn Foster, Stephen Pickles, Keith Taylor, Terry Hewitt, in GRID 2000, 1st IEEE/ACM International GRID Workshop, R. Buyya and M. Baker (Eds), LNCS 1971, Springer, p 158-169

“3D Topology Optimisation of Bone Microstructure using Parallel Computers” has been submitted for a special issue of 'Engineering Computations' in memory of the late Prof. Ernie Hinton.

And co-authors of:

A poster entitled “High Performance Computing in Engineering” presented at the EPSRC sponsored awareness event on 4<sup>th</sup> Dec' 2000 at the House of Commons, UK.

“Three-dimensional modeling of the initiation, evolution and linkage of faults in extensional rift systems and their  
Finch E, Hardy S, Gawthorpe RL, Foster M & Hewitt M. Eos,  
Transactions, American Geophysical Union, Vol. 81, No. 48, F1160, (2000)

### **5.5.4 Other Events Attended**

"Practical Software Engineering for Computational Scientists". This course was primarily aimed at those working on medium to large-scale applications with emphasis on good styles and techniques that are used to assess the potential problems with project development and address them. Edinburgh, October 2000.

“Machine Evaluation Workshop” at Daresbury, November 2000.

UKHEC Seminar on Java, Edinburgh, November 2000.

A meeting for the (EPSRC supported) Visualization and Virtual Reality Community Club (VVECC) on Computer Games at Rutherford.

A local community club meeting of the North West Virtual Reality Group (NWVRG).

### **5.5.5 Other Commitments**

5 papers have been reviewed: 3 for the "4th International Conference on Algorithms and Architectures for Parallel Computing (ICA3PP), City University, Hong Kong, 11th-13th Dec 2000) and 2 journal papers.

## **6 Added Value Services**

### **6.1 Joint Projects**

The final release from the phase II work will be available in February. Among several enhancements there will be the first version of a set of menus in virtual reality (the Vrmenus).

On Monday 13<sup>th</sup> November 2000, an official opening ceremony was held to launch the new facilities that were funded from the 1999 JREI success: a “Premier Facility for High Performance Visualization and Virtual Reality”. The facility, called Kilburn, is an SGI Onyx2 with 40 processors and six graphics pipelines – the most powerful graphics supercomputer in the UK. While the system is funded for use by the University of Manchester, we would welcome interest from CSAR users – please contact Dr Nigel John (n.w.john@man.ac.uk).

### **6.2 International Conferences**

Organisation of the two European conferences to take place in Manchester in the summer of 2001, Europar and Eurographics, are progressing well. Europar will take place on 28<sup>th</sup>-31<sup>st</sup> August 2001, and Eurographics shortly afterwards on 3<sup>rd</sup>-7<sup>th</sup> September. Web pages are available for both: <http://www.man.ac.uk/europar/> and <http://www.eg.org/egorg2001>

Europar is the major European Parallel Computing Conference with over 400 attendees. In 2001 it is hosted by University of Manchester and is being organised jointly by Computer Science and CSAR/MRCCS. This is part of the CSAR value-added contribution of hosting a major international conference yearly.

Joanna Leng, John Brooke and Kaukab Jaffri of CSAR are on the Local Organising Committee. The Call for Papers has been sent out and the software necessary for paper submission successfully installed. This has been a major commitment in terms of time for all three staff involved. Weekly meetings are held to steer the project and a visit from a student from Munich was arranged by Joanna Leng in November so that the expertise from the previous Europar 2000 could be utilised.

### **6.3 Seminars**

The seminars series for HPC and visualization, organised by MRCCs, are now being finalised for the second semester of the 2000/2001 academic year.