designers and on the attendant problems of increasing complexity and sophistication. Themes will include Theory, Design Methodology, Design Tools, Architectures, Applications, Circuit Design and Fabrication. Invited speakers are expected to be I M Barron (Inmos Ltd), M W Larkin (Plessey Ltd), C A Mead (California Institute of Technology) and J C Mudge (Digital Equipment Corporation).

The conference is being held during the first week of the Edinburgh International Festival and participants may wish to take advantage of the many cultural events being staged. Further information on the conference may be obtained by writing to:-

Secretariat, VLSI 81 International Conference
26 Albany Street
EDINBURGH EH1 3QH

7. SIGCE REPORT

Since the approval in July 1979 by the ICF committee of the SIGCE programme of software development in support of control engineering research, the following progress has been made. In December 1979 a contract was placed with Kingston Polytechnic for the programme of software development. Initial emphasis has been on the establishment of the Control Algorithms Library (CALIB), consisting of a set of numerical algorithms most commonly used in computer aided control system design. To date a number of algorithms have been implemented, documented and tested. These have been obtained from a variety of sources or developed 'in house' and have been chosen principally for their use of robust numerical methods.

Firm links in this work have been established with others outside the UK carrying out similar tasks, including Astrom (Lund), Laub (USC), Klema (MIT), Golub (Stanford) and Moler (New Mexico). Further contracts are in the process of being established, the aim of this being to ensure that the algorithms included in the library are the best currently available. It is planned that an initial version of the library will be available on the Prime 750 at UMIST by the end of 1980 and soon afterwards versions for mounting on other ICF machines will be provided.

In addition to the establishment of the Control Algorithms Library, the SIG has also been instrumental, mainly through Professor Douce and Dr Hughes at Warwick, in arranging for the mounting of the ACSL simulation package on ICF machines. A preliminary version was mounted on the Prime 550 at Warwick University in February 1981 and has also been made available at the Prime 550 at Sussex. An improved version from the USA is still awaited. The package will then be made available on the 750 at UMIST and other ICF Prime machines.

Work has begun at Warwick on a new identification package and it is proposed that SIG programming resources will be used in the near future to assist in this work.

Further information on any of the above aspects of the SIG work can be obtained from:

Dr M J Denham, School of Electronic Engineering and Computer Science, Kingston Polytechnic, Kingston upon Thames, Surrey.

8. GUIDELINES FOR QUALITY OF SERVICE CMS AND ELECTRIC

In FORUM 10 item 6 we published the currently established guidelines for batch turnaround on the MVT systems. In this article we bring you the guidelines for our two interactive sevices, CMS and ELECTRIC. We plan to publish regularly in FORUM our record at keeping to these guidelines. The response an interactive system gives to each user depends on a number of conditions, each of which contributes to the load on the system. The major factors affecting response are: number of users, processing requirements, memory requirements, filestore access rates. These factors have been taken into account in the allocation and control systems being set up for both services (see Section 5).

Even a realistically balanced interactive service will give a varying response to different types of command. We shall therefore use the following definitions of command types when attempting to define guidelines for quality of service.

- trivial command: any command which requires less than one time-slice of CPU time to execute.
- stretch factor: the average elapsed time taken to respond to commands, divided by the average CPU time needed to execute them.

We currently have guidelines only for CMS trivial commands. They have been defined as follows:

During peak periods 90% of trivial commands should produce a response in less than 1 second.

We intend to show our record at achieving this guideline by publishing the percentage of trivial commands which took less than 1 second and those less than 3 seconds. The statistics will be accumulated on a weekly basis during the period 1400 - 1700 hrs on weekdays.

Purely for purposes of comparison we shall publish similar statistics for the ELECTRIC service. The statistics presented will be the percentage of commands completing in less than 2 seconds and less than 5 seconds.

If guidelines for stretch factors become available they will be published and our record at achieving them will be reported regularly in FORUM.

9. CENTRAL COMPUTER REPRESENTATIVES MEETING

The next meeting has been arranged for Monday July 13 in the Lecture Theatre, commencing at 10am. Coffee will be available beforehand. Details of the Program will be sent to Representatives and in News files referred to by login messages.

FORUM
195 COMPUTER NEWSLETTER

Newsletter of the SERC Central Computing Facility

No.12 June 1981

1. INTRODUCTION

If this is the first FORUM you have received, please read on. It is quite probable that you used to get copies of the ICF publication Rapid Response. During the last few months there have been a number of changes at Chilton and at higher levels also: for example, you may have noticed that the Science Research Council has changed its name to Science and Engineering Research Council (SERC). There are proposals to set up an Engineering Board Computing Committee which will cover the applications software areas of the ICF (among other things), and for the Facility Committee for Computing to change its name and include responsibility for the hardware side of ICF. As part of the nationalization of circuit design, management of ICF SIG activities has been transferred to Technology Division. The net result of all this has been the decision to combine FORUM and Rapid Response, including articles in each issue on both central computing and interactive facilities.

In addition, we hope to be able to bring you some statistical information on the current levels of service we offer. The best format is still being decided for we are attempting to avoid printing lists of numbers for the sake of it. Graphs will be provided when we can organise the printing in such a way that production is not held up.

As you will see elsewhere in this newsletter, the major recent announcement is the start of the CMS service on the IBM machines. This has been made possible by the acquisition of more memory and disks for the 3032 and the means of access via Networked machines. However, we are carefully monitoring the increased load for we do not intend to let the service degrade below acceptable levels. Work on the VNET changes is still proceeding and it is hoped to review the situation again in July.

As explained in FORUM Number 10, this newsletter forms a major part of the Communications between the Computing Division at Chilton and the users. We will continue to send copies to all those registered on the ICF as well as to those who have copies of CIGAR, the main manual for users of the IBM complex. If you do not come within these two categories but would like to continue to receive a copy, please let us know by returning the slip included with this edition. We would also be grateful to know if you have received two copies (it may be that you come under both categories and the duplication has not been picked up). As always we would like to hear from you and are prepared to include letters and articles from users in future editions. Please address all such communications to:

The Editor, FORUM
Atlas Centre
Rutherford and Appleton Laboratories
Chilton
DIDCOT Oxon OX11 0QX

2. GRAPHICS UNDER VM/CMS

The graphics packages supported under OS/MVT - SMOG, MUGWUMP and GINO-F - are all now available under VM/CMS. The facilities provided to the user are being extended over the next few months, but a description of those available now and those that will shortly be released may be of interest to CMS users.

All the routines in the basic SMOG, MUGWUMP and GINO libraries are provided, as are the plotting, contouring and histogramming routines based on SMOG. The 3-D routines of MUGWUMP that are described in the ELECTRIC manual and the GINOGRAF routines are available in their respective libraries. The shading routines (PRSCAN, FRSCAN etc.), the map drawing routines and the block letter routines (WRITHE etc.) are currently not available.

Each basic package is stored in a separate library (TXTLIB), the names of the libraries being SMOG, MUGWUMP and GINO. Each of these libraries contains all the routines that depend on it, as under OS/MVT. The relevant library should be added to the list of libraries accessed by the GLobal command before a user program is LOADed; the GLobal command can conveniently be placed in your PROFILE EXEC to save having to remember this. For the MUGWUMP package, the RHELIB library is also required.

When a graphics program runs, the graphics output produced by the program is sent to a graphics stream whose characteristics are controlled by the user via the GRAPhics command. This controls the type of stream and the device code to be produced - it may be changed between runs of the program without changing the program in any way. Currently the GRAPhics command allows the user to specify that the graphics stream is connected to an online

Tektronix 401x screen or an online Sigma 567x screen. Imminent extensions will allow in addition the following assignments:

- a file on the user's minidisk

- a file in a common filestore, functionally very similar to the MUGWUMP filestore available under OS/MVT and ELECTRIC;

- a spool file destined for the FR80 film recorder.

When output has been sent to a disk file (whether on the user's own disk or the common filestore) the GVIEW command will be available to scan the file in the same way as MUGWUMP sub-commands in ELECTRIC and GVIEW sub-commands on the DES GEC 4000. Files on the common filestore will be erased automatically after a reasonable number of days but may be copied to a user's own disk using the normal COPYfile command if they need to be preserved. The need for a command to copy selected frames is foreseen.

When working to an online screen, the user can select one of a variety of actions (by program) to be taken when a frame of graphics output is complete. These include a request to the user to reply when the next frame should be started, a wait for a specified delay before the next frame is started and no pause or prompt at all. New routines in SMOG select these options - another new routine allows all graphics output to be sent to the screen (rather than being buffered in the graphics system): this is useful when an interactive program is being used before a read is performed. This facility is also used by GINO routines CHAMOD and CHAPOS.

In addition to the GRAPhics command needed to specify the type of output stream, the user should add GRAPHICS to the list of TXTLIBs accessed when a graphics program runs - this contains all the dynamically loaded portions of the graphics system.

Users who call a number of high level routines may find that the space available in their CMS virtual machine is not sufficient for their program and the graphics routines; in this case they should contact Program Advisor Office about the possibility of increasing their virtual storage limit to about 800k, which is sufficient for most purposes.

All current features of the RAL graphics systems, including those available under VM/CMS, are described in the "RAL Graphics User's Reference Manual": lineprinter copies of this are being circulated to major groups; when printed copies are available they will be circulated to those on the Graphics mailing list.

Users may explore the CMS graphics facility through the CMS Help facility - there is an extensive set of Help files for graphics. The GRAPhics command has its own Help file, but there is also a MENU for GRAPhics and for each package. Thus the user should try:

```
Help GRAPhics
Help GRAPhics MENU
Help GRAPhics topic <eg ENDFRAME>
Help SMOG topic
```

Latest information on the status of the graphics system will be found by

```
Help GRAPhics LATEST
```

and recently corrected or reported bugs will be displayed by

```
NEWS GRAPHICS
```

All problems and suggestions concerning graphics should be conveyed to User Interface Group by the GRIPE, ASKUS or TELLUS commands as usual: they will pass them to the relevent personnel in Graphics Section.

3. INTRODUCTION OF CMS SERVICE

We are now in a position to begin the controlled introduction of the CMS service to users. The following conditions will apply initially:

(1) Existing users of the Central Facility can apply for a CMS identifier if they have access via PACX or via a Networked computer. Most of the sites for which this is true are given below with network names:

DUWA	Durham 2050	GWGA	Glasgow ICF4070
CAGA	Cambridge ICF4070	BRWA	Bristol 2050
RLGA	Data Editing 4070	SNWA	Southampton 2050
RLGB	RL 4085	CDGA	Cranfield ICF4070
NEGA	Newcastle ICF4070	RGWA	Reading 2050
KWGA	Keyworth 4070	RHWA	Royal Holloway 2050
REGA	ROE 4082	BDGA	Bradford ICF4082
CFGA	Cardiff ICF4070	ZIWA	I.C.2050
BHGA	Birmingham ICF4080	HQGA	Swindon NERC 4070
ZUGA	UCL 4085	RSGA	Appleton 4070
DLXA	Gateway to Daresbury	CPWA	CERN 2050
RLPA	RL ICF PrimeA(750)	UMPA	UMIST ICF Prime 750
SVWA	Sussex 2050	RLGC	RL Stella 4080
SYPE	Surrey Prime 550	ZUXA	UCL LSI11
WKPA	Warwick Prime 550	SHGA	Sheffield ICF4085
XXWA	Oxford 2050	RLPC	RL EBL Prime 750
SVPA	Sussex Prime 750	BOWA	Bangor 2050
RLWB	RL 2050 Remote19	YKXA	York PDP11 Gateway
BRGA	Bristol 4085		
EDXA	Edinburgh PDP11 Gateway		

The work of registration will be assisted greatly if members of collaborative groups arrange to apply for identifiers together. Please supply the following information when requesting to be registered to use CMS:

Surname, initials (specify all please),
Style, title, address (work),
Telephone number,
Existing MVT identifier, account number,
Method of distribution of output (post, courier or RAL pigeon hole).
LOGON password (maximum 8 characters, set to be the same as your CMS userid by default).

Non-networked workstations are not yet able to access CMS in an acceptable manner so registration must be deferred until VNET is available.
(2) An overall limit of 450 users in total will apply to ensure that response remains within the stated guidelines. This limit will be reviewed in July. Users will be registered at a steady rate. The aim is for not more than 30 users in any one week.
(3) Controls for ELECTRIC and CMS will come into force from 1 September. Prior to that date allocations will be accounted so that users can adjust their habits to suit their budget.
(4) Owing to problems with supply of manuals from IBM it may not be possible to give each user a full set at the time of registration. We will make sure that a set is available at each workstation.

4. USE OF SUBROUTINE ARGUMENTS IN FORTRAN PROGRAMS

Apparently there is a widespread misconception about what happens when variables, and in particular arrays, are passed as arguments to a sub-program of a IBM FORTRAN program.

With a non-dimensioned variable, storage is allocated within the sub-program and the value of the variable is copied into this storage location at entry to the sub-program. Any calculation within the sub-program which alters this variable only changes the value within the sub-program. On returning to the calling program, the value is copied back into the storage location occupied by the variable in the calling program.

In the case of an array, no storage is allocated in the sub-program and any changes to the values of the array elements cause the array to be updated in the calling program immediately. This means that passing arrays as arguments to subroutines or function sub-programs does not involve the transfer of data backwards and forwards between two storage locations. It also gives rise to the feature whereby the dimensions of a dummy argument array can be passed as another argument which may be calculated dynamically. There is then no need to define the array size in the sub-program at compile time.

A feature which is not part of the standard FORTRAN language but which is implemented in the IBM FORTRAN H compiler is the ability to pass non-dimensioned variables by 'location' in the same way as arrays. This is achieved by enclosing the dummy argument in slashes and results in the storage location of the variable in the calling program being updated whenever the variable is changed in the sub-program.

A future issue of FORUM will describe the argument passing mechanism on ICF computers.

5. ALLOCATION AND CONTROL OF ELECTRIC

The Facilities Committee for Computing (FCC) has agreed that it is necessary to allocate and control front end resources, in particular logged-in time. A scheme to do this for ELECTRIC has been under discussion and the first phase was implemented on 1 April. This phase calculates how many allocation units have been used by an account according to an algorithm described below.

In a later phase each account will be given a weekly ration (in a similar manner to the issue of CPU time) and login controls will affect accounts (not identifiers) whose weekly ration has been exhausted. The following restrictions would then come into force:

(1) A user whose weekly ration has been exceeded will not be allowed to login during the period 09.00 to 18.00 from Monday to Friday.
(2) A user whose ration is exceeded during a session may be logged-out automatically when all the available user slots are taken.

Some details are given below, including a new command, to allow rations of allocation units to be examined. The new version of ELECTRIC which has been installed calculates and records the allocation units (AU's) used in each logged-in session. The allocation units used during a session are calculated according to the formula:-

Cost in AU's = T * (connect mins + 0.2 I/O's) / 810

where connect mins is the logged-in time and I/O's is the total number of I/O operations to the ELECTRIC and GRAPHICS (MUGWUMP) file-stores (excluding the routing of lineprinter output).

The time-dependent charge factor T is given in the following table:-

TIME	T	TIME	T
00.00 - 08.00	0.1	13.00 - 18.00	1.0
08.00 - 09.00	0.4	18.00 - 22.00	0.4
09.00 - 12.00	0.8	22.00 - 24.00	0.1
12.00 - 13.00	0.6	w/e & public holidays	0.1

These time bands may be adjusted in the light of experience.

At login the user will be told the weekly allocation of AU's, the total AU's used on the account so far (by all users of the account) and the current charge factor. At logout the user will be told the connect time, the I/O's and AU's used during the session and the AU's left on that account allowing for any other users currently logged-in on the same account.

A new command QUERY (Q) allows the current charge factor, the rations for a given account and the I/Os, connect time and AUs used so far, to be displayed.
Q CF - displays the current charge factor
Q RATION ID=ID ACCT=ACCT - displays the weekly ration and AUs used for the account. ID and ACCT are positional, only needed if not logged-in.
Q AU - displays the I/Os, connect time and AUs used so far during a session.
Q CF and Q RATION may be used when not logged-in, Q AU only when logged-in.

6. INTERNATIONAL CONFERENCE

The University of Edinburgh is organizing the first International VLSI Conference to be held in Edinburgh on August 18-21 1981. The conference will present current research in all aspects of the design and application of very large scale integrated circuits. It is intended to concentrate on the opportunities afforded by VLSI to system