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SCIENCE AND ENGINEERING RESEARCH COUNCIL

RUTHERFORD APPLETON LABORATORY
COMPUTING DIVISION

D I S T R I B U T E D C O M P U T I N G N O T E 5 6 7

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FINAL DRAFT

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 Investigators/Edmonds

(see next page)

IN CONFIDENCE

SCIENCE AND ENGINEERING RESEARCH COUNCIL
ENGINEERING BOARD

16/17 February 1982

Computing and Communications Sub-Committee

Note concerning grant application from Dr E Edmonds, Leicester Polytechnic

1. INTRODUCTION

A grant application from Dr Edmonds at Leicester Polytechnic entitled "Human Computer Interface Unit" was considered at the 1/2 November meeting of the Sub-Committee.

Arising from the discussion the Rutherford Appleton Laboratory (RAL) were asked to discuss with the applicants the following points:

- a. Cost of installing a GEC 4090 Multi-User Mini (MUM) at Leicester.
- b. Connection of SIGMA ARGS display to GEC 4090 (hardware and software).
- c. Estimation of effort required to move existing programs to PERQ/MUM.

A meeting was held on 19 January 1982 to discuss these points at which the following were present:

Leicester:	Dr E Edmonds	RAL:	Prof F R A Hopgood, Head of Computing Div.
	Dr A Hashim		Dr P E Bryant, Head of MUM Systems Group
	Dr S Guest		Dr M R Jane, Head of Telecommunications and Resource Allocation Group
	Dr B Bramer		Dr R W Witty, Software Technology Coordinator
			Dr D A Duce, DSC Coordinator
			Mr J R Gallop, Graphics Section

2. SUMMARY

2.1 MUM Installation

- 2.1.1. The 4090 configuration proposed is sensible and includes all the components of an ICF standard GEC 4090 MUM.

- 2.1.2. Cambridge Ring interface estimates cost £6K. JNT procurement policy will be followed.
- 2.1.3. Request for modems and terminals for remote dial-up reasonable.
- 2.1.4. Form AL54 should be submitted requesting resources on the machine.
- 2.1.5. Add £3K for 12 disc packs, ICF standard measure.
- 2.1.6. Separate out machine manager from staff requests. ICF standard 4090 installation recurrent support is £25K p.a. to covering manager's salary, consumables, travel expenses for manager. SERC expects to contribute £20K and the site is expected to contribute £5K (electricity etc).
- 2.1.7. ICF allow 5% of capital costs for installation.
- 2.1.8. It was agreed that the ICF installation manager, Mr Brandwood would visit Leicester to discuss site requirements. Following his visit on 3 February, installation costs (air conditioning, wiring, electrical cabling, minor building works) were estimated at £10K.
- 2.1.9. Dr Edmonds will send revised versions of sections 20 and 21 of form RG2 to the secretary, Mr Monniot, embodying these agreed decisions.

2.2 SIGMA ARGS Interface

- 2.2.1 Leicester agreed that SIGMA's interface using GEC digital i/o board would satisfy requirements. Cost about £2,500 including GEC board.
- 2.2.3. Dr Bryant estimated 2 man-months of effort at RAL is necessary to write a device driver in the GEC operating system to support the ARGS. This software is not available from elsewhere.

2.3 Software

- 2.3.1. Leicester's software is written in Fortran IV and needs conversion to Fortran 77 to run on PERQ and Unix. The task was not considered onerous.
- 2.3.2. Resources could be provided in machines at RAL if a grant is approved to enable software conversion work to start before Leicester hardware is delivered.

3. DISCUSSION

3.1 Equipment Requirements

The following points arose during the discussion of sections 20 and 21 of the RG2 Application Form:

- 3.1.1. Dr Edmonds presented the detailed quotation GEC had given for 4090 system. Dr Bryant was satisfied that this included the standard configuration for a 4090 as supplied by the Interactive Computing Facility (ICF), and was a sensible configuration.
- 3.1.2. The quotation included an estimated £4.5K for a Cambridge Ring interface. It was suggested this be increased to £6K. The Joint Network Team are currently handling the procurement of such interfaces and the relevant software. Leicester will follow JNT policy in this respect.
- 3.1.3. The provision of an SRCnet connection would be RAL's responsibility if provision of a MUM is approved.
- 3.1.4. Leicester request funds for dial-up modems and Texas Silent 700 terminals (the ICF standard portable terminal) to permit out of hours working from home as entry to the Polytechnic buildings after normal hours is forbidden. Dr Bryant thought that improved access to the machine might be possible through British Telecoms PSS, but unfortunately the nearest Packet Switch Exchange is at Birmingham which is outside the local rate calling charge zone from Leicester.

It was therefore agreed that the request for modems was reasonable.

- 3.1.5. Professor Hopgood pointed out that since the group were asking SERC to purchase and install a 4090 system as a standard ICF MUM, it would be necessary for them to submit an AL54 Form to formally request resources on the machine. The resource request was expected to show a rising profile of usage over the term of the grant.
- 3.1.6. Dr Jane pointed out that no allowance had been made for funds to purchase disc packs. The ICF standard measure is 12 packs per system at a total cost of about £3,000.

3.2 Manpower Requirements

It is ICF policy that each MUM machine has a local manager (employed by the site) whose duties include dumping discs, reporting errors, first line user support and attendance at liaison meetings.

It is normal policy that SERC places a contract with each MUM site for running the machine. SERC provides funds for:

- Manager's salary
- Consumables
- Travel expenses for manager

The site is expected to fund other costs, for example electricity and accommodation for the machine.

Running a standard 4090 installation is costed at £25K p.a., of which the site is expected to pay £5K (electricity etc) and SERC £20K (items as above).

It was agreed that an inflation correction of 10% p.a. should be built into this item as grant recurrent funds are not subject to yearly inflation connection.

It was agreed that the costs of running the 4090 would be made explicit in the grant application as a separate item and the manpower request would be adjusted accordingly. Leicester has assumed that 50% of the Manager's time would be available for programming duties for the research group and, based on experience at existing MUM sites, this was considered reasonable.

3.3 Environmental Requirements

Dr Jane stated that the ICF work on the basis of 5% of capital costs for installation, which includes provision of air conditioning, power supply, minor building work necessary to meet fire regulations etc.

The room which the Polytechnic have allocated for the machine does not have air conditioning. The room has a false ceiling, but this should not present any problems. The site is responsible for insurance of the equipment and hence must check with their insurers that the proposed environment is acceptable.

It was agreed that the ICF Installation Manager, Mr Brandwood would visit Leicester to discuss the requirements in detail with their relevant parties. Mr Brandwood subsequently visited Leicester on 3 February, and discussed installation requirements with the Building and Works Department at the Polytechnic. Installation costs were estimated at £10K.

3.4 SIGMA ARGS Interface

3.4.1 Mr Gallop (responsible for the ARGS displays used by the Starlink project) and Dr Bryant reported that Daresbury Laboratory have interfaced a SIGMA ARGS display to a 4090 using a CAMAC interface. Equipment costs are in the region of £9K. CAMAC is relatively slow and is not very well suited to the job.

Mr Gallop has discussed the problem with Mr Massey, then Managing Director of SIGMA and an alternative approach based on a GEC digital i/o board interface is proposed. This will operate over a distance of about 20 feet. The interface operates at about £200K words (16 bit) per second; roughly one image per second.

A DMA interface is a further possibility, but would be expensive and have severe limitations in that i/o would only be possible into particular regions of physical memory complicating considerably the provision of software to drive the display. The digital i/o board, however, looks like a normal i/o device.

SIGMA have produced an interface to the GEC digital i/o board and it is believed that a very large order for such interfaces has been placed by a nationalised industry. The cost of the interface including the GEC board is £2,500.

- 3.4.2. SIGMA do not provide software to drive the interface from GEC's operating system. Dr Bryant considered that 2 man-months effort would be required to write the necessary driver. His staff have wide experience in writing device drivers for OS 4000 and Starlink Staff wrote the device driver used in the Starlink VAX machines.
- 3.4.3. It was agreed that it would be beneficial to all parties if the ARGS were delivered to RAL in the first instance and shipped to Leicester when the necessary software work is complete. The provision of software to drive an ARGS from a GEC machine would be effort well invested and is expected to benefit other projects also.
- 3.4.4. Mr Gallop discussed the proposed ARGS configuration in detail and was reassured that it was a sensible configuration suited to the proposed tasks. A point of detail to emerge was that Leicester would like the ARGS to appear as a separate i/o device rather than as a terminal to the OS4000 user. The ARGS is also used in this way in the Starlink project.

3.5 Raster Hardcopy Device

Leicester sought RAL's experience of raster hardcopy devices. Mr Gallop outlined the problems experienced with both the Dunn Camera and the Image Resources devices. It was agreed that Leicester would further consult RAL when ready to purchase the device.

3.6.1. Synics Translator Writing System

This system is at the heart of much of Leicester's existing software. It has recently been moved to a Harris computer at Unilever's Research Laboratory at Port Sunlight. The software was written in Fortran IV, for the Burroughs B6700 at Leicester. The only problems experienced is moving the package to the Harris concerned the use of random access files from Burroughs Fortran which permits random and sequential access to be mixed.

Dr Witty commented that the Unix operating system to be provided with the PERQ has the necessary functionality to support this. Dr Bryant considered that the solution used on the Harris system would be appropriate to the GEC.

Synics conforms to the PFORT subset of Fortran IV. Both PERQ and GEC support Fortran 77 and translation to Fortran 77 is indicated. This is not expected to be difficult. Synics is about 4,500 lines of code.

3.6.2. Dialogue System

The Dialogue System uses Synics and was written with conversion for Fortran 77 in mind. When this software was written it was believed that Fortran 77 would include recursive subroutines. Unix Fortran 77 supports recursive and there are techniques for handling recursion in GEC Fortran 77.

3.6.3. RGOL Graphics Language

The RGOL graphics language uses Burroughs character packing and string handling facilities. Some work is required to convert the program to Fortran 77 but should not prove a major task.

3.6.4. Palantype System

The software for palantype encoding and decoding was Burroughs fast bit manipulation facilities to achieve good performance. Some work will be needed to move these programs to the GEC and Unix, but they are not large programs.

3.6.5. General

It was agreed that if a grant is awarded, time would be made available on the machines at RAL to enable the conversion task to commence before the grant formally commences and before the hardware is available at Leicester.