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SCIENCE AND ENGINEERING RESEARCH COUNCIL
RUTHERFORD APPLETON LABORATORY

COMPUTING DIVISION

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MEETINGS
Minutes of the Review Panel Visit to
Professor D Aspinall,
UMIST, 25 March 1983.

Issued by
Miss G P Jones

19 April 1983

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SCIENCE AND ENGINEERING RESEARCH COUNCIL
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DCS Panel

GR/C/4678.9 Minutes of a Review Panel visit to
Professor D Aspinall,
UMIST - 25 March 1983.

Background and Proposed Research

Professor Aspinall has a rolling grant entitled 'The Use of Microprocessors in Information Systems', for £283K which runs until September 1983. Professor Aspinall has now applied for an extension to September 1985. This will be the final period of the investigation and the £67.5K requested would be used to maintain the CYBA-M research vehicle and the program development environment to enable a range of current research activities to reach successful conclusions. These activities comprise

- a) Investigation of the implementation of languages on multicomputer structures. Languages being investigated are:

CYBA-L	by Prof Dagless	at Bristol
CHILL	by Dr M Barton	at Bristol
OCCAM	by Dr Gray	at UMIST
PASCAL PLUS	by Hughes & Powell	at UMIST

Researchers at Bristol are negotiating support for their own research activities with SERC and industry. The OCCAM project will investigate the value of the language in general and its use in a microcomputer system (CYBA-M) in particular.

The Pascal Plus investigation involves and SERC supported Ph.D student. The work funded by SERC in a grant to Hughes and Powell is for installation of Pascal Plus and UCSD Pascal on CYBA-M as a software development environment.

- b) The mapping of applicative languages onto a direct shared memory system. It has been decided recently to look at the problem of building a reduction machine suited to the language SASL based upon
- 1) a direct shared memory and
 - 2) upon a closely coupled net of transputers.
- Direct shared memory implementations and tests upon other regular structures are to be studied.

- c) Dr Ritchings is supervising research into image processing and pattern recognition. The most promising approach is for each processing element to perform the same operation on some segment of the image (SIMD style). The SIMD studies will involve post graduate students in the design and use of VLSI components.
- d) Under funding from the US Air Force, the group are looking at modelling multi-computer interconnection structures on CYBA-M, for studies of message passing protocols. They are also investigating bi-directional and dual rings. This has led the group to consider the design of processing elements for closely coupled systems.
- e) Prof Aspinall and Dr Edwards are using the results of an investigation into components, to provide the specification for several micro-electronic circuits which will be implemented by students on the SERC supported M.Sc course on integrated circuit design. CYBA-M may be able to provide a test bed for the characterisation of the working chips.
- f) A further study is looking at fault finding techniques for maintaining multi-processors such as CYBA-M. A suite of programs is being developed to pin-point faults; at present it is being developed specifically for CYBA-M but later developments will make it applicable for other multi-processor machines.

Review Panel

The review panel comprised:

E C P Portman (Chairman)
Dr M R Sleep
K Dixon
G P Jones (Secretary)

The objective of the review panel was to formulate a recommendation on the new application to the DCS Panel.

In the opening discussion the panels views were that in the time elapsed since the commencement of the grant the direction of investigation has changed from that of architecture to languages. The panel felt slightly concerned with the large number of languages being studied in the proposal, and also the lack of work in the study of shared memory. The importance of the OCCAM language and the general terms in which it is described in the proposal caused the panel to doubt its applicability to CYBA-M.

An important factor in the grant application was the separate grant of Hughes and Powell which relies on the CYBA-M for their investigation, and the effect on the grant if the Aspinall application were unsuccessful.

Discussion with Dr Edwards and Dr Ritchings

Due to illness Professor Aspinall could not attend the meeting, Drs Edwards and Ritchings stood in for him.

The panel asked to hear more information on the languages being investigated and over what timescale.

Dr Edwards replied that at present there are 2 RA's at Bristol who are leaving, or will have left the project by the end of April, therefore after that time only informal links will be maintained while joint work is being completed. Dr Mike Barton and Paul Skan from Bristol are looking at CHILL on the CYBA-M, their work is almost complete, they will require to work on the machine for another 6 months. After that time Skan will return to UMIST to work on the U.S Air force project evaluating ring protocols using CYBA-M.

An RA (Munro) is working on design methodology at Bristol, it is hoped to continue this work through a grant application recently submitted to SERC.

At UMIST over the past 4-5 years work on multiprocessor structures has been supported. A ring simulation model has been built and is in its last stages of commission. It will need the support of CYBA-M until February 1984.

Professor Aspinall has two Research Students who started in October 1982, it is thought that they will need the machine until October 1984 to study related to CYBA-M itself and also ring models.

The investigation of SASL continues, looking at structures applicable to these kinds of programming languages and finding what elementary node would be needed for building an engine to run these languages.

The panel enquired as to the suitability of CYBA-M to run SASL, Dr Ritchings stated that the answer would become apparent in approximately 6 months time when measurements would be complete.

On enquiring about OCCAM the panel was told that Dr Gray from UMIST was investigating this area which was outside the field of both Edwards and Ritchings but they believed Dr Gray is looking at Pascal, Chill and Message passing with ADA.

Private Meeting

The panel felt that it would not be catastrophic if the grant application was turned down, but the Hughes and Powell work was going so well that the disruption of this work would be a pity. It was decided to recommend funding the grant for 1 year on the proviso that the grant be reviewed again in March 1984 to see how work on the languages being investigated had progressed. If not satisfied at that time the remainder of the funds would be withheld.

Dr Edwards and Dr Ritchings were appraised of the panels views.

Demonstration

The panel were shown demonstrations of the image processing and pattern recognition project and also the Hughes and Powell Pascal Plus investigations.