

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 1 1

VISITS

Notes on a visit to Professor Grimsdale,
Dr Halsall et al, Sussex University

issued by
Miss G P Jones

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 Investigators/Grimsdale file

Professor Grimsdale introduced the entire DCS project group who attended the morning session.

Dr Halsall outlined the existing main grant which he described as a methodology for writing structured applications software onto multiprocessor real-time embedded systems. The application consisted of a set of modules, each module having a specific function, and each having the facility for intermodule communication. The software runs on a host machine which distributes tasks to processors.

When the project started, concurrent Pascal and Pascal plus were considered as concurrent programming languages, about that time the ADA specification was being released and it was decided to take Pascal and introduce the concurrent features proposed for ADA.

The setup program creates memory images which are downline loaded to the multiprocessor, they run interpretively, run-time support software handles scheduling, intertask communication etc.

The hardware architecture is a multiprocessor shared memory with a number of stations connected by a high bandwidth serial line, software architecture is independent of interstation communications medium.

The current state of the project is that, now applications software for such systems can be written, at the present time the compiler runs on a VAX and the set-up programme runs on a Prime; it is intended to bring the two together and run on an LSI 11/23.

Distinctive features of this project are:

On the hardware side the multiprocessors system is flexible, the stations have a shared memory, they are also joined by a serial CSMA link. The group will be looking at performance-measurement in the near future.

On the software side, applications programs have been written consisting of task modules. Their language, Martlett, is probably the first implementation of ADA multitasking.

Future requirements will be to add performance measurements, and in the applications field a fault-tolerant high availability system will be developed along with a terminal inquiry system. The group think they can identify useful features for such systems rather than requirements of a particular user. A very detailed plan of work has been drawn up.

The group are investigating robust, rather than perfectly reliable systems. They believe a robust system to be an achievable goal. A robust system admits the possibility of human intervention, for example to turn off a station which is generating spurious messages. Having turned off the offending station the system will recover preserving filestore integrity etc. Richard Hull and Richard Barber will be primarily concerned with this aspect of the work.

The group would be sympathetic to outside requests for development along specific lines, if resources allow.

Modifications on the present system will be to "clean it up" for users (for example moving compiler and setup program to the same machine e.g. task instancing). Areas have been identified in the compiler that need extra facilities and the 11/23 will have an interface to the serial highway. There is also a problem with memory size pseudo, memory management will be incorporated to overcome the bad architecture of the 8086. An M-code to 8086 code translator is being considered, but has low priority.

The system at the moment is fully documented, with a workable multiprocessor and pilot implementations. On the language side the programming language provide a necessary and sufficient set of facilities though it has no real numbers of files. Hardware addresses can be got at for L input memory mapped output, and interrupt handlers can be written in the language. The market place for this system is seen as someone who has multiprocessor requirements. ITT showed interest in this system but the representative from the firm was moved to another position. It was thought a good idea to contact Intel, this will be with the assistance of Fred Chambers.

Fred Chambers was told, in confidence, of the links with Redifon. He will assist in any way possible to foster these links and with the preparation of the submission for a Cooperative Research Award. David Duce suggested John Monniot be involved and that Fred Chambers seek an early meeting with the secretary of the Cooperative Awards Committee.