The CAM invention

Ivor Catt

On March 1, 1973, the National Research Development Corporation said that the CAM invention " ...could be of fundamental importance in the design, construction and operation of future digital processors and stores (i.e. computers)."

The dramatic collapse in the cost of computer circuitry due to the development of LSI (Large Scale Integration) was the most important development in the computer art. This should have had a profound effect on computer organisation but was ignored. Whereas in 1959 when I joined the computer industry the prime cost of a logic gate, the basic element in a computer, was £2.50, today we can manufacture some 300,000 interconnected logic gates on a semiconductor LSI wafer for a cost which is claimed to be £10 but is really probably more like £2.50. This means that the cost of a logic gate has fallen by a factor approaching a million.

The reasons why the enormous potential resulting from this massive cost reduction has not been exploited are given in my book, *Computer Worship*.

The CAM invention takes advantage of the collapse almost to zero in the cost of circuitry and uses the processed two-inch wafer as it stands without the many further manufacturing stages which have always before been indulged in. A self-organising associative memory is generated on the wafer, and there is plenty of computing power on a £2.50 wafer (equivalent to 300 general purpose computers) for regions of the wafer to decide which adjacent regions are faulty and should be avoided. The associative memory so formed is then used to simulate conventional memory, undercutting the present cost of core and semiconductor memories on the market by a factor of 20.

"The Spectator", 9, 16, 23 Feb, 2 March 1974" [There was also 2 Feb, 2 March]

Further technical information can be supplied by the company set up to exploit the invention, CAM, Crouch Hall, Redbourn, Herts AL3 7EU.

Development of the CAM (Computer Associative Modules) invention can be expected to take the British computer industry ahead of the American. The first target for CAM is the conventional computer memory market. However, later developments will be much more important, enabling us to do tasks which are not achievable with conventional computers. These include: the sorting out of traffic jams; air traffic control; railway timetable and school timetable planning; airline reservation system improvement; town planning; highway planning; electricity supply planning and control; pattern recognition.

NRDC paid for the patenting of the CAM invention in three countries. ACTP, a branch of DTI, is committed to the financial support (on their usual terms, 50 per cent of money spent) of the £40,000 development project. SRC recently granted the Middlesex Polytechnic Microelectronics Centre £1,000 to research into one aspect of the CAM invention.

Next week Ivor Catt writes about what the Government has done about the CAM invention.

HMG and the CAM

Ivor Catt

" . . . The history of Tracked Hovercraft Limited proved to be an example of the Government's failure to manage their research and development in a competent manner. It also showed up weaknesses in the system for developing and exploiting inventions." (From the *Third Report from the Select Committee on Science and Technology, Tracked Hovercraft Ltd.* HMSO 36½p)

The CAM invention further illuminated weaknesses in the system for developing and exploiting inventions, or to put it more accurately, the ingenious nature of the system for sabotaging new invention and industry. Certain important principles became clear during the first eighteen lingering months when the CAM invention was enveloped in the labyrinthine entrails of Her Majesty's Government.

At first sight, it might appear that a government agency such as the NRDC (National Research Development Corporation), set up to support new invention and industry, has two possible courses of action when a proposal such as the CAM project is made to it:

1) Say the proposal is bad and reject it, or

2) Say the proposal is good and support it.

However, either of these courses carries a risk, either of supporting a bad proposal and wasting taxpayers' money, or of rejecting a good proposal and facing embarrassment should the idea later be developed abroad. Either could hazard the comfortable career paths of worthy functionaries within the NRDC, particularly those lacking the ability to distinguish between a good idea and a bad, or even between an idea and a gatepost.

This apparent Hobson's choice was resolved some time ago by the discovery of a third, most attractive choice:

3) Say the proposal is a great idea and then play for time.

We find that the patent laws are admirably suited to this third course, because a provisional patent lasts for one year only, and if the complete (and expensive) patenting is not done within the year, the invention becomes valueless and the inventor can be relied upon to go away quietly, though perhaps a little puzzled.

After one or two false starts, the CAM invention was first mooted

to Mr P of the NRDC in early 1972, the details then being completely secret. Mr P advised the inventor (me) first to protect himself by filing a provisional patent in the Patent Office at a cost of one pound, and then to give the details to the NRDC. This he did in August 1972, and the waiting game began.

Mr Q of the NRDC selected option (3) with gusto, taking the inventor out to lunch and saying the invention (which it now appears he didn't really understand) was of great importance, and that the NRDC hoped it would match or surpass their one major success, which was currently earning them some £4 million per annum. This enthusiastic evaluation (and all appraisals of the CAM invention by all government officials have been enthusiastic) was all verbal, and there were lengthy delays for various obscure reasons until six months later, when on March 1, 1973, Mr Q finally put his enthusiasm into writing: " . . . I believe you are on to something which could be of fundamental importance in the design, construction and operation of . . . (computers)."

It was now only necessary for the NRDC to hold off the inventor for a further six months on one pretext or another and the CAM invention would be valueless (and harmless). The inventor would then leave them in peace.

Periodically, Mr Q sent the inventor letters, saying he was anxious to expedite the matter and gain full patent protection. However, the inventor could not take the matter further, because, throughout the whole year, Mr Q never once answered any of the telephone calls of the inventor, the inventor's wife, the patent agent recommended by the NRDC, or the technical expert brought into the affair by Mr Q himself. Neither did he return any of their calls during that year. He buttressed this position with occasional nonsensical letters.

As the eleventh hour (actually eleventh month) approached when it would be too late to start filing the full specification and save the invention, the situation became serious, so that I was finally forced secretly to guarantee the patenting costs (£1,700) to the patent agent himself. Also, he brought in a third party, an accountant, to try to get sensible communication going with Mr Q and the NRDC, but to no avail. (The crazy, incoherent negotiations between the accountant and the NRDC are hard to believe, and make another story. Suffice it to say that the NRDC was continually self-con-

NRDC, asking for the facts of the case. His call was immediately reported to the managing director of the NRDC, who called a board meeting that same morning. After the board meeting they called the reporter to say they had handled the CAM invention badly, that they were keen to support it, had reversed their decision on patenting costs, and a contract would be in the mail to the inventor that night.

Next day my accountant said the contract terms were unacceptable, so the NRDC corporation secretary told him to rewrite the contract as he wished. So after a delay of almost one year, a large amount of government money was given away under terms written by the recipient.

This first hurdle, patenting, successfully over, the waiting game recommenced, this time for the £40,000 to develop the invention. This new delay has now stretched into six months, and no meaningful communication between myself and the NRDC has occurred. However, the NRDC are careful to assure all inquirers that they are very keen on the CAM invention and anxious to support it.

Next week Ivor Catt issues a direct challenge to the DTI.

Challenging the DTI

Ivor Catt

The NRDC (National Research Development Corporation) was first asked to support the CAM invention eighteen months ago. Since then, though persistently claiming a strong desire to support it, they have continually prevaricated. No progress whatsoever has been made in the exploitation of the invention.

The NRDC, like the BBC, is an independent corporation, but under the wing of the Department of Trade and Industry. Nine months ago ACTP (Advanced Computer Technology Project), which is within the DTI itself, was asked for support. Like the NRDC, ACTP also expressed a strong desire to support the CAM invention, but again only prevarication has followed. We now have the absurd situation that all computer-oriented scientists in two separate branches of the DTI are very anxious to support the CAM invention, they believe the cost is trivial (£40,000) and the potential reward enormous, but they make no progress, being hopelessly tangled up in complicated rules and regulations.

The inventor [Ivor Catt] hereby respectfully requests that the Secretary of State for Trade and industry resolve the situation, by saying either that

1) The CAM invention is after all no good and should not be supported by further government money, or

2) The CAM invention will be supported by the DTI, the specific terms of support being stated at that time.

The Spectator will publish the response of the Secretary of State. Alternatively, in three months' time it will publish to the effect that he is indifferent to problems arising in the Government's handling of invention and new industry, which both Mr Walker and Mr Heath have said are vital for the future of this country.

Next week there was a snap election, and the ministers I was pressuring disappeared.