

July 68

Comments on the Minutes of the Special Meeting of the Atlas  
Computer Committee, 23rd July 1968 and the Technical  
Specification of the 1908A Computer System

1. The Technical Specification

The first immediate comment to be made is that having previously pointed out the difficulties of a multiprocessor approach in the last set of proposals, ICL now seem to support the case for a multiprocessor approach and promise to supply the software which they had previously considered too difficult. Their thinking here seems to be extremely muddled and it is not possible from the information set out in the specification to imagine just what they intend to do with twin configurations of either kind. This specifications adds practically nothing to what was proposed some months ago: it is disappointing as a system specification since it makes no attempt to suggest what parts of the "kit" would go to make up a viable system for an installation suitable for ACL. In particular the main store is available in modules of 128K (25 bit words), with a rider that indicates some delay if the store size is increased. Apart from the fact that no mention is made of how much of this effective 64K words would be taken up by the system, what are the economic factors determining the choice of more main store as against the support of a mass store. This latter store is merely viewed as a development and I feel that the system should start off with this concept, otherwise there is a good chance that the system will be unbalanced. Although under ideal conditions the internal speeds may be achieved, the throughput could suffer severe degradation if the backing store is to rely on discs and drums. In quoting the expected power this has an important effect and the specification of a machine for 1973 should not completely ignore such an important consideration. I would expect a mass store to have a significant effect on the power of the system, as is the case with other computers that have had these stores added. In general there is a completely inadequate appreciation of the concept of throughput and we are only treated to a somewhat "sloppy" reference to "matrix inversion etc." and the internal speeds expected.

Dealing with Section 2 "System Description" in detail: 2.1.1. the first consideration is "Compatibility" and I think that this is not a very important point for ACL since only at most a third of the Universities have 1900's and a good deal of the work is written in Fortran, Algol or some other high level language. It would be unreasonable to perpetuate the situation, that because it has been necessary to write in machine language for the 1900 series in recent years to achieve speed of execution, these programs should be able to run in 1973-4 without change. I do not believe that investment in programs for scientific use is that high or will be by 1973-4 so as to constitute an important factor in our case. I am considering the case for the large computer for ACL to consist of both the 1906A and 1908A. but if a 1906A is bought independently, then, of course, that decision forces the fact of compatibility upon us.

The reference to George 4 Operating System is not supported by any facts and in view of the present uncertainties regarding George 3 the ability of ICL to produce such a system is in question and it will not be possible to assess the effectiveness of this until 1969 or 1970. To rely on a system for the 1908A which itself relies on the suggested system for the 1906A, supported by a non-existent George 3 does stretch one's credulity a little far.

2.1.2(a) I have already made some comments on this, but I do not understand the reference to four way interleaving and at the same time the specification of thin film techniques. The only difference between the IBM 91 and 95 is that the 91 has core store 16 way interleaved and the 95 thin film store with no interleaving necessary; the full effect of the 16 way interleaving is then matched by the simple store. The point being that it is frequently not possible to arrange matters for the interleaving to be effective, e.g. the Atlas store is not used as effectively as it was planned to be.

2.1.2.(b) I am a little uncertain here about whether the idea once suggested of having a small special processor unit to control store accesses of all kinds has been resurrected or whether this is something new. It also raises the question of how the three units are put together with operand slave stores, instruction buffers and 16 current page registers as added features.

2.1.2.(c) CPU - the comment that the overlapping can make instruction rates of 100 n sec/instruction possible is not very realistic and I suspect that a factor of 2-3 has to be applied to give any idea of the real instruction rate.

2.1.2.(e) Is this another small processor designed to look after peripheral activity with special interrupt facilities, or does the 1906A or 1908A have to look after interrupts from peripherals? I am also not sure what equipment is envisaged as being linked in, and again the specification fails to give any indication of how the system is to operate in any kind of environment. There may be too great an emphasis on having local peripherals and little attention to the way the system could work with a whole range of equipment from the very lowest to the highest transfer rates.

3.7. Are these American circuits made under licence here? and a further question, how much of the equipment is of completely British manufacture?

3.12. The physical size is astonishing, what are all these cabinets of such size doing? I cannot believe that any other computer of this power in 1973 will require such a vast physical make up, since machines of greater power than this system already exist and are much smaller. This is important because buildings are expensive and there should be some recognition of this fact in putting forward proposals to customers. 21 cabinets, for a single processor with minimal core, of the size given cannot possibly give one confidence that this is to be a modern machine.

Some general comments on the "Summary" Section 1.

To suggest that this system will be competitive on its merits in 1973-75 is not I think realistic. It has no interesting features, it is large and expensive and its design aims for 1973-75 are something like 4-5 years behind the times. The success of the 1900 series has been largely dependent on the sale of computers at the small end of the range and to base our computing power for 1973-80 on the slender evidence of how well the larger 1900's have performed is disturbing.

The price also seems to have gone up again and this makes the system even lower value for money than it was several months ago. I do not expect that 10-15 systems can be sold competitively and the sale of such numbers will require deliberate massive Government support.

## 2. The Minutes of the Special Meeting

The meeting was held because of lack of information from ICL, but the technical specification seems to add little to what was previously known. Para 4(ii) this is a complete reversal of their previous position. What has changed and what are the technical reasons behind their new design.

Para 4(iii) Is this not yet another delay?

Para 4(iv) Others will have made this point but it should be clear that a simple architecture does not imply that it is a good one and present evidence does suggest that of some computers studied the 1900 design is poor.

Para 4(v) With a new product set to be produced in 1975-6 the system 1908A will be immediately obsolete and what is perhaps more serious, will ICL be in a position to support 1908A systems when all their energies will be directed to getting the new system off the ground? If ICL cannot produce the 1908A before 1972-3 the 1972-3 period then I think it is very questionable whether it is a suitable machine for ACL, which would have to rely on this machine possibly until 1980; a five year period at least when the new range of machine will be available. It will be difficult to be sympathetic in 1976 to pleas from ICL that after all the 1908A is based on an early 1960 design. If there was even some little indication that ICL regard this development as necessary for their new range, the lateness of the 1908A would be understandable.

Para 4(vi) ICL judgement of the points raised here is to be noted, as it is in direct opposition to a large body of expert opinion that thinks quite differently. It would be very important at this stage to investigate in detail the answers they have to the many criticisms that have been made. An overall assurance from Dr. Wilson and J. Deas that they are confident is just not good enough in considering a project of this size, and nothing short of some relevant facts to support their views is what is wanted.

Para 5.

The suggestion from Professor Page implies a role for the Atlas Laboratory which is inconsistent with the aims of the Laboratory as I understand it; i.e. to provide a professional service for research workers in the Universities. I do not think that a professional service can be made available at the same time as the development of systems of hardware and software in collaboration with ICL. It has been possible in recent years to develop the Atlas service in this way, but I consider this to be a completely wrong approach for the kind of service that will be required in the 1970's. It also implies a vertical hidden subsidy to ICL for the development of software and systems and this should be clearly understood before this suggestion is entertained. I do not doubt that the expertise is available to do this, but the environment will not be suitable for this in the 1970/s: the contact with our users will be quite different and development of systems mixed up with an expectation of a high quality service doesn't, in my opinion, to be a good prospect.

It is noticed that Professor Page explicitly refers to the mass store in his proposals and after my comments above this should be regarded as a key item.

That the Atlas Committee was able, with the present facts available, to reach a decision is something of a surprise, since ICL appear to have changed their minds yet again with little or no additional evidence to support their case for the suitability of the proposed system for ACL. At the present moment the combined uncertainties of function, cost, power, size, delivery and software do not make this latest proposal any more attractive than ICL's previous attempts. The reputation of the Laboratory as one of the few professional computer laboratories in the country is bound up with our ability to assess new computer systems in a critical manner and the decision of the Committee fails to do justice to the professional expertise within the Atlas Laboratory.

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