

Director DSB
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D/0952/133/2

4th July, 1957.

Copy No. ...2.....

Mr J.E.S.Cooper	}	Personal to each.
Mr R.N.Thompson		
Mr C.H.O'D. Alexander		
Mr A.Bruce		
Capt. P.R.Marshall		
Mr G.E.P.Jackson	}	Personal to each.
Mr A.C.Eastway		
Copies to : Dr. G.W.Morgan Capt. M.Hodges		

MINUTES OF A MEETING TO DISCUSS THE STATE OF THE INFUSE PROJECT.

1. A meeting was held on 2nd July, 1957, to discuss with Director, DSB, the state of the INFUSE project.

2. The following were present at the meeting :

AD1	Mr J.E.S.Cooper (Chairman)
Director, DSB.	Mr R.N.Thompson
H	Mr C.H.O'D.Alexander
M23	Mr A.Bruce
	Mr G.C.Kingsley (representing M23A, Dr.C.B.I.Glass)
W65	Capt. P.R.Marshall
	Mr A.C.Eastway
B	Mr G.E.P.Jackson
HP	Mr C.Rollo (Secretary)

3. The Chairman said that the INFUSE project was an ambitious and difficult one. He had been impressed by the very thorough and efficacious co-operation between Dr. Glass of M23 and Mr Trevor Robinson of "T" Group, as a result of which Mr Robinson had been able to influence the design of the machine. In carrying out the project a number of snags had arisen to which he wished to draw attention.

- (a) INFUSE was rather overdue. Originally it was planned to complete delivery in June, 1957; the present estimate was December, with the prospect of further delay if Ferranti failed to deliver a drum on time.
- (b) Since the project would not be completed on time Dr. Glass, who was due to move to a new post, would not be able to see the job through.
- (c) GCHQ's own COLOROB was not yet fully operational; although originally it had been planned to come into operation twelve months ago. This meant that Mr Eastway, who had been attached

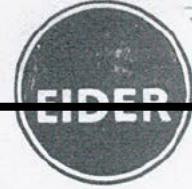
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-2-

to GCHQ since June, 1955, and was due to leave at the end of the present month, would have had no experience of COLOROB in operation.

The Chairman said that these three points covered all the difficulties which he was aware of, and he invited comments from Director, DSB.

4. Statement on Facilities Available in the Near Future at DSB.

Director, DSB, reviewed the situation in DSB. The basic works project for installation of the equipment was substantially complete. Refrigeration was not expected until January, 1958, which should however be acceptable in view of the delivery dates now quoted.

On staffing, Mr Eastway would be in charge of the programming team, supported by a newly recruited physicist, Philip Grouse, and Miss Dora Hills, formerly of GCHQ. Miss Barbara Beeson, who had seen something of the INFUSE project in GCHQ, would also belong to the team. There was a possible need for an operator, but no decision had been taken on this point. For engineering, there would be three professional engineers (two of them primarily electronics engineers) and three technicians, led by Mr Singleton, for the day-to-day running of INFUSE. There was also T Group at Salisbury with two, three or four scientific staff headed by Mr Robinson in support of DSB.

5. The Question of Programming and R. & D. Support for DSB by GCHQ.

(a) Programming.

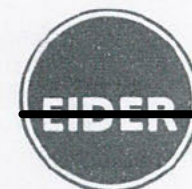
Director, DSB said that it had always been assumed in DSB that if for lack of background, tradition and experience in handling analytical machines DSB felt out of its depth with INFUSE they could lean on the programming experience of GCHQ. He now felt some concern because GCHQ priorities had perhaps changed and the assumption might no longer be justified. He had no wish to make a complaint but would be glad to know what support from GCHQ he could reckon on.

W65 said that EFFIGY had absorbed many resources, but they were new resources and the programming effort on COLOROB had not been reduced. Mrs Croft and Miss Bennett were doing a good job; many programmes were already written and checking out would take a good deal of time. The programmes already written could keep INFUSE employed on ██████████ Hagelin for perhaps as much as two years, by which time GCHQ might have acquired considerable experience of COLOROB working and be able to give guidance to DSB.

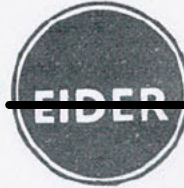
H said that he thought this statement painted too rosy a picture; in fairness to Director, DSB the less favourable possibilities should not be glossed over. There were unlikely to be fully adequate programming resources for EFFIGY, which would certainly take priority over COLOROB from H's point of view. There would therefore be severe competition for the

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D/O952/133/2 (continued)

-3-

programming resources now allocated to COLOROB. While he agreed that the gravest shortage for EFFIGY programming was the lack of two PSOs, and that neither of the present COLOROB programmers was a potential PSO, he did not think that this disposed of his objection. In reply to the Chairman, H said that he could not say at present whether he would have profitable work for COLOROB as well as EFFIGY, but he thought a likely future employment for COLOROB would be on a single long, steady task (for instance).

The Chairman said that GCHQ's programming requirements for COLOROB differed from DSB's, and would perhaps have done so even without EFFIGY. GCHQ had never undertaken to do programming beyond what was needed for its own purposes.

(b) New Attachments for COLOROB.

Director, DSB enquired whether GCHQ would continue to develop new attachments for COLOROB.

The Chairman asked M23 to outline plans for future COLOROB development, remarking however that such plans, like other crypt machine R. & D. work, would be designed to meet H requirements.

M23 said that from the philosophy and construction of COLOROB it was possible to incorporate new units without taking the machine out of operation for a long time. He listed some new features and modifications which had been suggested for R. & D. work:

- (i) a plugboard;
- (ii) a multiplier;
- (iii) modification of output (from octal to decimal);
- (iv) conversion of input and output to magnetic tape.

(i) Plugboard.

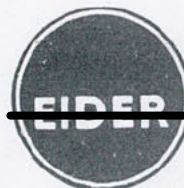
M23 said that the provision of a plugboard involved no real development work but was now a design and construction problem.

H said he envisaged no need for frequent programme variation and consequently had no firm requirement for a plugboard.

Mr Eastway said that there were two different programmes, one for breaking and one for setting, which would probably alternate frequently on INFUSE. Without a plugboard it would take two days or more to change from one programme to another; a plugboard was therefore a requirement for DSB.

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-4-

The Chairman doubted whether GCHQ would be able to spare engineering resources for the construction of this extra item, but suggested that it might be put out to contract.

In reply to B, Director, DSB said that DSB lacked the design and construction capacity to provide the plugboard themselves. T Group had the capacity but was properly an R. & D. establishment and as such would be unwilling to accept a job with so little R. & D. content. However he was keen that DSB should be as self-supporting as possible in such matters and he asked Mr Eastway to consult the appropriate GCHQ members and advise him on the requirement, including the cost.

(Action: Mr Eastway)

M23 agreed that M Division would produce a paper saying what could be done to meet DSB's requirements and estimating the cost.

(Action: M)

(ii) Multiplier.

Mr Eastway said that multipliers had been built into most programmes but they used up many of the machine's resources in logic and memory.

M23 said that work was still needed to achieve a simple logical design of multiplier; if this could be achieved the subsequent engineering problem should not be severe.

(iii) Modification of Output (octal to decimal).

Mr Eastway said there was no immediate requirement for this, but a requirement might well develop when results were presented to the DSB consumers for a more digestible form of output.

(iv) Conversion of Input and Output to Magnetic Tape.

Mr Eastway foresaw no requirement for this conversion for DSB purposes.

W65 said that GCHQ was interested in switching to magnetic tape since a faster input and output would permit fuller use of COLOROB's logical speed. Although DSB had no immediate need for conversion because of the particular programmes which they had in mind for the immediate future, he thought it likely that eventually a faster input and output would become desirable.

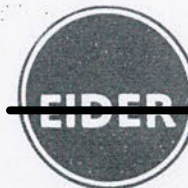
(v) Further Requirement : Core Store.

Mr Eastway said that DSB had a requirement for a core store.

M23 said that a core store of 1,024 6-bit words had been developed and made by Mullard's, but was not yet fully tested.

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28

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D/0952/133/2 (continued).

-5-

The Chairman suggested that GCHQ might be able to help with items which it would be difficult to put out to contract in Australia.

B suggested that it might be possible for DSB to place a contract directly with a British firm. This would avoid financial complications. M23 agreed that this should be practicable provided there was someone on the spot to look after DSB's interests.

Summing up his R. & D. requirements, Director, DSB said that for the plugboard and multiplier he would probably ask for GCHQ help with design, detailed specification, negotiation of contract details and supervision of the contract. The core store should be immediately available.

The Chairman said that GCHQ aimed to give satisfaction and should explore all reasonable ways of helping to provide DSB with the machine they wanted.

6. DSB Tasks for INFUSE.

The Chairman said that the latest DSB Annual Report had led to some concern in GCHQ, where it had been felt that DSB were perhaps expecting too much of INFUSE. He referred to a letter which he had written to SUKO (DGC/5143 of 18th December, 1954) in which he had made the following points :

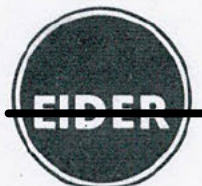
- (a) The main justification for RAM at DSB would be its application in wartime.
- (b) DSB needed RAM to do its job on [redacted] Hagelin properly.
[redacted]
- (c) A team of programmers must be trained and gain experience, otherwise the machine would prove a white elephant.
- (d) DSE had no task other than [redacted] Hagelin suitable for RAM, nor was one likely to arise.
[redacted]

He did not believe that anything which had since happened had seriously modified these points.

Mr Eastway said that (d) was not strictly true; a programme had been written which would enable INFUSE to attack certain stereotyped [redacted] messages by making and correlating columnar counts, and INFUSE could be used, with a plugboard, to decrypt [redacted] traffic, though this was an uneconomical use.

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-6-

Director, DSB said he could assure GCHQ that DSB was not banking on spectacular increases in output, but expected to play a more important part in the work on [REDACTED] and to provide a more timely service to Australian consumers.

7. Delays on INFUSE and COLOROB, and future work on COLOROB in support of INFUSE.

The Chairman said that a principal cause of delays in the past on COLOROB had in fact been competition from the INFUSE project. For the future, he asked whether DSB would like any particular action taken in connection with two of the difficulties he had referred to earlier; possible delays in Ferranti's delivering the drums, and Mr Eastway's departure before COLOROB was working. Would DSB wish to extend Mr Eastway's tour, for instance ?

M23 said that one drum should be delivered during the following week. Installation of cooling equipment should be completed in 2 - 3 weeks' time, and this would permit more extensive operational testing. From the engineering point of view it should be possible to run big programmes within a matter of weeks.

Mr Eastway said that he feared that it would be months before a big programme could be run. Faults were being found even in running letter counts. So far they were all wiring faults; logical faults in the programmes might well appear in the bigger programmes.

The Chairman enquired whether GCHQ had the engineering, machine operating and programming resources to ensure that by the time INFUSE was delivered and ready for assembly COLOROB would be free from faults; and if so, how far this would help the "de-bugging" of INFUSE.

M23 said that three Experimental Officers were now employed on INFUSE and COLOROB. All INFUSE chassis were thoroughly tested before despatch and constructional faults should therefore have been eliminated. Not all COLOROB chassis had been tested in the laboratory, and this accounted for the presence of wiring faults. A few design faults had come to light, but these were not of a kind which entailed a great deal of engineering work. Details of changes would be forwarded to DSB and the changes incorporated, unless the chassis had already been despatched.

Mr Kingsley said that so far about 50 chassis had been tested and about 80 remained to test. Of these, 20 could only be tested on COLOROB in conjunction with the drum. Some of the difficulties which had arisen were due to components not fulfilling the manufacturer's specification.

In reply to the Chairman, W65 said that if Mr Eastway left as at present planned it would be necessary to retain the present two programmers on COLOROB and at least bring the machine into operation to help INFUSE.

B said that

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D/0952/133/2 (continued)

-7-

H said that from GCHQ priorities alone there was at least a chance that we might not want to go that far with COLOROB.

The Chairman said that GCHQ must do such work as was necessary to fulfil its contract and deliver a machine in working order. He now felt that he had enough information to make his report to the Director, and accordingly the meeting closed.

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