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Memorandum L-19

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Electronic Computer Division
Servomechanisms Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts

CLASSIFIED BY: [redacted] NO. TO:
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Date: 3-15-60

SUBJECT: POSSIBLE 1950-51 BUDGETS - ELECTRONIC COMPUTER DIVISION

To: Jay W. Forrester

From: Hugh R. Boyd

Reference: 17 HRB - Pages 24-36

Date: March 1, 1950

Abstract: Three budgets for the next fiscal year are proposed and compared with our present budget as a guide in future planning. All budgets include the Air Traffic Program and are based upon retaining persons who contribute most to a possible future expansion.

February Budget - is \$826,000 and is included for comparison purposes.

Budget A - is \$826,000 - (the same cost as the February budget). It includes 15 more staff and 16 less non-staff, reflecting the shift toward applications and less construction.

Budget B - is \$722,000 (88% of A) and represents a cut-back for the next year involving 22 non-staff reductions and the same number of staff as at present.

Budget C - is \$552,000 (67% of A) and represents a severe cut-back for next year involving 47 non-staff and 7 staff reductions.

1.0 INTRODUCTION

As part of our planning for the 1950-51 fiscal year, I have considered three possible budgets for the Electronic Computer Division. These three budgets are compared in sections 2, 3, and 4. Section 2 is a cost and personnel summary, section 3 is a cost and personnel breakdown into 13 functional groups, while section 4

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is the materials and services breakdown for the items of section 3. In section 5, I have commented on a few of the current activities which I consider very valuable which would need to be stopped or sharply cut-back under budgets B and C. Organization charts showing the personnel considered are found in the notebook reference.

The February budget is our current budget (February 1, 1950). Budgets A, B, and C are possible budgets beginning on July 1, 1950. While the non-staff reductions of budgets A and B are primarily useful and trained but replaceable persons, budget C reductions include many outstanding men whose replacement is difficult and costly in the sense of the new training involved.

Budget A staff is based on our current staff plus the addition of 10 new research assistants and the hiring of 5 graduating research assistants.

Budget B has our present staff depleted by 5 graduating research assistants but increased by 6 new ones for a net gain of one. This is essentially the current staff.

The budget C staff is the same as B but with the loss of seven trained and valuable staff whose loss would be especially serious if new work required a construction program.

The Air Traffic Program, included in the above budgets, is currently operating at a \$80,000 per year level. It will be possible to increase the program to \$120,000 per year starting July 1 if staff transfers can be arranged.

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2.0 SUMMARY

CCST

Item	% of Total	Feb. 1950 Budget	Budget A	Budget B	Budget C
Salaries and Wages	61%	\$506,300	\$508,500	\$445,300	\$336,500
Overhead (42%-Item 2)	26%	212,700	213,600	187,100	141,400
Materials and Services	13%	107,000	103,900	89,600	74,100
Total	100%	\$826,000	\$826,000	\$722,000	\$552,000

PERSONNEL

	Feb. 1950 Budget	Budget A	Budget B		Budget C	
			No.	% of A	No.	% of A
Staff*	48	63	48	76	41	65
Non-Staff	94	78	72	92	47	60
Total	142	141	120	85	88	62
* Composed of						
DIC Staff and Professors	32	36	31	86	24	67
Research Assistants and Associates	16	27	17	63	17	63

Notes:

- a. Salaries and wages are approximately 60% or 3/5 of the total budget in all cases above so that quick budget estimates can be made by multiplying personnel cost by 5/3.
- b. Materials and services costs where no large equipment costs are involved run 13% or 1/8 of the total budget, while the Institute overhead runs approximately 26% or 1/4.
- c. Budgeted average total cost per staff member is \$17,200 at present and would reduce to \$13,000 under budget C. This reduction provides much less complete services and facilities than at present.

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3.0 BUDGET BREAKDOWN BY GROUPS (Costs include salaries, wages, overhead at 42% and materials and services. The materials and services included in these costs are independently itemized in section 4.)

Non-Staff and Services Costs¹

Item	Feb. 1950 Budget		Budget A		Budget B		Budget C	
	Cost	Personnel	Cost	Personnel	Cost	Personnel	Cost	Personnel
1. Drafting and Print Room	\$79,000	15	\$65,000	13	\$60,000	12	\$40,000	8
2. Shops (includes inspection)	99,000	19	72,000	14	62,000	12	48,000	9
3. Material Control	41,000	9	41,000	9	36,000	8	25,000	5
4. Building Operation	65,000	13½	65,000	13½	65,000	13½	51,000	10½
5. Secretarial	34,000	11	32,000	10	28,000	8½	25,000	7½
6. Building 32 Costs	27,000	8	25,000	7	22,000	6	13,000	3
7. Report Editing	11,000	1½	11,000	1½	11,000	1½	9,000	1½
8. WWI Technicians	62,000	12	48,000	9	48,000	9	29,000	5
9. Storage Tube Construction Technicians	51,000	10	38,000	7	38,000	7	20,000	3
Sub-total (items 1-9)	\$469,000	99	\$397,000	84	\$370,000	77½	\$260,000	52½
Engineering Costs ¹								
10. Air Traffic Control	\$ 40,000	4½	\$ 45,000	5½	\$ 45,000	5½	\$ 45,000	5½
11. Supervision and Planning	42,000	3½	37,000	3	37,000	3	35,000	3
12. New Projects and Available Staff	- - - - -	- - - - -	170,000	24	135,000	17	89,000	11
13. WWI	275,000	35	177,000	25	135,000	17	123,000	16
Sub-total (items 10-13)	\$357,000	43	\$429,000	57½	\$352,000	42½	\$292,000	35½
TOTAL (ITEMS 1-13)	\$826,000	142	\$826,000	131½	\$722,000	120	\$552,000	88

1. Items 10-13 cover all staff costs except those of five service staff members who are included in items 1-9.

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4.0 MATERIALS AND SERVICES BREAKDOWN (Part of costs in section 3)

Item	Feb. 1950 Budget	Budget A	Budget B	Budget C
1. Drafting and Print Room	\$ 9,600	\$ 7,700	\$ 7,200	\$ 6,000
2. Shops (includes inspection)	8,400	5,600	4,800	3,600
3. Material Control	1,500	1,300	1,200	900
4. Building Operation	7,200	7,200	7,200	6,000
5. Secretarial	2,400	2,100	1,800	1,800
6. Building 32 Costs	1,500	1,400	1,200	800
7. Report Editing	200	200	200	200
8. WWI Technicians	1,800	1,200	1,200	800
9. Storage Tube Construction Technicians	4,800	3,000	3,000	1,800
Sub-total (Items 1-9)	\$37,400	\$29,700	\$27,800	\$21,900

10. Air Traffic Control	\$ 6,000	\$ 7,200	\$ 7,200	\$ 7,200
11. Supervision and Planning	3,600	3,000	3,000	3,000
12. New Projects and Available Staff	None	24,000	18,000	12,000
13. WWI	60,000	40,000	33,600	30,000
Sub-total (Items 10-13)	\$69,600	\$74,200	\$61,800	\$52,000
TOTAL (ITEMS 1-13)	\$107,000	\$103,900	\$89,600	\$74,100

Note: Engineering groups are considered the material users where equipment construction beyond the breadboard or research stage is required.
(i.e. - WWI - storage tube construction)

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5.0 BUDGET REDUCTION EFFECTS

The losses due to continued budget reductions are serious. We have sometimes underestimated these losses probably because the effects are not visible in some cases for years afterward. Budget A, based on our present level of expenditures, is efficient and practical with its addition of needed staff and its reduction of non-staff as the nature of the work shifts from construction to applications. Budget B which achieves cost reduction primarily by cuts in useful and trained but replaceable non-staff is nevertheless serious in its failure to retain some of the half dozen graduating research assistants. Budget B is probably adequate for the completion of Whirlwind I, but it is inadequate in providing trained staff for new applications or possible expansion. Budget C is much more serious. Involved are all the losses of budget B and in addition several valuable staff and many outstanding non-staff. I don't believe that the persons involved in the cuts from budgets B to C can be replaced without spending heavily both in dollars and in time. Following are just a few of our current activities which will have to be either dropped or seriously curtailed to meet the stringent requirements of budget C: (Budget B losses are similar but less severe.)

History File and Log of Whirlwind I

These records, which are currently being kept by Libby Leighton and Harold Mercer, will in a matter of years provide an invaluable storehouse of information on computer operation, maintenance, and component reliability which is not now available, and doesn't promise to be under any other program that I know about.

Tube Testing and Records

Individual test records of more than 10,000 tubes are now available. This testing and records program is providing a high order of reliability in WWI, gathering tube reliability and life information not previously done by any other group insofar as we know, and is showing up certain fundamental problems in tube reliability for industrial users not previously suggested. For example, this program can at least be partially credited with our finding of the tube interface problem and our establishment of the need for dynamic rather than static testing of tubes.

Standard Work and Stockroom

Our standards and stockroom program has contributed substantially to our research program by providing well-specified, high quality parts and parts information. Several military

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Standard Work and Stockroom (continued)

and non-military users alike have tried to duplicate this system in whole or in part, and I believe that our engineers feel that this program has been a very useful one.

Drawings and Reports

Our present very complete drawing and reports program is most essential for a long-term, continuing program. Nevertheless, personnel cut-backs would reduce quantity and possibly quality of the reports. Drafting standards and practices become obsolete unless continually improved. Drawing modifications would fall behind, and print records become less accurate.

Storage Tube Research

The splendidly equipped and staffed storage tube group would suffer serious losses. The size of the present research and replacement tube program allows a great deal of specialization by personnel on the jobs which they perform best. Loss of help to care for and service the large amount of specialized equipment and stock would produce clutter, inefficiency, and possibly new types of construction "bugs".

Hugh R. Boyd
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