

Memorandum L-105

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Division 6 - Lincoln Laboratory
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

CLASSIFICATION CHANGED TO:
Auth: *DD/287*
By: *RLS*
Date: *3-15-60*

SUBJECT: DIVISION 6 FISCAL '54 EXTRAORDINARY BUDGET JUSTIFICATION

To: Jay W. Forrester

From: Harris Fahnestock

Date: 3 July 1953

It should be understood that the following breakdown of the Division 6 FY'54 Extraordinary Budget is tentative. We will probably wish to make transfers between these extraordinary accounts as the work develops, and we may also wish to transfer funds from some of these extraordinary accounts into operating accounts.

Five of the Division 6 extraordinary accounts which were used during FY'53 will have no further commitments made against them and will be used only for liquidation of outstanding commitments. These are

- 6-200 Conversion for SDV
- 6-201 Recording Radar Data
- 6-203 ERA Contract
- 6-204 Air Conditioning
- 6-214 IBM

Some of the accounts which follow involve continuation of work now in progress; others cover new work. At the time of making this Budget, firm decisions had not been reached on the division of the work on FSQ-7 between Lincoln Laboratory and IBM. Accordingly, the estimates for the FSQ-7 work are more subject to change than those for the Cape Cod System which is more clearly defined. It should be understood that the amounts presented herein are the Budget figures for FY'54 in addition to whatever commitments may be outstanding 30 June 1953.

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SECURITY INFORMATION

Accounts

6-202 Display (Cape Cod)

a. Drum Display.

In order to provide a flicker-free display on the Cape Cod scopes, it will be necessary to add a considerable amount of equipment to the input-output system.

\$25,000

b. Scopes.

We expect we will require five additional display scope assemblies. The speed-up of installation of the Cape Cod System which was requested during the winter of 1953 required the reproduction of existing scope amplifiers which have several severe limitations. It will probably be necessary to redesign and replace these amplifiers to make proper use of the Cape Cod System in training and experimental operation.

40,000

c. Tote Boards.

Some form of automatic or semi-automatic tote boards will be required in the Control Center. For this purpose, we estimate

10,000

d. Spare Drum.

The operation of the Cape Cod System is dependent upon magnetic drums. These can be damaged and at present we do not have a spare. It may be decided that we should have a spare drum on hand.

15,000

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Accounts

6-202 Display (Cape Cod) continued:

e. Manual Intervention.

The Cape Cod System, as constructed in the last few months, provides a variety of types of manual intervention. We expect our experience to demonstrate that additional provisions for manual intervention will be required.

\$ 5,000

f. Marginal Checking.

The marginal checking system of the WWI Computer which was designed several years ago contains a large number of relays which have not proven entirely satisfactory. If we wish to reduce the maintenance time for the Cape Cod System, we will replace these relays with a hermetically sealed type.

10,000

g. Miscellaneous (Cape Cod).

We will be providing improved lighting, an improved character generator, and a new real-time clock.

5,000

\$110,000

6-205 Power Supplies.

A variety of items are included in this account as a continuation of work planned during the past few months. They include spare supplies for the experimental DC

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Accounts

6-205 Power Supplies (continued).

distribution, spare supplies for the WWI Computer, power test equipment and de-humidification for the WWI Computer.

\$15,000

\$15,000

6-206 Ceramic Equipment.

a. Additional ceramic processing and molding equipment for the production of experimental memory cores.

10,000

b. Instrumentation and equipment for basic magnetic measurements, including a high-power magnet, interferometer, and a temperature recorder. The budget for some of this equipment should perhaps be compared with the Group 37 budget.

25,000

\$35,000

6-207 General Ceramics Subcontract.

General Ceramics has made valuable contributions in their research on memory cores under our Subcontract. We wish to have them continue this research. The Contract has been extended to 31 December 1953, and \$15,000 of 1954 money has been committed for the extension. The additional \$20,000 is included to cover an additional six months to 30 June 1954.

20,000

\$20,000

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Accounts

6-211 Terminal Equipment (Typewriters).

We expect to add approximately eight typewriters to the Cape Cod Output System. These will provide a permanent record of tests for later analysis.

\$20,000 \$20,000

6-212 Memory Test Computer.

The MTC, recently put into operation, has proved very valuable for the purpose for which it was designed. We expect to add to it considerably to give it greater flexibility.

a. A new control, the provision for multiplication, and possible extensive modifications to allow testing a variety of FSQ-7 components.

\$100,000

b. A second memory using small cores, close spacing, transformer drive and other modifications, and having 64 by 64 cores per memory plane.

50,000

c. Rental of IBM equipment for input and output purposes.

10,000 \$160,000

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Accounts

6-213 Test Equipment.

The Test Equipment Committee, representing all groups in the Division, estimates that the needs for the next year, including equipment for testing cores, the various components of FSQ-7, and general laboratory use will be

\$90,000

\$90,000

6-215 FSQ-7 Installation.

a. Modifications to the basement of Building A, including partitions, lighting, etc.

50,000

b. Equipment Cooling.

Although IBM is expected to furnish the cooling equipment for the Computer, it is not known whether they will provide the necessary cooling for the Operations Center. To provide for this and other undefined cooling requirements

50,000

c. Power Supplies and Distribution.

Although IBM will furnish the power supplies for the Computer, we will have considerable expense of our own, including transformers, switching and distribution.

40,000

\$140,000

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6-216 FSQ-7 Display.

We expect to build a considerable amount of equipment in the course of developing the display system to be used in the Operations Center. Our present estimate is

\$75,000

6-217 FSQ-7 Terminal Equipment.

In the course of our development of FSQ-7, we will have to work on a variety of specialized terminal equipment, including mappers, low-speed counters, high-speed printers, etc.

\$75,000

6-218 FSQ-7 Magnetic Drums.

Our development of FSQ-7 may call for the purchase of a magnetic drum and the construction or purchase of a large amount of associated circuitry.

\$75,000

6-219

The continued development of magnetic core memories requires the purchase of large numbers of cores from a variety of sources.

\$25,000

6-220 Development of New Magnetic Materials.

We expect to do further development on possible memory materials, such as ferrite crystals, electroplated magnetic films,

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6-220	Development of New Magnetic Materials (continued). ferroelectrics, etc. Some of this work may be sub-contracted.	<u>\$25,000</u>
6-221	Cape Cod Mappers. The extension of the Cape Cod System to include all the gap-filler radars will require the purchase and modification of 12 additional video mappers. This item may or may not be included in the Division 2 Budget.	<u>\$60,000</u>
6-222	Vacuum Tube Development. A considerable expense is anticipated in the purchase or development of special vacuum tubes and other components.	<u>\$75,000</u>
6-223	Cape Cod Magnetic Storage. Our experiments with the Cape Cod System may lead to the necessity of very materially increasing the reliability of WWI. If this need develops and if the magnetic storage turns out as well as expected, we might possibly wish to replace the present WWI	

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Accounts

6-223 Cape Cod Magnetic Storage (continued).

electrostatic storage system with a magnetic storage system. This figure is a rough estimate to cover this possible contingency.

\$100,000

Total Division 6 Extraordinary Budget, Fiscal 1954

\$1,100,000

Signed

Harris Fahnestock
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