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Memorandum M-2855

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

SUBJECT: BIWEEKLY REPORT FOR JUNE 2, 1954

To: Jay W. Forrester

From: Division 6 Staff

CLASSIFICATION CHANGED TO:
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Date: 2-1-60

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SECTION I - CAPE COD SYSTEM

1.1 Group 61

1.10 General

(R.J. Horn, Jr.) (CONFIDENTIAL)

During the two weeks remaining before shutdown, flight-test activity will concentrate on final-turn-intercept tests.

A new standard operating procedure for the Height-Finding Section is in effect. This SOP should speed processing of requests but may decrease the percentage of height replies. The effect in these respects will influence XD-1 proposals.

Extension of an analysis of the Track-While-Scan Program in the 1953 Cape Cod System to a system of 400 tracks and 2000 radar returns (including provisions for more complicated processing of the data) indicates a time requirement of about 7 seconds using the XD-1 machine.

A design for the Charactron matrix for XD-1 has been prepared.

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1.3 Group 65

1.31 Activities of Group 65

(P. Youtz) (UNCLASSIFIED)

Several trips were made by members of Group 65 to IBM and tube manufacturers in behalf of the program to produce reliable tubes for AN/FSQ-7. Two trips were made in pursuance of the research program, one to an ASTM meeting and the other to a JETEC meeting. The Group had several visitors from tube manufacturers and Corning Glass Works.

Several of the tube programs are facing difficulty, and this must be surmounted. Sylvania is still unable to process the SR-1782A so that the cathodes do not fail under certain life conditions. This problem had been under investigation for several months and to this date the satisfactory solution has not been found. Sylvania had certain other minor problems with the SR-1782A which have been or will be corrected. DuMont has been studying the K1211, the 3/4-inch photomultiplier tube for the light gun, and apparently can produce a tube that will meet our requirements. Specifications for the video mapper 16-inch cathode-ray tube must be clarified before DuMont can proceed with this assignment.

The second monthly letter report from Convair, covering the period 15 April to 15 May 1954, was received. Convair shipped the three sample 19-inch Charactrons (C19JYFA) as required by the scope of work in their IBM contract. Work is continuing at Convair on:

1. The study and evaluation of deflection elements with the objective of finalizing the designs of the convergence coil and deflection yoke.
2. Completion of special equipment and tooling necessary to fabricate prototype and production tubes. This will include such items as special exhaust ovens, cleaning systems, helical-dagging equipment, jigs and fixtures for Charactron gun assembly, etc.
3. Design and construction of special test equipment.
4. Refinement of special techniques necessary for construction of the final tubes and personnel familiarization with those techniques.
5. The modification of a demountable envelope and vacuum system to permit a series of tests in connection with the study of the electron optics of these tubes.

1.31 Activities of Group 65 (Continued)

(P. Youtz) (UNCLASSIFIED) (Continued)

A telephone report from Hughes Aircraft indicates that they have made three or four more good Typotrons during the past fortnight. These will be shipped East for evaluation and life-test studies. The contractors have finished Hughes' new tube-production facilities. The tube-production personnel expect to move into the new plant about 15 June. This crew has been making our Typotrons in the tube research and development laboratories. The recent Typotron tubes have been made with matrices supplied to Hughes Aircraft by the W. & L. E. Gurley Company of Troy, New York.

The construction section of Group 65 has been concentrating this past period in complementing the work of Convair and Hughes Aircraft. Previous efforts to process cathodes in tubes with the helical-dag coating were unsuccessful. As reported by P. C. Tandy, this series of tubes died early on life test. This problem has been studied, and it is believed that the next series of tubes can be processed so that the cathodes will endure on life test.

At our request American Optical Company of Southbridge, Massachusetts, put nonreflective coatings on two sides of a flat piece of Flexiglas and on the front-face panel of a 19-inch tube. These surfaces were turned over to Group 62 and Francis Associates for their evaluation and their light studies.

1.33 Research and Development

(P. C. Tandy) (UNCLASSIFIED)

Encouraging results have been obtained from initial tests made on the first aluminized, P7, helical-dag tube. The screen had good, long persistence characteristics. Deflection tests and a life test will be made on this tube.

Of the three tubes that were put on life test, two were rejected for poor cathodes, one after 26 1/2 hours and the other after 32 1/2 hours. A third tube which had been processed three times operated for 196 1/2 hours at a 1-ma cathode current before it was rejected for poor light output. The cathode of this tube was about 95 per cent bad after about 160 hours. The poor light output appears to be a function of cathode condition. When the center of the cathode is bad, most of the cathode current being drawn from around the usual area is collected by the G₁ or some other electrode. This results in poor light output at the specified cathode current.

Life-test equipment is progressing. Power supplies are the only units which have to be constructed before several tubes can be life tested at a time.