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SUBJECT: BIWEEKLY REPORT FOR MAY 21, 1954

To: Jay W. Forrester

From: Division 6 Staff

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SECTION I - CAPE COD SYSTEM

1.1 Group 61

1.10 General

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

Equipment specifications for the 1954 Cape Cod System are being forwarded for scheduling and action. In addition, work is progressing on more detailed plans for the programming involved.

A plan has been adopted for the use of Raydist data with the Cape Cod System this fall.

Utility programs for XD-1 are now being checked out with the IBM XD-1 simulation program.

A study of the XD-1 system indicates that the time required for the computations involved in 125 final-turn intercepts and 75 interceptors on return-to-base would be 1.73 seconds. If further sophistication is added to the programs, the time would be 2.6 seconds.

Block diagrams are being prepared for the manned-interceptor simulation program.

1.3 Group 65

1.31 Activities of Group 65

(P. Youtz) (UNCLASSIFIED)

During the week of 17 May 1954, C. L. Corderman, J. S. Palermo, and I visited Convair and found that they had made excellent progress with the 19-inch Charactron during the past five weeks. They had three tubes ready for shipment to IBM, as required by their contract. Two tubes will be shipped to Endicott and one to MIT. We examined these tubes in Convair's test rig and found that the registration was excellent. Convair has scheduled work during the next four weeks on their phosphor-settling and aluminizing techniques, improving the electron optics, deflection yoke, convergence coil, and developing a production-type matrix and gun assembly. The latest report from Corning is that the new 19-inch Charactron bulbs will be ready for shipment the week of 14 June.

We also visited Hughes Aircraft and found that they were making satisfactory progress with the Typotron. Three tubes have gone over 2000 hours on the life-test rack. Corderman brought three Typotrons from the west coast. One marginal Typotron was shipped by a common carrier to test the shipping crate; it arrived safely. Hughes Aircraft is making satisfactory progress with their production building and facilities which they expect to occupy in June.

At Willys-Kaiser in Berkeley, California, Ross Aiken demonstrated a 21-inch cathode-ray tube which was only 3 inches thick. The gun was mounted on the side of the face panel instead of in back of the face panel. This type of construction has some interesting possibilities.

A one-day trip was made to Tung-Sol to discuss an improvement program on the 5998. Satisfactory progress is being made in this direction.

Five members of the Group made a one-day trip to IBM to discuss methods of keeping tube records for MTC and XD-1.

Group 65 continued the work on phosphor, aluminizing processes, and nonreflective coatings.

1.33 Research and Development

(J. S. Palermo) (UNCLASSIFIED)

During the past few weeks we have studied the cascade method of preparation of P7 screens. We are presently adopting this method in our Chem Department.

1.33 Research and Development (Continued)

(J. S. Palermo) (UNCLASSIFIED) (Continued)

Our work on the masking techniques for aluminized tubes indicates the desirability of a mechanical mask. Toward this end a design for this type of masking will be started immediately.

Our work on helical dag continues. We are presently engaged in preparing a series of tubes with a dag line 0.020-0.030 wide and a similar width in the spacing of successive lines.

(P. C. Tandy) (UNCLASSIFIED)

Since the last Biweekly, five helical-dag tubes have been life tested. These tubes were rejected after from 4 1/2 to 113 3/4 hours of operation; three tubes were rejected for poor cathodes, while the other two were rejected for unusable light output. These screens were considered satisfactory at the beginning of the test. A tube now on life shows no sign of deterioration after 4 hours of operation. The two tubes mentioned in the last report which developed voltage breakdown with less than 2 hours of life test were found to have cracked at the base.

Work on life-test equipment for these tubes is progressing. A voltage-distribution panel has been completed, and a voltage-control panel is nearly completed. Individual tube voltage-control boxes have been started; when they are completed, two or three tubes at a time may be life tested. Further expansion of life-test facilities depends upon delivery of transformers for the necessary power supplies.

(H. B. Frost) (UNCLASSIFIED)

On 11 May 1954, a meeting was held at IBM on the tube records for MTC and XD-1. The records system will be tried on MTC in order to test the flow of data. The tubes in MTC will be Z-2177's in an operational life test. Results of the conference showed that Sanders at IBM had provided a system which, with minor modifications, is flexible enough to handle the tube records and provide data for life analyses. A. Zacharias is writing up the results of this meeting.

Study has continued on the lot of Z-2177 tubes using A31 cathode alloy. Although these tubes have low plate currents in the usual Class A operation region, they appear to have good cathodes. Pulse tests show them to be quite similar to other Z-2177 tubes and 5965's. So far, the reason for the low plate currents remains something of an enigma.

A method for marginal checking of thyratron circuits has been proposed by one of the circuit engineers at IBM, who was formerly