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Development, Testing, and Evaluation of
Visual Landing Aids

Consolidated Progress Report

to the

Airborne Equipment Division
Bureau of Aeronautics
Department of the Navy

For the Period
July 1 to Sept. 30, 1954

for
Bureau of Aeronautics Projects

TED No. NBS-AE-10002
TED No. NBS-AE-10006
TED No. NBS-AE-10008
TED No. NBS-AE-10011



U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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Development, Testing, and Evaluation of
Visual Landing Aids

July 1 to September 30, 1954

I. REPORTS ISSUED

Report No.
3377

Development, Testing, and Evaluation of
Visual Landing Aids, Consolidated Progress
Report for the Period April 1 to June 30,
1954

II. TED NO. NBS-AE-10002. GENERAL RESEARCH, LABORATORY
AND CONSULTATION SERVICES IN CONNECTION WITH SPECIAL-
IZED LIGHTING PROBLEMS, VISIBILITY AND FOG MODIFICATION

a. Visibility Meters and Slant Visibility

Assistance has been given the Aerology Section in the technical phases of their procurement of ten transmissometers. The instruction manual has been edited to include changes in circuitry and procedure made since it was originally prepared preparatory to the reproduction of additional copies.

The electrical controls of the scanning drive of the slant visibility meter have been designed, installed, and are now being tested. Difficulties with a high noise level in the receiver amplifier have been traced to an intermittently defective capacitor and corrected. This correction permits completion of the tests of the scanning drive.

d. Night Field Carrier Landing Practice Lights

A group of special light boxes were taken to the Naval Air Test Center where they were used in field tests to determine the optimum intensity for night field carrier landing practice lights. Data from this test and photometric data obtained last quarter have been used in preparing a specification. A report giving the results of the tests and including the specification requirements has been completed and is being prepared for reproduction.

e. General Laboratory and Consultive Services

Tests of fused and TEE connectors manufactured by Pacific Electricord have been completed and a report has been prepared. Because of the relatively

low insulation resistance of these connectors, the tests of insulation resistance were much more extensive than had been anticipated.

A report describing the method of testing retroreflectors and giving the results of measurements of a group of retroreflectors has been prepared. Release of the report has been delayed so that measurements of some additional reflectors can be included.

III. TED NO. NBS-AE-10006. DEVELOPMENT OF AN AIRFIELD LIGHTING INTENSITY CONTROL SYSTEM.

Schematic and block diagrams of the automatic intensity control system used at the Naval Air Test Center have been completed. Two milliammeters with a logarithmic response have been obtained. These meters will be specially calibrated to indicate directly the proper approach or runway-light intensity in the control tower at NATC and will be connected into the regular transmissometer circuit.

IV. TED NO. NBS-AE-10008. DEVELOPMENT AND TEST OF SEALED-REFLECTOR APPROACH-LIGHT LAMPS.

Preparation of a report and a specification covering this work has been started.

V. TED NO. NBS-AE-10011 FIELD SERVICE OPERATIONS.

a. Airfield Lighting

Some flight test data have been obtained on the performance of the approach beacons. Pilot comments indicate general satisfaction with the flash frequency and the horizontal beam spread and that the elevation of the beams may need to be increased. Threshold lights of higher intensity are indicated. The 18-inch course lights requested from the CAA for this purpose have been received and will be installed shortly. Some programmed flight testing is now required in order to fully explore the possibilities and performance of these units.

b. Runway and Taxiway Markings.

In an effort to obtain a more satisfactory paint for blacktop runway and taxiway markings, the Arcata Airport management has applied small test sections of "Nalcrete" at several locations on the runway and roads of the station. These have been checked visually from time to time. The appearance of these samples indicates this finish is superior to the usual traffic paints. In view of this, the stripes and marks on the taxiway needed for visibility tests (which were in need of repainting) have been finished with "Nalcrete" in order to obtain more comprehensive data on reflectance and durability.

The airport management has also refinished the runway with this finish and has modified the threshold and distance markers somewhat. The 1500-foot marker has been removed and the touch-down and 2000-foot markers have been increased in size. Some pilot comment indicates that the larger markers are more satisfactory.

c. Research on Visibility Measurements and Visibility Meters.

Transmissometers: Checks are being made of the time required to maintain the five instruments at the Field Laboratory. For the month of August the daily checks required 15 hours and the preventive maintenance checks 23 hours. Since these instruments are being used for special tests, they require more attention than those used routinely, and since these laboratory-type instruments are less easily serviced than production instruments, these times are considered to be about the maximum times which will be required by qualified personnel.

100% Setting Calibrator: Field checks indicate that the deviations from linearity of the photocells is limiting the accuracy of the calibrator producing errors of about $\pm 2\%$. A calibration procedure which will correct for these deviations has been developed.

Brightness Measurements: Analysis of the data obtained to date has continued.

Equivalent intensity of flashing lights ("Strobeaon") and of groups of lights (Slope-line fixture.): The comparison lamps used in the determination of equivalent intensity have been recalibrated in Washington. These calibrations will be used in the completion of the analysis of the equivalent intensity data obtained in the field. The field data indicate that the direct light of the slope-line unit is generally visible at distances one and two-thirds to twice the "reported" visibility and that the maximum distance at which the "Strobeaon" and the approach beacon are visible is somewhat less.

d. Electrical Engineering.

The step-by-step trouble shooting procedure for the Maintenance Manual has been organized. Most of the material for this section has been drafted and is now being edited. First drafts of the Preventive Maintenance and Routine Maintenance Sections have been completed.

General

A visit to the field laboratory was made by the Project Leader in July.

Resignations of two of the four people assigned to the laboratory during the last four months has delayed completion of some of the tests in progress. One part-time replacement has been obtained and efforts are being made to obtain a replacement Electrical Engineer.

Tests in Fog. The fog frequency has been unusually low this fog season. However, during the period September 25-30 several very stable fogs occurred during which tests were conducted.

