

# NATIONAL BUREAU OF STANDARDS REPORT

**NBS PROJECT**

**NBS REPORT**

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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  
January 1 to March 31, 1954

for  
Bureau of Aeronautics Projects

TED No. NBS-AE-10002  
TED No. NBS-AE-10006  
TED No. NBS-AE-10007  
TED No. NBS-AE-10008  
TED No. NBS-AE-10011



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# Development, Testing, and Evaluation of Visual Landing Aids

January 1 to March 31, 1954

## I. REPORTS ISSUED

<u>Report No.</u>	<u>Title</u>
3046	Visual Landing Aids Field Service Operation Progress Report for the Period December 1, 1952 to November 30, 1953.
3094	Addenda to Instruction Book for Transmissometer Set AN/GMQ-10.
3136	Development and Testing of Visual Landing Aids, Progress Report for the Period October 1 to December 31, 1953.

## II. TED No. NBS-AE-10002. MISCELLANEOUS SERVICES IN CONNECTION WITH FOG MODIFICATION AND VISIBILITY STUDIES.

Beam Setting of Type C-1 Runway Light. The analysis of the use of different beam settings in a type C-1 runway light using a 200-watt and a 500-watt lamp has been completed. A report covering this work is nearly ready for reproduction. (NBS Test Report 21P-5/54)

Lights for Night Field Carrier Landing Practice. A report describing tests of an experimental battery-operated unit has been completed and is now ready for reproduction. (NBS Test Report 21P-4/54)

Characteristics of Retroreflectors. Measurements of specific intensity of retroreflectors have continued. The basic data are now nearly complete. All measurements made to date have been analyzed and a report is being drafted.

## III. TED No. NBS-AE-10006. DEVELOPMENT OF TRANSMISSOMETER-CEILOMETER INTENSITY CONTROL SYSTEM.

Addenda to Instruction Manual. In addition to the five Addenda previously prepared, a sixth addendum, "Modification of the Indicator to Permit Direct Operation of the Pulse Amplifier," has been prepared. These Addenda have been issued as NBS Report No. 3094.

Specifications. Assistance has been given the Aerology Section, Bureau of Aeronautics, in the preparation of an interim specification for the procurement of transmissometers.

Intensity-Setting Indicators. A brief study has been made of the feasibility of using in the control tower at Patuxent River a meter specially calibrated to indicate the proper intensity settings of runway and approach lights. The meter would be operated from one of the regular transmissometers. One of the principal difficulties in using such an arrangement is the crowding of the high intensity settings for night conditions at one end of the meter scale. Another difficulty is the complexity of the scale if both high and low transmissometer ranges are used and if runway- and approach-light intensity settings are indicated on the same meter.

100% Setting Calibrator. An improved 100% setting calibrator was delivered to Arcata for field tests. Trials there indicated that the calibration of this instrument was not as stable as desired. Tests are now being made in Washington on a similar unit to determine whether this effect is inherent in the instrument, is the result of a defective component, or the result of errors introduced by the calibration technique. These tests indicate that considerable care is needed to prevent errors from stray light affecting the calibration and that when these errors are eliminated, the stability of calibration is satisfactory.

IV. TED No. NBS-AE-10007. RESEARCH ON VISIBILITY AND INTENSITY CONTROL OF VISUAL LANDING AIDS.

Marking of High Towers. Further analysis has been made of the problem of marking high radio and television towers. Computations are now being made of the comparative visual range of towers as now marked, of large painted markings on the ground, and of the lighting system proposed by the National Bureau of Standards. The Bureau proposal was described at a meeting of the A.G.A. Subcommittee.

V. TED No. NBS-AE-10008. DEVELOPMENT AND TEST OF SEALED-REFLECTOR APPROACH LIGHT LAMPS.

Qualification tests are being made on a group of eight pre-production samples of 399-watt approach-light lamps received from the Westinghouse Electric Company. The lamps meet the intensity, beam spread, and life requirements of the procurement specification.

A report giving the results of this test has been prepared and will be issued as soon as the life test is completed. (NBS Test Report 21P-6/54)

VI.. TED No. NBS-AE-10011. FIELD SERVICE OPERATION.

Progress Report. A progress report describing the background of the Operation, the facilities at the field location, the tests in progress, and the expected use of the data obtained, and giving preliminary results, has been issued. This report covers the period December 1, 1952 to November 30, 1953. (NBS Report 3046)

Survey of Naval and Marine Air Stations. A report giving the results of a survey of the visual landing aids at eleven Naval and Marine Air Stations has been prepared and is being edited.

Field Maintenance Manual for Airfield Lighting Systems. Preparation of this manual has been given priority over the other tasks of the field group. Considerable time has been spent in organizing the material to be presented and to the development of a plan of attack. Particular attention has been given to the step-by-step troubleshooting procedures and charts.

Approach Beacons. The installation of two approach beacons in the approach to runway 31 has been completed. The beacons are located 1000 and 2300 feet from the runway threshold. They are provided with high and low intensity settings so that the possibility of glare on clear nights is reduced. No flight tests have been made to date. However, as a result of casual observations, one of the pilots of Southwest Airways has requested that a beacon be placed on the approach to runway 13, thus indicating the utility of the beacons.

Transmissometry. The study of the errors in transmission measurements introduced by scattered light has been continued. The differences in the readings of the two parallel transmissometers due to natural conditions masked the errors resulting from scattered light. Therefore an indirect technique is now being used. One transmissometer, well-baffled, is used to measure the direct transmission. Another transmissometer, with a disk midway between the projector and receiver to block out all direct light, measures the scattered light and, hence, the error which would be introduced into measurements made with an unbaffled instrument. Results to date indicate that the errors are not serious.

Tests in Fog. Although fog is not usual during this reporting period, there was a two-week period in which dense fogs were frequent. Tests similar to those described previously were conducted during this period.

Analysis of Data. Data obtained during the fog season are being analyzed.

Future Work. The frequency of fog during the next reporting period is expected to be low. Emphasis will, therefore, be placed upon the analysis of the test work and the preparation of reports. Work on the maintenance manual will occupy a considerable portion of the time. Tests will be continued when suitable weather conditions occur.