

# NATIONAL BUREAU OF STANDARDS REPORT

NBS PROJECT

NBS REPORT

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4219

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  
April 1 to June 30, 1955

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

April 1 to June 30, 1955

I. REPORTS ISSUED

<u>Report No.</u>	<u>Title</u>
21P-8/55	Electric and Photometric Tests of a Model Datum Light for Mirror Landing Systems
21P-9/55	Photometric Tests of One Solar Spotlight
2588 (Revised)	Instruction Book for Transmissometer Set AN/GMQ-10 (Revised)
3606	Appendix II to Instruction Book for Transmissometer Set AN/GMQ-10
4072	Development, Testing, and Evaluation of Visual Landing Aids, Consolidated Progress Report for the Period January 1 to March 31, 1955

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

a. Visibility Meters and Slant Visibility

Transmissometers: Appendix II to Instruction Book for Transmissometer Set AN/GMQ-10 has been completed and released as NBS Report 3606. This appendix consists of the maintenance parts list and a brief description of the function of the parts.

The reproduction of the revised Instruction Book for Transmissometer Set AN/GMQ-10 has been completed and the manual released as NBS Report 2588 (Revised). The revised instruction book includes Appendix II (described above) and a number of revisions to include the changes in circuitry and procedure made since the original manual was prepared. Forty copies of the revised manual have been supplied the Aerology Division. A list of pen and ink changes and change sheets to be used in modifying the original manual to include these changes is being prepared.

Efforts are being made to obtain more suitable phototubes and "trigger-tubes". A visit was made to the plant of the Continental Electric Company and the phototube problem was discussed. Experimental phototubes with much lower than usual dark current were obtained for test.

THE HISTORY OF THE

REIGN OF

CHARLES

THE SECOND

BY JOHN BURNET

IN TWO VOLUMES

THE SECOND VOLUME

CONTAINING THE HISTORY OF THE

REIGN OF CHARLES THE SECOND

FROM HIS ESCAPE FROM BRISTOL

TO

THE END OF HIS REIGN

IN THE YEAR 1685

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REIGN OF CHARLES THE SECOND

FROM HIS ESCAPE FROM BRISTOL



Tests are being made of the deviations from linearity of the photo-cells used in the 100%-Setting Calibrator. Since these deviations are apparently unavoidable, a calibration procedure which will correct for them is being devised.

Brightness Meters: The construction of two sets of photoelectric brightness meters and illuminometers has been completed and the units are ready for calibration and testing. These units will be sent to the Field Laboratory at Arcata where they will be used in the study of the variations in contrast of runways and runway markings and of the ground/sky brightness ratio with such parameters as solar elevation, type of cloud cover, visibility, and location. These factors have a significant effect on the visual range of objects seen against terrestrial backgrounds.

e. General Laboratory and Consultive Services

Marking of Tall Towers: Meetings of the ACC/AGA Subcommittee were attended and technical aspects of the findings of the Ad Hoc Group studying the marking of tall towers were presented.

Cable Test Detecting Set: The cable test detecting set has been demonstrated to interested representatives of a number of agencies. It is now on loan to the Power and Lighting Section of the Civil Aeronautics Administration. When their tests are completed, the set will be forwarded to the Arcata Field Laboratory for field testing.

Mirror Landing Aids System: Construction of a unit to demonstrate several proposed wave-off signals was completed. The unit was used at NAS, Atlantic City, to determine the desired wave-off pattern and the desired frequency of flashing the wave-off lights. Tests made at this Bureau indicate that a flash frequency of 75 to 100 flashes per minute is feasible when PAR 399 approach-light lamps are used. The design of the wave-off system has been developed and the equipment required for two installations has been ordered.

Intensity distribution measurements of datum and guide light units used in the mirror landing aids system tests at NAS, Atlantic City, have been made and reported. (NBS Reports 21P-8/55 and 21P-9/55).

Miscellaneous: Intensity distribution measurements of a Doane high intensity deck-surface light have been made to determine the suitability of the light for use on refueling lanes and the results analyzed. A report is being prepared.

Approach-Light System Design: Furnishing technical advice and assistance to members of the Visual Landing Aids Branch in developing the control circuitry for the experimental approach-light system at NAS, Atlantic City, has continued.

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

a. Airfield Lighting

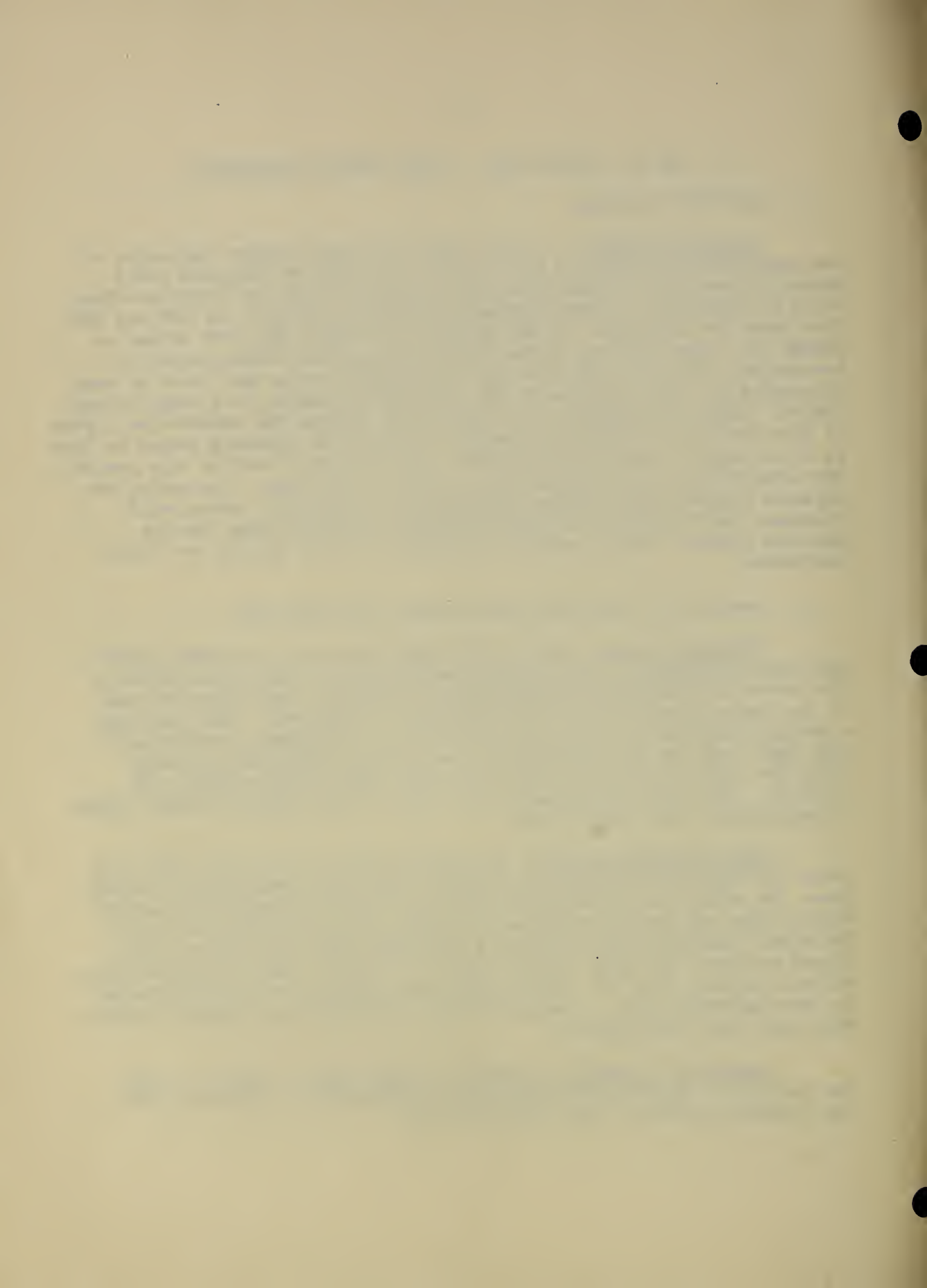
Approach Beacons: A "stub" approach beacon system consisting of one approach beacon mounted 500 to 1000 feet from the threshold and a special threshold lighting system was designed for use in locations where it is not feasible to mount approach beacons at distances of 1000 and 2000 feet from the threshold. It was planned to install this stub system on runway 13. Here, because of the bluff, the approach beacon cannot be located more than 500 feet from the threshold unless a tall tower is used to support it. The presence of the ILS antenna shelter is a complicating factor. Since the lights of the beacon will conceal the obstruction lights of this shelter, it would be necessary to mount the approach beacon so that it is as high as the antenna shelter. Tests indicate that in this position the interference with the localizer signal is too great. Increasing the distance between the localizer antenna and the approach beacon would eliminate the difficulty but would require a 150-foot tower for the approach beacon. Other possible solutions to the difficulty are being considered.

c. Research on Visibility Measurements and Visibility

Transmissometry: Special phototubes with very low dark current have been installed in the transmissometers used in the investigation of the errors in transmission measurements produced by light from the beam of the projector scattered by the fog into the receiver. This has made a marked improvement in the test conditions. Preliminary results indicate that when the transmission over the 500-foot base line is about 0.01, the error produced by this scattered light is approximately 5% (0.0005). The error produced by this error in the indicated visual range is negligible, less than 10 feet.

Slant Visibility Meter: The field units of the slant visibility meter have been received from Washington, installed, and placed in operation. In making the installation, 2000 feet of 19-conductor #14 direct-burial cable was removed from the old FIDO system and relaid as part of the slant visibility meter system. There have been a few minor operational problems including faulty action of control relays, resulting from voltages induced into the control lines and a defective reversing switch in the scan-drive motor. The sensitivity, stability, and signal-to-noise ratio are more than adequate.

Equivalent Intensity of Flashing Light Units: Reports giving the results of the effective intensity measurements of flashing lights and composite units are now nearly complete.





d. Electrical Engineering

Airfield Lighting Maintenance Manual: Revisions of the step-by-step trouble-shooting procedure for series lighting circuits have been completed. The trouble-shooting chart which will accompany the procedure is being revised so that it will be consistent with the revised procedure. A section covering general information on trouble shooting is considered necessary. This section will include explanations which are too long for inclusion in the step-by-step section. It is in the rough draft stage.

GENERAL

Mr. George E. Davis, Jr., Laboratory General Mechanic (electrical) GS-7, is now working on a full-time basis. The change became effective June 27, 1955. His previous tour of duty was 32 hours per week.

Mr. Robert G. Smith, Physicist, GS-7, resigned June 3, 1955 to accept a position in private industry.

There were only a few low-visibility periods during this quarter. These were used for measurements of the stray-light error in transmissometers, of the effective intensity of approach beacons, and in studies of thresholds.

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