

# NATIONAL BUREAU OF STANDARDS REPORT

NBS PROJECT

NBS REPORT

0201-20-2304

3222

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-10001  
TED No. NBS-AE-10003  
TED No. NBS-AE-10004  
TED No. NBS-AE-10005

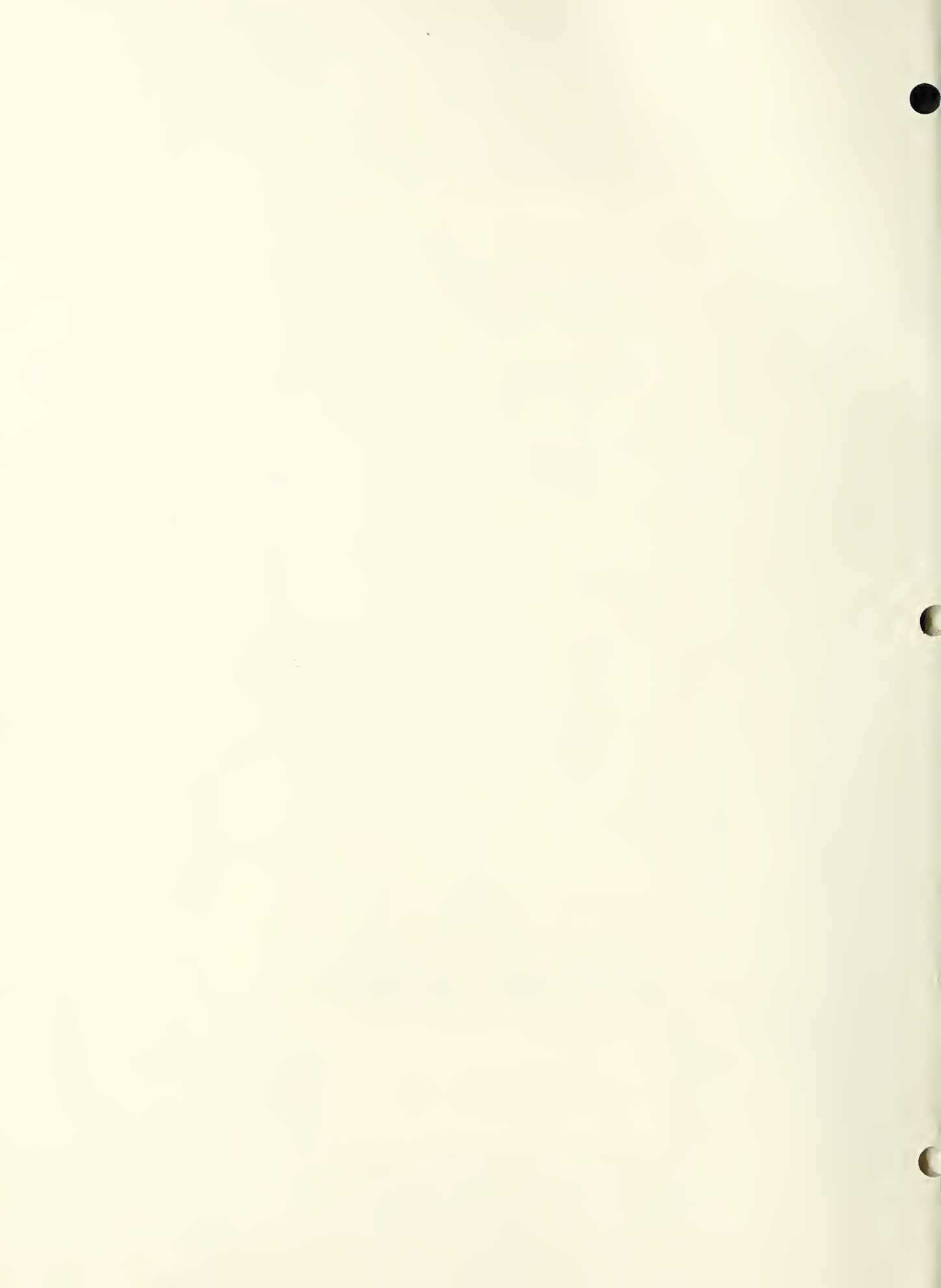


U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS

The publication, or  
unless permission  
25, D. C. Such pe  
cally prepared if

Approved for public release by the  
Director of the National Institute of  
Standards and Technology (NIST)  
on October 9, 2015

r in part, is prohibited  
standards, Washington  
eport has been specifi-  
report for its own use.



DEVELOPMENT, TESTING, AND EVALUATION OF VISUAL LANDING AIDS

Quarter Ending March 31, 1954

Laboratory Tests

Test No.

Requested

Study of the life characteristics of 36 seadrome-  
light batteries.

21A-3/54

In conference 2-12-54  
Letter dated 3-16-54

Status: Samples awaited; advanced mathematical analysis completed.

- - - - -

Electrical characteristics of four amperites.

21A-4/54

By telephone 3-9-54

Status: Measurements completed; report in preparation.

- - - - -

Photometric and colorimetric characteristics  
of two approach-angle lights.

21A-5/54

In conference 3-31-54

Status: Awaiting measurement.

- - - - -

Consultation Activities

Tentative boundaries have been adopted for all colors to be included in the Standard for Signal-Light Colors. The work of preparing diagrams to illustrate these boundaries is approximately 50% completed.

Mr. Breckenridge has attended meetings of the Lighting and Marking Panel in Dayton, Ohio and Washington, D. C. Assistance was furnished in reporting the status of projects being conducted by the Airborne Equipment Division.

Study of Heliport Lighting

Several models illustrating the principle of beacon identification by compound rotation, which was proposed by Mr. A. L. Lewis of



the Airborne Equipment Division, have been made and two demonstrations of these models have been given to members of the Division. These demonstrations indicated that beacons based on this principle can be so designed as to be more distinctive at ranges up to a mile than any beacons now in use. For ranges in excess of a mile, longer ranges for detection and recognition can probably be obtained with beacons of the multiple-flash type such as have been tested by the Bureau of Aeronautics at Patuxent and Arcata. An improved code for this type of beacon, which was devised by a member of our staff several years ago, is available if at any time there appears to be a need for it. The present indications seem to be that there is no immediately urgent need for powerful beacons for the helicopters used by the Navy. The use of other types of lighting for heliports has been discussed with representatives of the Airborne Equipment Division in two conferences.

### Kinorama Research

To explore the problem of analyzing the records of tests made with the kinorama, a series of approaches was flown by one observer, and the records were processed. The experience indicated that the time required for reducing the data could be shortened if the ratio of forward speed to recorder chart speed could be held more nearly constant. The drift in this ratio produces a maximum difference of approximately 2.5% between the chart lengths corresponding to 5000 feet of approach.

In an effort to stabilize the ratio of forward speed to recorder chart speed, a feedback circuit was designed and installed with available equipment. Tests with this circuit showed no noticeable improvement in operation, but further tests with other stabilizing circuits are planned and will be carried out when the more urgent task of validation of the kinorama permits.

It also became apparent from the test described above that the relocation of the altitude pen to bring its records abreast of the traverse records would also facilitate the reduction of data. A pen specially modified for this purpose has been ordered from the manufacturer.

An occasional erratic performance of the time-indicating photocell circuit during the program led to the further development of the projector-receiver units. The use of a projector of higher intensity led to the design of a unit which promises to be more stable and to give a longer lamp life. The mechanical design of the units has been substantially improved, and the construction of the two new units is now about 80% accomplished.

The work initiated last quarter with incandescent projectors for equalizing the illumination on all of the visible surfaces was continued, and an improved background lighting system was arranged. A group of forty approaches, constituting the first exploratory test of this aspect of the kinorama was flown, and the results showed that this method of reducing the extraneous visual cues was unsatisfactory.



Experiments were then conducted with a reflecting filter in an effort to obscure the differences in illumination which had not been eliminated. A group of twenty approaches flown using such a filter yielded results which suggest that this method largely obscures the extraneous cues present, but reduces somewhat the visibility of the simulated lights. However, mechanical difficulties encountered in mounting this filter to accommodate all conditions which may arise during a test have led to experiments with a different system.

Experiments with fluorescent filters are now in progress, and a preliminary test of such a device suggests that it probably will be as effective as a reflecting filter in obscuring differences in background illumination. It appears to be superior to the reflecting filter in two respects: the installation and adjustment are considerably simplified, and the attenuation of the lights under inspection is somewhat reduced. However, the chromaticity of the fluorescent filter appears to be somewhat questionable.

If further tests show that this method of eliminating extraneous visual cues is satisfactory, the validation program can be started at once.





KINORAMA CONFERENCES & DEMONSTRATIONS\*

Date		
1-22-54	H.J.C. Pearson	C.A.A. Evaluation Center, Indianapolis, Ind.
	Demonstration	
1-26-54	Prof. Fox	George Washington University
	Demonstration & Conference on psychological design of evaluation program	
3-5-54	Ward D. Davis	Lear, Inc., Washington, D.C.
	Demonstration & Conference on simulator for Air Force	
3-9-54	Col. A. J. Perna	Chief, Special Training Devices Div.
	Maj. W.H.Wilhelmi	Flight Simulator Section
	Maj. L. Davenport	Training Films Section
	(Representing Director of Personnel Procurement and Training, H.Q., U.S.A.F.)	
	A. L. Lewis	Bureau of Aeronautics
	The Kinorama as a Training Device	
3-26-54	Maj. W.H.Wilhelmi	U.S.A.F.
	Maj. Howard Ellsburg	U.S.A.F.
	Mr. Ray Stout	U.S.A.F. Wright Field
	The Kinorama as a Training Device	
3-26-54	Ward D. Davis	Lear, Inc., Washington, D. C.
	Dr. C. J. Breitwieser	Lear, Inc., Los Angeles
	"Kinorama, from standpoint of building an experimental model to be shown Air Force."	

\* All demonstrations of the kinorama are cleared with the Airborne Equipment Division in advance by telephone.

13



)  
)



)  
)

