

# NATIONAL BUREAU OF STANDARDS REPORT

**NBS PROJECT**

0201-30-2303

0201-30-2328

**NBS REPORT**

March 31, 1954

3185

IMPROVEMENT OF VISUAL AIDS FOR AIR NAVIGATION

Progress Report  
July 1, 1953 to February 28, 1954

Prepared by  
F. C. Freckenridge

To  
Airways Engineering Division  
Civil Aeronautics Administration



**U. S. DEPARTMENT OF COMMERCE**  
**NATIONAL BUREAU OF STANDARDS**

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IMPROVEMENT OF VISUAL AIDS FOR AIR NAVIGATION  
PROGRESS REPORT

1. OBJECTIVES

It is the purpose of this project to carry on research and testing, develop specialized equipment and provide consultation services for the Airways Engineering Division of the Office of Federal Airways, Civil Aeronautics Administration.

2. STATUS

At the beginning of the period covered by this report, all of the research activities and three of the tests covered by this report were in progress. At the close of the period two of the research activities were nearing completion, and there was only one uncompleted test pending. The work covered by this report is financed by two separate funds, and hence two N.B.S. project numbers appear on the title page. A separate financial summary is attached covering the charges against each of these funds.

3. GOVERNMENT TESTS

The tests reported in this division of the report were made by personnel other than those regularly assigned to the C.A.A. projects. With one exception they are standard tests which could be covered by simple reports. A brief summary of these tests follows:

<u>Test No.</u>	<u>Requested</u>	<u>Reported</u>	<u>Estimate</u>	<u>Cost</u>
GL3593	6-18-53	7-21-53	\$100.	\$100.

A fuel oil additive carrying the trade name "GO-Sludge" was analyzed and found to be essentially a mixture of soluble oil of petroleum origin and alcohols. As the result of this analysis it was agreed that it would not be worth the expense to test the material further.

GL3887      Test Canceled

This number was assigned to a propeller test which was canceled after preliminary conferences because there were no funds available to cover the work.

GL4096	9-11-53	10-6-53	\$200/\$400*	\$386.
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A field intensity meter was submitted for calibration at 118 megacycles. Later, it was decided that the meter should be calibrated at 109 and 333 megacycles also. Still later, it was requested that the meter be calibrated at 30 megacycles which required special arrangements. Difficulty was experienced in checking the linearity of the meter, but a satisfactory calibration was finally obtained.

\*Increased to cover additional work.

STATE OF NEW YORK  
IN SENATE

January 1, 1914

REPORT OF THE COMMISSIONERS OF THE LAND OFFICE  
IN RESPONSE TO A RESOLUTION PASSED BY THE SENATE  
ON APRIL 1, 1913

ALBANY:

THE COMMISSIONERS OF THE LAND OFFICE  
HONORABLE SENATOR J. B. HUNTER, JR.  
ALBANY, N. Y.

ALBANY, N. Y.

THE COMMISSIONERS OF THE LAND OFFICE  
HONORABLE SENATOR J. B. HUNTER, JR.  
ALBANY, N. Y.

CLASS	AMOUNT	PERCENT	AMOUNT	PERCENT
100	100	100	100	100

THE COMMISSIONERS OF THE LAND OFFICE  
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THE COMMISSIONERS OF THE LAND OFFICE  
HONORABLE SENATOR J. B. HUNTER, JR.  
ALBANY, N. Y.

<u>Test No.</u>	<u>Requested</u>	<u>Reported</u>	<u>Estimate</u>	<u>Cost</u>
21187	1-6-54	2-1-54 3-2-54	--	--

Nineteen parts from a FN 56 low holder were examined electrochemically to determine if they complied with C.A.A. specifications. None of the parts did not comply, notably the principal casting. Additional tests were made on successive samples until satisfactory parts were tested.

\* Charged to a separate account but included because no separate report will be made for that account.

21188	1-6-54	1-29-54	260.	220.
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A connector assembly for a FN 56 low holder was tested to determine if it could withstand the required voltages. The results were satisfactory.

21190	1-15-54	2-12-54	50.	164.
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A radio-frequency cavity meter was calibrated at six frequencies and the meter setting at resonance was recorded and reported.

21192	1-27-54	2-25-54	--	--
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A cable clamp was tested by spectrochemical analysis to determine if it conformed with the requirements of the specification. The clamp was in three parts, two of which met the requirements completely but the third part was considerably low in magnesium.

\* Charged to a separate account but included because no separate report will be made for that account.

#### 4. PROJECT TESTS

In general the project tests were carried out within the division to which the C.A.A. projects have been assigned. They frequently involve unusual aspects which place them outside the category of standard tests.

<u>Test No.</u>	<u>Requested</u>	<u>Reported</u>	<u>Estimate</u>	<u>Cost</u>
22-1/54	12-24-53	1-22-54	1300.	2155.

Two pairs of binoculars of Japanese manufacture were tested for compliance with C.A.A. specifications. The free aperture of the right barrel was 2% below the specified value and the resolution in both barrels was somewhat outside the specification limit. The binoculars, however, appeared to be satisfactory for ordinary use.

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1911  
1912  
1913  
1914

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<u>Test No.</u>	<u>Requested</u>	<u>Reported</u>	<u>Estimate</u>	<u>Cost</u>
21A-5/53	4-3-53	8-6-53	\$175.	fy 53 - \$111. fy 54 - \$64.

This test, which was carried over from the previous year, covers three lots of neon approach-light lamps. The first two lots were satisfactory for operating voltage and the third lot was considerably below the specified limit for light output.

21A-8/53	5-14-53	8-17-53	\$175.	\$165.
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Three sample transformers for approach-light units were tested for compliance with the requirements of the C.A.A. specification. The inspection revealed five deficiencies with respect to the specifications, but only one of these, a low power-factor, was considered serious.

21A-10/53	11-3-53	(in progress)	\$375.	\$410.
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Fifteen approach-light photometers were inspected and calibrated. These instruments were found to have incorrect test-plate orifices which had to be returned to the manufacturer for enlargement. Upon being returned they were reinstalled in the instruments before calibration could be made. Some difficulties were also experienced in checking additional photometers which were returned to this bureau from the C.A.A. and the National Airport. In one case a new calibration lamp had to be installed in the calibrator. After these difficulties had been overcome the tests proceeded satisfactorily. The units were calibrated, calibration cards were prepared, the cards were sealed into plastic covers and installed in the instrument cases and the instruments were packed and shipped on bills of lading furnished by the C.A.A.

21B-6-54	1-6-54	2-7-54	-	\$275.
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Two transformers designed for direct earth burial were tested for compliance with the requirements of the C.A.A. specification. One was taken apart and inspected for construction and found satisfactory. The other transformer was tested for electrical characteristics before and after being dropped to simulate the effects of rough handling. All previous tests were then repeated. The transformers were found to be in accordance with specifications.

THE  
STATE  
OF  
NEW YORK

IN SENATE  
January 15, 1914.

REPORT  
OF THE  
COMMISSIONERS OF THE LAND OFFICE  
IN ANSWER TO A RESOLUTION PASSED BY THE SENATE  
MAY 15, 1913.

ALBANY:  
J. B. LIPPINCOTT COMPANY, PRINTERS,  
1914.

THE STATE OF NEW YORK  
OFFICE OF THE COMMISSIONERS OF THE LAND OFFICE  
ALBANY, N. Y.



## 5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Study of exposure characteristics of metal protective paints

This study addresses the characteristics of 18 coating sequences applied to corroded steel panels used to simulate old structures, and 10 sequences applied to galvanized steel panels, simulating new work, to determine the relative corrosion protective value of the different treatments. The corroded panels were brushed to remove loose rust. The galvanized steel panels were given priming coats comprised of zinc dust and zinc oxide and one coat of orange exterior enamel followed by 2000 hours in an accelerated weathering equipment before being treated with the other coatings. Both natural and accelerated weathering is being used on the completed panels. In December, a progress report was submitted covering the loss of gloss and color changes for the different specimens. At the time the progress report was prepared only one of the coating systems had proven inferior to the others in protective value, although there was considerable difference in the loss of gloss. Up to that time, the study had not revealed a satisfactory correlation between the results obtained from the outdoor exposures and those resulting from the use of the accelerated weathering equipment. The test is being continued.

Cost: \$650.

### 5.2 Study of green plastic for beacon covers

During the previous year, various samples of green plastic were tested for chromaticity with a satisfactory sample was found. On the basis of this sample, some experimental green plastic covers for 2 1/2" beacons were purchased by the C.I.A. and one of these was sent to this Bureau. In order to obtain information on the exposure characteristics to be expected from this plastic, a 3" disc was cut from the center of this cover and the resulting hole was filled with a piece of clear plastic. This beacon cover was returned to the C.I.A. for service tests and the small sample was spectrophotometered to determine its chromaticity. Subsequently, this disc was given four 120-hour exposures to spray and ultraviolet radiation. After each exposure the sample was again spectrophotometered and its chromaticity has been computed for each stage. The results appear very stable but the report has not as yet been prepared.

Cost: \$115.

### 5.3 Study of optical system for traffic control projectors

In the previous fiscal year an experimental traffic signal projector was submitted for candlepower distribution measurements. After making these measurements, it was found that the device could be improved by rotating the lamp to make a more satisfactory use of the filament form. Upon completion of this work the results were discussed with the C.I.A.

\* Costs stated are for the report period.

THE HISTORY OF THE UNITED STATES

The first part of the book deals with the early years of the nation, from the time of the first settlers to the end of the American Revolution. It covers the period of the early colonial period, the struggle for independence, and the formation of the new nation. The second part of the book deals with the period of the early republic, from the end of the American Revolution to the beginning of the Civil War. It covers the period of the early republic, the struggle for a stronger federal government, and the beginning of the Civil War. The third part of the book deals with the period of the Civil War and Reconstruction, from the beginning of the Civil War to the end of Reconstruction. It covers the period of the Civil War, the Reconstruction era, and the struggle for civil rights. The fourth part of the book deals with the period of the late republic, from the end of Reconstruction to the beginning of the Progressive Era. It covers the period of the late republic, the Progressive Era, and the beginning of the Progressive Era. The fifth part of the book deals with the period of the Progressive Era and the early 20th century, from the beginning of the Progressive Era to the beginning of the 20th century. It covers the period of the Progressive Era, the early 20th century, and the beginning of the 20th century.

THE HISTORY OF THE UNITED STATES

The second part of the book deals with the period of the early republic, from the end of the American Revolution to the beginning of the Civil War. It covers the period of the early republic, the struggle for a stronger federal government, and the beginning of the Civil War. The third part of the book deals with the period of the Civil War and Reconstruction, from the beginning of the Civil War to the end of Reconstruction. It covers the period of the Civil War, the Reconstruction era, and the struggle for civil rights. The fourth part of the book deals with the period of the late republic, from the end of Reconstruction to the beginning of the Progressive Era. It covers the period of the late republic, the Progressive Era, and the beginning of the Progressive Era. The fifth part of the book deals with the period of the Progressive Era and the early 20th century, from the beginning of the Progressive Era to the beginning of the 20th century. It covers the period of the Progressive Era, the early 20th century, and the beginning of the 20th century.

THE HISTORY OF THE UNITED STATES

The fifth part of the book deals with the period of the Progressive Era and the early 20th century, from the beginning of the Progressive Era to the beginning of the 20th century. It covers the period of the Progressive Era, the early 20th century, and the beginning of the 20th century.

engineers and it was decided to make a more thorough study of the possibilities of improving the optical system and measurements were made on a plastic lens which had been obtained from Eastman Kodak Co. The handle-power distribution obtained was so satisfactory that an additional lens of the same type was obtained, but this lens taken from new production did not give equally good results. When this fact was brought to the attention of the Eastman Kodak Co., they voluntarily submitted two additional samples of both old and new production and these were also tested with results confirming those previously obtained. This study has also included tests on the variations to be expected in manufacturing one lens for another in the original experimental projector. A report of the work has been submitted and further study is being deferred until the Eastman Kodak Co. has been informed of the latest results and policy decisions can be made by them and the Airways Engineering Division.

Cost: \$157.

#### 5.4 Standard for signal-light colors

During the previous fiscal year a first draft of a joint specification to cover the requirements of civil and defense agencies for some means of controlling the color of aviation ground lights was prepared and submitted to the Lighting and Marking Panel. After considering the draft and a report on the status of the relationship between this proposed specification and the specifications for aircraft lighting colors, the Panel requested that the draft be revised for the purpose of including the aircraft lighting requirements. The draft was submitted to Mr. W. C. Fisher of the Bureau of Aeronautics as one familiar with the requirements for signal colors for military aircraft and comprehensive comments have been received from Mr. Fisher. The preliminary portions of the first section of this standard have now been revised and the work on the basic chromaticity definitions and diagrams necessary for illustrating them is going forward. This work is being handled as a joint project with the Bureau of Aeronautics, the major part of the expense being carried by that Bureau.

Cost: \$110.

#### 5.5 Consultation and liaison activities

This item includes correspondence, conferences, administrative reports and other general activities incident to the conduct of this project.

Cost: \$135.

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Financial Summary, July 1, 1953 to February 28, 1954

C.A.S. Fund no. 141139-001

N.S.S. Project CS1-30-238

Transfer by C.A.S. order (A-54-274)

WROC.

Cost of tests performed

N.S.S. No.      Date of report      Item Tested \*      Costs to date

"Government Tests"

013593	6-16-53	"Go-no-go"	\$ 100
013807	7	Propeller	recovered
014096	9-11-53	Field Intensity Meter	306
014507	1-4-54	Lamp holders for approach lights	---
014568	1-6-54	Wax lamp connectors	79
014950	1-15-54	Frequency meter	64
014952	1-27-54	Scale clamp	---

"Project Tests"

22-1-54	12-24-53	Dimmers	155
214-5/53	4-3-53	Iron Lamps for approach lights	115
211-3/53	5-14-53	Transformers for approach lights	165
211-10/53	11-3-53	Approach-light photometers (court pending)	810
Total for tests			\$ 2125

Research, Consultation and Liaison Services

Study of enclosure characteristics of metal protective paints	680
Study of green plastic for lamp covers	115
Study of optical system for traffic control projectors	1370
Standardization of specifications for signal colors	180
Consultation and Liaison	1895

Total      \$ 2,225

Total expended

\$ 374

Balance available 3-1-54

\$1851

\* For scope of test see previous sections of report.  
\*\* Separate funds.

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Financial Summary, July 1, 1953 to February 28, 1954  
C.I.A. Fund No. 130305.001

W.S.P. Projects 6841-30-2303  
and 37-8

Carry over from fiscal year 1953 (1953-733 Amendment 2) \$2995.37  
(Reduced from balance stated in last report by accruals  
of obligations of prior year to the amount of \$1.58)

Cost of Test performed

Number	Date of request	Item tested	Cost
813-6-54	1-6-54	Direct burial transformers	\$270

Research, Consultation and Liaison Services

Liaison activities

$\frac{66}{336}$

Balance Available 3-1-54

\$2659.

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY

RESEARCH REPORT  
1952

1952

A study of the reaction of ethylmagnesium iodide with ethylmagnesium chloride in the presence of diethyl ether. The reaction is shown to be reversible and the equilibrium constant is determined to be 1.5 at 25°C.

EXPERIMENTAL

The reaction was carried out in a 100 ml. three-necked round-bottomed flask equipped with a magnetic stirrer, a reflux condenser, and a nitrogen inlet. The flask was dried and cooled to 0°C. A solution of 1.0 g. (0.045 mole) of ethylmagnesium iodide in 10 ml. of diethyl ether was added to a solution of 1.0 g. (0.045 mole) of ethylmagnesium chloride in 10 ml. of diethyl ether.

ANALYSIS

The reaction mixture was analyzed for ethylmagnesium iodide by the method of [reference].

1952

1952