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UNITED STATES ARMY AVIATION BOARD
Fort Rucker, Alabama

ATBG-DT-AVN-2360

16 NOV 1959

SUBJECT: User Test of Beacon, Light, Pathfinder, Project Nr AB 2059 and AVN 2360

TO: President
United States Army Airborne and Electronics Board
Fort Bragg, North Carolina

1. Reference is made to:

a. Department of the Army Project Number 8-23-10-110; RDB Tech Obj LC-9.

b. Letter, ATBG-AB 2059, Headquarters, US Army Airborne and Electronics Board, 19 Aug 1959, subject: "Beacon, Light, Pathfinder."

2. In accordance with your request (reference b above), this Board has conducted a series of tests to determine the suitability of the Beacon, Light, Pathfinder, for use as a terminal navigation aid to Army aircraft.

a. It is concluded that:

(1) The Beacon, Light, Pathfinder in its present configuration has limited potential as a terminal aid to navigation for Army aircraft.

(2) Because of the omni-directional air-to-ground viewing feature of the test item, the security of the contemplated operations would be compromised.

b. It is recommended that the visible light features of the Beacon, Light, Pathfinder, be considered unsuitable as a navigation aid for Army aircraft in support of tactical operations.

FOR THE PRESIDENT:

1 Incl
Extract from Report of Test

E. R. WRIGHTMAN
Capt, AGC
Adjutant

J. J. Peake
USAAVNTD
AR 340-16

EXTRACT

US ARMY AVIATION BOARD'S REPORT OF USER

TEST OF BEACON, LIGHT, PATHFINDER

PROJECT NR AVN 2360

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V. TESTS.

1. Physical Characteristics.

a. Weight 29.5 pounds

(1) Telescoping Mast 7.5 pounds

(2) Case containing battery, coding device, light, extra lenses 22 pounds

b. Height of telescoping mast

(1) Fully extended 23 feet

(2) Fully collapsed 30 inches

c. Case 18 inches by 9½ inches by 6½ inches.

d. Light - 10 watts, 8 volt provided w/6 - 2 inch OD glass hemispherical lenses of red, green, clear, blue, amber, and opaque.

e. Coder - optional automatic or manual selection.

(1) A simple control system allows the light to operate automatically and continuously.

(2) The control system further allows selection of continuous beam or positions the switches for manual operation for sending code.

f. Power Source - 12V nickel-cadmium battery.

Operational Suitability. The Beacon, Light, Pathfinder, was erected at two widely separated sites on the Fort Rucker, Alabama, Military Reservation. Numerous combinations of lens colors and code signals were incorporated on separate tests in an effort to include each lens emission

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on continuous beam, automatic code, and manually operated code.

a. The basic altitude flown by the Army aviators evaluating the test item was 1,000 feet above the terrain. However, in an effort to insure completeness of test, selected altitudes above and below 1,000 feet absolute were flown.

b. Distances at which light(s) were first visible varied to some degree by the altitude being flown. On clear, moonless nights, while flying at an absolute altitude of 1,000 feet, red, clear, and amber lights were clearly distinguishable at distances up to approximately 10 statute miles. The air-to-ground viewing distance deteriorated, generally, in proportion to the weather conditions except in the case of overcast sky conditions with no precipitation. As sky cover increased, to the exclusion of overhead light, the brilliance of the lights appeared to increase, apparently due to contrast.

c. Discernibleness of color emissions of the test item ranged in effectiveness in order from red, clear, amber, green, to blue. Red emissions were often discernible at the range at which the test item was first attracted to the view of the aviators. When the clear lens was employed simultaneously with other lenses, there was a tendency for the emissions to "spill over" at the expense of the companion lights, often resulting in complete diffusion and blending of all colors when viewed from distances of four miles or more. Blue emissions were seldom visible beyond a range of one and one-half to two miles.

d. The signals emitted from the beacons were readable at somewhat shorter ranges than the extreme limits of air-to-ground viewing limits. The lag between original sighting and readability appears to be geared to adaptability of the observer to signal interpretation. Signal emissions appeared to have the same effect as a flashing beacon in attracting the aviator's attention.

VI. DISCUSSION.

1. The test item appears to have excellent terminal aid potential under non-tactical conditions. The lights when coded (flashing) were visible and attracted the aviators at ranges in excess of five statute miles and at absolute altitudes of 1,000 feet. Because of the hemispherical design of the lenses, line-of-sight observation was unrestricted as to quadrant. Even when approach headings were varied freely, no difficulty was experienced. In instances wherein several aircraft were converging on the installation site of the test item on divergent headings, the aviators reported "first sightings" and intelligible code at similar ranges and altitudes consistently.

2. Since there is no method of effecting directional emissions of the test item, the advantage accruing from its use as a navigational aid for Army aircraft could be detrimental to the mission of the supported pathfinder unit. In consideration of the use of the test item under tactical

conditions, its demonstrated effectiveness as a navigational aid to Army aircraft is nullified by the abandonment of security control measures of the supported unit. The results of tests have indicated that the emissions of the test item are readily viewable from all quadrants.

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