

August 1966

Brief 66-10316

NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U. S. space program and to encourage their commercial application. Copies are available to the public from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Legibility of Electroluminescent Instrument Panels Investigated

The problem:

To investigate the legibility of EL (electroluminescent) instrument display panels.

The solution:

Legibility studies of several EL displays were conducted to correlate reading time and accuracy with number size, stroke/width ratio, indicia size, pointer width, contrast, ambient illumination, and color background and contrast.

How it's done:

Two indicia and number sizes for a dual, vertical EL display were investigated under two levels of ambient illumination and two contrast conditions. The results indicate that speed of reading is affected by indicia and number size. For this study, the values of 0.030 inch for major indicia and 0.020 inch for minor indicia, and a stroke width-to-height ratio of 1:8 produced the best results. This program was not designed, however, to find the optimum values, but only to determine if such factors influence legibility. The two light levels did not affect performance, but the results indicate the research should be continued with illumination levels well below the minimum 2 foot-candles used for this study. Number background contrast influenced speed of reading and errors made; black numerals on a white background were preferred over the reverse condition. While the results of the study are not conclusive, they indicate that more information is required on the perceptual aspects of EL displays and suggest the direction of subsequent research efforts.

Four EL display configurations were investigated for legibility under two levels of ambient illumination and four color contrast combinations. Results indicate that color does not significantly influence

display legibility, that reading time is affected by contrast in the favor of black characters on a light background, and that the display configuration affects reading time and error scores. Circular displays were read more rapidly than vertical displays, but with greater error. Ambient illumination did not differentially affect display legibility.

The effects of (1) three pointer-background contrast values, (2) two sizes of pointer end widths, and (3) three levels of ambient illumination upon the legibility of EL displays were investigated. Both reading time and error results indicate that a wide pointer was significantly more legible under all conditions than the narrow pointer. Similar time and error results were found for the three contrast values, and the 50% contrast value, i.e., 2:1, being the most legible.

Notes:

1. The results of this investigation indicate that human factor criteria established on non-EL displays may not apply to EL displays.
2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas 77058
Reference: B66-10316

Patent status:

No patent action is contemplated by NASA.

Source: G. E. Miller and M. V. McLean
of North American Aviation, Inc.
under contract to
Manned Spacecraft Center
(MSC-494, 496, 501, and 505)
Category 02