Information Coding for Cockpit Human-machine Interface

ZHANG Lei*, ZHUANG Dam

School of Aeronautic Science and Engineering, Beijing University of Aeronautics and Astronautics 100191, China

Abstract: Pilot needs to process lots of information when operating an aircraft, and reasonable information coding can greatly improve the correct rate and speed of information identification. At present, related researches are mainly performed in the laboratory, and the experiment method for abstract simulation is often used to research single digit information coding. The research results demonstrate a lack of systematization and applicability. The present study is based upon information coding methods of human-machine interface under real time in flight simulators. Subjects are required to perform an aircraft landing and the corresponding experiment task. The correct rate and reaction time are chosen as the performance evaluation indexes, combined with eye movement data. The advantages and disadvantages of different information coding methods are also evaluated and analyzed. The experiment results demonstrate that the effect of color coding on the correct rate of information identification is not significant, but the effect on the speed of information identification is obviously significant. The study demonstrates that on a black background, red, green and yellow are suitable colors for color coding, but blue is not. The position of information on the performance of information identification is also significant. The center of the interface is better than the edge, and the left position is superior to the right. The impact of language and a person's mother tongue should also be considered in practical applications – the study shows the Chinese has a higher correct rate of identification than English. As the experiment research method in the present study is based on flight simulator, the actual utility and application value can be guaranteed. The research results have the ability to offer improvements in ergonomic reference for cockpit human-machine interface design.

Key words: cockpit design; ergonomics; information coding; eye movement; simulator

浏览（下载）论文全文（PDF格式）