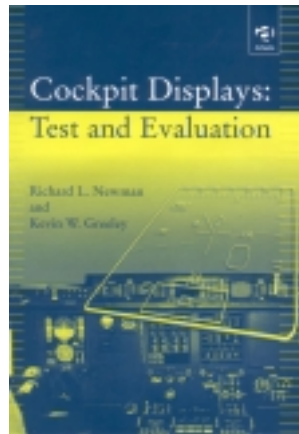


“Cockpit Displays: test and evaluation”

by Richard L. Newman and Kevin W. Greeley

Book review by Axel Boland



In their examination, the authors state that the reason for the often poorly structured development of modern systems does not lie in a lack of design guides, but that “Cockpit design analyses are like safety requirements. Every-



As technology advances with great leaps and we marvel at new capabilities, greater speed and increased capacity, the natural assumption seems to be that technology itself is the answer to the problems we

face. But as those on the frontiers of technology have come to appreciate, the problems faced today often are not related to the question “What can we build?”, but rather “What should we build?”. Technology can, and does, introduce new problems. Operational difficulties with modern cockpit systems and displays are well documented.

This book is intended for cockpit design engineers, those in civil aviation concerned with flight deck technical specifications and standards, procurement executives and program managers, flight test engineers and test pilots. In my opinion it is also a good read for anyone with an interest in the philosophy behind any design process and the problems inherent to it. Although, some familiarity with cockpit terminology does improve the books’ readability.

Another thing that would have improved its readability is a more thorough editing process. There are numerous errors in the text that are sometimes merely amusing (“...comparisons of the tasks to be perfumed”), but at other instances are quite confusing. Sometimes there are several of these annoying errors on one page. An idiosyncrasy, as the structure of the text and presentation of information are clear and concise.

The authors begin with an analysis of common problems and their causes. They proceed with a description of several cockpit design guides and then walk through the entire design process: Requirements Definition, Design, Engineering analysis, Test and Evaluation (T&E), Documentation and Certification. Newman and Greeley more or less take the reader by the hand through these phases, describing and comparing different methods of T&E. It is apparent that the writing of this book was preceded by extensive research.

A whole chapter is devoted to Situational Awareness (SA), and illustrates why comprehensive T&E of cockpit displays is so important. Apart from factors such as reliability, accuracy, durability, cost, dimensions and other requirements, a requirement specific and imperative to all cockpit displays is to help the pilot maintain SA. In both airline and military operations and to some extent in general aviation, flights are executed under Instrument Meteorological Conditions (IMC). This basically means that all steering, navigating and information gathering is done by sole reference to instruments, i.e. no outside visual clues. Cockpit displays, therefore, are the only link to the outside world. They have to display position, altitude, speed, attitude, weather and terrain information, proximity of other traffic, threats and all relevant aircraft status information. The pilot has to build a complete mental picture from this information quickly, in all flight phases, without shedding other important tasks. For pilots, SA is a gut-level concept: “staying ahead of the airplane”, “knowing what’s happening”. For designers and testers it is much harder, as these are not objective test criteria.

rybody pays lip service – few actually perform the required preliminary studies.” These include input from operational pilots and establishing objective test criteria as well as clear acceptance test methods. Another problem lies with the authorities. As technology and aviation itself evolve, so should the regulations. Newman and Greeley: “We object to requiring instruments simply because they were needed in 1943.”

The authors seem to me to have been very thorough in their research and step-by-step walkthrough of the design process. This thoroughness does not extend to the syntax of the text, however. A problem that could have easily been remedied during editing. That put aside, Newman and Greeley present a clear and well-supported argument for a comprehensive design philosophy, as they state in their summary, which almost reads like a manifest. I for one hope that those working in the industry pay this book the attention it deserves.

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