International Journal of Professional Aviation Training & Testing Research

Volume 1, *Issue* 1 2007 *Article* 5

The Limits of Expertise: A Book Review

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Abstract

Over the years many compilations of aircraft accident reports have hit the market. Many of them were designed to inform pilots of the human errors often the cause of aircraft accidents. Instructors, teaching courses in Crew Resource Management (CRM) or related subject areas, have been fans of such literature, because they are easier to study than the unabridged report provided by the National Transportation Safety Board (NTSB). In recent years, human error and the management of error have taken center stage in the CRM literature, although not everyone is agreed on the nature of human error or how one should go about mitigating its affect on safety. The new text on The Limits of Expertise bridges the gap between the technical description of accidents and the scientific explanation of pilot performance with an easily digestible blending of the two approaches.

KEYWORDS: accident, aircraft, NTSB, accident report, human factors, crew resource management, causality

The Limits of Expertise: A Book Review

Todd P. Hubbard

Oklahoma State University

Ashgate Publishing was right on target when they agreed to support and publish this very important text on the limits of pilot expertise. In a brilliant fashion, the book combines scientific aspects of pilot performance with straightforward analysis of pilot behavior. This was achieved through the blending of work by a number of NASA Ames researchers each one of whom have special knowledge of pilot behavior on the flight decks of U.S. commercial airlines.

Loukia Loukopoulos is currently a researcher with NASA Ames, in the Human Factors Division; R. Key Dismukes is the Chief Scientist, Human Factors Research and Technology Division at NASA Ames; and Ben Berman is a NASA Ames senior research associate through the San Jose University Foundation, is also an experienced commercial airline pilot with 6,000 hours, and the President of the Professional Aviation Board of Certification. Until 9/11 2001, Loukia and Key had spent a great deal of time on commercial airline flight decks, making their work available through scholarly publications and presentations at the major human factors events.

In 2001, while attending the 11th International Symposium on Aviation Psychology—an event attended by Loukopoulos and Dismukes—an airline captain with Braathens Airlines shared his puzzlement over the disconnect between a scientific understanding of an airline pilot's duties and performance and a practitioner's understanding of those same duties and performance. After having listened to dozens of papers on pilot performance, I agreed with his distillation of the available information. Gratefully, since that event, we see a more balanced view of pilot performance. Evidence of this balanced view can be observed in *Ten Questions about Human Error* (Dekker), *The Field Guide to Understanding Human Error* (Dekker), and now *The Limits of Expertise*.

The Limits of Expertise: Rethinking Pilot Error and the Causes of Airline Accidents bridges the philosophical gap between the deconstructionist approach used by the NTSB investigators and the systems approach that resists such a narrow view of causation. Although I will highlight chapter 21 later, I think the reader will find this chapter's review of the concept of causality in accidents of great importance. Given the philosophical gap, identified quite ably by Dekker in *Ten Questions about Human Error*, a companion read for this text, I found it interesting how the authors integrated NTSB reporting with their own analysis: making the read more meaningful for those who wanted to look beyond just the facts as they were reported by the NTSB investigators.

Nineteen accidents are reviewed in the first 19 chapters. Chapter 20 covers flightcrew-related accident data and chapter 21 discusses converging themes. Each accident report follows the same format. First, you get an introduction to the accident, with the

proximate or probable cause(s) listed, as revealed by the NTSB. Second, the significant events and issues are separately analyzed, to include what the pilot(s) did and when in the sequence of events the pilot(s) did it. Embedded within this section, you see the influence of the human factors scientist and the pilot practitioner. For CRM instructors, this approach helps your student understand how pilot behavior influences the outcome of a sequence of events. Third, the authors treat the reader to a concluding discussion. In the concluding remarks the reader will get a distilled version of the key points of the accident report and the analysis of the authors. The length of the conclusions varies with the number of issues that need to be discussed.

Chapter 20 is useful, if you need comparison data for flightcrew-related accidents. I found the special focus on human factors in flightcrew particularly useful. Finding good analyses of accident data is crucial when teaching professional pilots and the analyses provided in this chapter will enhance any lesson plan in Human Factors in Aviation or CRM.

Chapter 21 is perhaps the single best chapter; although one would have to read chapters 1-19 to really appreciate the benefit of its contents. This chapter answers the question, "what do we do now?" in the section on implications and countermeasures, found on pages 302-308.

If you are using the text in class, don't forget to review chapter 21 with your students. If you overlook this chapter you'll miss the reason behind the book. Anyone can read an NTSB report; but not everyone can go beyond the report to the important "cross-cutting" factors such as "human cognitive vulnerability, task demands, environmental events, and social, cultural, and organizational factors" (p. 296). The authors are experts in their analyses of these factors and this experience really comes through as you read the chapter.

I strongly endorse this text as a companion to the primary texts used in courses on Human Factors in Aviation or Crew Resource Management. As I prepared my syllabus for an upcoming CRM course, I found this text, reviewed it and then added it as a supplementary text to my primary CRM text.

In April 2007, I happened to see Key Dismukes in Dayton, Ohio at the 14th International Symposium on Aviation Psychology. I told him I was adding *The Limits of Expertise* to my CRM course and he said that he and the other authors had intended their text to be used in this unique way. I am grateful to the authors and to Ashgate Publishing for providing this unique insight into the limits of expertise.

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