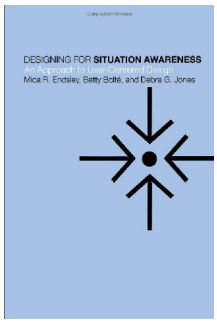

Seeing the Big Picture - BBB (Borrow)
Designing for Situation Awareness: An Approach to User-Centered Design
By Mica R. Endsley, Betty Bolte, and Debra G. Jones
Reviewed by Nick Sands

The control system human machine interface (HMI) has a significant impact on the performance of the operator, though not everyone believes it. The effects are explained in *Designing for Situation Awareness: An Approach to User-Centered Design*, a book on the human factors of HMI design by Mica Endsley, Betty Bolte, and Debra Jones. Endsley has a Ph.D. in Industrial Engineering from the University of Southern California and has authored over 200 scientific articles and reports on situation awareness. She is the president of SA Technologies, a PE, and a Certified Professional Ergonomist (CPE). Bolte is a technical writer/editor for SAIC in Huntsville with broad experience in technical writing. Jones was a research associate with SA Technologies. She received her PhD and master's in Industrial engineering from Texas Tech University.

The first set of chapters provides an overview of situation awareness (SA). The authors advocate user-centered design, which does not mean designing to give the user what they what, but analyzing for the needs of the user and designing to meet those needs. A key objective of user-centered design is situation awareness, which includes perception of the elements in the environment (level 1), comprehension of the current situation (level 2), and projection of the future state (level 3). There are barriers to situation awareness, which the authors call SA demons, like attention tunneling, out-of-the-loop syndrome, errant mental models, and more. The user-centered design process minimizes these barriers.

The second part of the book provides a process for determining HMI requirements and 50 principles for situation awareness design. The principles cover factors like uncertainty, automation, and complexity. A principle related to alarms is to "reduce false alarms, reduce false alarms, reduce false alarms". The section ends with consideration for enhancing situation awareness in teams.

The final part closes the loop with methods for evaluating the effectiveness of HMI designs, like the Situation Awareness Rating Technique (SART) and other measures. Measurement of SA can be challenging, but rewarding. The final chapter summarizes how application of the principles can be used to develop a user-centered design and defeat the SA demons.

Many automation professionals will be satisfied with basic and practical guidance on HMI design from other sources, but for those who wish to develop a deeper understanding, *Designing for Situation Awareness: An Approach to User-Centered Design* is an excellent resource. Since it is a specialized book that is more than the general practitioner will need it rates a borrow (BBB) on average. It is available from Amazon.com for ~$47US.