

Preface

Researchers are conducting cutting-edge investigations in the area of unmanned systems to inform and improve how humans interact with robotic platforms. Many of the efforts are focused on refining the underlying algorithms that define system operation and on revolutionizing the design of human–system interfaces. The multifaceted goals of this research are to improve ease of use, learnability, suitability, and human–system performance, which in turn will reduce the number of personnel hours and dedicated resources necessary to train, operate, and maintain the systems. As our dependence on unmanned systems grows along with the desire to reduce the manpower needed to operate them across both the military and commercial sectors, it becomes increasingly critical that system designs are safe, efficient, and effective. Optimizing human–robot interaction and reducing cognitive workload at the user interface require research emphasis to understand what information the operator requires, when they require it, and in what form it should be presented so they can intervene and take control of unmanned platforms when it is required. With a reduction in manpower, each individual’s role in system operation becomes even more important to the overall success of the mission or task at hand. Researchers are developing theories as well as prototype user interfaces to understand how best to support human–system interaction in complex operational environments. Because humans tend to be the most flexible and integral part of unmanned systems, the Human Factors and Unmanned Systems’ focus considers the role of the human early in the design and development process in order to facilitate the design of effective human–system interaction and teaming.

This book will prove useful to a variety of professionals, researchers, and students in the broad field of robotics and unmanned systems who are interested in the design of multisensory user interfaces (auditory, visual, and haptic), user-centered design, and task/function allocation when using artificial intelligence/automation to offset cognitive workload for the human operator. We hope this book is informative, but even more so that it is thought provoking. We hope it provides inspiration, leading the reader to formulate new, innovative research questions, applications, and potential solutions for creating effective human–system interaction and teaming with robots and unmanned systems.

A total of eight sections presented in this book:

- I. Requirements and Groundwork for the Next Generation of Robotics Systems
- II. Advanced Displays and Intuitive Interfaces
- III. Advances in Unmanned Aerial Vehicles (UAV) and Drones Research
- IV. Control Using Multimodal Input
- V. Tactile Applications for Enhanced Performance in Naturalistic Settings
- VI. Understanding the Key Drivers of Human-Machine Trust: Lessons Learned and Future Directions
- VII. Human-Robot Teaming
- VIII. Virtual Reality Technologies for Training Applications and C2 Of Unmanned Systems

Each section contains research paper that has been reviewed by members of the International Editorial Board. Our sincere thanks and appreciation to the board members as listed below:

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