Robotics Seminar Series

Unmanned Systems Research and a Framework of Autonomous and Automated Agents

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Research on unmanned systems has addressed a need to identify and define autonomous system design requirements. The same work has surveyed system features that impose demands (workload) on human operators and has formulated models to predict workload outcomes of design. In this talk, I will differentiate the concepts of automation and autonomy within a framework of agents. The framework is complemented by observations on characteristics of automated vs. autonomous systems with examples. I will also discuss levels of system automation along with types of autonomy. A definition of autonomy is developed throughout the talk to a form with utility for engineering. Key requirements for design of autonomy in unmanned (and other complex) systems include agent viability in context, agent self-governance in goal formulation, and independence in defined task performance. The main findings of this research are that demands of automated agents on the human-task-environment system should be absent from design of autonomous agents. Furthermore, the design of automated systems is always automation-centric, despite our best efforts at human-centered approaches. Current empirical work on human-autonomy teaming design is summarized.

David Kaber is currently the College of Engineering Dean's Professor in the School of Mechanical, Industrial and Manufacturing Engineering (MIME) at Oregon State University. Kaber recently completed a six-year term of service as Chair of the Industrial & Systems Engineering Department at the University of Florida (UF). Prior to joining UF, Kaber was a distinguished professor of ISE at North Carolina State University where he also served as the Director of Research for the Ergonomics Center of North Carolina. Kaber's primary area of research interest is human-systems engineering with a focus on human-automaton interaction, including design for levels of automation and adaptive automation in complex human in-the-loop systems. Domains of study for his research have included physical work systems, industrial safety systems, robotic systems, transportation systems and healthcare. Kaber is a fellow of IEEE and immediate past Editor-in-Chief of the IEEE Transactions on Human-Machine Systems. He is also a fellow of Institute of Industrial Engineers and the Human Factors & Ergonomics Society. Kaber is a Board Certified Human Factors Professional (BCPE) and a Board Certified Safety Professional (BCSP).

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