Human-Automation Interaction Considerations for Unmanned Aerial System Integration: A Workshop

Committee

Nancy T. Tippins

Chair

Nancy Tippins (chair) is a principal consultant at CEB. She manages teams that develop talent acquisition strategies related to work force planning, sourcing, acquisition, selection, competency identification, succession planning, and employee and leadership development. Dr. Tippins also conducts executive assessments and coaching and provides expert support in litigation matters. Active in professional affairs, Dr. Tippins has a longstanding involvement with the Society for Industrial and Organizational Psychology where she served as President (2000-2001). In addition, she served on the Ad Hoc Committee on the Revision of the Principles for the Validation and Use of Personnel Selection Procedures and is co-chairing the committee for the current revision of the Principles. She was one of the U.S. representatives on the ISO 9000 committee to establish international testing standards. She also served on the Joint Committee to revise the Standards for Educational and Psychological Tests (2014). She has served on a number of National Academies of Sciences, Engineering and Medicinecommittees and recently chaired a committee on Offshore Oil and Gas Safety Culture. Dr. Tippins received an M.S. and Ph.D. in industrial and organizational psychology from the Georgia Institute of Technology, an M.Ed. in counseling and psychological services from Georgia State University, and a B.A. in history from Agnes Scott College.

David R. Arterburn

Member

David R. Arterburn is director of the Rotorcraft Systems Engineering & Simulation Center at the University of Alabama in Huntsville. Mr. Arterburn currently heads a multi-disciplined team of researchers and students working on rotorcraft, unmanned aerial systems, model based systems engineering and payloads for space and earth bound systems. He is the Principal Investigator for a four school ASSURE team conducting research in UAS ground collision severity and development of safety systems for UAS systems to reduce the potential for injury to non-participants during UAS operations over people. He is currently a member of an ASTM team working on consensus standards for the safety of UAS for flying over people. Mr. Arterburn is a retired Master Army Aviator with over 28 years in Army Aviation. Mr. Arterburn has expertise in Experimental flight test and airworthiness, helicopter performance and handling qualities, fly-by-wire flight control, and digital cockpit development. He holds a M.S. in aerospace engineering from the University of Maryland at College Park, and a B.S. from the United States Military Academy.

Ellen J. Bass

Member

Ellen Bass is professor and chair of the Department of Health Systems and Sciences Research in the College of Nursing and Health Professions, professor in the Department of Information Science in the College of Computing and Informatics, and affiliate faculty in the School of Biomedical Engineering, Science & Health Systems at Drexel University. Ellen Bass has over thirty years of human-centered systems engineering research and design experience in air transportation, healthcare, meteorology and other domains. The focus of her research is to develop theories of human performance, quantitative modeling methodologies, and associated experimental designs that can be used to evaluate human-automation interaction and human-human collaboration in the context of total system performance. The outcomes of the research can be used in the systems engineering process: to inform system requirements, procedures, display designs and training interventions and to support system evaluation. She is currently a member of the Board on Human-Systems Integration in the Division of Behavioral and Social Sciences and Education. She earned a Ph.D. in industrial and systems engineering from the Georgia Institute of Technology.

John-Paul B. Clarke

Member

John-Paul B. Clarke is a College of Engineering Dean’s Professor at the Georgia Institute of Technology, where he has appointments in the Daniel Guggenheim School of Aerospace Engineering and the School of Industrial and Systems Engineering, and serves as director of the Air Transportation Laboratory.

Dr. Clarke is a leading expert in aircraft trajectory prediction and optimization, especially as it pertains to the development of flight procedures that reduce the environmental impact of aviation. His research has been instrumental in changing both the theory and the practice of flight procedure design, and has spurred the global effort to reduce the environmental impact of aviation via changes in operational procedures. He is also an expert in the development and use of stochastic models and optimization algorithms to improve the efficiency and robustness of airline, airport, and air traffic operations.

Professor Clarke was co-chair of the National Academies Committee that developed the US National Agenda for Autonomy Research related to Civil Aviation, and a member of the National Academies Committee that reviewed the Next Generation Air Transportation System. Dr. Clarke received the S.B., S.M., and Sc.D. degrees from the Massachusetts Institute of Technology.

Mary L. Cummings

Member

Mary Cummings is professor in the Duke University Department of Mechanical Engineering and Materials Science, the Duke Institute of Brain Science, and is director of the Humans and Autonomy Laboratory and Duke Robotics. A naval officer from 1988-1999, she was one of the U.S. Navy's first female fighter pilots. Her research interests include human-unmanned vehicle interaction, human-autonomous system collaboration, human-systems engineering, public policy implications of unmanned vehicles, and the ethical and social impact of technology. She has been on numerous National Academies committees and is currently a member of the committee on Economic, Legal, and Regulatory Implications of Emerging Technologies: A Workshop Series. She has a Ph.D. in systems engineering from the University of Virginia, a M.S. in space systems engineering from the U.S. Naval Postgraduate School, and a B.S. in mathematics from the U.S. Naval Academy.

Doug Davis

Member

Doug Davis is Director, Office of Independent Airworthiness, Research, Technology, and Engineering at Northrop Grumman Aerospace Systems, a premier provider of manned and unmanned aircraft, space systems and advanced technologies critical to our nation's security. In this role, Doug leads all aspects of airworthiness support across all divisions of the company's Aerospace Systems sector. He is responsible for flight certification for all manned and unmanned aircraft programs. Doug began his aviation career in 1984 as an FAA air traffic controller at the Jacksonville Air Route Traffic Control Center (ARTCC). He completed staff time in Traffic Management, Military Operations, and Airspace and Procedures and served as a first-line supervisor at the Atlanta ARTCC before moving to FAA HQ in Washington DC in 1997. He served as the manager of Enroute Procedures in Air Traffic before going on to be the Special Assistant to the Associate Administrator for Air Traffic Services. After the events of 9/11, Doug was asked to serve as the FAA Liaison to HQ NORAD in Colorado Springs, CO. which he did for 3 years. He was then selected to return to FAA HQ and chosen as the Assistant Manager, Avionics Systems in Aircraft Certification, and was subsequently picked to be the Aircraft Certification Lead for Unmanned Aircraft. In 2005, he was selected as the first manager to stand-up, organize, and lead the newly created Unmanned Aircraft Program Office. Doug crafted the initial certification and operational guidance that is primarily still in use by the FAA. Doug left the FAA in 2009 and then spent over 4 years with NMSU/PSL as the Director, Global Unmanned Aircraft Systems (UAS) Strategic Initiatives for the New Mexico State University Physical Science Laboratory. He served as the technical advisor to the chairman of EUROCAE WG-73, created and led an independent, international team of UAS and airspace subject matter experts called the Global Airspace Integration Team and Co-Chairs the RPAS and Emerging Technology Workgroup for the Civil Air Navigation Service Organization (CANSO), and represents CANSO on the Remotely Piloted Aircraft System (RPAS) Panel. In addition, Doug Chairs the ICAO UAS Advisory Group. Doug was recently elected to be the Vice Chairman of the CANSO Operations Steering Committee and currently chairs the AIA UAS Committee. Doug holds a bachelor's degree in business administration from California Pacific University and completed coursework at the Harvard Kennedy School of Government.

Mica R. Endsley

Member

Mica R. Endsley is President of SA Technologies, a cognitive engineering firm specializing in the analysis, design, measurement and training of situation awareness in advanced systems, including the next generation of systems for aviation, air traffic control, health care, power grid operations, transportation, military operations, homeland security, and cyber. From 2013 to 2015, she served as Chief Scientist of the U.S. Air Force, reporting to the Chief of Staff and Secretary of the Air Force to provide guidance and direction on research and development to support Air Force future operations and providing assessments on a wide range of scientific and technical issues affecting the Air Force mission. She has also held the position of Visiting Associate Professor at MIT in the Department of Aeronautics and Astronautics and Associate Professor of Industrial Engineering at Texas Tech University. Dr. Endsley received a Ph.D. in Industrial and Systems Engineering from the University of Southern California.
Dr. Endsley is a recognized world leader in the design, development and evaluation of systems to support human situation awareness (SA) and decision-making. She has previously served on National Academies' panels, the most recent being the Aeronautics and Space Engineering Board. Dr. Endsley holds a Ph.D. in Industrial and Systems Engineering from the University of Southern California.

Robert J. Hansman, Jr.

Member

John Hansman is the T. Wilson professor of aeronautics and astronautics at the Massachusetts Institue of Technology (MIT), where he is the director of the MIT International Center for Air Transportation. He conducts research in the application of information technology in operational aerospace systems. He has over 5800 hours of pilot in-command time in airplanes, helicopters and sailplanes including meteorological, production and engineering flight test experience. Dr Hansman chairs the U.S. Federal Aviation Administration Research Engineering and Development Advisory Committee as well as other national and international advisory committees. He is a member of the U.S. National Academy of Engineering, is a Fellow of the AIAA and has received numerous awards including the AIAA Dryden Lectureship in Aeronautics Research, the ATCA Kriske Air Traffic Award, a Laurel from Aviation Week & Space Technology, and the FAA Excellence in Aviation Award. He is currently a member of the Board on Army Science and Technology, and the Committee on Aviation Safety Assurance at the National Academies. He holds a Ph.D. in physics, meteorology, and aeronautics from the Massachusetts Institute of Technology.

Christopher Miller

Member

Christopher Miller is chief scientist at Smart Information Flow Technologies. Dr. Miller has pioneered work in computational models of human etiquette and politeness perception and their applications for nearly 10 years. Dr. Miller has contributed extensively to SIFT's technological success, including winning and managing SIFT's roles on Independent LifeStyle Assistant (ILSA), and Mixed-Initiative Control of Automa-teams programs, as well as more than 25 additional programs. Prior to joining SIFT, Dr. Miller led a series of adaptive information management and human task modeling projects at the Honeywell Technology Center over a period of 11 years. He developed an intent-based policy visualization approach to enable airline dispatchers to determine how 'bad' a current or proposed situation might be. Dr. Miller led the Intuitive Policy Specification for Optimized Flow of Asynchronous C3I Transmissions in Operations (IPSO FACTO) program, creating the information management layer of DARPA's Agile Information Control Environment to assist battlefield commanders in managing their communications and networking assets. He was the principal investigator for Honeywell's role in the U.S. Army's Rotorcraft Pilot's Associate program developing and implementing an information management system to coordinate information presentation and task flow between two pilots and the advanced automation systems in a next-generation attack/scout helicopter. Dr. Miller won Honeywell's highest technical achievement award for his work in designing an associate-like system for use in oil refineries. He holds a Ph.D. in cognition and communication psychology from the University of Chicago and a B.A. in psychology from Pomona College.

Julie J. Ryan

Member

Julie J.C.H. Ryan, is the CEO of Wyndrose Technical Group, having retired from academia in 2017. Her last position in academia was Professor of Cybersecurity and Information Assurance from the U.S. National Defense University. Prior to that, she was tenured faculty at the George Washington University and a visiting scholar at the National Institute for Standards and Technology (NIST). Dr. Ryan came to academia from a career in industry that began when she completed military service. Upon graduating from the U.S. Air Force Academy, Dr. Ryan served as a Signals Intelligence Officer in the Air Force, and then as a Military Intelligence Officer with the Defense Intelligence Agency. Upon leaving government service, she worked in a variety of positions, including systems engineer, consultant, and senior staff scientist with companies including Sterling Software, Booz Allen & Hamilton, Welkin Associates, and TRW/ESL supporting a variety of projects and clients. She is the author of several books, including "Defending Your Digital Assets Against Hackers, Crackers, Spies, and Thieves" (McGraw Hill 2000), and a Fellow of the American Academy of Forensic Sciences (AAFS). At Wyndrose Technical Group, she focuses on futures forecasting and strategic planning with an eye on technology surprise and disruption. She holds a D.Sc. in engineering management from George Washington University.