

NADINE SARTER

The University of Michigan
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EDUCATION

1994	Ph.D., Industrial and Systems Engineering, Ohio State University
1983	M.S., Applied & Experimental Psychology University of Hamburg, Germany
1981	B.S., Psychology University of Hamburg, Germany

PROFESSIONAL APPOINTMENTS

06/15 - present	Director, Center for Ergonomics, University of Michigan
09/17 - present	Director, Occupational Safety Engineering and Ergonomics Program, University of Michigan Center for Occupational Health and Safety Engineering (COHSE)
05/17 - present	Core Faculty, Robotics Institute, University of Michigan
09/11 - present	Professor, Department of Industrial and Operations Engineering, University of Michigan
09/04 - 08/11	Associate Professor, Department of Industrial and Operations Engineering, Center for Ergonomics, University of Michigan
10/99 - 08/04	Assistant, Associate Professor (2002), Department of Industrial, Welding, and Systems Engineering - Cognitive Systems Engineering Lab and the Institute for Ergonomics; Joint Appointment: Department of Psychology, Ohio State University
01/96 - 08/99	Assistant Professor, Institute of Aviation - Aviation Research Lab, Department of Mechanical and Industrial Engineering, Department of Psychology, Beckman Institute for Advanced Science and Technology, University of Illinois at Urbana-Champaign

REVIEWING AND EDITORIAL ACTIVITIES

Associate Editor, Human Factors (2008-present)
Associate Editor, Applied Ergonomics (2015-2016)
Associate Editor, IEEE Transactions on Human-Machine Systems (2013 - 2015)
Associate Editor, IIE Transactions on Occupational Ergonomics and Human Factors (2010-2015)
Consulting Editor, Journal of Experimental Psychology: Applied (2007-2013)
Associate Editor, IEEE Transactions on Systems, Man and Cybernetics (SMC), Part A (2008-2012)
Associate Editor, IEEE Transactions on Intelligent Transportation Systems (ITS) (2002-2011)

Member Editorial Board

Journal of Cognitive Engineering and Decision Making
International Journal of Aviation Psychology

Ad-Hoc Reviewer

IEEE Transactions on Haptics
Ergonomics
Human-Computer Interaction
Cognitive Science
International Journal of Human-Computer Studies
International Journal of Cognition, Technology, and Work

Other Editorial Activities

Editor, 'Cognitive Times' - Newsletter of the Cognitive Engineering and Decision-Making (CEDM) Technical Group of the Human Factors and Ergonomics Society. 1997-1999.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Member, Human Factors and Ergonomics Society
Member, American Institute of Aeronautics and Astronautics
Member, Association for Computing Machinery
Member, Society for Human Performance in Extreme Environments
Affiliate Member, American Psychological Association (APA) - Division 21 (Applied Experimental and Engineering Psychology)

HONORS AND AWARDS

2019 Elected Member of the National Academy of Engineering (NAE)
2017 Elected Fellow of the Human Factors and Ergonomics Society (HFES)
2017 Member, 2017-2018 Cohort of the UM Rudi Ansbacher Women in Academic Medicine Leadership Scholars Program
2009 Citation for Meritorious Service as a Reviewer for IEEE Transactions on Haptics. IEEE Computer Society.
2009 Best Paper Award ('Tactile displays for multitask environments: The role of concurrent task processing code' - with T. Ferris and S. Hameed). World Haptics Conference, Salt Lake City, UT.
2008 Jerome H. Ely Human Factors Article Award (with co-authors R. Mumaw and C. Wickens, for the best paper published in the previous year's volume of the journal Human Factors) - Human Factors and Ergonomics Society (HFES).
2008 'Best of Conference' Paper ('Seeing is believing?: The effects of real-time, image-based feedback on emergency management decision-making' - with J. McGuirl and D. Woods). 5th International ISCRAM, Washington, DC.
2002 Lumley Research Award - College of Engineering, The Ohio State University.
2001 TGIR ('Turning Goals Into Reality') Award as Member of the Aircraft Icing Project Team - NASA-Glenn Research Center.
2001 'Best of Track' Paper ('Who's Aware of The Little Green Box?: The Effectiveness of Onsets in Display Design' - with M. Nikolic and J. Orr). 20th Digital Avionics Conference, Daytona Beach, FL.
2001 'Best of Track' Paper ('Presenting Inflight Icing Information: A Comparison of Visual and Tactile Cues' - with J. McGuirl). 20th Digital Avionics Conference, Daytona Beach, FL.
1999 Earl Alluisi Award for Early Career Achievement - American Psychological Association (APA) - Division of Applied Experimental and Engineering Psychology (Division 21).
1999 'Best Of Track' Paper ('Informed Consent in Distributed Cognitive Systems: The Role of Conflict Type, Time Pressure, and Trust' - with W.A. Olson). 18th Digital

- Avionics Conference, St. Louis, MO.
- 1998 Faculty Early CAREER Award - National Science Foundation (NSF) - Directorate for Computer and Information Science & Engineering.
- 1996 Stanley Roscoe Award For The Best Dissertation In A Research Area Related To Aerospace Human Factors - Aerospace Medical Association/ Aerospace Human Factors Association.
- 1996 Aviation Week and Space Technology's 'Aerospace Laurels Award For Outstanding Achievement In The Field Of Commercial Air Transport'. (Aviation Week and Space Technology, Jan. 29, 1996, p.20).
- 1995 George E. Briggs Dissertation Award - American Psychological Association (APA) - Division of Applied Experimental and Engineering Psychology (Division 21).
- 1993 Amelia Earhart Fellowship Award - Zonta International Foundation.
- 1992 Amelia Earhart Fellowship Award - Zonta International Foundation.

GOVERNMENT, INDUSTRY, AND SCIENTIFIC COMMITTEES

- Elected Member, Human Factors and Ergonomics Society (HFES) Fellow Selection Committee, 2018-2019.
- Invited Participant, Human Performance Expert Panel To Inform The Air Force Strategy 2030. Washington, DC. July 2018.
- Invited Member, National Academies (Board on Human-Systems Integration) Expert Panel on FAA Staffing Issues. Irvine, CA. June 2016.
- Invited Member, NRC Expert Panel to Review the Implementation of the Recommendations of the 2007 National Research Council (NRC) Committee on FAA Aviation Safety Inspector Staffing Standards. Irvine, CA. June 2014.
- Expert Witness in the National Transportation Safety Board (NTSB) Investigative Hearing on Asiana Flight 214. Washington, D.C. December 2013.
- Invited Member, FAA PARC (Performance Based Aviation Rulemaking Committee)/CAST (Certification Authorities Software Team) Flight Deck Automation Working Group. 2006-2013.
- Invited Member, National Research Council - Transportation Research Board Committee on Electronic Vehicle Controls and Unintended Acceleration. 2010-2012.
- Invited Contributor/Human Factors SME to U.S. Government Accountability Office (GAO) Study on FAA and NASA's Human Factors Research and Development (R&D). February-March 2010.
- Invited Member, National Research Council (NRC) Organizing Committee for the Workshop on Assessing the Research and Development Plan for the Next Generation Air Transportation System (NGATS). 2007-2008.
- Invited Member, International Technical Committee on Aerospace Human Factors and Ergonomics, International Ergonomics Association (IEA). 2007-2008.
- Invited Member, External Program Review Committee for the Undergraduate Program in Human Factors in the Department of Behavioral Sciences & Leadership at the United States Air Force Academy. Colorado Springs. May 2007.
- Invited Participant, DARPA ISAT Workshop on Discovery and Innovation During Field Use of Information Technologies. Washington, D.C. April 2007.
- Invited Participant, NSF Human-Centered Computing (HCC) Workshop. Arlington, Virginia. September 2006.
- Invited Participant, JPDO (FAA-NASA Joint Program Development Office) Workshop on Next Generation Air Transportation System (NGATS) Human-Automation Interaction Issues and Research Needs. Washington, D.C. May 2006.
- Invited Member, National Research Council (NRC) Decadal Survey of Civil Aeronautics - Panel E (Intelligent & Autonomous Systems, Operations & Decision Making, Human Integrated Systems, Networking and Communications). 2005-2006.

Invited Research Track Co-Chair and Member of the Program Committee, 2006 Human-Computer-Interaction in Aerospace (HCI-Aero) Conference. Seattle, WA. September.

Invited Member, National Research Council (NRC) - Committee on FAA Aviation Safety Inspector Staffing Standards. 2004-2006.

Invited Member, Organizing Committee, 2005 Annual IIE/IERC Conference (Institute of Industrial Engineers/Industrial Engineering Research). Atlanta, GA. May.

Invited Member, Program Committee, 2004 Human Computer Interaction in Aerospace (HCI-Aero) Conference. Toulouse, France. September.

Associate Program Chair, 12th International Symposium on Aviation Psychology. Dayton, OH. April 2003.

Invited Member, National Research Council (NRC) - Transportation Research Board Committee On Shipboard Automated Identification Systems (AIS). 2002-2003.

Invited Member, National Research Council (NRC) - Transportation Research Board Review Committee of the Federal Railroad Administration R&D program - 1998-2001.

Invited Member, Program Committee, 2002 Human-Computer-Interaction in Aerospace (HCI-Aero) Conference. Cambridge, MA. October.

Invited Member, Organizing Committee, Third International Workshop on Human Error, Safety and Systems Development. Liege, Belgium. 1999.

Invited Technical Advisor, FAA Human Factors Team to Provide Policy Recommendations For The Design and Operation of Advanced Flight Deck Systems - 1994-1996.

Member, ATA DataLink Human Factors Committee - 1993-1995.

TEACHING EXPERIENCE

University of Michigan

- 1) Industrial and Operations Engineering 536
Cognitive Ergonomics
- 2) Industrial and Operations Engineering 434
Human Error and Complex System Failures
- 3) Industrial and Operations Engineering 491
Multimodal Displays: Conceptual Basis and Design

Ohio State University

- 1) Industrial and Systems Engineering 573
Cognitive Engineering I
- 2) Industrial and Systems Engineering 817
Attention and Interruption Management: Implications for Display Design and Human-Automation Coordination
- 3) Industrial and Systems Engineering 694H
Form Follows Failure: The Evolution of Artifacts From Early Tools To Modern Human-Machine Systems
- 4) Industrial and Systems Engineering 774
Computer-Supported Collaborative Work (CSCW)
- 5) Industrial and Systems Engineering 694
Engineering and Society
- 6) Psychology 695A.04
Cognition At Work: Decision-Making and Problem-Solving With Tools In Complex Real-World Domains
- 7) Industrial and Systems Engineering 773
Multimodal Interfaces: Their Conceptual Basis, Design, Affordances, and Applications

University of Illinois at Urbana-Champaign

- 1) Psychology/Industrial Engineering/Aviation 427
Engineering Psychology/Cognitive Engineering
- 2) Psychology 396 NS
Design for Error Prevention and Management
- 3) Aviation 355
Aviation Accident and Incident Investigation and Analysis
- 4) Psychology 493 NS
Human Error
- 5) Industrial Engineering 440
Analysis, Modeling, and Design of Man-Machine Systems

CURRENT AND FORMER GRADUATE STUDENTS

Current Graduate Students:

Karanvir Panesar
Kevin Lieberman
Yidu Lu
Yuzhi Wan
Jeremy Castagno
Sean Meyer

Former Graduate Students:

Julie Prinnet
Brandon Pitts
Nadine Moacdieh
Sara Lu Riggs
Huiyang Li
Kathryn Tippey
Thomas Ferris
Swapnaa Jayaraman
Shameem Hameed
John McGuirl
Mark Nikolic
Wesley Olson
William Hess
Chih-Yuan Ho
Beth Schroeder
Aaron Sklar
Heather Alexander

CAMPUS SERVICE

University of Michigan

Director, Center for Ergonomics, 2015-2020
Director, Occupational Safety Engineering and Ergonomics Program, UM NIOSH Center for
Occupational Health and Safety Engineering (COHSE), 2017-present
Chair, Department Safety Committee 2007-2010
Chair, ADVANCE STEP Team, IOE Department, 2007-2008, 2010-2011
Co-Chair, IOE Advisory Board Subcommittee on Research 2018 - present
Co-Chair, IOE Faculty Recruiting Committee, 2011/2012
Member, IOE Internal Review Committee, 2017-2018
Member, Chair Search Committee, IOE Department, 2016-2018
Member, IOE Faculty Recruiting Committee 2015/16, 2017/18, 2018/19

Member, IOE Space Committee, 2017-2018
Member, College of Engineering Diversity and Outreach Committee, 2008-2018
Member, IOE Honors and Awards Committee, 2016-2018
Member, College of Engineering Rules Committee, 2011-2017
Member, IOE Department Committee, 2013-2015
Member, IOE ABET Committee, 2011-2015
Member, IOE Graduate Program Committee 2005-2015
Member, Faculty Retreat Planning Committee, 2013
Member, Internal Review Committee, CSE Department 2011
Member, Internal Review Committee, IOE Department 2010
Member, College Safety Committee 2007-2010
Member, Graduate Admissions & Financial Aid Committee 2006-2009 and 2011
Member, Department Committee 2007-2008
Member, Newsletter and Publicity Committee 2005-2007
Faculty Reviewer, Rackham Merit Fellowships 2011 and 2012

Ohio State University

Chair, Honors Committee, ISE Department 2002-2004
Department Representative, College of Engineering Honors Committee 2002 – 2004
Member, Research and Graduate Council 2002-2004
Member, Graduate Council Fellowship Committee 2002-2004
Member, Review Committee of the OSU Aviation Program. 2002-2003
Member, Cognitive Science Center Executive Committee 2001-2004
Member, Undergraduate Studies Committee of the ISE Department 2000-2004
Member, Honors Committee of the ISE Department 1999-2002

University of Illinois at Urbana-Champaign

Member, Advisory and Executive Committee of the Institute of Aviation 1997-1999.
Member, Search Committees for a New Faculty Member and a New Airport Manager in the Institute of Aviation - Willard Airport – 1996-1999 and 1998, respectively.
ARL Representative, Steering Committee - 50th Anniversary Celebration of the Institute of Aviation 1996.

RESEARCH FUNDING

Department of Defense - Air Force. *Supporting Trust Calibration and Attention Management in Human-Machine Teams* (Principal Investigator - \$ 806,880). 2018-2021.
The National Institute of Aerospace (NIA; funded under NASA Prime Contract). *Paths to Autonomous Vehicle Operations for Urban Air Mobility* (co-PI - \$100,722 (Total: \$200,000)). 2018-2019.
Toyota Research Institute (TRI). *It's the transitions...!: Supporting Shared Control in Vehicle Steering Across Routine and Off-Nominal Conditions* (co-PI - \$333,253 (Total: \$538,079)). 2017-2019.
Federal Aviation Administration. *Complexity: Definitions, Empirical Findings and Recommendations for Training and Design* (Principal Investigator - \$651,732). 2014-2019.
Federal Aviation Administration. *Preventing Clutter and Confusion on NextGen Flight Decks: Guidance for the Design, Evaluation, and Approval of NextGen Visual, Auditory and Tactile Displays and Controls* (Principal Investigator - \$956,532). 2013-2016.
Northrop-Grumman Corporation. *Human Machines Interface and Supervisory Control* (Principal Investigator - \$60,000). 2013-2016.
Federal Aviation Administration. *Guidance for the Location and Grouping of NextGen Displays on Future Flight Decks* (Principal Investigator - \$414,214). 2010-2013.
Alion Science and Technology (Primary Sponsor: NASA Johnson Space Center). *Space Human Factors and Habitability: MIDAS-FAST – Development and Validation of a Tool to Support Function Allocation* (Co-Investigator - \$370,000). 2009-2012.

NASA-Langley Research Center. *Multi-modal Context-Sensitive Information Presentation in Support of NextGen Operations* (Principal Investigator - \$343,825). 2009-2012.

Department of Defense – US Air Force. *University of Michigan Collaborative Center In Control Science* (Co-Investigator - \$254,919 (Total: \$4,100,000)). 2007-2011.

NASA Ames Research Center. *Proactive System Design and Evaluation: Supporting Pilot-Automation Interaction Through Empirical and Modeling Analyses* (Principal Investigator - \$385,565 (Total: \$745,565)). 2007-2010.

National Science Foundation (NSF) – *Crossmodal Links in Attention Between Vision, Audition, and Touch: Their Implications For The Design of Adaptive Multimodal Interfaces* (Principal Investigator - \$470,125). 2005-2010.

United States Army Research Laboratory (ARL). *Advanced Decision Architectures: Building Information Superiority in the Army through User-Centered Decision Support* (Principal Investigator - \$812,537). 2001-2009.

NASA-Johnson Space Center (Primary Sponsor: NASA Ames Research Center). *Supporting Preattentive Reference and Interruption Management Through Multimodal Notifications* (Principal Investigator - \$81,000). 2005-2007.

NASA Glenn Research Center. *The Design of a Use-Centered Interface for Supporting Fault Management in Future Intelligent Propulsion Systems* (Principal Investigator - \$148,125). 2003-2004.

Center for Automotive Research (CAR) – The Ohio State University. *The Effects of Multimodal Information Presentation on Timesharing and Attention Management in the Modern Car Cockpit* (Principal Investigator - \$46,835). 2002-2003.

Center for Automotive Research (CAR) – The Ohio State University. *Visionary Concepts for Tomorrow's Automotive Cockpits and Interiors* (Co-Investigator - \$60,000). 2002-2003.

Federal Aviation Administration (FAA). *The Integration and Harmonization of Airborne and Ground-Based Tasks and Technologies: A Prerequisite For Safe and Efficient Air Traffic Management Operations* (Principal Investigator - \$392,644). 1999-2003.

University of Illinois at Urbana-Champaign (Primary Sponsor: NASA-Glenn Research Center). *Smart Icing Systems* (Co-Investigator - \$259,742). 1999-2003.

National Science Foundation (NSF) - Faculty Early CAREER Program. *Turning Automation Into A Team Player: The Development of Multisensory and Graded Feedback For Highly Automated Flight Deck Systems* (Principal Investigator - \$322,016). 1998-2003.

Center for Automotive Research (CAR) – The Ohio State University. *Driver Distraction: The Effects of Conversation Type and Content On Driver Performance* (Principal Investigator - \$59,400). 2001-2002.

Boeing Commercial Airplane Group. *Analysis of Automation Monitoring Skills and Strategies on Modern Glass Cockpit Aircraft* (Principal Investigator - \$76,294). 1999-2000.

University of Illinois at Urbana-Champaign. *Aircraft Icing Research Center* (Co-Investigator - \$200,000). 1997-1999.

Federal Aviation Administration (FAA). *Direct Communication With and Between Machines: A New Challenge For Human-Automation and Air-Ground Coordination in the Future Air Traffic Management System* (Principal Investigator - \$280,910). 1996-1999.

NASA-Lewis Research Center. *Smart Icing Systems* (Co-Investigator - \$200,000). 1998-1999.

Boeing Commercial Airplane Group. *Design Concepts in Support Of Effective Attention Allocation and Human-Automation Coordination in Dynamic Multi-Display Environments* (Principal Investigator - \$147,062). 1996-1998.

Ohio State University (Primary Sponsor: Federal Aviation Administration (FAA)). *The Price of Flexibility: Air-Ground and Ground-Ground Coordination in Critical Dynamic Situations* (Principal Investigator - \$59,449). 1996-1997.

Ohio State University (Primary Sponsor: NASA- Ames Research Center). *Human-Centered Technologies and Procedures for Future Air Transport Management* (Principal Investigator - \$37,343). 1996-1997.

University of Illinois at Urbana-Champaign. *Design Concepts in Support of Effective Attention Allocation in Dynamic Multi-Display Environments: The Case of Cockpit Automation*

(Principal Investigator - \$20,000). 1996-1997.

PUBLICATIONS

Monographs, Books, and Book Chapters

- Sarter, N. (2017). Design-Induced Error and Error-Informed Design: A Two-Way Street. In P.J. Smith and R. R. Hoffman (Eds.), *Cognitive Systems Engineering: A Future for a Changing World* (pp. 209-221). Boca Raton, FL: CRC Press/Taylor and Francis.
- Sarter, N. (2014). Multimodal Displays: Conceptual Basis, Design Guidance, and Research Needs. In J. Lee and A. Kirlik (Eds.), *The Oxford Handbook of Cognitive Engineering - Volume 1: Foundations, Perspectives, and Cognitive Issues* (pp. 556-565). New York, NY: Oxford University Press.
- Woods, D.D., Dekker, S. Cook, R., Johannesen, L., and Sarter, N. (2011). *Behind Human Error*. Aldershot, UK: Ashgate Publishing Ltd.
- McGuirl, J., Sarter, N., and Woods, D. (2011). Effects of Real-Time Imaging on Data Integration and Situation Assessment in a Simulated Incident Command Task. In M.E. Jennex (Ed.), *Crisis Response and Management and Emerging Information Systems: Critical Applications*. Hershey, PA: IGI Global.
- Ferris, T., Wickens, C.D., and Sarter, N. (2010). Cockpit Automation: Still Struggling to Catch Up... In E. Salas and D. Maurino (Eds.), *Human Factors in Aviation* (2nd edition; pp. 479-502). New York, NY: Elsevier Publishers.
- Sarter, N., Ferris, T., and Hameed, S. (2009). Multimodal Information Exchange and Dynamic Adaptation. In P. McDermott and L. Allender (Eds.), *Advanced Decision Architectures for the Warfighter: Foundation and Technology* (pp. 161-176). U.S. Army Research Laboratory.
- Sarter, N. (2007). Multiple Resource Theory as a Basis for Multimodal Interface Design: Success Stories and Qualifications. In A. Kramer, D. Wiegman, and A. Kirlik (Eds.), *Attention: From Theory to Practice* (pp. 187-195). New York, NY: Oxford University Press.
- Sarter, N. (2006). The Critical Incident Technique: A Method for Identifying Systems Strengths and Weaknesses based on Observational Data. In W. Karwowski (Ed.), *International Encyclopedia of Ergonomics and Human Factors* (2nd edition). Boca Raton, FL: CRC Press/Taylor and Francis.
- Sarter, N. (2006). Visual, Tactile, and Multimodal Information Processing. In W.S. Marras and W. Karwowski (Eds.), *The Occupational Ergonomics Handbook - Fundamentals and Assessment Tools for Occupational Ergonomics* (2nd edition; pp. 23.1 - 23.25). Boca Raton, FL: CRC Press/Taylor and Francis.
- Sarter, N. (2002). Multimodal Information Presentation In Support of Human-Automation Communication and Coordination. In E. Salas (Ed.), *Advances in Human Performance and Cognitive Engineering Research* (pp. 13-36). New York, NY: JAI Press.
- Sarter, N. and Amalberti, R. (Eds.) (2000). *Cognitive Engineering in the Aviation Domain*. Hillsdale, NJ: LEA.
- Woods, D.D. and Sarter, N. (2000). Learning from Automation Surprises and 'Going Sour' Accidents. In N. Sarter and R. Amalberti (Eds.), *Cognitive Engineering in the Aviation Domain* (pp. 327-353). Hillsdale, NJ: LEA.
- Sarter, N., Woods, D.D., and Billings, C.E. (1997). Automation Surprises. In G. Salvendy (Ed.), *Handbook of Human Factors and Ergonomics* (2nd edition) (pp. 1926-1943). New York, NY: Wiley.
- Sarter, N. (1997). The Trend Towards Errors Of Omission: Reasons For and Countermeasures Against It. In M. Mouloua and J.M. Koonce (Eds.), *Human-Automation Interaction: Research and Practice* (pp. 13-18). Hillsdale, NJ: LEA.
- Sarter, N. (1996). Cockpit Automation: From Quantity to Quality, From Individual Pilot to Multiple Agents. In R. Parasuraman and M. Mouloua (Eds.), *Automation and Human Performance: Theory and Applications* (pp. 267-280). Hillsdale, NJ: LEA.
- Woods, D.D., Johannesen, L., Cook, R.I., and Sarter, N. (1994). *Behind Human Error: Cognitive Systems, Computers, and Hindsight*. Crew Systems Ergonomic Information and Analysis

Center (CSERIAC), Dayton, OH (State of the Art Report).

Woods, N.B. and Sarter, N. (1993). Evaluating the Impact of New Technology on Human-Machine Cooperation. In J.A. Wise, V. D. Hopkin, and P. Stager (Eds.). *Verification and Validation of Human-Machine Systems* (pp. 133-158). Springer Verlag, NATO-ASI series.

Journal Articles

- Lu, Y. and Sarter, N. (xxxx). Eye Tracking: A Process-Oriented Method for Inferring Trust in Automation as A Function of Priming and System Reliability (under revision).
- Riggs, S. L. and Sarter, N. (xxxx). Tactile, Visual and Crossmodal Visual-Tactile Change Blindness: The Effect of 1 Transient Type and Task Demands (in press).
- Sirihorachai, R., Aebersold, M., Sarter, N., Harris, M., Marsh, V., and Redman, R. (2018). Examining Interruptions in the Operating Room Using Simulation. *Clinical Simulation in Nursing*, 24, 14-24.
- Hoffman, R., Sarter, N., Johnson, M. and Hawley, J.K., (2018). Myths of Automation and Their Implications for Procurement. *Bulletin of the Atomic Scientists*, 74(4), 255-261.
- Pitts, B. and Sarter, N. (2018). What You Don't Notice Can Harm You: Age-related Differences in Detecting Concurrent Visual, Auditory, and Tactile Cues. *Human Factors*, 60(4), 445-464.
- Moacdieh, N. and Sarter, N. (2017). The Effects of Data Density, Display Organization and Stress on Search Performance: An Eye Tracking Study of Clutter. *IEEE Transactions on Human-Machine Systems*, 47(6), 886 – 895.
- Moacdieh, N. and Sarter, N. (2017). Using Eye Tracking to Detect the Effects of Clutter on Visual Search in Real Time. *IEEE Transactions on Human-Machine Systems*, 47 (6), 896 – 902.
- Riggs, S., Wickens, C., Sarter, N., Thomas, L., Nikolic, M., and Sebok, A. (2017). Multimodal Information Presentation in Support of NextGen Operations. *International Journal of Aerospace Psychology*, 27(1-2), 29-43.
- Riggs, S. L. and Sarter, N. (2016). The Development and Evaluation of Countermeasures to Tactile Change Blindness. *Human Factors* 58(3), 482-495.
- Pitts, B., Riggs, S. and Sarter, N. (2015) Crossmodal Matching: A Critical But Neglected Step In Multimodal Research. *IEEE Transactions on Human-Machine Systems*, 12, 46(3).
- Moacdieh, N. and Sarter, N. (2015). Clutter in Electronic Medical Records: Examining its Performance and Attentional Costs Using Eye Tracking. *Human Factors*, 57(4), 591-606.
- Wickens, C.D., Sebok, A., Li, H., Sarter, N. and Gacy, A.M. (2015). Using Modeling and Simulation to Predict Operator Performance and Automation-induced Complacency with Robotic Automation: A Case Study and Empirical Validation. *Human Factors*, 57(6), 959-975 (published online before print, doi: 10.1177/0018720814566454).
- Moacdieh, N. and Sarter, N. (2015). Display Clutter A Review of Definitions and Measurement Techniques. *Human Factors*, 57(1), 61-100.
- Li, H., Wickens, C., Sarter, N., and Sebok, A. (2014). Stages and Levels of Automation in Support of Space Teleoperations. *Human Factors*, 56(6), 1050-1061.
- Sarter, N. (2013). Multimodal Support for Interruption Management: Models, Empirical Findings and Design Recommendations. In L.J. Karam, W.B. Kleijn and K. Maclean (eds.), *Special Issue on "Perception Based Media Processing" - Proceedings of the IEEE*, 101(9), 2105-2112.
- Lu, S., Wickens, C., Prinnet, J., Hutchins, S., Sarter, N. and Sebok, A. (2013). Informing Multimodal Interface Design Using a Novel Meta-Analytical Technique. *Human Factors*, 55(4), 697-724.
- Sebok, A., Wickens, C.W., Sarter, N., Quesada, S., Socash, C., Anthony, B. (2011). The Automation Design Advisor Tool (ADAT): Development and Validation of a Model-Based Tool to Support Flight Deck Automation Design for NextGen Operations. *Journal of Human Factors & Ergonomics in Manufacturing Systems and Service Industries* (Special Issue on "Cognitive Engineering for Next Generation Transportation Systems").
- Ferris, T. and Sarter, N. (2011). Continuously Informing Vibrotactile Displays in Support of Attention Management and Multitasking in Anesthesiology. *Human Factors*, 53(6), 600-611.

- Ferris, T. and Sarter, N. (2010). When Content Matters: The Role of Processing Code in Tactile Display Design. *IEEE Transactions on Haptics*, 3(3), 199-210.
- Woods, D.D. and Sarter, N. (2010). The Shape of Models To Come: Capturing the Dynamics of Attention Control From Individual to Distributed Systems. *Theoretical Issues in Ergonomics Science - Special Issue on Situation Awareness*, 11(1), 7-28.
- Hameed, S., Ferris, T., Jayaraman, S., and Sarter, N. (2009). Using Informative Peripheral Visual and Tactile Cues to Support Task and Interruption Management. *Human Factors*, 51(2), 126-135.
- McGuirl, J., Sarter, N., and Woods, D. (2009). Effects of Real-time Imaging on Decision-making in a Simulated Incident Command Task. *International Journal of Information Systems for Crisis Response and Management*, 1(1), 54-69.
- Sarter, N. (2008). Mode Errors on Automated Flight Decks: Illustrating the Problem-Driven, Cumulative, and Interdisciplinary Nature of Human Factors Research. *Human Factors (Special Golden Anniversary Issue)*, 50(3), 506-510.
- Ferris, T. K. and Sarter, N. (2008). Crossmodal Links Between Vision, Audition, and Touch in Complex Environments. *Human Factors*, 50(1), 17-26.
- Jones, L.A. and Sarter, N. (2008). Tactile Displays: Communicating Through The Skin. *Human Factors*, 50(1), 90-111.
- Nikolic, M.I. and Sarter, N. (2007). Disturbance Management on Modern Flight Decks: A Simulator Study of Diagnosis and Recovery of Pilot-Automation Coordination Breakdowns. *Human Factors*, 49(4), 553-563.
- Sarter, N., Mumaw, R., and Wickens, C.D. (2007). Pilots' Monitoring Strategies and Performance on Highly Automated Glass Cockpit Aircraft. *Human Factors*, 49(3), 347-357.
- McGuirl, J. and Sarter, N. (2006). Supporting Trust Calibration and The Effective Use of Decision Aids by Presenting Dynamic System Confidence Information. *Human Factors*, 48(4), 656-665.
- Sarter, N. (2006). Multimodal Information Presentation: Design Guidance and Research Challenges. *International Journal of Industrial Ergonomics (Invited contribution to Special Issue on 'New Insights in Human Performance and Decision Making')*, 36(5), 439-445.
- Ho, C-Y, Nikolic, M., Waters, M., and Sarter, N. (2004). Not Now: Supporting Interruption Management By Indicating the Modality and Urgency of Pending Tasks. *Human Factors*, 46(3), 399-409.
- Nikolic, M.I., Orr, J.M., and Sarter, N. (2004). Why Pilots Miss the Green Box: How Display Context Undermines Attention Capture. *The International Journal of Aviation Psychology*, 14(1), 39-52.
- Sarter, N. and Sarter, M. (2003). Neuroergonomics: Opportunities and Challenges of Merging Cognitive Neuroscience with Cognitive Ergonomics. *Theoretical Issues in Ergonomics Science*, 4, 142-150.
- Sarter, N. and Schroeder, B. (2002). Supporting Decision-Making and Action Selection Under Time Pressure and Uncertainty: The Case of Inflight Icing. *Human Factors*, 43(4), 573-583.
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Peer-Reviewed Proceedings Papers and Presentations

- Lu, Y., Lieberman, K., Sarter, N. (2018). Eye tracking: a promising method for inferring trust in real time. Proceedings of the 62nd Annual Meeting of the Human Factors and Ergonomics Society (HFES). Philadelphia, PA. October.
- Wan, Y. and Sarter, N. (2018). The effects of masking on the detection of alarms in close temporal proximity. Proceedings of the 62nd Annual Meeting of the Human Factors and Ergonomics Society (HFES). Philadelphia, PA. October.
- Wan, Y., Sarter, N., and Gillespie, B. (2018). Haptic shared control: Improving human-automation collaboration in semiautonomous driving. Proceedings of the 2018 IISE Annual Conference. Orlando, FL. May.
- Wan, Y., Prinnet, J. C., & Sarter, N. B. (2017). Visual and auditory feedback to improve touchscreen usability in turbulence. Proceedings of the 61st Annual Meeting of the Human Factors and Ergonomics Society (HFES). Austin, TX. October.
- Moacdieh, N., Ganje, T.W., and Sarter, N. (2017). Physician perceptions of clutter in electronic medical records. Proceedings of the 61st Annual Meeting of the Human Factors and Ergonomics Society (HFES). Austin, TX. October.
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- Sarter, N. and Wickens, C.D. (1997). Cognitive Issues Governing (Breakdowns In) Pilot-Automation Communication And Coordination. Technical Report to Boeing Commercial Airplanes Group. September.
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- Ground Communication and Coordination In Future Air Traffic Management (ATM) Operations. Technical Report to NASA-Ames Research Center. January.
- Abbott, K., Slotte, S., Stimson, D., Bollin, E., Hecht, S., Imrich, T., Lalley, R., Lyddane, G., Thiel, G., Amalberti, R., Fabre, F., Newman, T., Pearson, R., Tigchelaar, H., Sarter, N., Helmreich, R., and Woods, D. (1996). The Interfaces Between Flightcrews and Modern Flight Deck Systems. Federal Aviation Administration Human Factors Team Report. Washington D. C.: Federal Aviation Administration. June.
- Sarter, N. and Woods, D.D. (1993). Cognitive Engineering in Aerospace Applications: Pilot Interaction with Cockpit Automation. NASA Contractor Report CR-177617. NASA-Ames Research Center, Moffett Field, CA, August.
- Woods, D.D., Cook, R.I., and Sarter, N. (1992). Clumsy Automation, Practitioners' Adaptive Responses, and Human Error. Cognitive Systems Engineering Laboratory Report 92-TR-04, The Ohio State University, Columbus, OH. Prepared for NASA Ames Research Center.

INVITED ADDRESSES AND PRESENTATIONS

- 2018 Presentation on "Design of Automation Behavior and Interfaces in Support of Human-Machine Teaming" at the Society for Information Display (SID) 'Vehicle Displays and Interfaces 2018' Conference. Livonia, MI. September.
- 2018 Presentation on "Trust and Attention Management in Human-Machine Teaming" to the NASA Human Systems Integration Division. Mountain View, CA. February.
- 2018 Presentation on "Human Systems Integration: Engineering and Design at the Intersection of Humans and Complex Technologies" at Vanderbilt University. Nashville, TN. February.
- 2018 Presentation on "SOSU, SOMU and beyond: GCS design and requirements" at the NAS 'Workshop on Human-Automation Interaction Considerations for Unmanned Aerial System Integration'. Washington, DC. January.
- 2017 Plenary talk on "Human-machine interaction in nuclear power plants: Applying lessons learned across domains" at the 10th International Meeting on Nuclear Plant Instrumentation, Control & Human-Machine Interface Technologies (NPIC & HMIT). San Francisco, CA. June.
- 2017 Presentation on "Attention management in complex data-rich domains" at the University of Wisconsin (Industrial and Systems Engineering Department). Madison, WI. April.
- 2017 Presentation on "Human factors in complex system failures: The example of Asiana Airlines flight 214" at the United States Air Force Academy. Colorado Springs, CO. April.
- 2017 Presentation on "Trust and attention management in UAS control" at Wright-Patterson Air Force Base (WPAFB). Dayton, OH. February.
- 2017 Presentation on "Aviation Safety Assurance: A Cognitive Engineering Perspective" to the National Academies' Aviation Safety Assurance Committee. Washington, DC. January.
- 2015 Presentation on "Transfer of HF principles from other domains" at the TRB Workshop on Human Factors & Automation. Ann Arbor, MI. July.
- 2015 Presentation on "Human-Automation Interaction: Lessons Learned Across Domains" as part of UMTRI's 50th anniversary seminar series. Ann Arbor, MI. April.
- 2014 Presentation to the Institute of Medicine (IOM) Committee on Diagnostic Error in Health Care on "User-Centered Design of Health IT". Washington, DC. August.
- 2013 Presentation on "Human Factors Challenges in Human-Automation Interaction for Vehicles" at NHTSA-sponsored meeting at Google Headquarters. Mountain View, CA. June.
- 2013 Presentation at Northrop Grumman on 'Human-Automation Coordination and Collaboration in Aerospace Applications.' Redondo Beach. February.
- 2012 Presentation as part of the Volpe National Transportation Systems Center Colloquia Series on 'Transportation Challenges and Opportunities' titled 'A Roundtable on Automation and the Human: Intended and Unintended Consequences.' Cambridge, MA.

- April.
- 2011 Presentation on ‘Attention and Interruption Management in Human-Machine Teams’ at the Automation and Human Performance Research Summit at John Deere & Company World Headquarters, Moline, IL. November.
- 2010 Ohio State University - Department Seminar in Industrial and Systems Engineering. Presentation (with T. Ferris) on ‘Multimodal/Tactile Interfaces in Support of Attention Management in Event-Driven Data-Rich Domains’. Columbus, OH. February.
- 2009 NASA Aviation Safety Program Annual Technical Conference 2009. Presentation on ‘Multimodal Context-Sensitive Information Presentation in Support of NextGen Operations’. McLean, VA. November.
- 2009 NASA Aviation Safety Program Annual Technical Conference 2009. Presentation on ‘Proactive System Design and Evaluation: Supporting Pilot-Automation Interaction through Empirical and Modeling Analyses’. McLean, VA. November.
- 2008 Keynote Address on ‘Attention Management in Complex Event-Driven Domains: Challenges and Promising Solutions’ and Invited Workshop on ‘Multimodal Information Processing and Design’ at ABERGO 2008 (16th Brazilian Ergonomics Congress of Ergonomics). Porto Seguro, Brazil. November.
- 2007 HCI International 2007 (as part of a session on ‘Information Complexity of Systems and Displays’). Presentation on ‘Coping With Complexity through Adaptive Interface Design’. Beijing, P.R. China. July.
- 2006 2nd Meeting of the European Societies of Neuropsychology (Workshop on Neuroergonomics). Presentation on ‘Neuroergonomics in Aeronautics: Opportunities and Challenges’. Toulouse, France. October.
- 2006 Keynote Address and Invited Workshop at ABERGO 2006 (14th Brazilian Ergonomics Congress of Ergonomics). Curitiba, Brazil. October. (unable to deliver because Visa was not issued on time).
- 2006 Army Research Laboratory Collaborative Technology Alliances Conference 2006 – Presentation on ‘How To Design Adaptive Multimodal Interfaces For Future Combat Operations: Empirical Findings and Guidelines’. Adelphi, MD. April.
- 2006 Keynote Address on ‘Cognitive Ergonomics: Supporting Human-Computer Interaction In Complex High-Risk Domains’ at ‘Explorathon 2006: Expanding Horizons for Girls in Science and Mathematics’ (organized by the American Association of University Women). Detroit, MI. April.
- 2005 APA Annual Convention – Invited Address (APA Division 3) - ‘Cognitive Ergonomics: The Application of Basic Research Findings to Interface Design’. Washington, DC. August.
- 2005 ‘Applied Attention: From Theory to Practice’ Conference at the University of Illinois at Urbana-Champaign (in honor of Dr. Christopher Wickens’ retirement) – Presentation on ‘Multiple Resource Theory as a Basis for Multimodal Interface Design: Success Stories and Qualifications’. Urbana-Champaign, Illinois. June.
- 2004 Central Ohio HFES Chapter and OSU HFES Student Chapter on ‘Multimodal Interfaces in Support of HCI and CSCW’. Columbus, OH. May.
- 2004 Federal Aviation Administration (FAA) on ‘Multimodal Interfaces in Support of Attention Management and Spatial Guidance in Air Traffic Control’. Washington, D.C. March.
- 2003 COGFEST of the Cognitive Science Center at the Ohio State University on ‘More Than Meets The Eye: Multimodal Information Presentation in Real-World Domains’. Columbus, OH. March.
- 2002 University of Michigan – Department of Industrial and Operations Engineering on ‘Multimodal Interfaces in Support of Human-Computer Interaction and Computer-Supported Cooperative Work’. Ann Arbor, MI. December.
- 2002 General Motors (GM) Human Factors Symposium on ‘Multimodal Interfaces In The Modern Car Cockpit’. Detroit, MI. April.
- 2002 NRC-TRB (Transportation Research Board) Workshop on ‘Human Factors Considerations in the Design of Automatic Identification Systems (AIS)’. New Orleans,

- LA. April.
- 2000 APA Annual Convention - Earl A. Alluisi Award For Early Career Achievement - Recipient Address on 'Turning Automation Into A Cooperative Agent: Context-Sensitive Multimodal Feedback and Adaptive Management Strategies'. Washington, D.C. August.
- 1999 ONR Workshop on 'Managing Critical Event Systems: Attention Management – Interruptions and Alerts'. Washington, D.C.. June.
- 1999 NSF Human-Computer-Interaction Workshop Panel on 'Synergistic Visual/Haptic Interfaces'. Orlando, FL. February.
- 1998 Rockwell-Collins Human-Machine Interface Symposium on 'Breakdowns in Pilot-Automation Coordination: Conflicting Goals, Priorities, and Strategies'. Cedar Rapids, IA. November.
- 1998 Nissan Cambridge Research Center on 'Making Coordination Effortless and Invisible: The Exploration of Automation Management Strategies and Implementations'. Cambridge, MA. June.
- 1998 Air Force Laboratory Colloquium Series on Human-Technology Integration on 'Human-Automation Coordination: Creating Conditions For Making It Effortless and Invisible'. Dayton, OH. May.
- 1998 Keynote Address at the 2nd Workshop on 'Human Error, Safety, and System Development'. Seattle, WA. April.
- 1997 S.A.S. (Scandinavian Airlines System) Flight And Maritime Training Academy on 'Difficulties with Modern Automation Technology and Their Implications For CRM/BRM Development'. Stockholm, Sweden. October.
- 1996 2nd IATA Human Factors Seminar and Exhibition on Managing Human Factors for Safety and Cost Benefit on 'Turning Automation Into A Team Player: The Need For Communication And Coordination Between Pilots and Machines'. Warsaw, Poland. October.
- 1996 ICARUS committee of the Flight Safety Foundation on 'Sometimes it leads, sometimes it follows, but it never gets out of the way: Difficulties with Pilot-Automation Coordination on Modern Flight Decks'. Montreal, Canada. September.
- 1996 APA Annual Convention - George Briggs Award Recipient Address on 'Strong, Silent, and Out-Of-The-Loop: Properties of Advanced Automation And Their Impact On Human-Automation Coordination'. Toronto, Canada. August.
- 1996 APA Annual Convention of the APA on 'Practice-Centered Automation: Integrating Human, Machine, and Task Constraints'. Toronto, CA. August.
- 1996 Third Global Flight Safety and Human Factors Symposium - International Civil Aviation Organization (ICAO) on 'Human Error and Automation'. Auckland, New Zealand. April.
- 1996 Wright-State University - Department of Psychology on 'Reasons For Breakdowns In The Coordination Between Pilots and Advanced Cockpit Automation'. Dayton, OH. February.
- 1996 Air Force Academy on 'Cognitive Engineering in Aviation Applications'. Colorado Springs, CO. February.
- 1995 International Conference on Experimental Analysis and Measurement of Situation Awareness' on 'Situation Awareness Process Tracing Techniques'. Daytona Beach, FL. November.
- 1994 'Training for Automation' workshop at NASA-Ames Research Center, Moffett Field, CA. August.
- 1994 Northwest Airlines on 'Pilot-Automation Interaction on the Airbus A-320', Minneapolis, MN. August.
- 1994 Northwest Airlines on 'Training for Advanced Automated Aircraft - The Need for Active Exploration', Minneapolis, MN. January.
- 1993 National Transportation Safety Board (NTSB) on 'Pilot Interaction with Cockpit Automation: Implications for What is Human Error', Washington, D.C. October.
- 1991-93 Second, Third, and Fourth Annual AS/A Program Meeting at NASA-Ames

- Research Center. August.
- 1992 Annual Zonta International Conference on 'Pilot-Automation Interaction in Commercial Glass Cockpit Aircraft', Columbus, OH. October.
- 1991 Boeing Commercial Airplane Group - B-777 design team and members of flight deck research group, Seattle, WA. August.
- 1991 AIAA/NASA/FAA/HFS Conference on 'Challenges in Aviation Human Factors: The National Plan', Washington, D.C. January.

AERONAUTICAL RATINGS AND TRAINING

Private Pilot - Airplane Single-Engine Land
Airbus A-320 - Completed Airline Pilot Training