

CURRICULUM VITAE

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EDUCATION

- 2004 Ph.D. in Engineering Psychology/Human Factors, University of Illinois at Urbana-Champaign, US.
- Title of Doctoral Dissertation: Effects of Air Traffic Geometry and Conflict Alerting System Reliability on Pilots' Conflict Detection with Cockpit Display of Traffic Information.*
- Adviser: Prof. Christopher D. Wickens.*
- 2001 M.A. in Industrial/Organizational Psychology, Central Michigan University, US.
- Title of Master's Thesis: Improving Air Traffic Control Specialist Selection Methods with Personality and Cognitive Predictors.*
- Adviser: Prof. Richard W. Backs.*
- 1990 B.A. in Air Traffic Control and English Language, Civil Aviation University of China, China.
- 1984 Student Air Traffic Controller License, College of Air Traffic Control, UK.
- 1983 Diploma of UNDP (United Nations Development Program) English for Special Purposes Program, Beijing Second Foreign Language Institute, China.
- 1982 Air Traffic Control Diploma, Civil Aviation University of China, China.

EXPERIENCE

- 2004-Present Research Associate, San Jose State University Foundation at NASA Ames Research Center.
- 1998-2004 Research Assistant, University of Illinois at Urbana-Champaign.
- 2000 Teaching Assistant, University of Illinois at Urbana-Champaign.
- 1996-1998 Research Assistant, Central Michigan University.
- 1996 Visiting Scholar, Swiss Federal Institute of Technology in Zurich.
- 1990-1996 Air Traffic Control Lecturer, Civil Aviation University of China.
- 1984-1990 Air Traffic Control Instructor, Civil Aviation University of China.

PROFESSIONAL LICENSES & CERTIFICATE

- 1994 Certificate of Translation (English-Chinese) for Flight Training, Civil Aviation Administration of China.
- 1988 Air Traffic Controller License (Aerodrome Control and Approach Control), Civil Aviation Administration of China.
- 1984 Student Air Traffic Controller License (Aerodrome Control and Approach Control), Civil Aviation Authority, UK.

DISTINCTIONS & GRANTS

- 2004 Offered National Research Council (NRC) Research Associateship Award with the FAA Civil Aerospace Medical Institute in Oklahoma City, OK.
- 1997 Graduate Student Research Grant, Central Michigan University.
- 1996 Visiting Scholarship at Swiss Federal Institute of Technology in Zurich, Ministry of Education, China.
- 1993 Excellent Performance in Teaching Award, Civil Aviation University of China.
- 1983 International Civil Aviation Organization (ICAO) Fellowship (for an Air Traffic Control Training Program at College of Air Traffic Control, UK), ICAO.

1982 "Healthy, Studious, and Helpful Student" Award, Civil Aviation University of China.

THESIS & PROJECT SUPERVISION

2002 Ming Zhang, Master's Thesis for Master of Business Administration (Aviation Management) at the Royal Melbourne Institute of Technology (RMIT), Australia.

Title of Ming Zhang's Thesis: The Management of Flight Crew Error.

1994 Four Students, Graduation Projects in Partial Fulfillment of the Requirements for Their Bachelor's Degree, Civil Aviation University of China.

COURSES TAUGHT

2000 Human Factors in Human-Machine Systems, University of Illinois at Urbana-Champaign (as Teaching Assistant).

1990-1996 Air Traffic Management, Civil Aviation University of China (as Instructor).

1986-1996 Aviation English, Civil Aviation University of China (as Instructor).

1984-1996 Air Traffic Control, Civil Aviation University of China (as Instructor).

1984-1996 Radiotelephony for Air Traffic Controllers and Pilots, Civil Aviation University of China and Air China (as Instructor).

RESEARCH AREAS & INTERESTS

Performance under Various Workload and Stress Conditions, Performance with Automation Aid, Multi-Task Performance, Decision Making and Judgment under Uncertainty, Prospective Memory, Personnel Selection and Training, Job Design, Cockpit Resource Management, Organization Development, Test Construction and Evaluation, Culture and Language.

MAJOR RESEARCH PROJECTS

Xu, X., Holbrook, J. B., Nowinski, J. L., & Dismukes, R. K. (in progress). Task interruption: Counter-measures to prospective memory failures. NASA Ames Research Center.

Xu, X., Dismukes, R. K., & Barshi, I. (in progress). Analysis of accidents and incidents in air traffic control. NASA Ames Research Center.

Xu, X., Dismukes, R. K., & Barshi, I. (in progress). Ethnographic study of air traffic control. NASA Ames Research Center.

Xu, X., & Dismukes, R. K. (in progress). Time-based and event-based prospective memory in air traffic control. NASA Ames Research Center.

Xu, X., Wickens, C. D., & Rantanen, E. M. (2003-2004). Effects of air traffic geometry and conflict alerting system reliability on conflict detection with cockpit display of traffic information (Ph.D. dissertation project) (supported by the FAA and NASA). University of Illinois at Urbana-Champaign.

Xu, X., & Rantanen, E. M. (2003). Timing of discrete actions (Phase II). University of Illinois at Urbana-Champaign.

Rantanen, E. M., & Xu, X. (2001-2002). Timing of discrete actions (Phase I). University of Illinois at Urbana-Champaign.

Rantanen, E. M., McCarley, J. S., & Xu, X. (2000-2001). The effect of audio throughput delay of the NEXCOM system on air traffic controller performance and workload (supported by the FAA). University of Illinois at Urbana-Champaign.

Mumaw, R., Sarter, N., Wickens, C. D., Kimball, S., Nikolic, M., Marsh, R., Xu, W., & Xu, X. (2000). Analysis of pilots' monitoring and performance on highly automated flight decks (supported by NASA). Boeing Commercial Airplane/Ohio State University/University of Illinois at Urbana Champaign.

Wickens, C. D., Xu, X., & Helleberg, J. R. (1999-2000). The allocation of visual attention for aircraft traffic monitoring and avoidance: Baseline measures and implications for free flight (supported by the FAA). University of Illinois at Urbana-Champaign.

Wickens, C. D., Helleberg, J. R., & Xu, X. (1999). Pilot maneuver choice and safety in a simulated free flight scenario (supported by the FAA). University of Illinois at Urbana-Champaign.

Xu, X., & Backs, R. W. (1997-2001). Improving air traffic control specialist selection methods with personality and cognitive predictors (master's thesis project). Central Michigan University.

Xu, X. (1996). Workload and stress research in air traffic control. Swiss Federal Institute of Technology in Zurich.

Xu, X., Wu, T., & Zhao, N. (1994-1995). Test construction of an English examination for Chinese air traffic controllers (supported by the Civil Aviation Administration of China). Civil Aviation University of China.

PUBLICATIONS

Journal Papers

- Xu, X., Backs, R. W., Navidzadeh, H. T., & da Silva, S. P. (in preparation). Personality, divided attention performance, cardiovascular, and EEG predictors of performance in a simulated air traffic control task. To be submitted to *International Journal of Aviation Psychology*.
- Xu, X., Wickens, C. D., & Rantanen, E. M. (in review). Effects of conflict alerting system reliability and task difficulty on pilots' conflict detection with Cockpit Display of Traffic Information. *Ergonomics*.
- Xu, X., & Rantanen, E. M. (in review). Effects of air traffic geometry on pilots' conflict detection with cockpit display of traffic information. *Human Factors*.
- Rantanen, E. M., & Xu, X. (in preparation). Timing of discrete actions: Perceptual and task influences on performance. To be submitted to *Journal of Experimental Psychology: Human Perception and Performance*.
- Rantanen, E. M., McCarley, J. S., & Xu, X. (2004). Time delays in air traffic control communication loop: Effect on controller performance and workload. *International Journal of Aviation Psychology*, 14(4), 369–394.
- Wickens, C. D., Helleberg, J. R., & Xu, X. (2002). Pilot maneuver and workload in free flight. *Human Factors*, 44(2), 171-188.
- Xu, X. (1992). The indeterminacy of translation. *Journal of Civil Aviation University of China*, 10, 92-102.

Conference Papers

- Xu, X., Wickens, C. D., & Rantanen, E. M. (in press). Pilots' conflict detection with imperfect conflict alerting system for the cockpit display of traffic information. To appear in *Proceedings of the 13th International Symposium on Aviation Psychology*. Oklahoma City, OK.
- Xu, X., Wickens, C. D., & Rantanen, E. M. (2004). Effects of air traffic geometry on pilots' conflict detection with cockpit display of traffic information. In *Proceedings of the 48th Annual Meeting of the Human Factors and Ergonomics Society*. Santa Monica, CA: Human Factors and Ergonomics Society.

- Wickens, C. D., & Xu, X. (2004). Imperfect automation for airborne conflict avoidance: Implications for trust, situation awareness, and display design. *Paper presented at the Symposium on Workload, Situation Awareness, and Automation at the 28th International Congress of Psychology*. Beijing, August 8-13, 2004.
- Wickens, C. D., Rantanen, E. M., Thomas, L. C., & Xu, X. (2004). Imperfect automation and CDTI alerting: Implications from literature and systems analysis for display design. *Aviation, Space, and Environmental Medicine*, 75 (4, section II), B138.
- Xu, X. (2003). Conflict detection with cockpit display of traffic information: What is it, what has been found, and what needs to be done? In *Proceedings of the 47th Annual Meeting of the Human Factors and Ergonomics Society*. Santa Monica, CA: Human Factors and Ergonomics Society.
- Xu, X., & Rantanen E. M. (2003). Timing of discrete actions: Evidence for perceptual dominance in human performance. In *Proceedings of the 47th Annual Meeting of the Human Factors and Ergonomics Society*. Santa Monica, CA: Human Factors and Ergonomics Society.
- Rantanen, E. M., Wickens, C. D., Thomas, L. C., & Xu, X. (2003). Developing and validating human factors certification criteria for cockpit displays of traffic information avionics. *Paper presented at the FAA General Aviation, Aviation Maintenance, and Vertical Flight Human Factors Research Program Review Conference*. University of Nevada, Reno.
- Wickens, C. D., & Xu, X. (2003). How does automation reliability influence workload? In *Proceedings of the 1st Annual Robotics Consortium*. U.S. Army Research Laboratory Collaborative Technology Alliance Program.
- Xu, X., & Rantanen, E. M. (2003). Conflict detection in air traffic control: A task analysis, a review, and a need for further research. In *Proceedings of the 12th International Symposium on Aviation Psychology*. Dayton, OH.
- Backs, R. W., da Silva, S. P., & Xu, X. (2003). Resting EEG asymmetry predicts performance in a simulated air traffic control task. In *Proceedings of the 12th International Symposium on Aviation Psychology*. Dayton, OH.
- Shi, H., Xu, X., & Wang, Z. (2003). Human factors in air traffic control incidents and controllers' opinions on human factors in China. In *Proceedings of the 12th International Symposium on Aviation Psychology*. Dayton, OH.

- Rantanen, E. M., McCarley, J. S., & Xu, X. (2002). The impact of communication delay on air traffic controller's vectoring performance. In *Proceedings of the 46th Annual Meeting of the Human Factors and Ergonomics Society*. Santa Monica, CA: Human Factors and Ergonomics Society.
- Rantanen, E. M., & Xu, X. (2001). Human performance in timing of discrete actions. In *Proceedings of the 45th Annual Meeting of the Human Factors and Ergonomics Society*. Santa Monica, CA: Human Factors and Ergonomics Society.
- Wickens, C. D., Xu, X., Helleberg, J. R., & Marsh, R. (2001). Pilot visual workload and task management in free flight: A model of visual scanning. In *Proceedings of the 11th International Symposium on Aviation Psychology*. Columbus, OH: Ohio State University.
- Xu, X., Navidzadeh, H. T., & Backs, R. W. (2001). Personality, divided attention performance, and cardiovascular predictors of performance in a simulated air traffic control task. In *Proceedings of the 11th International Symposium on Aviation Psychology*. Columbus, OH: Ohio State University.
- Backs, R. W., Navidzadeh, H. T., & Xu, X. (2000). Cardiorespiratory indices of mental workload during simulated air traffic control. In *Proceedings of the 44th Annual Meeting of the Human Factors and Ergonomics Society*. Santa Monica, CA: Human Factors and Ergonomics Society.
- Wickens, C. D., Helleberg, J., & Xu, X. (2000). Decision and workload implications of free flight and the cockpit display of traffic information (CDTI). In *Proceedings of the IEA 2000/HFES 2000 Congress*. Santa Monica, CA: Human Factors and Ergonomics Society.
- Wickens, C. D., Helleberg, J., & Xu, X. (1999). Maneuver choice in free flight. In *Proceedings of the World Aviation Congress (1999-01-5591)*. Warrendale, PA: Society of Automotive Engineers, Inc.

Technical Reports

- Xu, X., Rantanen, E. M., & Wickens, C. D. (2004). *Estimation of conflict risk using cockpit displays of traffic information* (AHFD-04-11/FAA-04-4). Savoy, IL: University of Illinois, Aviation Human Factors Division.
- Xu, X., Wickens, C. D., & Rantanen, E. M. (2004). *Imperfect conflict alerting systems for the cockpit display of traffic information* (AHFD-04-8/NASA-04-2). Savoy, IL: University of Illinois, Aviation Human Factors Division.

- Rantanen, E. M., Wickens, C. D., Xu, X., & Thomas, L. C. (2004). *Developing and validating human factors certification criteria for cockpit displays of traffic information avionics* (AFHD-04-1/FAA-04-1). Savoy, IL: University of Illinois, Aviation Human Factors Division.
- Wickens, C. D., & Xu, X. (2002). *Automation trust, reliability and attention HMI 02-03* (AHFD-02-14/MAAD-02-2). Savoy, IL: University of Illinois, Aviation Human Factors Division.
- Rantanen, E. M., McCarley, J. S., & Xu, X. (2001). *The effect of audio throughput delay of the NEXCOM system on air traffic controller performance and workload* (ARL-01-19/FAA-01-5). Savoy, IL: University of Illinois, Aviation Research Laboratory.
- Wickens, C. D., Helleberg, J. R., Goh, J., Xu, X., & Horrey, W. J. (2001). *Pilot task management: Testing an attentional expected value model of visual scanning* (ARL-01-14/NASA-01-7). Savoy, IL: University of Illinois, Aviation Research Laboratory.
- Wickens, C. D., Helleberg, J. R., Kroft, P., Talleur, D. A., & Xu, X. (2001). *Mid air target detection: What makes it difficult? Application of attention and situation awareness model* (ARL-01-9/NASA-01-5). Savoy, IL: University of Illinois, Aviation Research Laboratory.
- Helleberg, J. R., Wickens, C. D., & Xu, X. (2000). *Pilot maneuver choice and safety in a simulated free flight scenario* (ARL-00-1/FAA-00-1). Savoy, IL: University of Illinois, Aviation Research Laboratory.
- Mumaw, R., Sarter, N., Wickens, C., Kimball, S., Nikolic, M., Marsh, R., Xu, W., & Xu, X. (2000). *Analysis of pilots' monitoring and performance on highly automated flight decks*. NASA Ames Contract NAS2-99074 Final Project Report.
- Wickens, C. D., Xu, X., Helleberg, J. R., Carbonari, R., & Marsh, R. (2000). *The allocation of visual attention for aircraft traffic monitoring and avoidance: Baseline measures and implications for free flight* (ARL-00-2/FAA-00-2). Savoy, IL: University of Illinois, Aviation Research Laboratory.

Unpublished Manuscripts

- Xu, X., & Dismukes, R. K. (2004). *A research proposal for time-based and event-based prospective memory in air traffic control*. NASA Ames Research Center.
- Xu, X. (in preparation). *A research proposal to examine the effects of air traffic geometry and conflict alerting system reliability on conflict detection in air traffic control*. NASA Ames Research Center.

- Xu, X. (2004). *A research proposal to examine the effects of three-dimensional air traffic geometry on pilots' conflict detection with cockpit display of traffic information*. University of Illinois at Urbana-Champaign.
- Xu, X. (2003). *A research proposal for validation of information complexity metrics for air traffic control automation displays*. University of Illinois at Urbana-Champaign.
- Xu, X. (2002). *A research proposal for assessment and evaluation of two automated air traffic control conflict and resolution systems*. University of Illinois at Urbana-Champaign.
- Xu, X. (2002). *Prediction in air traffic control*. University of Illinois at Urbana-Champaign.
- Xu, X. (2000). *A research proposal for situation awareness evaluation of plan view, perspective, and stereoscopic displays in air traffic control*. University of Illinois at Urbana-Champaign.
- Xu, X. (2000). *A CREAM-based analysis of A320 spoiler disconnection*. University of Illinois at Urbana-Champaign.
- Rich, A., Goh, J., & Xu, X. (2000). *Development of scale to measure trust in automation*. University of Illinois at Urbana-Champaign.
- Xu, X. (2000). *A MicroSAINT model as an operator function model*. University of Illinois at Urbana-Champaign.
- Xu, X., & Richter, J. (2000). *Reason versus Rasmussen: A comparison of two human error models*. University of Illinois at Urbana-Champaign.
- Xu, X., & Wickens, C. D. (1999). *Pilot expectancy and attentional effects for hazard awareness in free flight and conventional flight* (First Year Project). University of Illinois at Urbana-Champaign.
- Xu, X. (1998). *Effects of automated air traffic control system on controller mental workload*. Central Michigan University.
- Xu, X. (1996). *Stress in air traffic control*. Central Michigan University.
- Xu, X. (1995). *Preliminary test construction of an English examination for Chinese air traffic controllers*. Civil Aviation University of China.

PRESENTATIONS (LECTURES & POSTERS)

- Xu, X., Wickens, C. D., & Rantanen, E. M. (2004, September). Effects of air traffic geometry on pilots' conflict detection with cockpit display of traffic information. The 48th Annual Meeting of the Human Factors and Ergonomics Society. New Orleans, LA.
- Xu, X. (2003, October). Conflict detection with cockpit display of traffic information: What is it, what have been found, and what need to be done? The 47th Annual Meeting of the Human Factors and Ergonomics Society. Denver, CO.
- Xu, X., & Rantanen, E. M. (2003, April). Conflict detection in air traffic control: A task analysis, a review, and a need for further research. The 12th International Symposium on Aviation Psychology. Dayton, OH.
- Shi, H., Xu, X., & Wang, Z. (2003, April). Human factors in air traffic control incidents and controller's opinions on human factors in China. The 12th International Symposium on Aviation Psychology. Dayton, OH.
- Rantanen, E. M., & Xu, X. (2001, October). Human performance in timing of discrete actions. The 45th Annual Meeting of the Human Factors and Ergonomics Society. Minneapolis/St. Paul, MN.
- Xu, X., Navidzadeh, H. T., & Backs, R. W. (2001, March). Personality, divided attention performance, and cardiovascular predictors of performance in a simulated air traffic control task. The 11th International Symposium on Aviation Psychology. Columbus, OH.

INVITED TALK

- Xu, X., Wickens, C. D., & Rantanen, E. M. (2004, March). Effects of air traffic geometry and conflict alerting system reliability on pilots' conflict detection with cockpit display traffic information. NASA Ames Research Center, Moffett Field, CA.

PROFESSIONAL MEMBERSHIPS

- 2004-Present Association for Aviation Psychology (US).
- 1999-Present Human Factors and Ergonomics Society (US).

SERVICE

- 2004 Student Forum Sessions Peer Reviewer for the 48th Human Factors and Ergonomics Society Annual Meeting.

- 2001-2004 Graduate Representative of the Visual Cognition and Human Performance Division, Dept. of Psychology, University of Illinois at Urbana-Champaign.
- 1992 Review Board Member for the Radiotelephony Manual for Air Traffic Controllers and Pilots, Civil Aviation Administration of China.
- 1988 Task Force Member for Radar Control Rules, Civil Aviation Administration of China.

OTHER SKILLS & INTERESTS

- Statistics SPSS and SAS.
- Sport Twice US National Collegiate Table Tennis Association (NCTTA) Team Champion (Team of University of Illinois at Urbana-Champaign), 2002-2003.
- Third Place in Table Tennis Championships of the Chinese Students and Scholars in Switzerland, 1996.
- Hobbies Amateur in Violin, Chinese Brush Calligraphy, and Fishing.
- Languages Fluent in English and Chinese (Mandarin and Several Wu Dialects).