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Education

Ph.D. in Aerospace Engineering, Georgia Institute of Technology, June 1999.
M.S. in Mechanical and Aerospace Engineering, University of Virginia, August 1992.
B.S. in Aerospace Engineering, University of Virginia, May 1990.

Experience

Associate Professor, Penn State University, July 2006 to present.

Assistant Professor, Penn State University, July 2000 to June 2006.

- Teaching courses in dynamics, flight dynamics, and controls.
- Current Research Projects:
 - Carefree Maneuvering Control Laws for Rotorcraft (sponsored by National Rotorcraft Technology Center)
 - Simulation and Control of Shipboard Launch and Recovery Operations (sponsored by National Rotorcraft Technology Center and Center for Rotorcraft Innovation)
 - Control Optimization of Compound Helicopters (sponsored by Piasecki Aircraft and U.S. Navy)
 - Damage Mitigating Control for Rotorcraft (sponsored by Army Research Office)
 - Semi-autonomous hand-launched rotary-wing UAV (sponsored by National Rotorcraft Technology Center)
 - Intelligent Control and Coordination of UAV (sponsored by Penn State Applied Research Laboratory)

Senior Engineer, Sikorsky Aircraft Corporation, Electronic Flight Controls/Simulation, Handling Qualities Group, Stratford, CT. July 1999 to July 2000.

- Handling qualities, stability and control development on S-92 program.
- Handling qualities, simulation, and control law development on Cypher II UAV program.

Graduate Research Assistant, Georgia Tech., School of Aerospace, September 1996 to June 1999.

- Developed flight envelope limiting systems for the V-22 and XV-15 aircraft using neural network limit prediction and tactile cueing through an active center stick. Demonstrated envelope cueing system in piloted simulation at the Boeing Helicopters Flight Simulation Laboratory.
- Research was funded by the Center of Excellence in Rotorcraft Technology at Georgia Tech and conducted in cooperation with Boeing Helicopters – Philadelphia.

Project Engineer, Piasecki Aircraft Corporation, Essington, PA. August 1992 to August 1996.

- Flying Qualities and Simulation Specialist for the U.S. Army Vectored Thrust Combat Agility Demonstrator (VTCAD) Program. Programs involved the investigation of compound and vectored thrust technologies on the AH-64 and AH-1W helicopters. Conducted wind tunnel testing of the Vectored Thrust Ducted Propeller. Developed simulation models and flight control laws. Conducted real-time flight simulation studies at the McDonnell-Douglas Helicopter Systems Full Mission Simulator, the NASA Ames Vertical Motion Simulator, and the Boeing Helicopters Flight Simulation Laboratory.
- Developed flight simulation code and control laws for the U.S. Navy SH-60F/VTDP program.

Awards and Associations

- 2003 American Helicopter Society Best Paper in Flight Simulation
- 1998 Robert L. Lichten Award from American Helicopter Society. Awarded for best AHS paper by a first-time author.
- Member of American Helicopter Society (AHS), AHS Handling Qualities Technical Committee
- Senior Member of AIAA

Publications in Archival Journals

1. Tolani, D.K., Ray, A., and Horn, J.F., “Integrated decision and control of human-engineered complex systems,” *International Journal of General Systems*. In press.
2. Sahani, N. A., Horn, J. F., Jeram, G. J. J., and Prasad, J. V. R., “A Hub Moment Limit Protection System Using Neural Network Prediction,” *Journal of the American Helicopter Society*. In press.
3. Sahasrabudhe, V., Horn, J.F., Sahani, N., Faynberg, A., and Spaulding, R. “Simulation Investigation of a Comprehensive Collective-Axis Tactile Cueing System.” *Journal of the American Helicopter Society*. In press.
4. Horn, J.F., Bridges, D.O., Wachspress, D.A, and Rani, S.L., “Implementation of a Free-Vortex Wake Model in Real-Time Simulation of Rotorcraft,” *AIAA Journal of Computing, Information, and Communications*, Vol. 3, (3), March 2006.
5. Chen, H.N., Brentner, K.S., Lopes, L.V., and Horn, J.F., “An Initial Analysis of Transient Noise in Rotorcraft Maneuver Flight.” *International Journal of Aeroacoustics*, Vol. 5, (2), April 2006.
6. Sahani, N. and Horn, J.F., “Adaptive Model Inversion Control of a Helicopter with Structural Load Limiting.” *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 29, (2), March-April 2006.
7. Lee, D. and Horn, J.F., “Simulation of Pilot Workload for a Helicopter Operating in a Turbulent Ship Airwake.” *Journal of Aerospace Engineering – Proceedings of the Institute of Mechanical Engineers Part G*, Special issue on shipborne aviation, Vol. 219, (G5), October 2005, pp. 445-458.
8. Horn, J.F., Tolani, D.K., Lagoa, C.M., Wang, Q., and Ray, A., “Reliable Operation of Rotorcraft Using Probabilistic Robust Control.” *IFAC Control Engineering Practice*, Vol. 12, (8), August 2005, pp. 1037-1046.
9. Horn, J.F., Bridges, D.O., Lopes, L.V., and Brentner, K.S., “Development of a Low-Cost Multi-Disciplinary Rotorcraft Simulation Facility.” *AIAA Journal of*

Computing, Information, and Communications, Vol. 2, (7), July 2005, pp.267-284.

10. Lee, D., Sezer-Uzol, N., Horn, J.F., and Long, L.N., "Simulation of Pilot Control Activity During Helicopter Shipboard Operations," *AIAA Journal of Aircraft*, Vol. 42, (2), March-April 2005, pp.448-461.
11. Brentner, K.S., Lopes, L.V., Chen, H.N., and Horn, J.F., "Near Real-Time Simulation of Rotorcraft Acoustics and Flight Dynamics," *AIAA Journal of Aircraft*, Vol. 42, (2), March-April 2005, pp. 347-355.
12. Sahani, N. and Horn, J.F., "Neural Network Based Algorithms for Comprehensive Collective Axis Limit Avoidance on Rotorcraft," *AIAA Journal of Computing, Information, and Communications*, Vol. 1, (11), November 2004, pp.432-451.
13. Horn, J.F. and Sahani, N., "Detection and Avoidance of Main Rotor Hub Moment Limits on Rotorcraft," *AIAA Journal of Aircraft*, Vol. 41, (2), March-April 2004, pp.372-379.
14. Horn, J.F., Calise, A.J., and Prasad, J.V.R, "Flight Envelope Limit Detection and Avoidance for Rotorcraft," *Journal of the American Helicopter Society*, Vol. 47, (4), October 2002, pp. 253-262.
15. Horn, J.F., Calise, A.J., and Prasad, J.V.R, "Flight Envelope Cueing on a Tilt-Rotor Aircraft Using Neural Network Limit Prediction," *Journal of the American Helicopter Society*, Vol. 46, (1), January 2001, pp. 23-31.

Conference Publications

1. Geiger, B.R., Horn, J.F., Delullo, A., Long, L.N., and Niessner, A.F., "Optimal Path Planning of UAVs Using Direct Collocation with Nonlinear Programming," Accepted for Publication at AIAA Guidance, Navigation, and Controls Conference, Keystone, CO, August, 2006.
2. Yasar, M., Bridges, D.O., Mallapragada, G., and Horn, J.F., "A Simulation Test Bed for Coordination of Unmanned Rotorcraft and Ground Vehicles," Accepted for Publication at AIAA Modeling and Simulation Technology Conference, Keystone, CO, August, 2006.
3. Guo, W. and Horn, J.F., "Modeling and Simulation for the Development of a Quad-Rotor UAV Capable of Indoor Flight," Accepted for Publication at AIAA Modeling and Simulation Technology Conference, Keystone, CO, August, 2006.
4. Yasar, M., Horn, J.F., and Ray, A., "Effects of Supervisory Decisions on Nonlinear Aircraft Dynamics," Proceedings of the American Control Conference, Minneapolis, MN, June, 2006.
5. Horn, J.F., Lee, D., and Bridges, D.O., "Flight Control Design for Alleviation of Pilot Workload during Helicopter Shipboard Operations," Proceedings of the American Helicopter Society 62nd Annual Forum, Phoenix, AZ, May 9-11, 2006.
6. Chen, H.N., Brentner, K.S., Shirey, J.S., Horn, J.F., Ananthan, S., and Leishman, J.G., "A Study of the Aerodynamics and Acoustics of Super-BVI," Proceedings of the American Helicopter Society 62nd Annual Forum, Phoenix, AZ, May 9-11, 2006.
7. Miller, J.A., Minear, P.D., Neissner, A.F., DeLullo, A.M., Geiger, B.R., Long, L.N., and Horn, J.F., "Intelligent Unmanned Air Vehicle Flight Systems," AIAA Paper No. 2005-7081, AIAA InfoTech@Aerospace Conference, Washington D.C., September, 2005.

8. Hanford, S.D., Long, L.N., and Horn, J.F., "A Small Semi-Autonomous Rotary-Wing Unmanned Air Vehicle," AIAA Paper No. 2005-7077, AIAA InfoTech@Aerospace Conference, Washington D.C., September, 2005. Bridges, D.O., Horn, J.F., and Ray, A., "Model-Following Control of a Military Helicopter with Damage Mitigation", AIAA Guidance, Navigation, and Controls Conference, San Francisco, CA, August, 2005. AIAA Paper 2005-6347.
9. Sahani, N.A. and Horn, J.F. "Command Limiting for Full-Envelope Guidance and Control of Rotorcraft", AIAA Guidance, Navigation, and Controls Conference, San Francisco, CA, August, 2005. AIAA Paper 2005-6348.
10. Tolani, D.K., Horn, J.F., Yasar, M., and Ray, A., "Hierarchical Control of Rotorcraft for Enhanced Performance and Structural Durability", AIAA Guidance, Navigation, and Controls Conference, San Francisco, CA, August, 2005. AIAA Paper 2005-6349.
11. Chen, J., Lagoa, C.M., Horn, J.F., and Ray, A., "Output Bounded Switching Control for Future Generation Rotorcraft", AIAA Guidance, Navigation, and Controls Conference, San Francisco, CA, August, 2005. AIAA Paper 2005-6371.
12. Lee, D. and Horn, J.F., "Optimization of a helicopter Stability Augmentation System for Operation in a Ship Airwake," Proceedings of the American Helicopter Society 61st Annual Forum, Grapevine, TX, June 1-3, 2005.
13. Horn, J.F., Bridges, D.O., Wachspress, D.A., and Rani, S.L., "Implementation of a Free-Vortex Wake Model in Real-Time Simulation of Rotorcraft," Proceedings of the American Helicopter Society 61st Annual Forum, Grapevine, TX, June 1-3, 2005.
14. Jeram, G. J., Sahani, N. A., Prasad, J. V. R., and Horn, J. F., "Distributing Limit Protection between Autonomous Restraint and Voluntary Tactile Cues," AIAA Aerospace Science Meeting, Reno, Nevada, Jan. 2005.
15. Lee, D. and Horn, J.F., "Simulation of Pilot Workload for Helicopters Operating in a Turbulent Ship Airwake," AIAA Atmospheric Flight Mechanics Conference, Providence, RI, August 2004. AIAA Paper 2004-5360.
16. Sahani, N. and Horn, J.F., "Adaptive Model Inversion Control of a Helicopter with Structural Load Limiting," AIAA Guidance, Navigation, and Controls Conference, Providence, RI, August, 2004. AIAA Paper 2004-4753.
17. Horn, J.F., Bridges, D., Sharma, C., Lopes, L., and Brentner, K.S., "A Multi-Disciplinary Rotorcraft Simulation Facility Composed of Commodity Components and Open Source Software," Proceedings of the American Helicopter Society 60th Annual Forum, Baltimore, MD, June 7-10, 2004.
18. Sahani, N., Horn, J.F., Jeram, G., and Prasad, J.V.R., "Hub Moment Limit Protection Using Neural Network Prediction," Proceedings of the American Helicopter Society 60th Annual Forum, Baltimore, MD, June 7-10, 2004.
19. Geiger, B., Horn, J.F., Greenjack, A., and Piasecki, F.W., "Trim and Maneuver Optimization Methods for Compound Rotorcraft," American Helicopter Society 60th Annual Forum, Baltimore, MD, June 7-10, 2004.
20. Tolani, D.K., Horn, J.F., Ray, A., and Chen, J., "Hierarchical Control of Future Generation Rotorcraft," American Controls Conference, Boston, MA, June 30 – July 2, 2004.
21. Kothmann, B.D., Lu., Y., DeBrun, E., and Horn, J., "Prospective on Rotorcraft Aerodynamic Modeling for Flight Dynamics Applications," American Helicopter

Society 4th Decennial Specialist's Conference on Aeromechanics, San Francisco, CA, January 21-23, 2004.

22. Chen, H., Brentner, K.S., Lopes, L., and Horn, J.F., "A Study of Rotorcraft Noise Prediction in Maneuvering Flight," Proceedings of the AIAA 42nd Aerospace Sciences Meeting and Exhibit, Reno, NV, January 2004.
23. Lee, D., Horn, J.F., Sezer-Uzol, N., and Long, L.N., "Simulation of Pilot Control Activity During Helicopter Shipboard Operations," Proceedings of the AIAA Atmospheric Flight Mechanics Conference, Austin, TX, August 2003, AIAA Paper 2003-5306.
24. Horn, J.F., Tolani, D.K., Lagoa, C.M., Wang, Q., and Ray, A., "Reliable Operation of Rotorcraft Using Probabilistic Robust Control," Proceedings of the 5th IFAC Symposium on Fault Detection, Supervision and Safety of Technical Processes, Washington, D.C., June 9-11, 2003, pp.181-186.
25. Bridges, D., Horn, J.F., and Ray, A., "Damage Mitigating Control of Rotorcraft," Proceedings of the American Helicopter Society 59th Annual Forum, Phoenix, AZ, May 2003.
26. Lee, D., Sezer-Uzol, N., Horn, J.F., and Long, L.N., "Simulation of Helicopter Shipboard Launch and Recovery Operations Using Time-Accurate Airwakes," Proceedings of the American Helicopter Society 59th Annual Forum, Phoenix, AZ, May 2003.
27. Brentner, K.S., Lopes, L., Chen, H., and Horn, J.F., "Near Real-Time Simulation of Rotorcraft Acoustics and Flight Dynamics," Proceedings of the American Helicopter Society 59th Annual Forum, Phoenix, AZ, May 2003.
28. Sahani, N. and Horn J.F., "Collective Axis Cueing and Limit Avoidance Algorithms for Carefree Maneuvering," Proceedings of the American Helicopter Society Flight Controls and Crew System Design Specialists' Meeting, Philadelphia, PA, October 2002, 12 pages.
29. Lee, D. and Horn J.F., "Simulation and Control of Helicopter Shipboard Launch and Recovery Operations," Proceedings of the American Helicopter Society Flight Controls and Crew System Design Specialists' Meeting, Philadelphia, PA, October 2002, 10 pages.
30. Horn, J.F., "Rotor State Feedback for High Bandwidth Control and Structural Load Limiting," Proceedings of the American Helicopter Society Flight Controls and Crew System Design Specialists' Meeting, Philadelphia, PA, October 2002, 13 pages.
31. Sahasrabudhe, V., Spaulding, R., Faynberg, A., Horn, J., and Sahani, N., "Simulation Investigation of a Comprehensive Collective-Axis Tactile Cueing System," Proceedings of the American Helicopter Society 58th Annual Forum, Montreal, Canada, June 2002, Vol. 1, pp. 559-568.
32. Horn, J., and Sahani, N., "Detection And Avoidance of Main Rotor Hub Moment Limits on Rotorcraft," Proceedings of the AIAA Atmospheric Flight Mechanics Conference, Montreal, Canada, August 2001, AIAA Paper 2001-4138, 10 pages.
33. Horn, J. F., Calise, A. C., and Prasad, J.V.R, "Flight Envelope Limit Detection and Avoidance for Rotorcraft," Proceedings of the 25th European Rotorcraft Forum, Rome, Italy, September 14-16 1999, 11 pages.

34. Horn, J. F., Calise, A. C., and Prasad, J.V.R, "Development of Envelope Protection Systems for Rotorcraft," Proceedings of the American Helicopter Society 55th Annual Forum, Montreal, Canada, May 25-27, 1999, Vol. 2, pp. 2025-2036.
35. Horn, J. F., Calise, A. C., and Prasad, J.V.R, "Flight Envelope Limiting Systems Using Neural Networks," Proceedings of the AIAA Atmospheric Flight Mechanics Conference, Boston, MA, August 10-12, 1998, pp. 741-751, AIAA Paper 98-4459, 12 pages.
36. Horn, J., Calise, A.C., Prasad, J.V.R, and O'Rourke, M., "Flight Envelope Cueing on a Tilt-Rotor Aircraft Using Neural Network Limit Prediction," Proceedings of the American Helicopter Society 55th Annual Forum, Washington, D.C., May 1998, Vol. 2, pp. 1093-1104.