

Stephen B. Stancliff

sbs0 [at] ymail.com

OBJECTIVE

To obtain a technical leadership position in an organization developing autonomous vehicles / robots.

EDUCATION

- **Ph.D.** Robotics Carnegie Mellon University
- **M.S.** Robotics Carnegie Mellon University
- **M.E.** Electrical Engineering, minor in Mechanical Engineering The University of Florida
- **B.S.A.A.E.** Aeronautical and Astronautical Engineering Purdue University
- **B.A.** Philosophy Purdue University

Ph.D. Thesis: Planning to Fail: Incorporating Reliability into Design and Mission Planning for Mobile Robots

Master's Thesis: Learning to Fly: Developing an Autonomous Aerial Vehicle Using Human Skill Modeling

EMPLOYMENT HISTORY

5/09 – 9/09	Graduate Student	Carnegie Mellon University	Pittsburgh, PA
5/08 – 5/09	Research Engineer	Carnegie Mellon University	Pittsburgh, PA
8/04 – 5/08	Graduate Student	Carnegie Mellon University	Pittsburgh, PA
11/01 – 8/04	Engineer	U.S. Navy, SPAWAR Systems Center	San Diego, CA
8/00 – 8/01	Graduate Student	Carnegie Mellon University	Pittsburgh, PA
5/00 – 8/00	Engineer	U.S. Navy, Coastal Systems Station	Panama City, FL
1/98 – 5/00	Graduate Student	The University of Florida	Gainesville, FL
8/96 – 8/97	Science Teacher	The Charlotte Latin School	Charlotte, NC
8/94 – 8/96	Science Teacher	Concord High School	Concord, NC

SKILLS

- Project definition, decomposition, estimation, budgeting, scheduling, oversight.
- Systems engineering - "big picture" design. Systems integration, safety, usability, reliability, manufacturability, etc.
- Mentoring of junior engineers
- Selection and integration of COTS electrical and mechanical components. Design and development of custom electrical and mechanical components.
- Integration of computers with sensors and actuators (hardware-level and software-level).
- Hands-on electrical and mechanical prototype development using hand tools and machine tools.
- Software development experience with numerous programming languages, operating systems, toolkits. (C, C++, Java, Matlab, Pascal, FORTRAN, BASIC, Prolog, M4, asm, UNIX, VxWorks, Win32, Gnome/GTK, GLUT/OpenGL, TestPoint, etc.)
- Experience with numerous electrical and mechanical design tools (AutoCAD, VariCAD, Eagle, Protel, PSpice, PowerView, etc.)

ENGINEERING EXPERIENCE

- **Reliability of Mobile Robot Teams (Ph.D. thesis research)** **Carnegie Mellon University**

Graduate Student

8/04 – 9/09

- Initial work under a NASA-funded project developed methods for incorporating reliability engineering into the design process for robots and multirobot missions.
- Follow-on work on integrating reliability information into multirobot planning.
- Primary author of six peer-reviewed publications resulting from this work.
- Teaching Assistant for undergraduate 'Introduction to Robotics'

- **Telesupervised Adaptive Ocean Sensing Fleet (TAOSF) project** **Carnegie Mellon University**

Graduate Student

7/06 – 5/08

Research Programmer

5/08 – 5/09

- Worked on a team to develop a multirobot remote-sensing system using unmanned surface vehicles (USVs) to monitor ocean and river water quality.
- Designed the overall software architecture integrating C4ISR subsystems from CMU, NASA and U.S. Navy as well as COTS open-source components. Designed and implemented most of the CMU code.
- Designed and implemented control, communications, and sensing hardware and software for new USVs developed at CMU.
- Provided tasking and supervision for other students working on the project.

- **DARPA Urban Challenge** **Carnegie Mellon University**

Graduate Student

5/06 – 7/06

- Worked on the team that developed the preliminary software design for the TartanRacing autonomous vehicle that won the 2007 DARPA Urban Challenge.

- **Automated UAV Mission System (AUMS) Project** **U.S. Navy**

Project Manager

3/02 – 7/02 ; 4/04 – 8/04

Lead Engineer

7/02 – 8/04

- Managed a small team of engineers and technicians developing automated launch-recovery-refueling capabilities for small VTOL unmanned aerial vehicles (UAVs). Supervised a half-dozen employees and an annual budget of roughly \$750k.
- Established a vision for the overall project. Estimated budget and schedule. Supervised the work of other team members through informal meetings and formal design reviews. Identified personnel needs and interviewed potential hires.
- Sought and developed partnerships with outside agencies including universities, private companies, and other DoD labs. Negotiated and supervised subcontracts.
- Served as a member of the branch-level management team responsible for budget and personnel decisions for approx. 45 employees and budget of approx. \$15M.

- As lead electrical and software engineer on the project, designed and implemented hardware and software for control of launch-recover mechanisms, developed graphical user interface, and integrated these systems with the existing network communications layer.
- **Mobile Detection Assessment and Response System (MDARS) Project** **U.S. Navy**
Lead Engineer for MDARS-Exterior Vehicles *11/01 – 6/03*
 - Led a team of engineers and technicians working to improve the communications, sensors, and reliability of MDARS-E autonomous ground vehicles.
 - Developed formal test and operating procedures for vehicles in order to provide better documentation of problems.
 - Designed a formal network communications test plan and supervised its implementation. Changes resulted in improved network reliability and coverage.
 - Re-engineered remotely operated gun turret to improve reliability and safety.
 - Developed hardware for autonomous control of access gates and garage doors.
 - Investigated alternative sensors for navigation and obstacle avoidance.
 - Supervised experiments and demonstrations both onsite and at other DoD facilities.
 - **Surveillance Towed Array Sensor System (SURTASS) Project** **U.S. Navy**
Systems Engineer *3/02 – 6/02*
 - Worked with a team of engineers to produce a preliminary design for a semi-autonomous unmanned surface vehicle.
 - **The MultiRobot Lab** **Carnegie Mellon University**
Graduate Student *8/00 – 10/01*
 - Project leader and lead hardware engineer for CMU mid-sized RoboCup team.
 - Selected and integrated new robot hardware including computers and cameras.
 - **Unmanned Underwater Vehicle Project** **U.S. Navy**
Engineer *5/00 – 8/00*
 - Developed software for automated UUV battery charging and monitoring onboard submarines.
 - Developed 3D user interface for display of simulated and recorded UUV tracking data.
 - **Machine Intelligence Laboratory** **The University of Florida**
Graduate Student *1/98 – 5/00*
 - Designed and built an autonomous airplane using a neural network to learn flying skills from human pilots.
 - Designed and built an autonomous four-legged robot.
 - Designed and built a single-board computer using the MC68000 processor.
 - Instructor of record for upper-division EE microelectronics lab sections.
 - Taught robotics to secondary teachers as part of NSF-funded program.

ACADEMIC HONORS

- Member of Eta Kappa Nu (National Electrical Engineering Honor Society)
- Member of Sigma Gamma Tau (National Aerospace Engineering Honor Society)
- Purdue Outstanding Senior (Philosophy)
- Purdue President's Honor Award Scholarship
- National Merit Finalist

ENGINEERING COURSEWORK

(*=Graduate-level)

Design, Fabrication, Systems Engineering, Management, etc.

- Managing Software Development *
- Intelligent Machines Design Lab *
- Microprocessor Hardware/Software Design Lab *
- Human Factors Engineering *
- Human Factors *
- Aerospace Design I & II
- Engineering Economy

Artificial Intelligence, Computer Vision, etc.

- Computer Vision *
- Game Theory *
- Minds, Machines and Knowledge *
- Machine Intelligence and Synthesis *
- Machine Learning in Robotics I & II *
- Machine Learning *
- Artificial Intelligence *

Electronics, Control Systems, etc.

- Sensing and Sensors *
- State Variable Methods in Linear Systems *
- Computer Control of Machines and Processes *
- Circuits I
- Electronic Circuits
- Digital Logic
- Communication Systems
- Control Systems
- Flight Dynamics and Control
- Experimental Flight Mechanics

Mechanics

- Mechanics of Manipulation *
- Geometry of Mechanisms and Robots I & II *
- Mechanics III *
- Aeromechanics I & II
- Structural Analysis
- Dynamics and Vibrations

Fluids, Thermo, etc.

- Thermodynamics I & II
- Fluid Mechanics
- Aerodynamics

Other.

- Optimization in Aerospace Engineering *
- Mathematical Fundamentals for Robotics *
- Random Variables

PUBLICATIONS

Journal Articles

Mission Reliability Estimation for Repairable Robot Teams

S. Stancliff, J. Dolan, and A. Trebi-Ollennu, *Journal of Advanced Robotic Systems (IJARS)*, vol. 3, no. 2, June 2006, pp. 155–164.

Technical Reports

Planning to Fail: Incorporating Reliability into Design and Mission Planning for Mobile Robots

S. Stancliff, Ph.D. thesis, Carnegie Mellon University tech. report CMU-RI-TR-09-38, Sept. 2009.

Towards a Predictive Model of Mobile Robot Reliability

S. Stancliff, J. Dolan, and A. Trebi-Ollennu, Carnegie Mellon University tech. report CMU-RI-TR-05-38, Aug. 2005.

Learning to Fly: Developing an Autonomous Aerial Vehicle Using Human Skill Modeling

S. Stancliff, Master's thesis, The University of Florida, 2000.

Conference / Workshop Papers

Planning to Fail - Reliability Needs to be Considered *a Priori* in Multirobot Task Allocation

S. Stancliff, J. Dolan, and A. Trebi-Ollennu, *Proc. 2009 IEEE Int. Conf. Systems Man and Cybernetics (SMC-09)*, Oct. 2009.

Cooperative Aquatic Sensing using the Telesupervised Adaptive Ocean Sensor Fleet

J. Dolan, G. Podnar, S. Stancliff, K. Low, A. Elfes, J. Higinbotham, J. Hosler, T. Moisan and J. Moisan, *Proc. SPIE Conf. Remote Sensing of the Ocean, Sea Ice, and Large Water Regions*, Aug. 2009.

Robot Boats as a Mobile Aquatic Sensor Network

A. Elfes, G. Podnar, J. Dolan, K. Low, and S. Stancliff, *Proc. Workshop on Sensor Networks for Earth and Space Science Applications (ESSA-09)*, Apr. 2009.

Smart Ocean Sensing Using the Telesupervised Adaptive Ocean Sensor Fleet System

J. Dolan, G. Podnar, A. Elfes, S. Stancliff, E. Lin, J. Higinbotham, J. Hosler, J. Moisan, and T. Moisan, *Proc. 2008 NASA Earth Science Technology Conf. (ESTC-08)*, June 2008.

Operation of Robotic Science Boats Using the Telesupervised Adaptive Ocean Sensor Fleet System

G. Podnar, J. Dolan, A. Elfes, S. Stancliff, E. Lin, J. Hosler, T. Ames, J. Moisan, T. Moisan, J. Higinbotham, and E. Kulczycki, *Proc. 2008 IEEE Int. Conf. Robotics and Automation (ICRA-08)*, May 2008, pp. 1061–1068.

The Telesupervised Adaptive Ocean Sensor Fleet (TAOSF) Architecture: Coordination of Multiple Oceanic Robot Boats

A. Elfes, G. Podnar, J. Dolan, S. Stancliff, E. Ratliff, J. Hosler, T. Ames, J. Higinbotham, J. Moisan, T. Moisan, and E. Kulczycki, *Proc. 2008 IEEE Aerospace Conference*, Mar. 2008, pp. 1–9.

Planning to Fail - Reliability as a Design Parameter for Planetary Rover Missions

S. Stancliff, J. Dolan, and A. Trebi-Ollennu, *Proc. 2007 Performance Metrics for Intelligent Systems Workshop (PerMIS-07)*, Aug. 2007, pp 218–222.

The Telesupervised Adaptive Ocean Sensor Fleet

A. Elfes, G. Podnar, J. Dolan, S. Stancliff, E. Lin, J. Hosler, T. Ames, J. Moisan, T. Moisan, J. Higinbotham, and E. Kulczycki, *Proc. SPIE Conf. Atmospheric and Environmental Remote Sensing Data Processing and Utilization III: Readiness for GEOSS*, Aug. 2007

Harmful Algal Bloom Characterization Via the Telesupervised Adaptive Ocean Sensor Fleet

J. Dolan, G. Podnar, S. Stancliff, E. Lin, J. Higinbotham, J. Hosler, T. Ames, J. Moisan, T. Moisan, A. Elfes, *Proc. NASA Science Technology Conf. 2007 (NSTC-07)*, May 2007

Mission Reliability Estimation for Multirobot Team Design

S. Stancliff, J. Dolan, and A. Trebi-Ollennu, *Proc. 2006 IEEE/RSJ Int. Conf. Intelligent Robots and Systems (IROS-06)*, Sept. 2006, pp 2206–2211.

Planning to Fail: Mission Design for Modular Repairable Robot Teams

S. Stancliff, J. Dolan, and A. Trebi-Ollennu, *Proc. 8th International Symposium on Artificial Intelligence, Robotics and Automation in Space (ISAIRAS-05)*, B. Battrick, ed., European Space Agency publication SP-603, 2005.

Mission Reliability Estimation for Repairable Robot Teams

S. Stancliff, J. Dolan, and A. Trebi-Ollennu, *Proc. 1st Int. Workshop Multi-Agent Robotic Systems (MARS-05)*, Peter Sapaty and Joaquim Filipe, eds., INSTICC Press, Portugal, 2005, pp. 144–151.

Automated Launch, Recovery, and Refueling for Small Unmanned Aerial Vehicles

K. Mullens, A. Burmeister, M. Wills, N. Stroumtsos, T. Denewiler, S. Stancliff, and K. Thomas, *Proc. SPIE - Vol. 5609 Mobile Robots XVII*, D. Gage, Ed., Dec. 2004, pp. 233–243.

An Automated UAV Mission System

K. Mullens, E. Pacis, S. Stancliff, A. Burmeister, T. Denewiler, M. Bruch, and H. Everett, *Proc. AUVSI Unmanned Systems in International Security 2003 (USIS-03)*, Sept. 2003.

CMU Hammerheads 2001 Team Description

S. Stancliff, R. Balasubramanian, T. Balch, R. Emery, K. Sikorski, and A. Stroupe, *RoboCup 2001: Robot Soccer World Cup V*, A. Birk, S. Coradeschi and S. Tadokoro, Eds. New York: Springer, 2002, pp. 631–634.

Learning to Fly: Modeling Human Control Strategies in an Aerial Vehicle

S. Stancliff and M. Nechyba, *Proc. 2000 Florida Conf. Recent Advances in Robotics (FCRAR-00)*, 2000.

Learning to Fly: Design and Construction of an Autonomous Airplane

S. Stancliff, J. Laine, and M. Nechyba, *Proc. 1999 Florida Conf. Recent Advances in Robotics (FCRAR-99)*, Apr. 1999.