

SUMMARY

Senior Software Engineer with over 7 years of software development, software/hardware integration, and modeling and simulation experience. Knowledgeable in the analysis, design, implementation, and verification of real-time software with advanced proficiency in C/C++. Inquisitive and self-starting with proven ability to lead and execute development efforts utilizing strong technical, interpersonal, and communication skills.

TECHNICAL SKILLS

Languages: C, C++, C#, Java, MATLAB, Python, PHP, UML
Systems: MS Windows, Linux, UNIX, VxWorks, Android
Protocols: TCP/IP, IEEE 1394 (FireWire), ARINC 429, RS-232, RS-422, MIL-STD 1553b
Database: MySQL, JDBC, MS Access
Web: JavaScript, AJAX, XML, JSON, XSLT, HTML
Graphics: OpenGL, Java3D, SGI OpenGL Performer
Tools: MS Visual Studio, MATLAB & Simulink, MS Visio, Java SDK, Android SDK, WindRiver Workbench, Subversion

PROFESSIONAL EXPERIENCE

Northrop Grumman Corporation

Redondo Beach, CA

Sr. Software Engineer - 2003 to Present

Senior developer and architect on several successful projects focused on the development of Unmanned Aerial Vehicle (UAV) technologies.

Situational Awareness Interface (SAI) for UAV Ground Control Station

Served as principle investigator on design and development of a situational awareness interface integrated as part of a modern UAV ground control station to assist UAV pilots monitor and avoid nearby air traffic.

- Spearheaded research activities on existing UAV ground control stations and interviewed UAV pilots to explore desirable features for the SAI.
- Worked independently with customers to define SAI functional requirements through use-case analysis and was able to quickly build acceptance for system design.
- Led a team of five engineers on design, implementation, test, and integration of the SAI. The design was modeled in UML and developed in C# over multiple iterative and incremental development cycles.
- Demonstrated working system to customer and received positive feedback on system robustness and GUI effectiveness.
- Managed overall program schedule, budget, and task allocation. Completed the 1 year \$500K program in less than 9 months, yielding an additional \$125K net profit for the company.

UAV Collision Sense-and-Avoid Technology - Real-time Hardware-in-the-loop Simulation System

Core developer responsible for design and development of a real-time hardware-in-the-loop simulation system for UAV collision sense-and-avoid (SAA) technology. The system serves as a facility for real-time flight software testing, flight hardware integration validation, and flight test preparation.

- Designed and implemented a real-time and distributed simulation framework (RTSF) in C. The RTSF provides real-time synchronization, priority-thread scheduling, and message passing capability for 64 hot-swappable Linux machines connected to a common FireWire network.
- Developed a suite of MATLAB tools and libraries to convert sensor and vehicle models from Simulink to C++ classes and automatically populate the generated code to the RTSF for multi-sensor and multi-vehicle simulation.
- Integrated both commercial and custom-built flight hardware into the RTSF simulation system. Custom interface software was developed in C to inject simulation data into the flight

hardware using the following protocols: TCP/IP, ARINC 429, IEEE 1394a/b, MIL-STD 1553b, RS-422, and RS-232.

- Created system level test plan and developed an automated test suite using Python and MATLAB to test and validate of the results generated by the SAA system, such as the accuracy of the sensor data fusion algorithm and the optimality of the generated avoidance trajectory.

UAV Autonomous Terminal Area Operation

Designed and developed a real-time mission management system that allows UAV to operate autonomously within any airport terminal area.

- Created software architecture and finite state machines to allow UAV execute different flight phases within the airport terminal area including: taxi-to-runway, take-off, climb-out, final-approach, landing, and taxi-to-terminal.
- Designed and implemented various algorithms in C++ to solve challenging terminal area operation problems such as: path planning, ground traffic collision avoidance, terminal area right-of-way rules, and air traffic control voice recognition and speech synthesis.
- Designed and developed a real-time multi-vehicle simulation system using C and C++ to test, evaluate, and demonstrate the capabilities of the mission management system.

GENESIS - GenX (Technical Student Intern)

Designed a multi-vehicle flight simulation software based on a legacy single-vehicle flight simulation software.

- Applied object-oriented principles to create a software architecture for the multi-vehicle flight simulation software, entailing a software design that encompasses about 30 C++ classes.
- Communicated with technical lead to ensure software architecture is extensible for future system capabilities.
- Generated a complete set of UML diagrams and documentations using Microsoft Visio for code generation.
- Presented initial software system design to engineers and received positive responses.

EDUCATION

University of Southern California, Los Angeles, CA

December 2009

M.S. Electrical Engineering, GPA: 3.83

University of California, Santa Barbara, CA

June 2004

B.S. Computer Science, GPA: 3.55 (Honors)

AWARD

2006 San Fernando Valley Engineer's Council Distinguished Engineering Project Achievement Award for Unmanned Air Vehicles See and Avoid Development

PUBLICATIONS

1. W. Chen, L. Wong, J. Kay, V. Raska, "Autonomous Sense and Avoid (SAA) for Unmanned Air System (UAS)", SCI-202 Symposium on 'Intelligent Uninhabited Vehicle Guidance Systems', June 2009
2. L. Wong, A. Phadnis, O. Shakernia, W. Chen, B. Schwartz, "A Real-time Electro-Optical Sensor System Simulator for Unmanned Aerial Vehicle Sense and Avoid Development", AUVSI's Unmanned System North America Conference, June 2008