

**Richard C. Wagner**  
**Aerospace Engineer, B.S., M.S.**

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**SUMMARY**

**Engineering:**

- Control systems (GNC) for manned and autonomous aircraft and rockets
- Aircraft flight dynamics and flight simulation
- External and internal aerodynamics
- Computational Fluid Dynamics
- Wind tunnel testing
- Piston engine modeling, analysis and design

**Computing:**

- Artificial Intelligence
- Operating Systems
- Embedded systems
- Real-time systems
- Network programming
- Signal and image processing
- Operating Systems: DOS, UNIX, Linux, Windows, Palm OS
- Programming languages: Ada, Assembler, Basic, C, C++, Easy5, Forth, FORTRAN, Matlab, Maxima, Simulink, TutSim
- Parallel Processing with MPI

**General:**

- Program and business management
- Contract proposal writing
- Automobile and motorcycle mechanics
- Ski instruction

## EXPERIENCE

### **Graduate Student**

8/15 to 12/17

**Colorado State University**, Fort Collins, CO

I focused on Computational Fluid Dynamics, High Performance Computing, control theory, internal combustion engines and high-level math. I finished my coursework with a 4.0 GPA. [My research](#) focused on the application of CFD to performance modeling of internal combustion engines.

### **Aerospace Engineer**

7/12 to 4/15

**Radical Novelties**, Montrose, CO

Created "[Multi-Sim](#)", a multi-purpose, multi-vehicle, multi-instance, engineering flight simulation. Derived the mathematics and physics of the system from first principles and embodied them in artfully written software that is fast, robust and supportable. Presently maintaining four versions of the system concurrently.

Developed a real-time, embedded, control, data acquisition and analysis system for a U.S. Navy, autonomous, underwater glider.

### **Aerospace Engineer**

3/12 to 7/12

**Analytical Methods Inc.** (A division of Stark Aerospace), Redmond, WA

Designed the STANAG 4586-compatible remote/autonomous airborne [control system](#) for the ArrowLite man-portable, collapsible-wing UAV. Created a [Hardware-In-the-Loop simulation](#) for all-up testing of the airborne system in the lab. This simulation is noteworthy, as it is fully non-linear, generating extremely high-fidelity responses by sampling—at runtime—an extensive database of wind tunnel aerodynamic data for the aircraft. Performed wind tunnel studies on the UAV at University of Washington's Kirsten wind tunnel.

### **Aerospace Engineer**

4/11 to 12/11

**Masten Space Systems, Inc.**, Mojave, CA

Created [Guidance, Navigation and Control systems](#) for Masten's "Xaero" vertical takeoff/vertical landing, sub-orbital rocket. Designed control systems employing Kalman-filtered GPS/IMU data and wrote software embodying them in real-time, on-board control programs. Directed aerodynamic (CFD) studies of flight vehicles and rocket engines. Acted as pilot for the rocket during test flights. Wrote government and private contract proposals.

### **Aerospace Engineer**

3/02 to 4/11

**Radical Novelties**, Montrose, CO

Created a Computational Fluid Dynamics (CFD)-based [piston engine design and analysis system](#). Derived and wrote the interacting CFD models embodied in the simulation from first principles. These flow models were unsteady, modeling flows from subsonic through supersonic, and included "upwind" flux schemes, non-reflecting boundary handling and chemical and vibrational equilibrium and non-equilibrium. Employed time- and space-marching techniques using both finite-difference and finite-volume approaches.

- Director of Research and Development** 12/99 to 3/02  
**CaphNet Inc.**, Monterey, CA  
Created the [CaphNet WML Browser](#), a WML 1.3-compatible World Wide Web browser designed to run initially on the Palm OS and be portable to any handheld, wireless device.
- Senior Engineer** 5/96 to 12/99  
**iTV Corporation**, San Mateo, CA  
Played a central role in the creation of the iTV “[Pegasus](#)” set-top internet appliance. Developed the iTV target cross-compiler for iTV's proprietary, 20-bit CPU, “i21”. Designed and wrote the low-level i21 library routines (like add, subtract, multiply, divide, do...loop, if...then, case, etc.) Designed and wrote the i21 operating system, providing multitasking and memory management. Co-wrote the i21 TCP/IP protocol stack. Wrote a collection of i21-based network applications, including HTTP, TFTP, FTP, Telnet, network time, plus other, iTV-proprietary network applications.
- Senior Software Engineer** 3/96 to 5/96  
**NAVSYS Corporation**, Colorado Springs, CO  
Updated and maintained software systems for Global Positioning Systems and Inertial Navigation Systems. Designed and wrote new components for the systems.
- Aerospace Engineer** 6/95 to 3/96  
**Radical Novelties**, Manitou Springs, CO  
Designed and wrote real-time, object-oriented software for Digalog Corporation's “TestMate” dynamometer and engine test cell control system.
- Senior Engineer** 3/94 to 5/95  
**CIBER, Inc.**, Denver, CO  
Consulted to MCI Corporation on the development of their “[Site Control Computer](#)” system, a real-time, telephone network monitoring, data acquisition, data analysis and data distribution system. Designed and wrote the software for Site Controller releases 11.0, 12.0, 13.0 and 14.0.
- Ski Instructor** 12/93 to 3/94  
**Blue Mountain Ski School**, Palmerton, PA  
Taught skiing techniques to people from the beginner through the intermediate level. Worked with classes ranging from 1 person to 20 using the American Teaching System, as it was presented by the Professional Ski Instructors Association.
- Independent Product Development Engineer** 6/92 to 3/94  
**Radical Novelties**, Revere, PA  
Researched and developed the “SandMan” intelligent sleep monitoring device. Performed literature research on sleep, sleep monitoring and signal processing.
- Aerospace Engineer** 5/87 to 6/92  
**Naval Air Development Center**, Warminster, PA  
**Naval Air Engineering Center**, Lakehurst, NJ  
Was a principal creator of the [Sensor Driven Airborne Replanner \(SDAR\)](#), the world's first, fully

autonomous UAV control system. Also created a high-fidelity, faster-than-real-time, hardware-in-the-loop simulation, modeling the aircraft and all of its subsystems, for the development and testing of the control system.

Performed flight dynamics studies of existing and proposed naval aircraft using high-fidelity, engineering flight simulations (open-loop and pilot-in-the-loop) that I created. Analyzed and processed aircraft wind tunnel data, and used engineering techniques to estimate other aircraft aerodynamic data for the studies.

Created the RAMPCAT flight dynamics and catapult launch analysis system. Performed studies using the system to optimize the design of a “skijump” takeoff ramp and a new, shorter catapult.

Performed analyses of aircraft carrier visual landing aids. Created an aircraft carrier visual landing aid development system, a Monte Carlo flight simulation combined with a pilot and visual landing aid model. Used the system to begin the development of new visual landing aids for aircraft carriers.

Performed an analysis of Bell/Boeing SV-22 “Osprey” Helicopter In-Flight Refueling (HIFR). My studies, conducted using a simulation I created for the project, initiated the Navy's development of automatic fuel line handling systems for air-capable ships.

Performed Operations Research studies on aircraft carrier defensive capabilities and tactics. Created the CAPRAD attack analysis system, a Monte Carlo simulation predicting the defensive performance of Combat Air Patrol (CAP) formations in protecting aircraft carriers. Used the system to optimize the CAP strategies employed by current U.S. aircraft carriers. Also used the system to perform intelligence analyses of foreign, air-capable ships.

As a Contracting Officer's Technical Representative (COTAR), I wrote contract solicitations and read and reviewed contract proposals.

### **OTHER SIGNIFICANT ACTIVITIES**

#### **Director and Chairman, 21st Annual FORML Conference**

11/99

Asilomar Conference Center, Pacific Grove, CA

Managed all arrangements for a conference on computer programming, including housing, meals, conference rooms, presenter and attendee resources, conference proceedings and evening entertainment. Organized and directed the conference sessions, introducing each speaker, making general announcements, moderating the impromptu sessions, keeping time for each speaker and session, and providing the welcome and goodbye speeches for the conference.

### **EDUCATION**

- M.S., Mechanical Engineering, 2017, Colorado State University, 4.0 GPA
- B.S., Aerospace Engineering, 1985, The Pennsylvania State University

- Business Operations Management training, 1989, Naval Air Engineering Center and Conway Quality, Inc.
- Contracting Officer's Technical Representative (COTAR) training, 1988, Naval Air Engineering Center

### **SECURITY CLEARANCE**

Highest Level Held: NATO Secret

### **AWARDS AND ACHIEVEMENTS**

- Inducted into the Pinnacle National Honor Society, 2017
- Inducted into the Golden Key International Honour Society, 2017
- Commended by MCI management and the MCI test groups for developing one mission-critical software release with only 6 RFAs (requests for attention), and three releases with no RFAs—a first at the company. Also commended on developing four system releases in the time required by the in-house development team to develop a single release
- The SDAR system was recruited into the Common Core Avionics Group by the Unmanned Air Vehicle Joint Program Office
- The SDAR system was top-rated by the Office of Naval Technology during its 1991 NADC site review
- The SDAR simulation was nominated for inclusion on SIMNET by the Office of Naval Research
- "Outstanding Paper on Applications and Utilities"; 1992 FORML Conference; Pacific Grove, CA
- U.S. Navy Performance Awards: 1987, 1988, 1990, 1991
- Who's Who Among Students in American Junior Colleges, 1982

### **ACTIVITIES**

Senior Member, American Institute of Aeronautics and Astronautics; President, Montrose Model Aircraft Association, 2003; flying; radio-controlled modeling; cycling; alpine and Nordic skiing; sea kayaking; hiking; camping