**KARL MILLER**

1419 Avalon Court

Winona Lake, IN 46590

karl@karltmiller.com

260-580-9967

I am a senior systems and software engineer with extensive experience in .NET, Linux, and real time embedded applications. I have been a contract engineer for almost all of my career. I am equally comfortable working as a team member or as a technical lead.

**SOFTWARE**: .NET, ActiveX, Ada, Android, Apple iOS, ASP, AutoDesk 3ds Max, Boost, Build Forge C, C++, C#, CAN, CentOS, ClearCase, ClearQuest, COM, Coverity, DipTrace, DirectX, DMX, DOORS, DOS, Eclipse, ESRI, FORTH, FORTRAN, Git, Google Earth, GTest, HTML, J2EE, Java, JavaScript, Jenkins, JIRA, lex/yacc, Linux, MapGuide, Microsoft Test, Microsoft Visual Studio, MQX, Nucleus, ODBC, OLE, openSUSE, ORACLE, Pascal, PERL, Postscript, pSOS/pNA, QNX, QT, Rational Rose Real Time, REST, Rhapsody, SharePoint, Shell Scripts, SOSCOE, SQL Server, STL, SVN, TCP/IP, TFS, UNIX,VRTX, VxWorks, WCF, Windows XP/Vista/7/8, WPF, Yocto, ZeroMQ

**HARDWARE**: Atmel AT91SAM9G25, Analog Devices DSPs; Apple Macintosh/iPad/iPhone; ARM 9/11; Broadcom; DEC VAX; Freescale i.MX6, I2C, Intel 80X86/7, Pentium, Ivy Bridge; MIPS; Motorola 56000, 68HC11, 68XXX, PowerPC; PCs; Rabbit 2000; SPI, Texas Instruments DaVinci, TMS320C40; USB

**SOFTWARE DEVELOPMENT METHODOLOGIES**: Agile Development Methodology; ISO-90003; Microsoft Enterprise Architect, MIL-STD-2167A; OOAD (Object Oriented Analysis and Design); Rational Rose; SASD (Structured Analysis and Design); SEI CMM Level 5 and Level 3; Structured Development for Real Time Systems, UML

**APPLICATIONS**: Air Traffic Control, Animation, Automated Testing, Avionics, Battle Management, Broadband Communications, Cable Modems, Cellular Communications, Cryptography, Database Design, Device Drivers, Digital Rights Management, Digital Signal Processing, Engine Monitoring and Control, GIS, Medical, Multiprocessing, Power Grid, Printed Circuit Board Design, Radar, Radio, Real Time, Robotics, Satellites, Security Systems, Simulation, Smartcards, Surveillance, Telephony, Unmanned Aerial Vehicles

**EDUCATION**: BSCS from Ball State University

**CONTRACT EMPLOYMENT**

**Advanced Micro Aviation – Consultant – Indianapolis, IN (1/2014 – Present)** I am working weekends and evenings remotely for this spinoff from WM Robots (see below). I am responsible for software design and development of the UAV piloting applications under both Android 4.4 and iOS 8 for phones and tablets. These applications allow flight control via accelerometer or touch and also provide custom low latency video streaming. ZeroMQ is used to accomplish failsafe realtime air to ground communications. REST web services are used for aircraft configuration. All firmware updates for the aircraft occur thru these mobile applications.

**Eaton – Consultant – Franksville, WI (1/2014 – 6/2014)** I worked on Eaton’s next generation electric utilities automatic recloser. This device detects numerous fault conditions, and then opens the power line circuit. After sensing the fault condition has cleared, it automatically recloses, thus restoring power to utility customers after a momentary outage. My work involved porting previous generation software from Green Hills C under Integrity RTOS to C++ under Linux. I converted approximately 125,000 lines of code. I was also responsible for the high performance i.MX6 Quad core locked Data Dispatcher software which distributes hundreds of data samples on a ~4 msec interval. I customized U-Boot for manufacture/test. I wrote a custom PCIe driver to work with an FPGA handling several unique peripherals.

**WM Robots – Staff Systems Engineer – Colmar, PA (2/2013 – 1/2014)** I was responsible for overall software, mechanical, and hardware design, as well as systems analysis for a new commercial UAV product line. This drone is a unique quadcopter ducted fan design with all electronics and mechanical components embedded in a flying saucer shaped EPP foam airframe. The specific software work I was responsible for involves real time ARM 9 (TI DaVinci DM355) Linux threads for an ADXL362 accelerometer and an ST Micro L3GD20H gyroscope to produce a fused roll/pitch/yaw sensor. I also designed and implemented the high level C++ software framework including system state machine, message processing, and 80+ PID controllers. STL is used extensively. I designed and implemented the Mission Planning software using Visual Studio 2013. This software consisted of 2 core C# WCF Service Applications (one for Google Earth and one for the UAV) and multiple application specific C# Web Applications (for security patrols, virtual real estate tours, etc). I was also the Scrum Master for the team. I helped define Agile Sprints and conducted daily scrums on the clock.

**GE Medical – Consultant – Milwaukee, WI (6/2012 – 1/2013)** I worked on a next generation High Speed CT Scanner. This software was written in C++ and runs under VxWorks on custom multiple PowerPC hardware. Windows and Red Hat Linux are hosting cross development. I used ClearCase for configuration management. I used Coverity for static code analysis. Build Forge was used for system builds. ClearQuest was used for defect management. My primary areas of responsibility were device level software for x-ray control, power management, and communication error recovery across the slip ring.

**Logos Technologies – Software Engineer – Raleigh, NC (2/2011 – 5/2012)** I worked on a state of the art tactical video surveillance system onboard the RQ-7 Shadow UAV. I was responsible for Navigation and Communications software managing multi-threaded applications traffic with onboard hardware capable of archiving up to 4 terabytes of airborne video and dynamically wrapping up to 10 real time video streams onto a DEM terrain model. I was responsible for requirements analysis, design, coding, and field testing this software which was written in C++ and involves high performance low level device communications with custom FPGA hardware using a wrapper around Boost sockets. The target operating system was CENTOS 6.0. I was also solely responsible for Mission Planning Software written as a managed .NET application using Microsoft Visual Studio 2012 C++ and C#. This software performs extraction of mission DEM data as well as flight planning.

SVN and Git were used for all version control. The Jenkins continuous integration server was utilized for all system builds along with GTest for the airborne software only. The Agile development methodology was used with JIRA and daily scrums.

**General Dynamics – Software Engineer – Columbia, MD (8/2010 – 2/2011)** I worked on an ARM11 based telephony product that ties together commercial telephone lines, OPAL VOIP, and a variety of military radios. Phytec hardware and embedded Linux is being used with C++ cross development via Eclipse under openSUSE on a PC. I customized several kernel build scripts. I also modified U-Boot to support the factory diagnostic/test environment and proper bad block management for flash with JFFS2. I also debugged kernel level software for a custom USB codec driver using an Arbatron BDI 3000 JTAG debugger. The Agile development methodology was employed for all software development activities.

**Sarnoff Corporation – Software Engineer – Princeton, NJ (3/2010 – 8/2010)** I worked on TerraSight, a complex intelligence/surveillance product that wraps video from various military platforms onto a 3D terrain model in real time. This software was written using WPF and WCF under Visual Studio 2010 C# and C++. I was also responsible for rewriting the CERBERUS platform software to add TerraSight support for its Laser Range Finder and Laser Target Designator. I used Microsoft Enterprise Architect during the design phase.

**Comcast – Design Engineer – West Chester, PA (1/2010 – 3/2010)** I performed security analysis and design for a planned large scale wireless network (50,000+ access points) deployment. I utilized Rational Rhapsody to document the back office design modifications necessary to interface to existing accounting, support, security, and law enforcement infrastructure elements.

**Fidelity Technologies – Software Engineer – Reading, PA (8/2009 – 12/2009)** I worked on a large simulator/trainer for the Norwegian Army. This dome-based system is for the purpose of training Forward Air Controllers and Forward Observers and is both HLA and DIS compliant. I both authored and presented several system level design specifications to NDLO (Norwegian Defence Logistics Organisation). I also implemented software on this high performance 42 PC system employing 21 XP (VS 2008 C++ .NET) and 21 QNX/QT machines. I was personally responsible for major software components of the MARIA Field Terminal and the Instructor/Operator Station. The Instructor/Operator station work largely involved modifications to pre-existing Boost widgets and porting C++ over from legacy Linux software. Microsoft TFS was used for version management and the Agile development methodology was employed for all software development activities.

**CoSolutions – Technical Lead – Reston, VA (2/2008-8/2009)** My work for this consulting company involved the following clients. SharePoint was utilized extensively to coordinate this offsite work with client staff.

**QRC – Stafford, VA** I was the Technical Lead for 3 engineers working on major upgrades to QRC’s DCode software, which is used by the U.S. Government to gather intelligence data on foreign cellular telephone traffic. This work involved adding support for new receiver hardware, new algorithms, and improved workflow to DCode. The software is written in C#/C++ for use on specialized covert Windows XP machines. I was also the primary author for all design and system test documentation for which Microsoft Enterprise Architect was used.

**Walter Reed Army Medical Center – Washington, DC** I designed and implemented a system with a C# web-based client front end and a SQL Server backend for hospital staff to report and analyze Patient Safety Events.

**Affiliated Computer Services – Columbia, MD** I worked for the Transport Solutions Division, on software to support buses and trains. I made enhancements to realtime C++ Pentium based QNX software that involved new bus fare box features to support a contract with West Chester, PA. I also maintained and documented Visual Basic and C++ high performance graphics software on an embedded Windows XP based PC that drives a network controlled bus/train terminal scrolling sign display showing arrival, departure, advertisement, and special text messages. Rational ClearCase was used to manage this source code.

**Raytheon – Software Engineer – Fort Wayne, IN (4/2007-12/2007)** I worked on FCS (Future Combat Systems) where I designed and implemented SOSCOE based WAN level interprocess communications and associated utilities in both Java and C++ using Eclipse under Linux. This software utilized Ajax, JavaBeans, and JSF 1.2 extensively. I also designed and implemented new functionality for AFATDS (Advanced Field Artillery Tactical Data System) that dynamically adds/deletes/updates units across the wide area network distributed databases. This work was performed using GNAT Ada 2005 in a CMM Level 5 environment. Rational Rose was used extensively for all my design work on AFATDS. Rational ClearCase was used for FCS software configuration management.

**Ingersoll Rand Security – Software Engineer – Indianapolis, IN (10/2006-4/2007)** I worked in C# implementing windows services and applications for manufacturing Steelcraft door and frame products. This work utilized XmlTextReader for processing command and configuration files; System.Net.Sockets.Socket for robotic control and inter-PC communications; and ODBC .NET Managed Provider and OLE DB .NET Data Provider for database access.

**ITT Aerospace – Design Engineer – Fort Wayne, IN (5/2006-10/2006)** I worked on NOAA’s next generation weather satellite program, the GOES-R Advanced Baseline Imager as a CSCI level design engineer for the Spacecraft Interface Simulator. Rational Rose RealTime was used for design and code generation which was initially targeted for Visual Studio 2005 C++ prior to moving on to a PPC G4 MPC7447A processor running VxWorks. DOORS was utilized to maintain and track system requirements. Boost Allocators and Containers were used for complex interprocess memory management.

**ENSCO – Staff Engineer – Springfield, VA (4/2001-5/2006)** I have designed and implemented two major components of the SENTRY system deployed for facility/force protection at the Pentagon and other classified government locations. The first component is a sophisticated map of the National Capital Region displaying high resolution aerial imagery, Tele Atlas road and landmark data along with weather, sensor states, and Chem/Bio/Rad/Nuclear/Other alarms at several government facilities. This map is a complex webpage based on ESRI ArcGIS, AutoDesk MapGuide, and Microsoft .NET technologies. I created similar maps for Andrews AFB, Fort Monmouth, Fort Leonard Wood, Fort Belvoir, the North Dakota/Canadian border region, and the Nevada Test Site. The second major SENTRY component I’ve been responsible for is a dynamic evacuation system that controlled 5 miles of directional rope lighting inside the Pentagon as part of the Pentagon Shield II Force Protection Exercises. The building map and lighting control software was written in a combination of C++ and C# and runs under Windows XP. I was also solely responsible for the electrical, network, and software/firmware design and most of the implementation for this project. I also supervised the installation crews.

I worked on the Smart Building (2002 Salt Lake City Olympics Joint Operational Command Center) and Immune Building programs. These security systems provide state of the art protection of military facilities against CBRN threats. My specific areas of responsibility involve design and implementation of software to control air filtration, sensor alarm processing, and HVAC - all through a LonWorks network.

I also worked on a Rabbit 2000 microprocessor based covert intelligence sensor. I was completely responsible for the design/code/test of this real time C software. Time base and location for this sensor were obtained from a Trimble GPS. This software obtained real time samples from a special purpose receiver and sent them over a wireless network to a PC for intelligence analysis and pattern matching. Further, this Rabbit 2000 microprocessor was a SPI master to a TI TMS320C40 DSP. I worked with two other engineers using Code Composer to implement C code for the DSP. My specific areas of responsibility were SPI communications, overall timing/scheduling code, as well as FFTs and Cross Correlations on large sample data blocks obtained from a high speed custom analog to digital converter.

**ElectroMedicine International – System Engineer – Las Vegas, NV (6/1997-11/2001)** I moonlighted part time working on several Visual C++ ActiveX Controls with DirectX; Java Applets/Servlets; and Dynamic HTML web pages that control very adaptable medical hardware performing the following bioelectric functions: Transdermal Electric Nerve Stimulation (TENS), Electrical Muscle Stimulation (EMS), Percent Body Fat Measurement, Electronic Acupuncture, and Microcurrent Therapy. I also served as the corporate webmaster for a Windows 2000 Server and have written several ASP, C++, and Perl CGI applications.

**Booz-Allen & Hamilton – Software Engineer – McLean, VA (3/2000-4/2001)** I was the technical lead of a four person software team. The application was a military inventory control system for the government of Egypt. This work involved Sun Java running with ODBC/ORACLE on an NT 4.0 platform which communicated through a wireless LAN to an Intermec Janus 2020 handheld barcode scanning computer programmed in C++. My responsibilities involved requirements analysis/specification, design documentation, and C++/Java coding.

**Ericsson – Software Engineer – Lynchburg, VA (4/1998-2/2000)** I worked on various areas of new development for a DOCSIS 1.1 compliant cable modem product line based on Broadcom chipsets. This work involved VxWorks with C++ and Rational Rose on the IDT R5000 (MIPS) processor. I was responsible for device drivers and critical algorithms with cable modem line cards in the head end equipment. I also worked with competing and complementary equipment, primarily consisting of Cisco and Torrent routers.

**Motorola – Senior Engineer – Schaumburg, IL (1/1997-3/1998)** I consulted to Motorola's SmartCard Systems Business Division as a key hardware and software designer/implementer for M68HC05 based smartcards. These activities involved extensive work with various cryptographic technologies - DES, RSA, and ECC. I worked with numerous stored value purse schemes, including but not limited to EMV 3.0, VISA cash, MONDEX, and ecash using both contacted (ISO 7816) and contactless (ISO draft 14443) technologies. I also worked with PowerPC 604 based card readers running under Nucleus in the area of processor specific memory management extensions.

I was employed on the Iridium project, which is a highly publicized global wireless voice/data satellite system. My area of responsibility involved analysis, design, and coding of 683XX mobile unit software. This work involves modification and enhancement of the software in Motorola's then current cellular phone line, adapting it to the differences for Iridium.

**Lucent Technologies/Bell Labs – Software Engineer – Naperville, IL (3/1996-12/1996)** I was responsible for design, code, and test of 683XX C and assembly under pSOS on the DACS II and ISX T1 switch projects.

**E.F. Johnson/Motorola – Software Engineer – Waseca, MN/Arlington Heights, IL (6/1995-3/1996)** I consulted to the CableComm project, which involved 68360 C and assembly under VRTX. I also worked on a new generation APCO 25 compliant digital radio for the public safety marketplace using the Intermetrics toolkit. I wrote a FORTH interpreter in C++ which is used by the digital repeater console under Windows 95/NT. All of these projects utilize ClearCase along with the classic waterfall structured design methodology.

**Microsoft/Intel – Software Engineer – Redmond, WA/Portland, OR (7/1994-6/1995) I worked on two Windows VxD projects using both C++ and assembly. The first project involved extensive digital signal processing and multitasking (via SPOX). The second project involved driver support for a new generation of low cost host based laser printers.**

**Cummins Electronics – Senior Software Engineer – Columbus, IN (4/1993-7/1994)** I used the Sun SPARC for object oriented analysis/design (using Rational Rose) and implementation (using Microtec C++) of code targeted to a 68331 based turbo diesel engine monitor and control system. My primary responsibilities were in the areas of application tasking architecture, data security, development hardware/software support, CAN communications, device drivers, pSOS/C++ board support, and sensor input.

**Informix – Senior Software Engineer – Lenexa, KS (11/1992-4/1993)** I worked with Borland and Microsoft C++ under Windows 3.1, WIN32s, and Windows NT. I also worked on a conversion of the WingZ product to a spreadsheet object for eventual inclusion in the Asymetrix Toolbook product; and created a MDI test program using the Microsoft Test API.

**Texas Instruments – Senior Software Engineer – Lewisville, TX (4/1992-11/1992)** I used Borland C++ under Windows 3.1 and Intel C on an embedded 286 to develop test and diagnostic software for the gyros on the P85 missile system.

**IBM/Micronyx – Software Quality Assurance and Test Manager – Richardson, TX (5/1991-4/1992)** I was the technical manager responsible for testing Secured DOS. My team was also responsible for Software Quality Assurance and Software Configuration Management. I authored a comprehensive test plan; created scores of automated test suites using AutoTester for DOS and Windows; wrote a multiuser problem reporting system in Paradox; and wrote several applications and device drivers used in testing an OS/2 security product under development.

**Boeing/UTL – Software Engineer – Dallas, TX (11/1990-9/1991)** I worked on a multiprocessor passive intelligence gathering system onboard the AWACS. This work involved parallel processing with multiple 80286/87 processors in a Multibus II configuration which I programmed in C. I also implemented/debugged specialized signal processing algorithms in assembly code on digital receiver cards which employed multiple Analog Devices 21XX DSPs.

**Reliance/Commtech – Software Engineer – Farmers Branch, TX (6/1990-1/1991)** I wrote Motorola 68HC11 assembly code to perform complex control sequences for a switch matrix in proprietary T1 test equipment. In addition, I wrote Motorola 56000 DSP assembly code that performed signal analysis tests.

**Texas Instruments – Software Engineer – Dallas, TX (2/1990-11/1990)** I performed software enhancement to in-house integrated circuit design tools by writing software in C, Pascal, Postscript, and FORTH on an Apollo Domain workstation running System V.3 UNIX.

**Electrospace – Software Engineer – Richardson, TX (11/1989-2/1990)** I worked on software customizations to a secure voice/data switch used in the White House. This work was in C under VAX/VMS.

**Southwestern States Bankcard Association – Software Engineer - Addison, TX (4/1989-11/1989)** I utilized ORACLE Forms, C, lex, and yacc on an AT&T 3B2 based credit card application processing program. I wrote several complex ORACLE Forms triggers to perform complex data validation.

**Boeing/UTL – Software Engineer – Dallas, TX (11/1988-4/1989)** I worked on a multiprocessor passive intelligence gathering system onboard the AWACS. This work involved parallel processing with multiple 80286/87 processors in a Multibus II configuration which I programmed in C.

**Recognition Equipment – Lead Software Engineer – Irving, TX (3/1988-10/1988)** I wrote pSOS/pRISM/pROBE/pUCP board support packages, diagnostics, and application code for a multiCPU 68020/68851/68881 VME based currency processing machine.

**Merit Technology – Software Engineer – Plano, TX (4/1987-3/1988)** I worked on a multiple 68020 CPU VME based digital radar simulator using C, RMS68K, and VERSAdos. I wrote a multi-processor graphics library supporting fine grain parallelism for up to six simultaneous processors.

**Magnavox – CPCI Leader – Fort Wayne, IN (11/1985-4/1987)** I led a team of 14 engineers as the CPCI Leader for the Fire Support Planning CPCI, which was the largest CPCI for the AFATDS (Advanced Field Artillery Tactical Data System). The target hardware was a multiprocessor 68020 based tactical data terminal which was cross-compiled from a VAX host.

**Team Transport – Independent Consultant – Fort Wayne, IN (6/1983-12/1986)** I moonlighted part time where I designed and implemented a flight scheduling program in IBM PC Pascal for this investment group’s presentations to professional baseball and hockey teams.

**General Dynamics – Logistic Support Analyst – Fort Worth, TX (6/1985-11/1985)**  I conducted R&D on software maintainability; and tailored several DOD-STD-2167 DIDs to incorporate software maintenance considerations.

**PERMANENT EMPLOYMENT HISTORY**

**Gearhart Industries – Team Leader – Fort Worth, TX (6/1984-5/1985)** I was the technical team lead for a small 4 person team of software engineers implementing a 68010 based oil well logging VME subsystem using C with VRTX/TRACER.

**Magnavox – Programmer Analyst – Fort Wayne, IN (5/1981-6/1984)** I worked on a variety of military and FAA embedded applications based on the 68000 and 80X86 using C, Pascal, and assembly code. One of these applications was a highly sophisticated six processor 8086/87 electronic warfare application onboard the F15 aircraft.