J. Whitaker McRae

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Summary

I am a lifelong technology enthusiast who has worked in many areas of embedded and systems software development and testing. Results driven and self taught in many aspects, I excel at programming real-time software from the firmware up to the application level, with a special love for C++.

Education / Qualifications

Bachelor of Science in Aerospace Engineering, 2009
Bachelor of Science in Mechanical Engineering, 2009
University of Florida, Gainesville, Florida
Minor: Business Administration
Honors: UF Honors Program
National Society of Collegiate Scholars, 2003
Golden Key International Honor Society, 2004

International Baccalaureate Diploma, 2003
Stanton College Preparatory, Jacksonville, Florida
Honors: National Honor Society

Technical Expertise

Development

- Realtime development in C/C++ (Eclipse, gcc), and using UML modeling (Rational Rhapsody)
- ARM device development in C/C++/Python/sh with systemd using Yocto, Embedded Linux, BitBake
- MCU device development in C using Microchip, STMicro, Atmel development environments
- Communication protocol development including CAN (J1939), LIN, RS-485, RS-232, ARINC 429, SPI, I^2C
- Distributed system framework development using Python 3 with REST API + MQTT
- Telemetry system development using MQTT, ZeroMQ, Amazon Web Services (AWS S3)
- GUI and tool development experience in GTK+3 (Python, C++), PyQt5, Java, C#
- Database programming using InfluxDB, DynamoDB, MySQL, SQLite
- Basic web development using HTML, Javascript (including ReactJS), and CSS

Testing/Validation

- Requirements driven continuous regression testing using automated script suites in Python and VB
- Regulation driven testing and formal product/device certification in both healthcare and aviation industries
- Feature driven continuous regression testing using Jenkins + PyTest + RPi/Arduino + custom robotics
- Creation of automated script and manual procedure tests for formal FDA and FAA certifications

Experience

DIRECTOR OF ENGINEERING, EMBEDDED SYSTEMS, 2020-2021
HiViz LED Lighting, Hendersonville, North Carolina
Reference: Lee Schafer, Coworker / Teammate. (828) 772-5383

- Development to successful release of first full vehicle distributed modular lighting system for fire industry
  - Development of PIC16 and PIC18 control nodes, RS-485 proprietary protocol + LIN bus distribution
  - Development of STM32 system controller, J1939 control panel + up to 304 independent light nodes
  - Creation of all accompanying configuration tools, EEPROM data schemes, associated documentation
- Inception to successful release of first full spectrum NeoPixel based ladder light system for fire industry
  - Worked with Korean EE + manufacturing team for control board + light bar creation to product realization
  - Created J1939 control + status schema, created NeoPixel script library to drive up to 882 NeoPixels

SENIOR SOFTWARE EMBEDDED SYSTEMS ENGINEER, 2019-2020
Proterra, Greenville, South Carolina
Reference: Kevin Siniard, Direct Manager. (256) 508-4741

- Re-architected telemetry system firmware to unify builds + OTA updates across all EV platforms
  - Converted manual process calls to systemd processes with startup relationships + service watchdogs
  - Replaced hardcoded platform data with JSON config files + config-sync service to retrieve from AWS S3
- Improved 5 minute telemetry data latency to a real-time data stream with under 1 second data latency
  - Added new real-time data stream using MQTT for critical signals, allowing real-time remote debug
  - Reduced costs significantly by caching last reported values and only reporting deltas over 4G LTE
- Updated all telemetry board supplier and production line tooling to support unified firmware + OEMs
  - End-of-line software used in board manufacturing modified for unified firmware + international modem
  - Created in-house + OEM tooling for vehicle heartbeat, malfunction analysis, and real-time remote debug

SYSTEM ARCHITECT + LEAD ENGINEER, GOOEE TEST LAB, 2016-2019
Gooee, St Petersburg, Florida
Reference: Krzysztof Mlodozeniec, UK Counterpart / Teammate. +44 7966 448667

- Architected and constructed cloud based automated wireless bluetooth mesh test facility
  - Jenkins + PyTest based automation of control and data gathering scripts, regression tests, latency tests, etc
  - Design and integration into Balena + Docker deployed RPi nodes (BLE sniffing, FW flashing, RTT I/O)
  - Integration into line following robots with upward facing sensor array, servo controlled button pressers
- Designed data analytics reporting system using local + AWS InfluxDB instances for cached raw + processed data
  - Data reporting from distributed devices of BLE packet sniffing and decomposition, Vout + DALI bus devices
  - Data read + visual analysis of statistics via Grafana, available in real-time to engineers across 3 continents
- Assistance with design and deployment of satellite and partner company test operations
  - Helped to architect and deploy IoT test lab for Gooee partner Aurora Lighting (Swindon, England)
  - Deployment of modular components to smaller Gooee test facility for build sanity (London, England)

SENIOR SOFTWARE ENGINEER + AVIONICS GROUP LEAD, 2015-2016
TRU Simulation + Training, Lutz, Florida
Reference: Tom Beers, Software Lead. (813) 480-2813

- Lead Software Engineer on Bell 505 and Bell 412 Level 7 certified Flight Training Devices
  - Led full lifecycle from requirement creation with Bell through FAA (and EASA) FTD Level 7 certification
  - Integrated all I/O (ARINC-429, RS-232, ethernet, and CAN bus), motions and vibrations platforms
- Developed and Integrated Garmin G1000H suite for the initial Bell 505 Flight Training Device
  - Stimulated Garmin 1040 Display Units over ARINC-429 and Garmin's proprietary HSDB protocol
  - Updated Garmin Integrated Avionics (GIA) simulation in C++ to support multiple modular LRUs

SENIOR PROJECT ENGINEER, 2012-2015
Performance Software, Clearwater, Florida
Reference: Michael Johnson, Site Lead. (623) 337-8240

- Developed Patient UI app for Sonosite's iViz ultrasound tablet, running on top of AOSP (Android) framework
  - Wrote requirements from initial customer wire frame drawings, scoped work effort and man hours
  - Coded/Integrated Patient UI app into existing Scan UI framework (Android NDK)
- Subsystem lead for Collimator system firmware development in on GE Healthcare's Revolution CT device
  - Coded/Integrated VxWorks C driver updates for modified FPGA register map, new register functionality
  - Coded/Integrated VxWorks C++ application updates using Rational Rhapsody model driven development

AVIONICS & DATA LINK ENGINEER, 2009-2012
CAE USA Military Simulation and Training, Tampa, Florida
Reference: Bahram Abgoon, Avionics Group Lead. (813) 887-1605

- Developed C++ Hawklink Radio Terminal Set to be used on all Navy MH-60R Romeo mission simulators
  - Coded/Integrated Air-side RTS module to link with AOP (Mission Computer) via MIL-STD-1553
  - Coded/Integrated Ship-side RTS module to simulate Momship data link Command / Control
- Developed C++ Communications Management Unit (ATC data link) to be used on all capable mission simulators
  - Coded/Integrated Williamsburg Protocol + ARINC 619 + ARINC 702 link to Flight Mission Computer
  - Coded/Integrated ARINC 739 link to MCDU, ARINC 740 link to Cockpit Printer for ACARS control