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

- Real-time development in C/C++ (Eclipse, gcc), and using UML modeling (Rational Rhapsody)
- Distributed system framework development using Python 3 with REST + MQTT
- GUI and tool development experience in GTK+3 (Python, C++), PyQt5
- Telemetry system development using MQTT, Amazon Web Services (AWS S3)
- Shell scripting (bash), Makefile and Dockerfile creation, RegEx knowledge
- Basic web development using HTML, Javascript (including ReactJS), and CSS
- Database programming using InfluxDB (time series), SQLite, MySQL (relational)
- Familiar with IBM Rational DOORS, Atlassian JIRA, Git, Mercurial, Subversion, ClearCase

Testing

- 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

SENIOR SOFTWARE EMBEDDED SYSTEM ENGINEER, 2019-2020
Proterra, Greenville, South Carolina
Reference: Kevin Siniard, Direct Manager. (256) 508-4741
Reference: John Gerber, Principal Engineer. (864) 907-3511

- Re-architected telemetry system firmware to unify builds + OTA updates across all vehicle 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
  - Vehicle CAN baud + CAN database handled dynamically at runtime instead of statically in build
- 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

    - Created in-house tooling for vehicle heartbeat, malfunction analysis, and real-time remote debug
- 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
    - Production line tooling updated for unified firmware + OEM tooling created with controlled credentials

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

- Architected 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, etc)
    - Integration into line following robots with upward facing sensor array, servo controlled button pressers
- Designed data analytics reporting system using local + cloud 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
    - Led verification effort using Python script and test framework developed alongside firmware updates
- Developed Python test script sets for Axial Rotation system on GE Healthcare's Revolution CT device
    - Wrote core Python test libraries to integrated with C/C++ firmware running on a VxWorks control board
    - Scripted ~40 individual tests to be used in FDA 510(k) premarket verification

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
- Spearheaded development of AT-6 Flight Mission Computer and Link 16 synthetic environment (SADL)
    - Coded/Integrated C/C++ Flight Mission Computer DAFIF database control and flight planning capability