Kyle R. Hess

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Professional Experience

09/2017 - Present | Electrical Engineer | Gladiator Technologies & LKD Aerospace

Hardware & Firmware
- Work with small teams to develop and debug firmware for IMUs and Inertial Navigation Systems (INS)
  - Support new product development innovations as well as existing and deployed firmware
  - Prototype new hardware, sensors and embedded algorithms to advance our product performance
- Create and manage electrical schematics, circuit board layouts, board revisions and bills of materials with OrCAD
- Collaborated with a contracted team of experts to write, integrate and test a new 15-state Extended Kalman Filter into a legacy INS/GPS design which resulted in a 10x improvement in "free-inertial" navigation performance

Production Support & Software Development
- Support our in-house production test and calibration software (a custom C++ Windows applications)
  - Maintain legacy testing capabilities while implementing bug fixes and merging new test capabilities
  - Doubled our potential production capacity by adding support for up to eight units to existing test software
- Rewrote our data reduction system using Python to replace cryptic Excel macros and support new products
  - The data reduction scripts extract IMU performance metrics such as noise, bias, scale factor error and linearity
  - Python allowed for highly flexible data manipulation, coherent code and direct database integration
  - This transformed a lengthy production process into a one-click solution that removed human error
- Took on the roll of a "git champion" to steer our software team towards embracing git as the goto version control system. This resulted in much more efficient code reviews and shorter debugging sessions.
- Helped create and use tools for simulating IMU/INS algorithm changes in a post-processing environment

Product Development & Quality
- Oversee new product development at every stage from concept, qualification and release
  - Track all product development progress through phase-gates per AS9100D quality management system
  - Write work instructions ranging from low-level device assembly to end-item testing procedures
  - Manage prototype builds from system design to part procurement to final compliance testing
- Own and complete Engineering Change Requests (ECR) as needed to update controlled documents and drawings

Sales Support & Documentation
- Support customers with application engineering challenges faced during IMU integration (remotely and directly)
- Handle all software maintenance and customer questions for our existing Windows SDK package
- Write and maintain product Datasheets, User Guides, Technical Summaries and Reference Manuals

Skills & Abilities

Electronics: Experience with SPI, UART, RS-485 and USB interfaces, 32-bit microcontrollers (STM32 & NXP K22), schematic design & capture, PCB layout, CAD/EDA library management, component selection and soldering
Lab Equipment: Oscilloscopes, DMMs, function generators, power supplies and spectrum analyzers
Software: KiCAD, Visual Studio, Git, Eclipse, OrCAD, Autodesk Eagle, LTSpice, NI Multisim, Smartsheet, AutoCAD
Programming: C (Embedded), C++, Python, MATLAB, C#, Arduino and System Verilog

Personal Projects

eBike Motor Driver - Field-Oriented Control (01/2021 - 05/2021)
Efficient servo driver for a 3-phase brushless DC motor. Utilizes phase current sensing and incremental encoder feedback to control the 3-phase currents for optimal rotor torque with space vector modulation. Cascaded PID controllers allow for precise speed and position control with an encoder resolution of 0.26 mrad.
This motor drive was then successfully used as the controller for a 1.5 kW eBike hub motor.

Racing drone flight controller (12/2019)
A custom controller built around an ARM Cortex M-4. Utilizes an IMU, barometer, and GPS receiver. A PID loop running at 1 kHz controls four motors for stabilization and flight control.

Education

University of Washington, Seattle, WA | Bachelor of Science in Electrical Engineering (2017)
Concentrations: Power Electronics, Motor Drives, Large-Scale Power Systems (GPA: 3.67)

Olympic College, Bremerton, WA | Associate of Science (2015)