Luna Gräfje

Embedded Software Engineer

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Experience

Employment

12/2024 – current	**Embedded software designer**, *Kepler Communications Inc. through remote.com*, Berlin
	Development of flight software for not so small satellites.
Keywords	C++, Xilinx MPSoC, Yocto Linux, Git

10/2021 – 11/2024	**Embedded software engineer**, *German Orbital Systems GmbH*, Berlin
	Development of flight software for small satellites.
Keywords	C, C++, STM32, RaspberryPi, Yocto Linux, CMake, Git, CAN, GnuRadio

- Developed flight software for three satellite subsystems from scratch, two microcontroller based systems and a raspberry pi based OBC
- Introduced linux simulation capabilities to firmware builds
- Introduced test driven development and continuous integration to the companies workflow
- Developed various GnuRadio based applications to test spacecraft radio systems
- Lead the standardization of on-board and ground software infrastructure towards CCSDS and ECSS protocols

8/2020 – 9/2021	**Embedded software engineer**, *CarTelSol GmbH*, Berlin
	Development of software, firmware and FPGA components for an automotive telematics unit.
Keywords	C, C++, VHDL, FPGA, Xilinx Zynq, CMake, Yocto Linux, Git, CAN ISO-TP

- Developed FPGA SoC Components in VHDL
- Developed embedded Linux applications in C++
- Developed (bare metal) power management firmware and Linux device drivers in C

11/2018 – 1/2020	**Research Assistant / Embedded Software Engineer**, *RFT TU Berlin*
	Software development for the TechnoSat and TUBIN satellites (TUBiX20)
Keywords	C++, Stm32, Git, Gnu Make

- Implemented, integrated and tested new software features
- Ported a subsystem's code from RODOS to FreeRTOS
- Narrowed down and fixed critical software flaws
- Optimized the build process to reduce CI build times
- Implemented new drivers for peripheral devices (connected via I2C, SPI and UART)
- Wrote automated hardware abstracting unit tests for the developed drivers
- Found various optimization opportunities that reduced the code and stack memory requirements of a subsystem that was heavily limited by both

9/2016 – 9/2017	**Student Assistant / Embedded Software Engineer**, *SecT TU Berlin*
	Performance optimization of an Armv7-A paravirtualization hypervisor

Keywords	C, Virtualisation, Linux, ARM Cortex-A, Git

- ○ Created benchmarks to evaluate the performance of the system
- ○ Implemented support for new software features
- ○ Created a patch to the guest Linux kernel to share page table information with the hypervisor which improved performance

Student Projects

2017 – 2019	**Lead software engineer**, *TUPEX-6*
	Technology demonstration experiment for picosatellite fluid dynamic actuators by a international team of around 25 young engineers. Part of the REXUS/BEXUS Program from the European Space Agency and the German Aerospace center (DLR)
Keywords	C++, Flight software, ARM Cortex-M, Requirements engineering, Git

- ○ Defined software requirements from mission requirements
- ○ Adapted an existing satellite bus framework to mission requirements
- ○ Wrote software to route messages between a UART based ground station network and a vehicle internal CAN bus
- ○ Aided in troubleshooting of electrical issues
- ○ Operated the experiment during the test and launch campaigns
- ○ The experiment launched on the REXUS 26 sounding rocket on 2019-03-19

2017 – 2018	**Software engineer / System administrator**, *MarconISSta*
	SDR+Rasbperry Pi based RF spectrum analyzer on the International Space station (ISS).
Keywords	Raspberry PI, Linux, SDR, Bash

- ○ Developed a scheduling system that allowed running experiments with only infrequent user interaction to maximize experiment time with limited up-/downlink opportunities

Education

8/2016–3/2019	**Msc. Computer Science**, *TU Berlin*
	Including various space technology courses taken as elective
	Average grade: 1.0
	Note that German grading goes from 1.0 (best possible) to 4.0 (worst possible passing grade)
8/2012–7/2016	**Bsc. Computer Science**, *TU Berlin*
	Minor subject: Mathematics

Master Thesis

Title	Model-driven Verification Using Symbolic Execution
Supervisors	Prof. Dr. Jean-Pierre Seifert, Prof. Dr.-Ing. Klauß Brieß
Description	I developed a method to employ symbolic execution to prove the conformance between abstract software models of embedded software and its implementation. The developed method was demonstrated on software from the TechnoSat nanosatellite

Languages

German	Native language
English	Fluent

Technical skills

Languages	C++, Python, C, VHDL, Bash, Assembly (x86 and ARM)
Build Systems	Make, CMake, Meson
Continuous Integration	Jenkins, Gitlab CI
Testing	Catch2, Googletest, Test Driven Development
Platforms	Linux, RODOS, FreeRtos, Bare metal
Protocols	I2C, SPI, UART / Serial, CAN (including ISO-TP)
Other Technologies	Microcontrollers, Git, LaTeX, Qt, ARM Architecture, GnuRadio
Testing related	On-target debugging with GDB, Oscilloscopes, Spectrum Analyzers, Logic analyzers, Reading schematics

Miscelaneous

Hobbies	Cycling, Learning Japanese, Amateur radio