Ingenieurbüro Zitzmann

Software Engineering

+49 151 7004 7001

www.zitzmann.io

reinhard@zitzmann.io

Skills

Overview

Projects

FDK-AAC in Rust
3D Soundbar
MPEG-H in GStreamer
FPGA Audio to IP
Android Multimedia
OpenLR
Audio Watermarking
Webhosting
Software Defined Radio
0190-Payment System
Rust Flight Controller
HFT Simulation Platform

Company Profile

Since 1998, our engineering office has stood for sophisticated, high-performance software development at the intersection of hardware and the operating system. Through our long-standing experience in industry and research, we are your reliable partner for the new and further development of your products – from the initial idea to serial production. Our focus is on future-proof technologies such as Rust, robust Linux systems, and precise embedded software. With a deep system understanding of electronic circuits, we develop modular, object-oriented, and perfectly optimized software solutions that integrate seamlessly into your hardware. As a creative think tank, we work consistently customer-oriented and quality-conscious according to the highest standards of quality and precision. Through structured requirements analysis and agile processes, we ensure that you receive a solution that is tailored precisely to your needs in terms of time, quality, and cost.

Core Competencies

since 2022 **Rust & Systems Programming**
Secure, high-performance software development in Rust. Successful porting of business-critical C/C++ legacy codebases to Rust to meet the highest safety and security requirements (AOSP/Android) as well as the development of latency-critical simulation and analysis software.

since 1995 **Linux & Systems Engineering**
Long-standing, profound expertise in the Linux ecosystem at all levels – from sophisticated system administration and network configuration to embedded Linux distributions and the low-level development of tailored kernel drivers.

since 2011 **Embedded Software & Low-Level**
Development of high-precision firmware and low-level software for microcontrollers (such as RP2350 via Embassy-Rust) and FPGAs (Xilinx Zynq, Lattice). Real-time control, sensor fusion, and seamless integration with the operating system.

Education

1996 - 2003 **Computer Science Studies**
Specialization in Application Development GSO FH Nürnberg
Degree: Dipl.-Informatiker (FH)

1991 - 1994 **Vocational Training**
Communication Electronics Technician Siemens
Degree: Communication Electronics Technician

Projects

Rust Port of FDK-AAC Modules Fraunhofer IIS
Safety-critical port of the FDK-AAC audio codec (part of the Android Open Source Project AOSP) from C/C++ to Rust. Development and implementation of four core work packages: AAC Channel Downmix, SBR HF generator (USAC), HCR Error Resilience Tool, and Parametric Stereo for HE-AAC v2 under Android (Soong/Cargo).

3D Soundbar Fraunhofer IIS
Development of FPGA components to read HDMI audio signals and write I2S and S/PDIF. Optimization and adaptation of the existing 3D Soundbar software for the Linux FPGA platform.

Integration of MPEG-H in GStreamer Fraunhofer IIS
Integration of MPEG-H (multichannel codec) into GStreamer, development of an On-Screen Display (OSD).

Multichannel FPGA Audio to IP Interface pi labs
Programming a Lattice FPGA and ARM SoC to capture a multichannel audio stream and forward the data over IP for further processing.

Android CODEC integration Fraunhofer IIS
Integration of the Fraunhofer AAC codec into the Android platform.

Low-Complexity Watermarking Fraunhofer IIS
Development of an acoustic watermarking method. Porting the receiver from Matlab to C for use on an embedded device.

Port of OpenLR from Java to C++ Tomtom
Porting Open Location Referencing (OpenLR) for use on embedded devices.

Webhosting Issociate GmbH
IP traffic billing system, DNS system (www.dnsbox.de), fax database application, SMS database application, reconciliation of the central database with invoices and stock lists of suppliers, setup of the PBX, Linux kernel module, Apache module.

Software Defined Radio GSO FH Nuremberg
Development of a software 'Digital Radio Mondiale' (DRM) modulator and integration of an AAC encoder to use an amateur radio transmitter as a DRM station.

0190-Payment System comtron.de
Setting up the servers and routers of a dial-up service (Radius server, Cisco BGP routing, etc.).

Asynchronous Rust Flight Controller (RP2350) Self-development
Design and development of a high-performance, asynchronous flight controller in bare-metal Rust for the RP2350 dual-core microcontroller. Implementation of a real-time scheduling model via Embassy, quaternion-based sensor fusion (AHRS) for attitude control via nalgebra, precise DShot motor communication via RP2350 hardware PIO, and telemetry/control links over Wi-Fi (CYW43) and GPS (NMEA).

HFT Simulation & Playback Platform Self-development
Design and development of a high-performance simulation and playback platform for high-frequency algorithmic trading (HFT) over the FIX (Financial Information eXchange) protocol. The platform parses and simulates order books and market data feeds in real-time (Binance, Coinbase, Kraken) with nanosecond-level latency and delay analysis. Includes an interactive desktop GUI (Iced/Plotters) to visualize order book states and trader metrics.

Blockchain Analysis Tool Self-development
Development of a high-performance tool for analyzing Bitcoin wallets, address clusters, and transaction flows in Rust.

Qualifications

Programming Languages

- Rust
- Java
- C/C++
- Assembler
- Bash
- Matlab
- Perl
- Python
- Verilog
- VHDL

Languages

- German
- English

Hardware

- Digital Circuits
- FPGA Development
- Microcontrollers

Database Systems

- Apache Derby
- MySQL
- PostgreSQL
- SQLite

Operating Systems

- Android
- CentOS
- Embedded Linux
- Enterprise Linux
- Fedora
- Linux
- RedHat Linux

Products / Standards / Experience

- Agile Software Development
- Android Multimedia Framework
- DAB
- Digital Radio Mondiale
- Digital Signal Processing
- Eclipse IDE
- Enterprise JavaBeans
- Research & Development
- GNU Toolchain
- GStreamer
- Low-Level / Bare-Metal Programming
- Audio Codec Integration
- Linux Kernel Drivers
- Netbeans IDE
- Interface Design
- Xilinx Development Tools
- Zynq Platform