Elias Kanelis

Embedded Systems Engineer

blog.voidbuffer.com

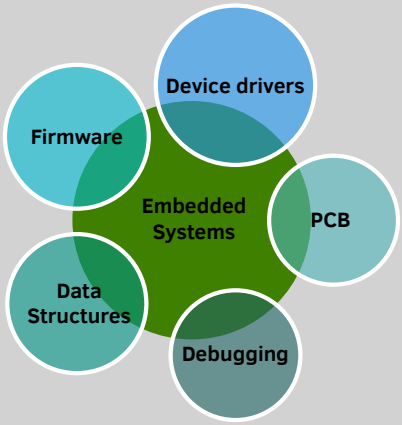
e.kanelis@voidbuffer.com

/in/eliaskanelis

eliaskanelis

Skills

Overview



Programming

- C
- C++ 98
- Assembly
- PLC Programming
- MySQL

Scripting

- Python
- Bash
- LaTeX

Microcontrollers

- Infineon Tricore
- ARM Cortex-M
- AVR
- PIC

Summary

My primary interest lies in low-level software development, complemented by a proficiency in electronics support. I am fascinated by how algorithms can seamlessly control machines.

Creativity comes naturally to me and I express much of it through my artwork. While achieving innovation presents challenges, I am determined to overcome them.

I lean towards C for embedded systems but I always strive to apply software design patterns that not only abstract complexity but also optimize the final outcome. This is done while ensuring the robustness, security and safety of the system.

Education and training

2006 - 2014 **BSc., Automation Control Engineering** (GPA: 7.23/10)
Technological Educational Institution of Chalkida, Greece
Thesis: Development of a virtual reality software library for use in SCADA systems

2022 **Seminar, ISO 26262** Lorit Consultancy

2013 **Seminar, NI CompactRIO and FPGA design** National Instruments

2010 **Seminar, Electrical Safety** ABB Limited

Professional Experience

Dec 2023–Now **Embedded Systems Engineer** CarUx

Developing embedded software for automotive displays, ensuring real-time performance and compliance with industry standards.

- Implemented the display's warping functionality.
- Implemented the network connectivity of the displays with the ECU (Automotive pixel link).
- Designed an I2C based amblient light sensor driver.
- Occasionally writing assembly code for a proprietary co-processor.

Hardware skills: Arm Cortex M23, TI's Opt3004, Various propriety chips

Software skills: C, ARM Compiler 6, assembly, Keil, CMSIS, RTX5-RTOS, make, I2C, ISO 26262, MISRA C

Apr 2022–Aug 2023 **Embedded Systems Engineer** Kenotom I.K.E.

Worked on an autonomous navigation system that involves path planning, tracking and motion control for autonomous vehicles.

- Ported a real-time multithreaded Linux-based decision-making algorithm to an Infineon microcontroller under PxRos RTOS.
- Abstracted the reading and writing to EEPROM as if it were a filesystem.
- Designed and implemented the Can bus and its messages with pacmod2.
- Implemented the CI/CD pipeline using GitHub Actions and conducted testing/flashing on the target with Trace32 in a custom Docker image.
- Analyzed UDP (Ethernet) and Can bus traffic using Wireshark.

Hardware skills: Infineon Aurix TriCore (TC387), TtControl ECU

Software skills: C, gcc, gdb, Docker, make, Linux, GitHub Actions, CI/CD, Can bus, pacmod2, UART, PxRos, Trace32, Wireshark, ISO 26262, MISRA C

RTOS - OS

- GNU/Linux (Posix)
- Windows
- FreeRTOS
- QPC (RTEF)
- PxRos

Tools

- GNU Make
- GNU C/C++ Compiler
- CMake
- Git
- Doxygen
- Altium Designer
- KiCad
- Eagle
- Matlab (Core)
- Labview

Protocols

- U(S)ART
- I2C
- SPI
- LoRa
- Mobdus
- Can Bus
- NMEA 0183

Language

- Greek
- English (First Certificate in English)
- German (Zertifikat Deutch)

Mini Projects

HSM - A hierarchical state machine in C without the use of dynamical allocation.
sString - A C string module that does not use dynamical allocation.
Real Engine - Developed a custom Game Engine in C++ with the following libraries: Irrlicht SDK, Havok Physics and Animation SDK, LUA scripting language and Irrklang SDK.

Oct 2019–Mar 2022 **Embedded Systems Engineer** Kenotom I.K.E.

Worked on a transmission control unit for use in a hybrid car.

- Implemented safety acquisition of ADC values.
- Configured the watchdog, its manager and applied program flow monitoring and other safety-related best practices.
- Designed and implemented Functional Safety Software based on automotive safety requirements.
- Debugged and analyzed integration problems.
- AutoSar configuration.

Hardware skills: Infineon Aurix TriCore (TC399), many proprietary ICs

Software skills: C, Tasking Compiler, Trace32, AUTOSAR, ISO 26262, ASPICE, MISRA C

Feb 2018–Jun 2019 **Embedded Systems Engineer** DeepSea Technologies I.K.E.

Developed a data acquisition network of sensors for sending vessel data to a Neural Network that predicts oil consumption, performs ship monitoring, and optimizes critical performance parameters. Worked as a 'one-man' firmware, software, hardware and field engineer under extreme pressure and tight deadlines.

- Developed the data acquisition user space application, low-level device drivers, and designed the PCBs.
- Automated hardware testing for defects using Python.
- Conducted installations on client vessels.
- Assisted in resolving a major wireless networking issue within the vessel's Engine.

Hardware skills: Raspberry Pi 3, sx1276, mcp3424, lsm9ds1

Software skills: Python 3, C, mbpoll, KiCad

2014–Jan 2017 **Founder** "Beehive" weighting and antitheft system

Design and manufacture of a product based on ARM Cortex-M microcontroller and sensors that help beekeepers keep track of their amount of honey, temperature, humidity and GPS status (anti-theft) in beehive farming.

- Designed the product from birth to finish. (pending battery management)
- Tried to be MISRA C compliant as an exercise to myself.
- Followed Test driven development workflow.
- Developed an AT command parser.

Hardware skills: stm32f072rb, atsam4l, atmega8, m41t81, mcp3421, mma8541q, sim900

Software skills: Test Driven Development, C, gcc, gdb, valgrind, GNU Make, FreeRTOS, QPC, MISRA C, cppUtest, CMSIS, FreeRTOS, Altium Designer

2015–2017 **Teacher, Part-time** Efodia Karieras I.K.E.

Prepared students for the Cambridge/Vellum Diploma in IT Skills.

- Organized an educational workshop on microcontrollers and the Arduino platform.

Hardware skills: Arduino

Software skills: Atmel Studio 7, Arduino IDE

2017 **Freelancer** Aftermarket Marine Parts, Piraeus

Redesigned an electronic fuel injection controller PCB based on an old circuit from 2005 called Megasquirt, which consisted of obsolete parts. This redesigned controller would manage a speedboat's electronic fuel injection engine according to the customer's requirements.

Hardware skills: Megasquirt 3 Module, 68hc908

Software skills: Eagle

2016 **Freelancer** Client

Designed a solution that notifies the user/client over a GSM network about the status of an AC motor used as a pump for watering cotton fields.

Hardware skills: atmega8, sim900

Software skills: Eagle, Atmel Studio 7

2014 **Freelancer** UV PCB Developer Box

Designed a 'UV PCB developer box' capable of producing dual-layer PCBs and equipped with a timer for automation.

Hardware skills: atmega8

Software skills: Eagle, Atmel Studio 7

Sep 2012–Jan 2013 **Electronics Engineer** Sielman S.A.

- Repaired electronics of the MIM-23 Hawk missile system.
- Designed and manufactured a test bench for DC generators in Hummer SUVs using LABVIEW.

Hardware skills: A few proprietary military spec ICs

Software skills: LabView

2011–2012 **Automation Engineer** Automation System Hellas S.A.

- Developed a fire detection and TMS control SCADA application for Egnatia Motorway tunnels in Ioannina, Greece.
- Developed a production process automation SCADA application for the Culture line at OLYMPUS DAIRY INDUSTRY S.A. in Larissa, Greece.
- Repaired malfunctioning PCBs that controled pneumatic valve.
- Performed PLC and SCADA programming, testing and debugging.

Hardware skills: Siemens Simatic PLC

Software skills: WinCC

Summer 2010 **Internship** Kalogiannis Koutsikos Distillery A.B.E.

- Performed electrical machinery maintenance.

Summer 2008 **Internship** Soukos Robots S.A.

- Participated in the development of an innovative, smart, fully automated wastebin controlled by a SIEMENS Logo PLC.

Hardware skills: Siemens Logo PLC

Theoretical Knowledge

Classical and Modern Control Theory of Dynamical Systems

- Classical and modern Control Theory of dynamical systems.
- Stability, Controllability and observability.
- Adaptive, Hierarchical, Intelligent, Optimal, Robust and Stochastic control.
- System identification.
- Neural network and fuzzy logic control.

Robotics

- (Inverse) Kinematics and dynamics theory of movement.

Mechatronics

- Electronics.
- Sensor data acquisition and actuator control.

Telematics

- SCADA systems.
- M2M interface.

Telecommunications

- Laplace, Z-transform.

Spare time activities

- Playing music (blues and Greek rebetiko) with Tzouras, Cretan lyre, or the guitar.
- Trying to live a zero-waste life. This is a challenge when living in the city.
- Drawing comics and bringing to life unique fantastical characters.
- Hiking, bushcrafting, camping and cooking over an open fire.
- Reading lots of books.
- Building stuff.

February 2, 2025