

Hüseyin Bertan Acar

Embedded System Engineer

🏠 24.08.2000

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SUMMARY

Mechatronics Engineer specializing in high-performance **Embedded Systems** and **Control Theory**. Extensive experience in **bare-metal firmware** development using **STM32** microcontrollers, custom **multi-layer PCB design** in **Altium**, and advanced control strategies like **LQR** and **Cascaded PID**. Proven leadership as **Team Lead of ICAROS**, a **TEKNOFEST 2026** UAV competition project, spearheading the end-to-end hardware and software architecture of an autonomous flight system. Passionate about developing mission-critical solutions for the defense industry, robotics, and high-speed real-time applications. Published researcher in **Nature Portfolio** journals with embedded R&D background.

EDUCATION

MSc in Electrical and Electronics Engineering

09.2025 - Ongoing

Izmir University of Katip Celebi

- **Team Lead | ICAROS Autonomous Drone Project (TEKNOFEST)**: Leading a multidisciplinary team in developing a high-performance flight controller from scratch.
- **Hardware Development**: Designing a custom 4-layer PCB in **Altium Designer** based on **STM32H743VIT6**.
- **Software Development**: Developing bare-metal C firmware, **IMU sensor fusion** (BMI270), barometric altitude estimation (BMP280), and cascaded PID flight stabilization. Debug via **ST-Link/SWD**.
- **Thesis Research**: Developing **adaptive robust control** for GPS-denied UAV navigation under payload variation, utilizing a **VIO + EKF** based state estimation architecture. Target application: autonomous landmine/IED detection under real-world adversarial conditions (GPS jamming, dynamic payload shift).
- **Real-Time Guarantees**: Implementing deterministic control loops with worst-case execution time (WCET) analysis on bare-metal STM32, targeting safety-critical defense system requirements.

Bachelor's degree in Mechatronics Engineering

2018 - 2024

Izmir University of Economics

- Focused on Embedded Systems, Control Theory, and System Modelling.

WORK EXPERIENCE

Embedded System Engineer

05.2024 - 12.2024

Simon Automation and Mechatronics

Industrial Automation | Embedded Systems

- Developed an OPC UA Client (C# GUI) for real-time industrial data visualization & logging.
- Built a coffee roasting machine with custom PLC software and C# monitoring GUI.

Tubitak Researcher

06.2023 - 05.2024

Izmir Biomedicine and Genome Center

Embedded Systems | Control Systems | PCB Design

- Designed PID controllers for incubator (0.2°C) and CO₂ regulation.
- Developed servo-driven syringe pump with position feedback (±6% error)

Hard Skills

- **Programming**: C, C#, Python, MATLAB/Simulink
- **Embedded Dev**: STM32 (Bare Metal), ESP32, FreeRTOS
- **Debug & Tools**: ST-Link/SWD, UART Debug, Git
- **Protocols**: I2C, UART, SPI, DMA, RS232/485, TCP/IP, ModBus
- **PCB Design**: Altium, Circuit-Maker, OrCad, Proteus
- **Platforms**: Raspberry Pi, STM32, Jetson Nano/Orin

Soft Skills

- Analytical Approach
- Project Management
- Teamwork
- Communication
- Problem Solving
- Kinematics
- System Modeling

Languages

- English (C1)
- German (A1)

Publications

- npj Biosensing, 2024
- Clinica Chimica Acta, 2024

PUBLICATIONS

Incubator-Integrated Electrochemical Analysis Platform for Cell-Based Studies

npj Biosensing, 2024 (Accepted)

Authors: Fatma Kurul, Meryem Beyza Avci, H. Bertan Acar, Seda Nur Topkaya, Arif E. Cetinç

Advanced electrochemical platform integrated with incubator capabilities to enhance cell-based studies.

[Link to Article](#)

Revolutionizing Cell-Based Analyses: An Electrochemical Analysis Platform with Integrated Incubator Capabilities

Clinica Chimica Acta (IFCC WorldLab Dubai 2024), Vol. 558, 119385, 2024

Innovative electrochemical analysis platform for cell-based analyses.

REFERENCES

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Muzaffer Nizam

Embedded Hardware Engineer

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