Vojtěch Špaček

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Links: github.com/sparesparrow | linkedin.com/in/sparesparrow | sparesparrow.github.io/sparrow-ai-tech

Senior C++ Engineer (Embedded / Real-Time / Safety-Critical / Linux) · AI/LLM Integration (MCP)

From the microcontroller to the LLM agent: I have shipped every layer in between.

Available immediately · Brno on-site, hybrid or remote · EU citizen (Czech Republic) · B2B (Czech IČO)

Skills

C++

safety-critical & real-time systems

C++17/20 · ARM/RTOS · state machines · HAL & IPC (COM/MIDL, Unix sockets) · FPGA · gRPC · FlatBuffers · Qt/QML *(working knowledge)* · Clang cross-compilation

Kernun firewall & TLS proxy (TNS) · aircraft maintenance computer framework (Honeywell) · electron-microscope camera server (Thermo Fisher)

Linux & Security

network security · NIS2 audits

Netlink · nftables · TCP/IP · TLS 1.3 inspection · Kerberos/LDAP/OCSP · Suricata · PostgreSQL · Rust *(working knowledge)*

ipmon · rust-network-mgr · siem · Kernun TLS inspection · Zoo Brno NIS2 / ZoKB

Python & Automation

test benches · CI/CD · packaging

Python *(senior)* · C# *(medior)* · pyvisa/USBTMC/SCPI · CAN · Modbus · requirement traceability · UL/CSA test evidence · Conan · Docker · TeamCity · GitLab CI · Jenkins · GitHub Actions

UL/CSA HIL bench (Resideo) · Conan recipes (sparetools) · IBM automation

AI/LLM & MCP

agents · MCP servers · tool calling

MCP servers · agentic workflows · prompt engineering · human-in-the-loop multi-agent workflows · tool calling · RAG · prompt caching · structured outputs · LLM provider APIs · TypeScript/JavaScript *(medior)*

mcp-prompts · mcp-prompts-rs · omarchy-agent-setup · human-action

Aviation · Scientific instruments · Network security · Safety-certified controls · Automotive IoT (MIA)

Experience

2026	**Resideo (CoolPeople) · Test Automation Engineer** sole owner of HIL verification for a UL/CSA gas furnace ignition controller; agentic AI harness (case study)
2025	**Zoo Brno · IT Administrator, IS Referent** NIS2 / ZoKB security audits, network, AD domain and VPN
2023 – 2024	**Thermo Fisher Scientific (Ixperta) · Software Developer (C++)** electron-microscope camera control server, FPGA software over gRPC
2022 – 2023	**Honeywell · Software Engineer II** DiagTest C++ engine for the aircraft maintenance computer framework
2020 – 2022	**Trusted Network Solutions · Application Developer** TLS-inspecting C++ proxy for the Kernun firewall, Netlink/nftables
2014 – 2016	**IBM · Automation Developer** ticketing and server automation (Bash, PowerShell, JavaScript)

Featured Projects

MCP-Prompts

Model Context Protocol server for prompt templates (TypeScript), hexagonal design with memory, file and AWS storage adapters

npm · Docker Hub · Rust port · Glama · MCP Market · AIBASE

MIA

vehicle telemetry and IoT platform with an OBD-II digital twin and a read-only vehicle safety profile (case study)

ESP32 → Raspberry Pi → C++17 core → Android → MCP tools

Experience Details

`Test Automation Engineer (Python, C#)` · **Resideo (Ademco), CoolPeople contractor** 2026

HIL verification of a safety-certified two-stage gas furnace ignition controller (UL/CSA, ANSI Z21.20, NFPA 54). Sole owner of the verification test suite and the automated bench that drives it.

- Built the bench device layer so each instrument is owned by one thread against a shared monotonic clock: `pyvisa/USBTMC/SCPI` programmable AC source, CAN bus monitoring, Modbus relay and probe I/O.
- Implemented a correlated `JSONL` timeline that puts every instrument command, signal edge and bus message on one axis, for root-cause analysis across devices.
- Built a generator that expands a `YAML` catalogue of the controller's state, event and transition model into an executable test suite, replacing hand-written duplicates.
- Designed an `Arrange/Act/Assert` validation pipeline of independent gates: preconditions, stimulus timing, state sequence, alarms, signal history, cross-layer consistency, timer accuracy, requirement traceability.
- Added measurement of stimulus windows, which the suite had never checked, and fixed a leaked USB handle that had been reported as a hardware fault, unblocking a whole test family.

- Found firmware and harness defects by analysing the C/C++ sources; each one came with a standalone reproduction script.
- Delivered an unattended nightly bench pipeline: per-key locking, crash and abort recovery, result journalling, Excel evidence workbooks, bilingual HTML dashboards, Mermaid failure graphs.
- Built an agentic AI harness (specialised agents, skills, prompt workflows, policy hooks, MCP servers) that became a daily part of the delivery workflow.
- Owned delivery end to end: traceability, pull requests, Conan packaging, CI, monthly client reporting.

`IT Administrator and Information Systems Referent (ISVS)` · **Zoo Brno** 2025

- Security audits and vulnerability assessments (Nmap, Shodan) under NIS2 / ZoKB; incident reports for management.
- Secured the network, internal AD domain, VPN and public websites; Linux admin with Python/Bash automation.

`Software Developer (C++)` · **Thermo Fisher Scientific, Ixperta contractor** 2023 – 2024

Electron-microscopy software for operating high-resolution detector hardware and acquiring images.

- Implemented server-side C++ with hardware abstraction layers and `COM/MIDL` inter-process communication on Windows.
- Developed embedded software for FPGA-based hardware communicating over `gRPC`, in C++ and Python on Linux.
- Contributed to the backend of a C#/WPF image-processing application, using `COM/MIDL` IPC with the HAL, with graceful degradation.
- Built vscode-automation, a VS Code extension that combines TICS code-quality analysis with the OpenAI API to detect violations and propose fixes (TypeScript).
- Led GitHub Copilot best-practice sessions for the team and presented bi-weekly sprint demos to stakeholders.

`Software Engineer II` · **Honeywell** 2022 – 2023

Onboard Maintenance System that monitors aircraft condition and diagnoses issues during flight.

- Architected and implemented `DiagTest`, a C++ state-machine diagnostic test engine covering the operational states used in aircraft system testing during flight and maintenance.
- Designed job-based asynchronous test orchestration (`DiagTestJob`, `DiagTestMsgQueProc`) with message-queue processing for real-time diagnostics.
- Built test-interference management that prevents conflicting diagnostic tests from running at the same time.
- Implemented test modes (data collection, passive monitoring, interactive, non-interactive) with timeouts, precondition handling and aviation command/response protocols; built `MonitorManager` for real-time parameter monitoring.
- Developed Python integration tests validating communication protocols, state transitions and stability under failure scenarios.

`Application Developer` · **Trusted Network Solutions (Kernun Adaptive Firewall)** 2020 – 2022

- Implemented a C++ HTTP/HTTPS forward proxy on Linux with TLS inspection, OCSP validation, Kerberos authentication, LDAP user/group lookup, CA and client-certificate management, and a modular manager/partition daemon design.
- Integrated Suricata (IDS) and `nftables` with PostgreSQL log aggregation and connection tracking.
- Developed and maintained `ipmon`, a C++20 `Netlink` network-monitoring daemon (github.com/sparesparrow/ipmon).
- Rewrote the Perl `reporter_log` tool in C++ with PostgreSQL integration, keeping Perl interoperability for legacy compatibility.
- Built a Perl test framework for HTTP/HTTPS, TLS inspection, Kerberos/LDAP and OCSP.

More Open Source

- **rust-network-mgr** (Rust): redesign of `ipmon` with atomic `nftables` updates via `Netlink`, epoll-based event processing and an MCP server. Published on crates.io.
- **ipmon** (C++20): `Netlink` daemon that tracks IPv4/IPv6 address changes and updates `nftables` rules; RAII, thread-safe atomics, Unix-socket IPC, Debian packaging with systemd hardening.
- **sparetools** (Python): shared tools and Conan recipes for C/C++ dependency management and cross-platform CI/CD.

All at github.com/sparesparrow · case studies: sparesparrow.github.io/sparrow-ai-tech/case-studies

Education, Training and Languages

- Masaryk University, Faculty of Informatics: Computer Science coursework *(no degree awarded)*.
- DeepLearning.AI / Coursera: Deep Learning Specialization (Andrew Ng), prompt engineering, building LLM agents.
- Self-directed: Hack The Box; Certified Ethical Hacker syllabus *(exam not taken)*.
- Languages: Czech *(native)*, Slovak *(native)*, English *(fluent)*, German *(A1)*, Polish *(elementary)*.