



LONG PHAN

Mechatronics Engineer | Custom Machines & Retrofits, PLC, SCADA, Machine Vision

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IEEE Senior Member · Remote, and on site anywhere in Vietnam

SUMMARY

I build special-purpose machines and add automation, data and machine vision to equipment that is already in service, without replacing it. On most projects I take the brief and do the mechanical design, automation design, PLC code and PC software myself, then see the system through commissioning. 20+ years of industrial work; current systems run at a water treatment plant, an NDT company and a paint factory in Vietnam.

CORE SKILLS

Mechanical	Automation and controls	Software and vision
SolidWorks: parts, assemblies, sheet metal, drawings for machining	Mitsubishi Q-series, GX Works2, QD77MS4 motion, MR-J4 servos	Python (FastAPI, asyncio), C#/.NET, CUDA
Static FEA, gearbox and drive sizing	Siemens S7, Modbus RTU/TCP, RS-232/RS-485	OpenCV, YOLO, PaddleOCR, Segment Anything
Injection-mould design, 3D scanning	OPC UA (KEPServerEX), Wonderware/AVEVA	Basler line-scan cameras, encoder triggering
CNC and fabrication sourcing in Vietnam	Denso SCARA, load cells, weighing indicators	PostgreSQL, Redis, Docker, Linux edge PCs

RETROFITS OF EXISTING EQUIPMENT

Unattended truck weighbridge, water treatment plant (Ho Chi Minh City) Contractor for R&P Electronics · 2026

Disciplines: System design, load cell and sensor layout, lightning protection, Modbus RTU I/O, licence-plate recognition (own YOLOX model + PaddleOCR), PostgreSQL, web UI, OPC UA server for the plant SCADA, offline Docker installer.
Hard part: A state machine that runs every weighing and every exception with nobody on duty.
Result: In daily use since June 2026. Plate reads on 70 hard images rose from 66% to 94% after re-tuning. More than 500 automated tests, including end-to-end runs against a hardware simulator.

Motor drive for buried water gate valves Contractor for R&P Electronics · 2024-2026

Disciplines: Invention, custom planetary gearbox with FEA, stem latch, 24 V LFP battery pack, 4G control concept.
Hard part: Everything fits a 146 mm protective pipe with an off-centre stem and drops through the existing valve box, so the street is not dug up.
Result: Five prototype generations and a butterfly-valve variant. Vietnamese utility solution application No. 2-2024-00774.

Clamp-on drive for Auma GK25.2 valve gearboxes, water plant Contractor for R&P Electronics · 2025-2026

Disciplines: Torque sizing (2,000 Nm gearbox, 180 Nm servo at the input), FEA on clamp, gears and shaft, battery and control boxes, cable harness, BOM.
Result: Gearboxes stay in place. Machining drawings released; 15 CNC parts ordered in December 2025.

Spoken SCADA alarms and network monitor, water treatment plant Independent · 2026

Disciplines: Audit of a Wonderware System Platform (12,004 I/O on Schneider, Allen-Bradley and Siemens PLCs), OPC UA security with own certificate chain, alarm engine, offline Vietnamese neural voice, kiosk and phone app, network map built from the plant AutoCAD drawing, IEC 62443 zoning plan.
Hard part: Add alarms and monitoring with read-only access, without touching the control logic.
Result: On the plant SCADA network since September 2026: 375 tags, alarm spoken 1-3 s after a limit is crossed. Live network map of 117 devices on two sites.

Line-scan label inspection, paint can line Independent, sole engineer · 2026

Disciplines: Servo turntable mechanics, Basler line-scan camera, encoder-triggered capture, OpenCV checks, Mitsubishi MC protocol and Siemens S7 links, PySide6 HMI, Linux kiosk.
Hard part: A 360° image of each can synced to the encoder. On site, the PLC ACK handshake was replaced with encoder pulse counting.
Result: Deployed; checks wrinkles, print defects and label type across 8 label types.

Smart water meter retrofit housings Contractor for R&P Electronics · 2024-2026

Disciplines: 3D scanning of meters, enclosures with snap fits, injection-mould design, test plan to IEC 60068 (vibration, thermal shock) and IEC 60529 (immersion).
Result: Housings that add an IoT reader to Kent, Itron, BMeter, Actaris and Brightwell meters without removing the meter; the Kent design went through mould tooling.

NEW MACHINES

Draymir: robotic X-ray film digitizer for NDT

R&D contractor for Alpha NDT · 2024-2025

Disciplines: Cell mechanics (tilted scan bed, 100-film trays, ball-screw axis), Mitsubishi Q-series PLC and servos, Basler line-scan optics, C#/.NET 8 application, CUDA/OpenCV pipeline with exposure fusion, LLM-assisted defect tagging.

Hard part: Moving thin film by robot and triggering the camera line by line at 24 µm per pixel.

Result: In use since October 2025. About 90 s per X-ray film, roughly 3x faster than a Microtek NDT-2000.

Servo cam design for an 8-station rotary labeler

2026

Disciplines: Motion design for 3 Mitsubishi MR-J4 servos synced to the table encoder through QD77MS4 cam tables; kinematic simulator; tool that generates cam tables as GX Works2 CSV.

NDT tooling

R&D contractor for Alpha NDT · 2024-2025

Delivered: Chain scanner for ultrasonic testing of pipes OD 21.3-60.3 mm (joint redesign, encoder module, two machining batches); lifting stand for phased-array UT equipment (ball-screw lift, 50 kg); drill-powered tube push-puller; RFID time-attendance terminal (ESP32).

PATENTS AND OPEN SOURCE

- Turntable touchless car wash system, patent VN 2-0003657, open hardware (CERN OHL-W v2).
github.com/longpxt/Turntable_carwash
- Water cleaning module for conveyor touchless car wash, patent VN 1-0051197 (with Le Nguyen Han).
- Remote motor coupling for buried gate valves, utility solution application No. 2-2024-00774 (pending).
- Universal communication method between vehicles and automated car washes, CC-BY 4.0. doi.org/10.5281/zenodo.17051154
- Weld ROI Finder: weld region detection on radiographs with Segment Anything, Apache 2.0. github.com/longpxt/WeldROIFinder

EXPERIENCE

Independent Mechatronics & Automation Engineer, Vietnam

2025 - present

SCADA alarm and network-monitoring software and a SCADA audit for a water treatment plant; line-scan label inspection station for a paint factory.

R&D Contractor, R&P Electronics

2022 - present

Motor drive for buried gate valves, clamp-on drive for Auma gearboxes, portable motor operator for Rodney Hunt sluice gates, smart water meter housings, truck weighbridge retrofit and its software.

R&D Contractor, Alpha NDT

2024 - 2025

Draymir film digitizing robot, chain scanner for small-pipe UT, PAUT lifting stand, tube push-puller, RFID terminal.

Co-founder & CTO, Spice Tune Company

2018 - present

Personal R&D company: turntable car wash, vehicle-to-car-wash protocol, Weld ROI Finder, all released as open hardware or open source.

Co-founder & CEO, Saigon Archive JSC

2012 - 2018

Designed and delivered archive digitization systems for national and provincial archives in Vietnam.

Vice Director, VT Company Limited

2003 - 2009

Ran a smart card factory; delivered ticketing systems (POS, access control, turnstiles) for Vinpearl Nha Trang and Ba Na Hills.

Software Engineer, Kasati JSC (VNPT group)

Built the first private internet firewall in Vietnam and telecom billing software for VNPT An Giang.

OTHER

Professional: IEEE Senior Member (2024). *Languages:* English, Vietnamese (native).