

# JOHAN WILHELM VAN ANTWERP

Founder · Technical Lead & Architect  
Ionity (Pty) Ltd | Antwerp Designs | AEDI  
IoT Engineer · Ecosystems Architect · AI Solutions · Toolmaker

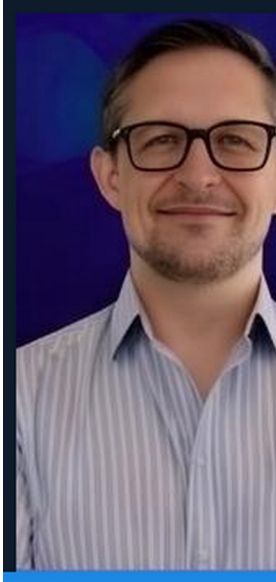


CENTURION, PRETORIA, GAUTENG  
SOUTH AFRICA · GLOBAL INTENT

[ionity.co.za](https://ionity.co.za)

## Johan Wilhelm van Antwerp

*Multi-skilled solutionist who always finds a way. Toolmaker by trade, architect by discipline, product designer by instinct — Johan closes the hardware–software gap most engineering teams only talk about, and documents every step so his clients own what he builds.*



**Johan Wilhelm van Antwerp** is the Founder, Technical Lead and Architect of **Ionity (Pty) Ltd** — grown from Antwerp Designs, est. 2018 — and the author of **AEDI**, the Antwerp Ecosystems Designs Ionity framework. He is a qualified Section 26(D) Toolmaker who began underground in mining, studied part-time to become an artisan, and went on to machine spinal implants and precision tooling to a few microns for medical, aerospace, defence and industrial clients. From the shop floor he moved into CNC, R&D and design, then lectured at Sol-Tech before founding his own practice.

Eight years on, he works as a **product designer, IoT engineer, ecosystems architect and AI solutions specialist**, leading a team of engineers and specialists across every industry he touches. His rule is simple: **create, don't merely iterate**. Housing, board, firmware and dashboard are engineered in parallel — true vertical integration — and delivered end to end under his ten-step design-to-production method. He has yet to meet a brief he could not route around: where a part does not exist he machines it, where a driver does not exist he writes it, and where a vendor says no he builds the alternative. Clients get a founder who has stood on the factory floor, drawn the part, written the firmware and deployed the cloud, then handed over the documentation.

### AT A GLANCE

|                    |                                                                                      |
|--------------------|--------------------------------------------------------------------------------------|
| <b>Role</b>        | Founder, Technical Lead & Architect — Ionity (Pty) Ltd   Antwerp Designs   AEDI      |
| <b>Also</b>        | Design Engineer — EDC Engineering Design Consultants (2025– )                        |
| <b>Trade</b>       | Section 26(D) Artisan Toolmaker · N5 Mechanical & Design · N6 Management · CAD   CAM |
| <b>Based</b>       | Centurion, Gauteng, South Africa — remote-first, global intent                       |
| <b>Contact</b>     | ai@ionity.today · +27 64 699 9877 · www.ionity.co.za                                 |
| <b>Identifiers</b> | ORCID 0009-0005-7181-0347 · GitHub @AntwerpDesignsIonity · Ionity-Global             |

### TRACK RECORD

|                  |                                                                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>2010–2015</b> | Mining floor to artisan — part-time study while working underground; qualified Section 26(D) Toolmaker (MERSETA) in 2013.               |
| <b>2016–2017</b> | JHPE Engineering — wire and sinker EDM and precision CNC milling for medical, aerospace, defence and banking tooling to ~5 µm.          |
| <b>2017–2019</b> | Sol-Tech — lecturer in mechanical engineering and toolmaking; built the curriculum and introduced CAD and 3D printing to the programme. |
| <b>2018</b>      | Antwerp Designs founded — product design A–Z, CAD/CAM, prototypes and the first IoT work. Overbooked inside the first year.             |
| <b>2020</b>      | EnerG Africa, Malawi — plant production engineer; factory workflows, production tooling and mass-market hardware lines.                 |
| <b>2023–2024</b> | Pax Divitiae — IoT engineer and systems designer; rapid-prototyping lab, hardware–software integration, field sensor deployments.       |
| <b>2025</b>      | Ionity (Pty) Ltd — Antwerp Designs becomes Ionity Global; the practice formalises around Native-AI. Appointed Design Engineer at EDC.   |
| <b>2026</b>      | Native-AI and True Edge AI — AI-M and PRS01 on Hailo-accelerated edge compute; custom MCP, agents and the AEDI assistant.               |

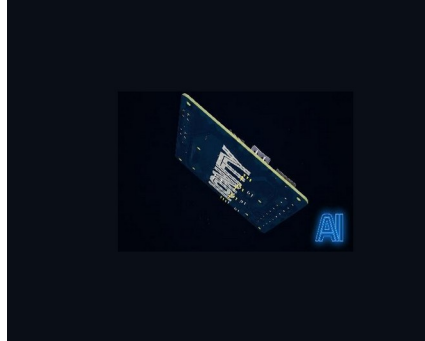
## What I Build

Six things that define the work — each one designed, built and shipped by Johan and the Ionity team, and each one available to clients today.



### AI-M — Artificial Intelligent Monitoring

Hailo-8 / Hailo-10H edge-accelerated compute paired with HD optical streams. On-device machine vision, anomaly detection and local alerting — no cloud dependency, 5 V rails, solar-capable.



### PRS01 — Preventative Root System

Ultra-low-power microcontrollers reading high-precision environmental sensors (ZMPT101B, SCT-013, LiFePO4 BMS) into a TimescaleDB backend that catches failures before they happen.



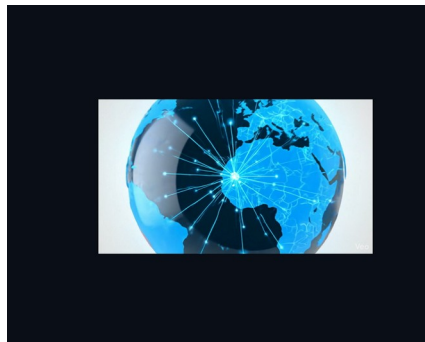
### AEDI — Edge Networks, RMS & Twins

The Antwerp Ecosystems Designs Ionity framework in the field: DaQ pipelines, predictive maintenance, hardened edge appliances with encrypted tunnels and headless remote management, live digital twins.



### Physical Hardware & Firmware

Custom PCBs in KiCad, ESP32-S3 and Pico-class boards, enclosures machined and printed in-house, firmware in C/C++ and Rust with secure OTA — built to survive a factory floor, not a bench.



### MCP, Cloud & Evidence-First Audit

Custom MCP servers and agents wired into the client stack, plus independent audits of systems, networks, cost and security posture — every finding ranked by level of effort against return.



### Native-AI, Custom MCP & Agents

Ionity's own assistant on ionity.co.za; custom MCP servers, RAG and copilots wired into client stacks — including AI ecosystems built around high-profile datasets, private by default.

## STATS SA 2022/2023 — MELO ON THE NATIONAL PODIUM



### "Before AI was — Melo was."

Robotics work by Antwerp Designs with Pax Divitiae and Stats SA put a humanoid unit on the national government podium during a live eNCA broadcast — years before conversational AI went mainstream. The programme earned the **"Anything is Possible — News with Robotics"** distinction in Robotics, 2024.

## Capabilities & Selected Work

*"Qualifications 2%, on-demand skill set 98%." Formally trained in toolmaking, mechanical engineering and management — everything else was learned by building it.*

### Firmware & Development

ESP32-S3, Pico and STM32 firmware in C/C++ and Rust · FreeRTOS · secure OTA · Modbus, OPC UA, LoRa, BLE · Python, Node.js, React, FastAPI and REST above it · PostgreSQL, TimescaleDB, MariaDB, SQLite

### Physical Hardware & Design

KiCad schematic capture and PCB layout · Onshape and SketchUp · CNC machining · wire and sinker EDM · high-speed FDM and SLA resin printing · mould design · enclosures, production layout, BOM and SHEQ

### Edge AI & Embedded

Hailo-8 and Hailo-10H NPUs · Raspberry Pi 4/5 with PCIe and SATA · 5 V custom rails, solar-capable · mmWave, Wi-Fi CSI, ZMPT101B, SCT-013, LiFePO4 BMS · TFLite Micro on-device inference

### MCP, Cloud & Audit

Custom MCP servers, AI agents, RAG and copilots wired into the existing stack · Google Cloud with Vertex AI, Firebase, AWS, Azure · CI/CD and infrastructure-as-code · evidence-first audits of systems, cost and security

### Security & Networks

Zero-trust architecture · WireGuard and OpenVPN · local failover and firewall containment · SHA-256/512, GPG/PGP, SSL · Nmap, tcpdump, Suricata · POPIA and GDPR by design · digital forensics

### Delivery & Sectors

Founder-led with a standing team of engineers and specialists · Letter of Engagement on every job · SLA-backed, documented handover · medical, aerospace and defence, mining, industrial and FMCG, energy, banking and government, robotics, agriculture

## SELECTED WORK

### Nobify

24 GHz mmWave and Wi-Fi CSI human-presence sensing on ESP32-S3, with Node server, OTA and a built-in AI assistant.

### Ionity-EDGE-VIEW

Raspberry Pi Pico 2W firmware driving a Waveshare 10.1" DVI display for industrial edge dashboards.

### Water ATM & Smart Energy Meter

Metered, coin and RFID-paid water dispensing; ESP32 CT-sensor solar generation tracking.

### Edge Micro-Audit · Matrix Vision

Browser-native device and network diagnostics with on-device camera vision — nothing transmitted.

### Ai F.IT — Forensic IT

SYS.ID 994-ALPHA: secure, transparent Gen-AI transition using Gemini/Gemma with Wi-Fi CSI and BLE sensing.

### ionity-k10-edge

UNIHAIKER K10 (ESP32-S3) edge-AI firmware backed by a FastAPI "Edge Brain" service.

### Smart AC & Groundwater Monitoring

HVAC electrical tracking with predictive maintenance; solar-powered LTE dam and reservoir level platform.

### Meta-Data-AEDI · ProGramerly

The public machine-readable brand and identity registry; a free cross-platform coding environment for all.

## ENGAGE



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*Every engagement is scoped under a formal Letter of Engagement — transparent pricing, measurable deliverables, provable return. Available for hardware development, edge AI integration, MCP and cloud audits, and systems consulting.*

**Building Tomorrow, Today.**

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