



LEARN | BUILD | SCALE

COMPANY PROFILE · 2026

Engineered in Zambia.

*We repair it. We design it. We build it.
We teach the people who keep it running.*

SERVICE

DESIGN

MANUFACTURE

INTEGRATE

SUPPLY

TRAIN

THE PROBLEM WE WERE BUILT FOR

When the OEM says “discontinued”, we design the replacement.

Across Zambia, the machines that keep mines running, water flowing and networks online were mostly built somewhere else. When one fails, the usual answer is a long wait, a foreign invoice, or a full replacement because the **OEM** (original-equipment manufacturer, the company that built the machine) no longer supports it.

HCS began on one bench in Lusaka, answering exactly that. We open the equipment, find the real fault, and repair it down to the component. When no spare exists anywhere, we design one.

Over time that bench became a company that **services, designs, manufactures, integrates, supplies and trains** — the whole loop, in Zambia, by Zambian engineers. A repair teaches us the design. The design becomes a product. The product needs installing, supplying and servicing, and people trained to run it.



OUR ENGINEERS, ON CLIENT SITES



MOTORS AND DRIVES, ON SITE

“A national electronics industry starts on one bench.”

2019

Building in Lusaka since 2019;
incorporated 2021

300+

Engineers and technicians
trained

57

Schools running our Zabble
STEM kits

7

Live apps on the O'Sense
platform

Electronics we designed in Lusaka are exported to the **United States (Texas)** and run in Zambian pump stations, telecom sites and plants. African-built, field-proven.

Local and fast

Engineers in Lusaka, not a ticket in another time zone. We reach the site, the fault and the answer sooner.

Component-level

We fix the fault, not the whole unit. That keeps the cost down and the equipment in service longer.

Designers, not just fixers

Because we design boards, we can recover the ones others scrap, and make the ones nobody sells.

ONE COMPANY, THE WHOLE LOOP

Six ways we keep you running.

Pick one, or let us run the loop for you. Each job feeds the next.

Service

01

We repair and maintain it.

Telecom power and radio, industrial drives (VFDs), soft starters, contactors, motors, UPS, inverters, lithium battery systems, thermal-imaging inspections.

TYPICAL CALL A drive trips; a rectifier dies.

Design

02

We design what is missing.

Electronics and PCB (printed circuit board) design, power cards, replacement boards for discontinued OEM equipment, firmware, BMS, product R&D.

TYPICAL CALL The OEM stopped making the part.

Manufacture

03

We build it here.

Bench manufacture of boards, power cards and devices we designed ourselves: prototype to repeat builds, tested and commissioned in Zambia.

TYPICAL CALL You need ten of the board, not one.

Integrate

04

We make it work together.

PLC (programmable logic controller) programming, SCADA and HMI screens, sensor calibration, IoT telemetry, retrofit software, on-premise AI.

TYPICAL CALL Your equipment will not talk to each other.

Supply

05

We source it and prove it.

We source equipment on your behalf and factory-accept it before it ships, plus the replacement boards and training kits we make ourselves.

TYPICAL CALL You are buying abroad and cannot inspect it.

Train

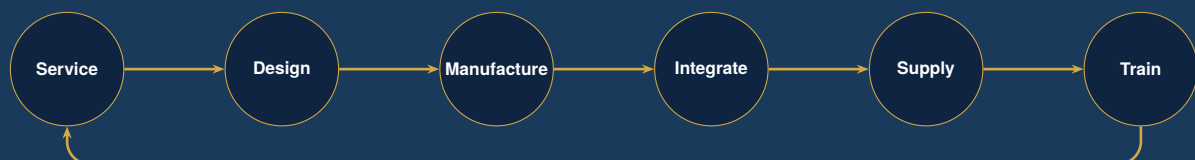
06

We teach your people.

Hands-on courses in PLC and automation, electronics design, power-electronics repair and thermal imaging. 300+ engineers and technicians trained.

TYPICAL CALL Your team cannot find the fault without us.

HOW THE LOOP WORKS



A repair teaches us the design. A design becomes a product. A product needs installing, supplying, servicing and people who can run it. One accountable team, end to end.

Plain-English key. OEM: original-equipment manufacturer. PCB: printed circuit board. VFD: variable-frequency drive (controls motor speed). PLC: programmable logic controller. SCADA: supervisory control and data acquisition. HMI: human-machine interface (operator screen). BMS: battery management system. BTS/RRU/BBU: base-station radio and baseband units.



WE REPAIR AND MAINTAIN IT

We open it, find the real fault, fix it at component level.

When a drive trips or a rectifier dies, most suppliers swap the whole unit. We put it on the bench, trace the failure to the part that actually broke, and repair it — then test it under load before it leaves.

Telecom power and radio

Rectifiers, power and control modules; BTS, RRU and BBU repair; tower-site energy systems.

Industrial drives and motors

VFDs, soft starters, contactors, motors and industrial inverters, from mine plant to pump station.

Backup and energy storage

UPS, inverters, lithium packs and BMS repair or replacement; solar charge controllers.

Thermal imaging

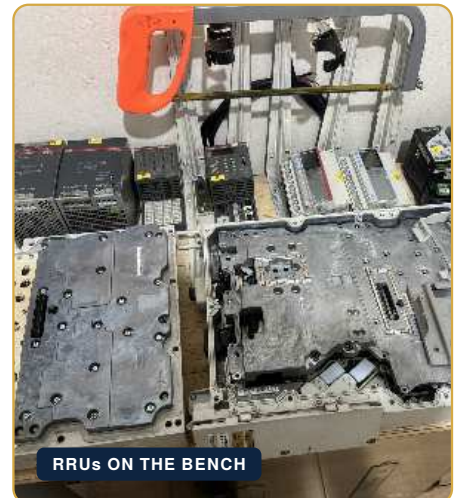
Inspection routes that find hot joints and failing parts before they cause a stop.



DRIVES UNDER TEST



THERMAL INSPECTION



RRUs ON THE BENCH

HOW A REPAIR RUNS

1

Diagnose

Fault traced on the bench

2

Quote

A clear price before work

3

Repair or fabricate

Component level, or a new board

4

Test

Under load, before release

5

Deliver

Back on site, documented

WE DESIGN WHAT IS MISSING, AND BUILD IT HERE

When nobody sells it, we design it.

Most repair shops stop when a part is discontinued. That is where we start. Every board below was designed by our own engineers, built on our bench in Lusaka, and put to work.



Oil-pump controller, designed here by our founder for a Texas client. Printed on the board: "Designed in Zambia".



WaterHandler, designed here and exported to the United States.

Lusaka Water: contactor coil economizer card

Discontinued worldwide, redesigned and built in Lusaka, running since February 2026. The full story is on the next two pages.

JCHX Mining, Botswana: RADAR controller

Designed in Lusaka and delivered across the border: specification, firmware, PCB manufacture and export.

UPS converter control card

Designed for Quality Uptime Services, on a UPS project managed by Verimod LLC.

Motor control cards

Industrial motor control cards for commercial buildings powered by clean energy.

Battery management systems

Cell monitoring, balancing and protection with CAN, RS485 and IoT telemetry, from small packs to modular storage.

Oil-pump controller

Wi-Fi-ready board with motor driver and limit-switch inputs, built for a Texas oil retailer.

WaterHandler

Smart water valve, meter box and app, designed here and exported to the United States.

Why it matters. A board we design is a board we can repeat. Lusaka Water's card is now a product, not a one-off repair. Our founder's electronics-design research is published and peer-reviewed, and he is an EasyEDA-certified instructor (May 2024).

CASE STUDY · LUSAKA WATER SUPPLY AND SANITATION

The card the world stopped making.

Part 1 of 2. The problem: a dead card, no supplier, and a very expensive alternative.



WHAT HAPPENED

Lusaka Water's pump stations, which serve over three million people, run on contactors driven by this card. The card burnt out. The manufacturer had **discontinued it worldwide**, and a global supplier search found **none**.

THE ONLY OTHER OPTION

USD 4 million

To scrap the machinery the card is built into, and buy new. That was the alternative on the table.

Turn the page to see what we did instead.

CASE STUDY · LUSAKA WATER SUPPLY AND SANITATION

The card we designed.

Part 2 of 2. Designed in Lusaka, manufactured in Lusaka, running since February 2026.



THE CARD WE DESIGNED

WHAT WE DID

We recovered the switching logic from first principles, redesigned the board with our own firmware, and manufactured it in Lusaka. “Designed in Zambia” is printed on the board itself.

We commissioned it on site, and it has been **running since February 2026 with zero failures reported**. Lusaka Water came back and placed a repeat order.



In service. The Pump No. 2 control cabinet at Lusaka Water, running on our card.

WHAT IT SAVED LUSAKA WATER

USD 4 million

The alternative: replace the machinery the card is built into.

K90,667

What one of our cards costs: designed and made in Lusaka.

K272,000

Lusaka Water's repeat order for our cards.

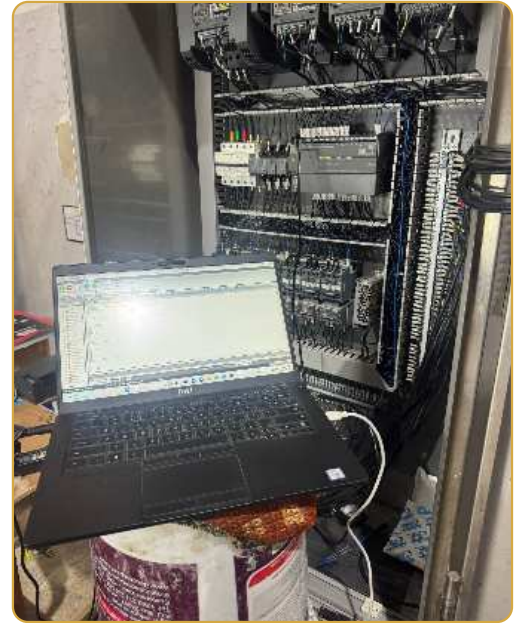
Fix the card, keep the machine. Millions of kwacha in avoided replacement, for a fraction of the price.

The USD figure is the cost of scrapping and replacing the machinery; prices are what Lusaka Water paid per card and in total for the repeat order.

WE MAKE IT WORK TOGETHER

From the control cabinet to the whole plant.

A plant runs on many boxes that were never meant to talk to each other. We program the controllers, calibrate the sensors, wire the telemetry and commission the result — and when you need new equipment, we source it and inspect it at the factory so you do not find the faults on your floor.



Process plants

PLC programming, sensor calibration and pneumatic-filler calibration on the Ministry of Technology and Science fruit-juice plant, and PLC programming and calibration on a client reverse-osmosis plant.

Monitoring and telemetry

RiverSense public-river monitoring: electronic design, probe calibration, software and installation. Smart meters that add leak detection to meters you already own.

Own your AI, and your data

On-premise AI systems for plants, schools, law firms and clinics. No cloud, no internet needed, and your information never leaves the building.

SUPPLY · FACTORY ACCEPTANCE

We source it. We test it. Then it ships.

Buying equipment from abroad is a trust problem. We act as your engineers at the factory: we check the specification and contract requirements, run the factory acceptance test, and report on **quality, compliance and performance** before payment is released.

Replacement boards and training kits we design ourselves are supplied direct from our Lusaka bench.

BRANDS WE SERVICE, MAINTAIN AND SOURCE

DELTA

ABB

EATON

EMERSON
ROSEMOUNT

FESTO

HONEYWELL

SCHNEIDER
ELECTRIC

SIEMENS

Brand names belong to their owners. HCS is an independent service provider.

WE TEACH THE PEOPLE WHO KEEP IT RUNNING

The skills gap is real. We close it with our hands on the equipment.



Zambia does not have enough engineers who can diagnose and repair modern industrial electronics, and you cannot simply hire them. So we train them: on real drives, real boards and real faults, the same ones our engineers work on every week. Corporate cohorts are available at your site or in our lab.

Industrial automation

A PLC, SCADA, DCS, VFD and HMI.

Electronics and power design

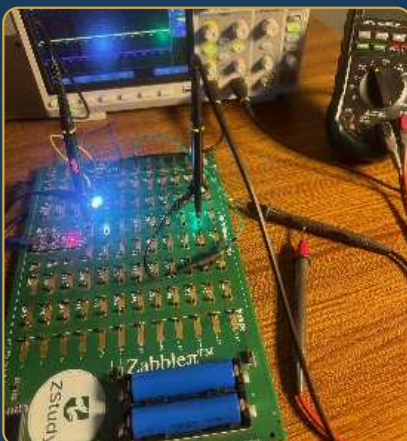
B PCB design, buck/boost and SMPS supplies, troubleshooting and repair.

Thermal imaging and vibration

C Predictive maintenance: find the failure before it stops the plant.

Solar and energy storage

D For telecom and critical infrastructure: UPS, lithium, PSUs and rectifiers.



300+

engineers and technicians trained

57

schools running Zabble kits

In schools. Through ZStudy, our STEM programme, we give teachers free training on bringing modern technology into the classroom, in collaboration with the National Science and Technology Council.

Accreditation. TEVETA accreditation of our industrial courses is in progress.

ONE FOUNDATION, FOUR WAYS OF SHOWING UP

Hardware, software, water and schools, from one bench.



Travis Labs

HARDWARE R&D AND INDUSTRIAL SERVICES

Where we repair, redesign and build. The electronics lab designs, programs and builds boards in Lusaka, and every repair is also research.

O'Sense

O'Sense

OPERATIONS SOFTWARE · [OSENSE.IO](https://osense.io)

An all-in-one platform to manage people, resources and plant operations with AI. Seven apps live today.



WaterHandler

SMART WATER MANAGEMENT

A smart valve, meter box and mobile app that stop leaks and cut non-revenue water. Designed here and exported to the United States.



ZStudy

STEM EDUCATION

Educational technology that is STEM-focused and learner-centred, including the Zabble electronics kit now in 57 schools.

IN DEVELOPMENT

Abby

A child-safety wearable on the O'Sense platform, built to give families a beacon they can rely on.

Lamia 1

A phone designed in Zambia, targeted for availability in 2028. A long road, and the reason the bench exists.

THE PEOPLE BEHIND THE WORK

Engineers who run what they build.

The leadership of Hero Control Systems Limited.



Eng. Cephas Kalembo

FOUNDER & CHIEF EXECUTIVE OFFICER

BEng (Hons) Mechatronics · MSc Computer Science · MEIZ

Founder of Hero Control Systems and the engineer behind its vision of an African industrial-technology company that designs, builds, repairs and trains. A registered engineer (MEIZ) with more than a decade in power electronics, he founded ZStudy, Zambia's first STEM-kit maker, now in 57 schools and winner of the 2022 Genius Zambia award. He then built HCS into a group with a contracted telecom service centre, a live software platform and 300+ trained engineers. Published researcher and EasyEDA-certified instructor.



James Chiponda

CHIEF OPERATIONS OFFICER

Runs day-to-day delivery across the service centre, field teams and training cohorts, so that projects ship on time and clients are kept informed.



Felix Mangala

CHIEF FINANCIAL OFFICER

Financial planning, budgeting and controls. Steers cash-flow discipline in a market where clients pay on 60–90 day terms.



Emmarance K. Kalembo

HEAD OF MARKETING & CORPORATE PARTNERSHIPS

Partnerships with schools, training clients and corporates; brand and campaign management across HCS and ZStudy.



Blackwell Chalwe

BUSINESS DEVELOPMENT DIRECTOR

Supply-chain and business-transformation specialist (EMBA, MSc Procurement & Supply Chain). Leads key accounts, tenders and strategic partnerships.

Governance and advisors are on the next page.

GOVERNANCE AND ADVICE

Governed by a board, guided by advisors.

An executive board, two non-executive directors and an independent director. The search for an independent chair is under way.

BOARD OF DIRECTORS

**Eng. Cephas Kalembo**

FOUNDER · EXECUTIVE DIRECTOR & CEO

**Felix Mangala**

EXECUTIVE DIRECTOR · CFO

**James Chiponda**

EXECUTIVE DIRECTOR · COO

**Edwin Chansa**

NON-EXECUTIVE DIRECTOR

**Josephat Kaoma**

NON-EXECUTIVE DIRECTOR

**Michael D. Carson**

INDEPENDENT NON-EXECUTIVE DIRECTOR

Michael D. Carson is an entrepreneur and technology specialist in automation and control systems, with experience in product development, business strategy and international collaboration.

ADVISORY BOARD

**Bryce L. Hesterman**

Principal Research Engineer, Utah State University

Co-author of the Discover Electronics paper on the Zabble power fabric.

**Manish Kothari**

Entrepreneur; helps founders and companies grow

**Benjamin C. Katubiya**

Zambian entrepreneur, author and mentor

WHAT WE HAVE DONE, AND FOR WHOM

Proof, not promises.

Broadcast and telecom power: work our engineers have delivered.

BROADCAST · MULTICHOICE ZAMBIA · UNDER REPAIR NOW

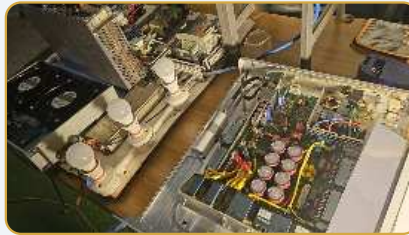
Broadcast RF power amplifiers, on our bench in Lusaka.

THE JOB

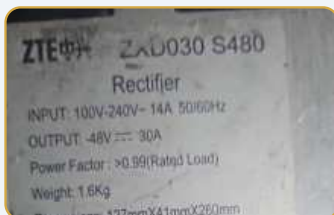
Four RF power amplifiers from MultiChoice's transmitter stations came to our bench for board-level repair, in place of shipping them abroad for a full module swap.

WHAT WE DID

Opened the module against the manufacturer's service manual, traced the fault at component level, and powered it up on the bench under a lamp load with a meter on the supply.



A rectifier module opened on the bench.



Nameplates of the units repaired.

TELECOM TOWERS · INFRATEL ZAMBIA · SEPTEMBER 2026

Tower-site power and solar equipment, repaired.

We repaired a Huawei and a ZTE rectifier, a Huawei solar DC/DC module and a Huawei site-monitoring controller from Infratel's tower sites, each at component level in our Lusaka lab.

UNIT	FAULT FOUND	TEST LEVEL
Huawei R4875G1 rectifier	Blown EMI filter and input protection; the PFC stage failed with it	Bench and load tested
ZTE ZX030 S480 rectifier	Same failure: EMI filter, input protection and PFC stage	Bench and load tested
Huawei S4850G1 solar module	Failed power MOSFET on the switching stage	Bench tested
Huawei SMU02C controller	Failed electrolytic capacitors on the supply rails	Bench tested

EMI: electromagnetic interference. PFC: power factor correction. MOSFET: the main switching transistor.

The pattern. Both rectifiers failed in the same place, the mains-side input stages. That is the signature of grid surges rather than old age, and it is a fault class we can repair in Lusaka that recurs across a tower portfolio.

WATER, PROCESS PLANTS AND UTILITIES

Plants and networks that cannot stop.

Telecom, mining, water and process plants. Lusaka Water has its own two pages (6 and 7).


MTN

MTN Zambia

TELECOM · RADIO AND TRANSMISSION

WHAT WE DID

Component-level repair of Aviat microwave radios, Cambium broadband radios and Huawei baseband-unit fan units.

OUTCOME

Two Aviat radios back in live service on MTN's network.


ZAMTEL

Zamtel

TELECOM · NETWORK POWER AND RADIO

WHAT WE DID

Component-level repair of rectifiers and remote radio units (RRU), including the Huawei RRU3900.

OUTCOME

Rectifiers and RRUs repaired for Zamtel's network.


JCHX

JCHX Mining, Botswana

MINING · CROSS-BORDER DELIVERY

WHAT WE DID

Designed and delivered a RADAR controller for the mine: specification, firmware, PCB manufacture and export.

OUTCOME

Delivered across the border to Botswana.



Ministry of Technology and Science

GOVERNMENT · FOOD PROCESSING

WHAT WE DID

PLC programming, sensor calibration and pneumatic-filler calibration on the Ministry's fruit-juice processing plant.

OUTCOME

Completed on site.



Reverse-osmosis water plant

INDUSTRY · WATER TREATMENT

WHAT WE DID

PLC programming and calibration of a client's reverse-osmosis plant, including work inside the control cabinet.

OUTCOME

Completed on site.



RiverSense river monitoring

ENVIRONMENT · UNITED STATES

WHAT WE DID

Electronic design, probe calibration, software development and installation for public river water monitoring.

OUTCOME

Installed in the field.



Flour milling plant

FOOD AND MILLING · MACHINERY SERVICE

WHAT WE DID

Servicing Böhler roller-mill machinery on site, working inside the machine with the guards open.

OUTCOME

Serviced on site by our engineers.

DESIGN, PRODUCTS AND COMMUNITY

Boards, packs, products and people.

Where the client needed something that did not exist yet, we designed it.



Quality Uptime Services

WHAT WE DID

Designed the converter control card for a UPS (uninterruptible power supply), on a project managed by Verimod LLC.

POWER ELECTRONICS · UPS

OUTCOME

Card fitted in the UPS cabinet.



Oil-retail start-up, Texas

WHAT WE DID

Designed and built an oil-pump controller board, with Wi-Fi control, for a client in Texas.

EXPORT · CONTROLLER

OUTCOME

Boards produced and delivered.



Battery management systems

WHAT WE DID

Cell monitoring and protection, balancing, state-of-charge firmware and CAN, RS485 and IoT telemetry.

ENERGY STORAGE · IN-HOUSE DESIGN

OUTCOME

Designs scale from small packs to modular storage.



MA2

WHAT WE DID

Developed industrial motor control cards for commercial buildings powered by clean energy sources.

BUILDINGS · CLEAN ENERGY

OUTCOME

Developed and deployed.



Nshima cooker

WHAT WE DID

Product design for a client's nshima cooker, from the cross-section design process through to a working prototype review.

PRODUCT DESIGN · PRIVATE CLIENT

OUTCOME

Prototype built and reviewed with the client.



Smart-meter conversion

WHAT WE DID

Converting an ordinary water meter into a smart meter with leak detection, on a rechargeable, solar-supported battery.

WATER UTILITIES · NON-REVENUE WATER

OUTCOME

A standard meter turned into a leak-detecting smart meter.



Kasempa schools, with NSTC

WHAT WE DID

Free teacher training in Kasempa, with the National Science and Technology Council under the Ministry of Technology and Science.

EDUCATION · ZSTUDY

OUTCOME

Complimentary training delivered through ZStudy.

TRUST IS EARNED ON SITE

Who already runs on our work.

Telecom and media

MTN Zambia
Zamtel
MultiChoice

Utilities and energy

ZESCO
Lusaka Water Supply and Sanitation
Ecovolt

Government and institutions

Ministry of Technology and Science
National Science and Technology Council
National Technology Business Centre

Industry and manufacturing

National Breweries Big Tree Beverages
Crown Millers National Milling
Trade Kings Bayer

Mining

JCHX Mining (Botswana)

Partners and projects

Verimod Quality Uptime Services
MA2 Oil Changers

SECTORS WE SERVE

Manufacturing

Transportation

Technology and telecom

Government

Energy

Water

Agriculture

Education

Corporate and private sector

NGOs

RECOGNITION AND STANDING

Most Innovative STEM Solution

ZStudy, Genius STEM Awards, Zambia.

EasyEDA Certified Instructor

Our founder is an officially affiliated EasyEDA instructor (May 2024).

Peer-reviewed research

Published, peer-reviewed research on electronics design.

Exporting from Zambia

Self-designed electronics sold into the United States (Texas), month after month.

Registered in Zambia. Hero Control Systems Limited is incorporated with PACRA (October 2021), registered with the Zambia Revenue Authority and with the Zambia Development Agency. The certificates are on the next page.

WHO WE ARE, ON PAPER

Registered in Zambia.

The certificates behind the name. Verify them with the issuing agencies.



PACRA

PATENTS AND COMPANIES REGISTRATION AGENCY

Certificate of Incorporation, company limited by shares

Hero Control Systems Limited**Registration No. 120210022261**

Incorporated 15 October 2021, under the Companies Act, 2017



ZDA

ZAMBIA DEVELOPMENT AGENCY

Certificate of Registration

Hero Control Systems Limited**Certificate No. ZDARC/3092/09/24**

Registered 8 October 2024, valid to 7 October 2029.

Service sector

ALSO REGISTERED

Registered with the **Zambia Revenue Authority** as a taxpayer. Our founder is a registered member of the **Engineering Institution of Zambia (MEIZ)**. Further compliance documents are available on request from admin@hcsys.co.



LEARN | BUILD | SCALE

Start with the thing that is **broken**.

Send us a photo and the model number on WhatsApp. We will tell you what we can do, and what it will take.

1

Message us
the fault

2

We assess and
quote clearly

3

We repair, build
or train

WHATSAPP AND HOTLINE

+260 974 546 632

SALES

sales@hcsys.co

WEB

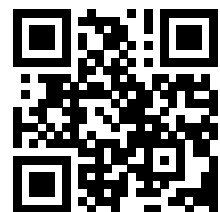
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[linkedin.com/company/h3ro-control-systems-ltd](https://www.linkedin.com/company/h3ro-control-systems-ltd)



SCAN FOR HCSYS.CO

LEARN | BUILD | SCALE

Hero Control Systems Ltd · Engineered in Zambia, built for Africa, ready for the world.