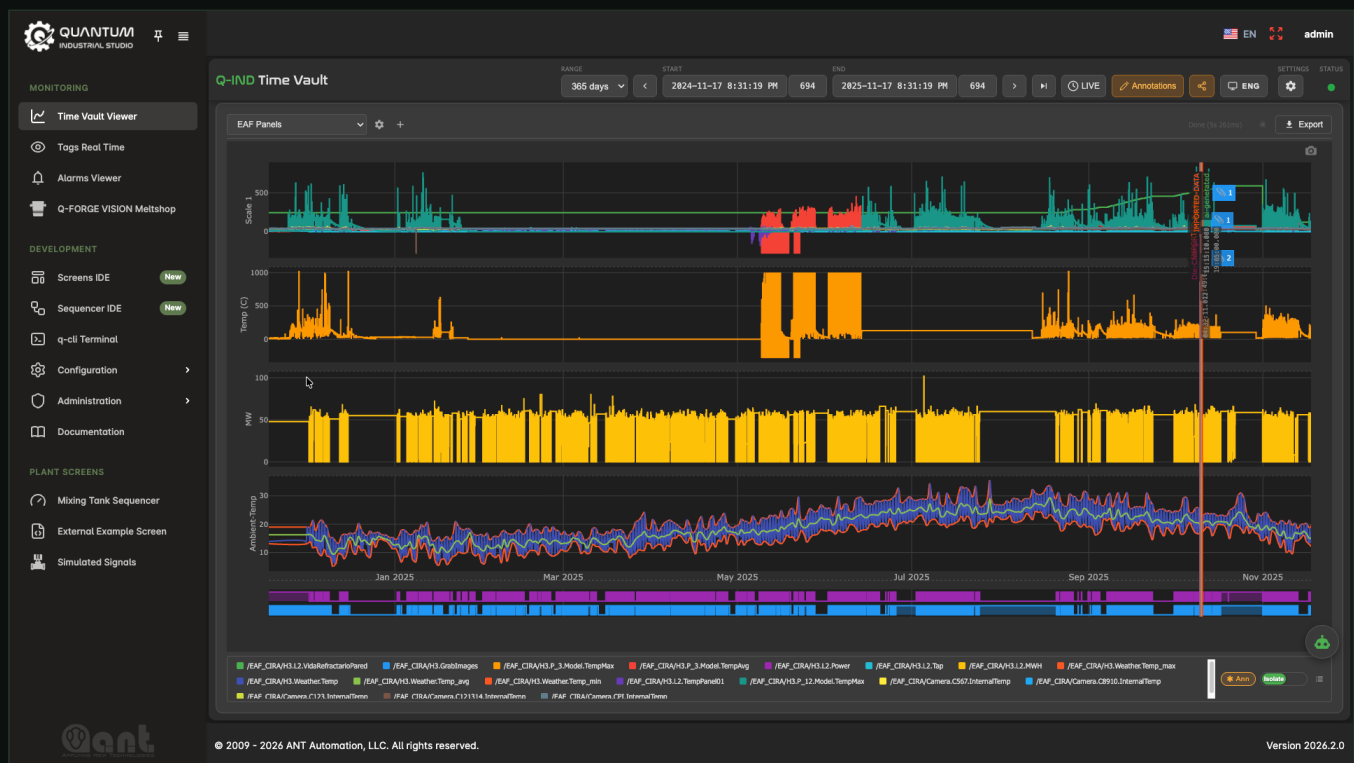


ANT AUTOMATION · SOFTWARE FOR OPTRIS PI & XI CAMERAS

FROM RADIOMETRIC FRAME TO PLANT DECISION

One suite that connects Optris infrared cameras, records every frame, runs AI pipelines on the live temperature matrix and turns the result into tags, alarms, trends and reports. Docker-native. Runs on a plant PC, a Jetson or a server.



Q-IND Time Vault · 365 days of EAF panel temperatures from 6 IR cameras, power, ambient and annotations, in one chart

CIRA OPTRIS ACQUISITION

Camera to shared memory,
video, recording

Q-FORGE VISION

AI pipelines on
temperatures

Q-IND TIME VAULT

Years of history at full
resolution

QUANTUM STUDIO

SCADA, drivers, alarms, AI
assistant

FOUR PRODUCTS, ONE DATA PATH

Each stage is a Docker service with its own web UI and REST API. Use the acquisition alone, or the whole chain up to plant-wide analytics. The radiometric float32 matrix travels through every stage untouched: the camera is treated as a measuring instrument, not as a video source.

01 · acquire CIRA Optris Acquisition CAMERA TO SHARED MEMORY Connects any number of Optris cameras through the OTC SDK and publishes the temperature matrix, live MJPEG video and health tags. v2026.2.1 · Linux / Windows	02 · analyze Q-FORGE VISION AI PIPELINES ON TEMPERATURES Visual pipeline builder: YOLO, SAM, OCR, polygon math and thermal statistics on the real temperatures. Datasets, labeling and training included. v2026.3.2 · CPU / CUDA / Jetson	03 · record Q-IND TIME VAULT YEARS OF HISTORY, NO ROLLUPS Millisecond-timestamped time-series store. Every sample kept at full resolution, charted in seconds, annotated with images. v2026.3.0	04 · operate QUANTUM INDUSTRIAL STUDIO SCADA, ALARMS, AI ASSISTANT Screens, alarms, expressions, sequencers, PLC drivers and an AI assistant on the same data. Thermal results become ordinary plant tags. v2026.6.1
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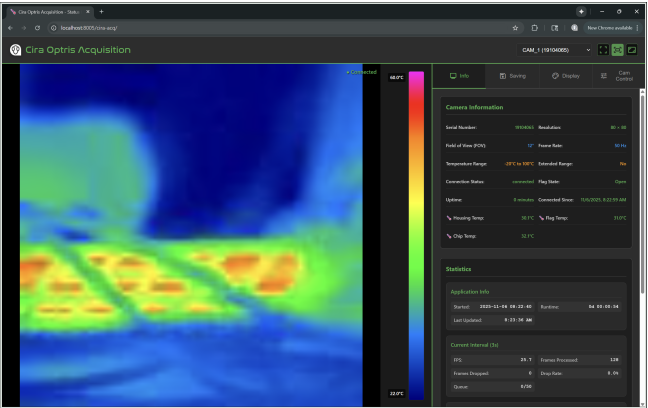
CIRA Optris Acquisition

CONNECT, CONFIGURE, WATCH, RECORD. OUT OF THE BOX.

Point the configuration at your cameras and start the containers. The dashboard shows each camera live with serial number, field of view, temperature range, flag state, housing and chip temperature, frame rate and drop rate.

- **Ethernet and USB cameras**, including USB cameras behind a GigE USB server, so one PC serves a whole floor.
- **Shared-memory output** with atomic writes: consumers always read a complete frame.
- **Recording** of radiometric NPZ frames on interval or on demand, date-based folders, configurable file names, recording sessions via API.
- **Live control** of emissivity, transmissivity, ambient temperature, temperature range, focus, autofocus and shutter flag from the web UI or API.
- **Palettes and alarm overlays**: iron, rainbow, grayscale, custom; above/below temperature zones painted on the stream.
- **Health as tags**: frame min/max/avg, FPS, disconnections and internal temperatures on the plant bus. In-plane rotation for cameras mounted sideways.

OTC SDK 10.1.0	MJPEG	REST + Swagger	MQTT
NPZ	JSON5	Docker	Windows .exe



Status dashboard · Info · Saving · Display · Cam Control

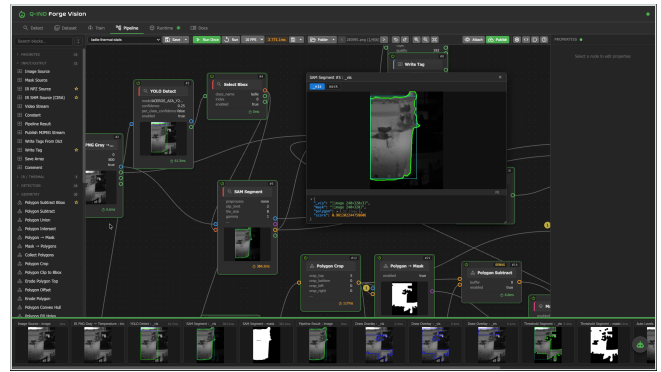
OUTPUTS PER CAMERA	
Shared memory	float32 H×W temperature matrix + timestamp, lock-free readers
Video	MJPEG stream per camera, palette and overlays applied
Recording	NPZ radiometric frames, interval or session, YYYY/MM/DD folders
Tags	min / max / avg, FPS, drops, disconnections, emissivity, housing / flag / chip temp
API	parameters, ranges, focus, flag, palettes, overlays, temperature at pixel

Q-FORGE VISION

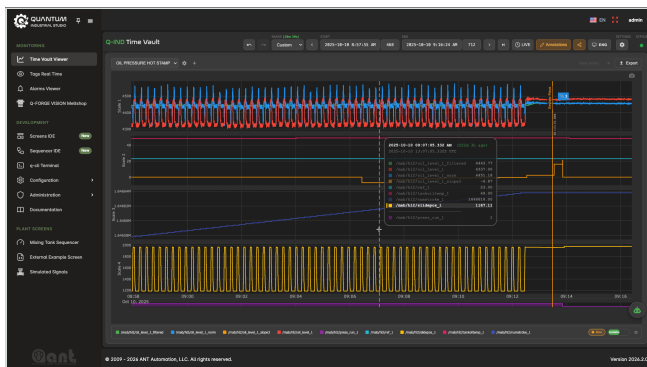
AI THAT READS DEGREES, NOT COLORS

A drag-and-drop editor where the IR SHM Source block delivers the live matrix from the acquisition. Detect the object, segment it precisely, cut the polygon you care about and compute min, max, average and standard deviation inside it. Then write the numbers to tags.

- **Complete workflow:** datasets, in-app labeling, YOLO training with live metrics, detection test bench, publish to runtime.
- **Plug-and-play models:** drop a model folder; the server picks TensorRT, OpenVINO or PyTorch automatically.
- **More than 100 blocks:** YOLO, MobileSAM, FastSAM, tracking, OCR, ArUco, morphology, contours, polygon geometry, thermal histograms, math expressions.
- **Runtime triggers:** every N ms, on every new frame, or when a tag expression becomes true.
- **Augmented MJPEG** with polygons, crosshairs and temperatures burned in, for any SCADA screen.
- **AI pipeline assistant** drafts a pipeline from a sentence.



IR source → YOLO ladle → SAM segment → polygon crop → region stats → Write Tag



Trend view · zoom, pan, statistics, quality filter, UTC or local time, CSV export

Q-IND TIME VAULT

A YEAR OF THERMAL HISTORY, OPENED IN SECONDS

Process signals, camera health and every temperature the pipelines produce land in the vault with millisecond timestamps. The viewer draws a full year of a six-camera EAF in one chart and lets you dive to a single second without changing tools.

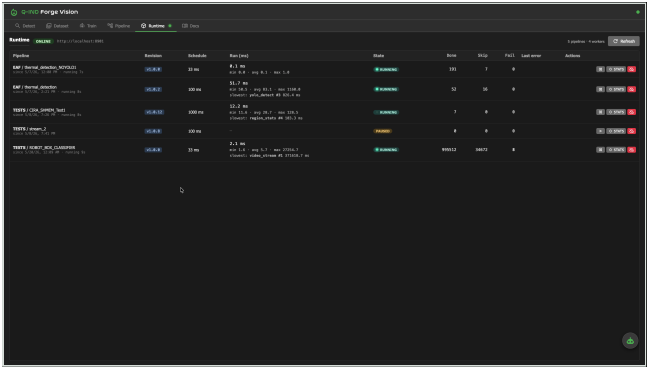
- **Full resolution forever:** no rollups that erase the peak that mattered.
- **Shape-preserving downsampling** keeps the real timestamp of each min and max: a two-second spike still shows in a 30-day view.
- **Annotations with images:** alarms post a note and the augmented thermal snapshot on the trend, searchable event to event.
- **Frame replay:** recorded radiometric frames stay linked to the timeline.
- **Deterministic analytics:** correlations, expressions, SPC and anomaly detection on live and historical data.

WHERE IT RUNS TODAY

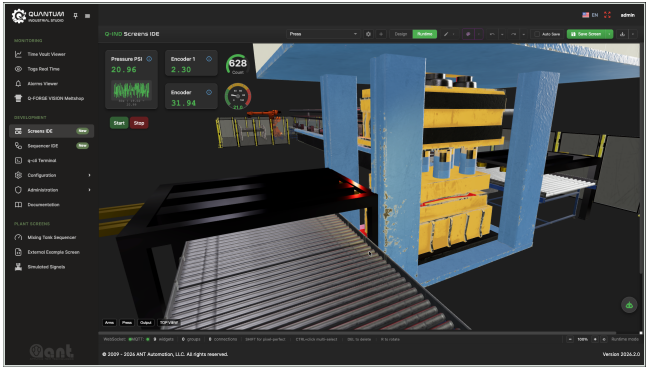
Every application below is a Q-Forge Vision pipeline over CIRA acquisition, delivered as a configured product with its own screens, alarms and reports. Deployed in steel melt shops and automotive plants in North America, South America and Europe.

STEELMAKING · SECONDARY METALLURGY LADLE HOT-SPOT DETECTION Cameras at the ladle furnace and casting turret detect the ladle, read its number, segment slag line, barrel and bottom and watch each zone for hot spots, spills and cold arrivals. Heat history with navigable thermography, per-ladle wear reports. zones SLAG · BARREL · BOTTOM	STEELMAKING · EAF EAF COOLING PANELS & TAP-HOLE Continuous surveillance of water-cooled panels and the EBT from several cameras. SPC over hundreds of heats separates refractory wear from panel events and filters slag splashes from true hot spots. reference 6 cameras · 14 panels + tap-hole · 800+ heats	EAF → LADLE SLAG DETECTION ON TAP STREAM Detects slag carry-over on the pour stream as it appears, protecting ladle refractory and downstream metallurgy. output slag ratio, event tag, augmented stream
IRON MAKING · LOGISTICS TORPEDO CAR DETECTION & ID Detects torpedo cars in the thermal image and reads their number: a shell temperature profile per car per trip for refractory monitoring. output car number, shell max/avg, cycle timing	LADLE METALLURGY FREEBOARD MEASUREMENT Vision measures freeboard height in the ladle in real time for refractory life, capacity planning and stirring quality. output freeboard height as a plant tag	AUTOMOTIVE · HOT STAMPING DIE TEMPERATURE INSPECTION Measurement points per die and per recipe, emissivity and palette per recipe, the active recipe following the PLC. Every piece measured, every cycle recorded. example 8 points · 601 °C threshold · 20 cycles trended

Also built with the same blocks: crane and LMF hot-spot detection, refractory wear baselining, flame and burner state from IR, equipment thermal baselining, conveyor anomalies, scrap truck inspection, zone intrusion and PPE compliance. Ladle and crane hot-spot detection is the subject of an AISTech 2026 paper.



Runtime tab · published pipelines, schedules, per-instance statistics



QUANTUM Screens · 3D digital twin with live values and video widgets

THE THERMAL RESULT BECOMES A PLANT TAG

Once a temperature is a tag, everything in the platform applies to it: trends, alarms, screens, expressions, sequencers, reports and the AI assistant.

DRIVERS BY WEB

Siemens S7, Allen-Bradley ControlLogix, Modbus TCP/RTU, OPC UA, IEC 60870-5-104/101, IEC 61850, MTConnect, MQTT bridges. Devices created and tested from the browser, with built-in S7, Modbus and OPC UA simulators. Plugin architecture for custom drivers.

SCREENS & 3D TWINS

Web mimics and 3D digital twins with the thermal streams embedded as widgets next to live values.

ALARMS & NOTIFICATIONS

Threshold and rule alarms on thermal tags, acknowledgement with audit trail, email with the thermal snapshot embedded.

AI ASSISTANT

A Model Context Protocol server that knows your tags, screens and pipelines. Ask for a trend, a correlation, a screen or a pipeline in plain language.

EXPRESSIONS & SPC

Virtual tags from formulas between tags, deterministic SPC (I-MR, CUSUM, EWMA, Cp/Cpk), anomaly detection without thresholds.

SEQUENCERS

Automated sequences and PLC simulation with their own IDE, so a thermal event can drive an action.

LIGHTWEIGHT & OFFLINE

Minimal industrial hardware, fully offline, one instance per line or plant, interconnectable.

NO PER-TAG, NO PER-SEAT

Unlimited tags, screens, alarms and engineers. Continuous updates.

DEPLOYMENT

DOCKER. ONE FOLDER. ONE COMMAND.

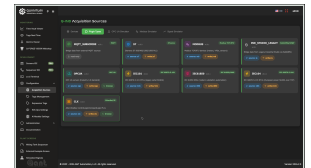
Everything ships as images on Docker Hub. A plant deployment is a folder with the config, an .env with the ports, and compose. Windows hosts can run the acquisition as a native executable with the web UI and video server in containers.

```
# Acquisition, real cameras
docker compose --profile prod up -d

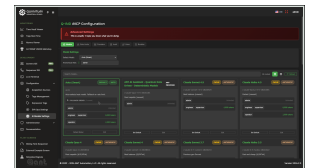
# Acquisition, simulation from recorded frames
docker compose --profile sim up -d

# Q-Forge Vision: GPU, ARM or Jetson
docker compose --profile cuda up -d

# QUANTUM Industrial Studio
docker run --rm --pull always -v ${PWD}:/output antauto/q-ind-studio-dist
cd q-ind-studio-deploy && docker compose up -d
# http://localhost:4242
```



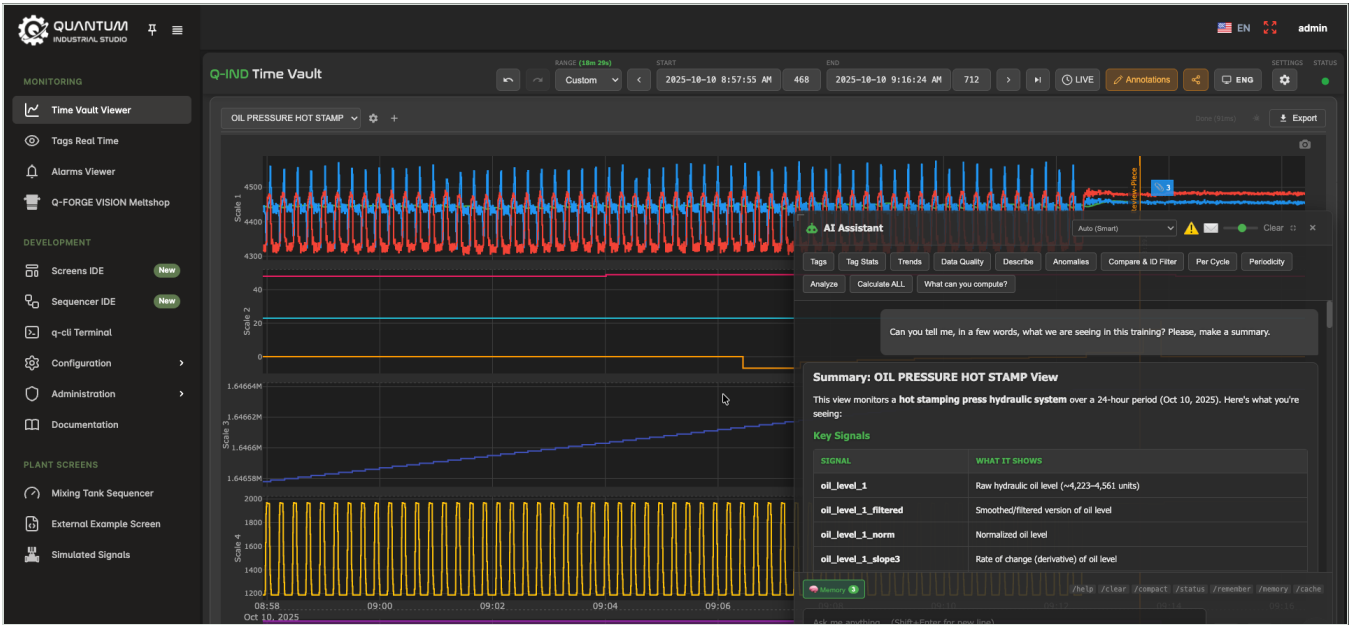
Acquisition Sources · driver plugins configured from the browser



AI assistant (MCP) · tools, bundles and audit

CAMERAS, HOSTS AND FORMATS

Cameras	Optris PI series (PI 160 / 200 / 400 / 450 / 640 / 1M) and Xi series (Xi 80 / 160 / 400 / 410 / 440 / 640 / 1M) as exposed by OTC SDK 10.1. Production-proven with Xi 80, Xi 410 ETH, Xi 640, PI 1M.
Interfaces	USB direct, Ethernet (Xi ETH, PI NetBox), USB over GigE USB server
Host OS	Linux x86-64 (Docker); Windows 10/11 (native acquisition + Docker); ARM64 and NVIDIA Jetson for Q-Forge Vision
Calibration	Optris calibration files from PIX Connect, mounted into the container
Data	float32 temperature matrix (SHM, NPZ), MJPEG, MQTT JSON tags, CSV
Integration	REST + Swagger on every service, MQTT, WebSocket, OPC-quality tags, Python client
Security	Single sign-on, JWT API tokens, roles, audit log



Q-IND Time Vault · deterministic, data-driven AI analysis embedded in the trend

CONTACT

TELL US ABOUT YOUR CAMERAS AND YOUR PROCESS

Start with a remote pilot: one camera, three months, fixed price, credited toward the project. After the project the plant owns the platform, with unlimited users, tags, screens, alarms and history, and your engineers retrain the models. Sold directly to plants worldwide; developed and supported by ANT Automation.

quantum@ant-automation.com

COMPANY	ANT Automation, LLC
ADDRESS	651 Holiday Dr STE 400, Pittsburgh, PA 15220, USA
WEB	ant-automation.com · quantum.ant-automation.com
PRODUCT	quantum.ant-automation.com/q-forge-vision/
EMAIL	info@ant-automation.com