DCA MOSAIC Software

Monitor, Sense, Automated Interface Control



Full control today,

self-driving deposition tomorrow

- AI-ready by Design
- Layer-based Recipe Control
- Anomaly Root-cause Analysis
- Secure Local-network Access
- SECS/GEM Compatible
- Full System - One Interface

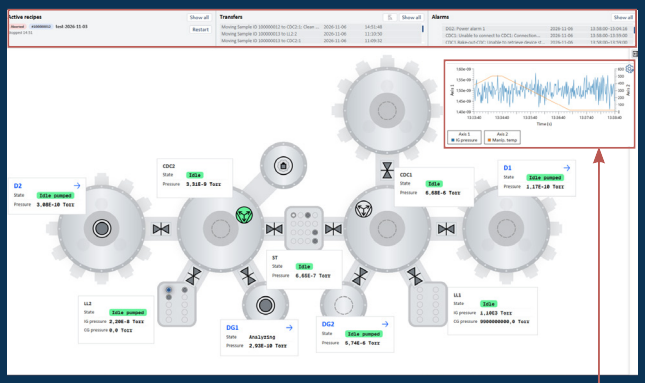
I N S T R U M E N T S

More than just control - MOSAIC delivers understanding

MOSAIC is DCA's next-generation process control software. Delivered with every system, it gives complete software control of the entire UHV tool from a single, configurable interface over one Ethernet connection, on Windows or Linux.

Two capabilities set MOSAIC apart: root-cause analysis that pinpoints the most likely cause of any event you investigate, and an AI-ready architecture built toward fully self-driving deposition.

Highly customisable UI

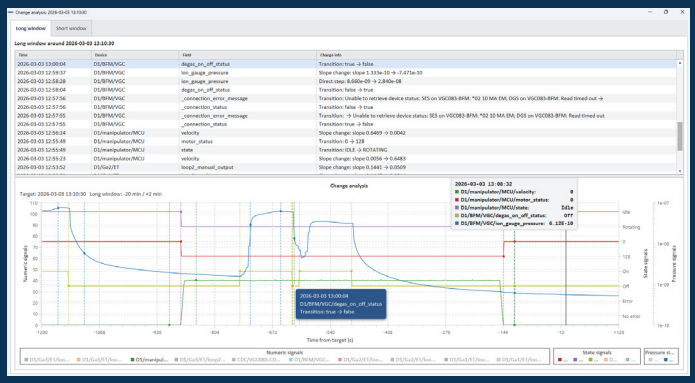


Your profile, your layout: Customise plots and status cards, saved for every login.

Permission levels tailored for each user.

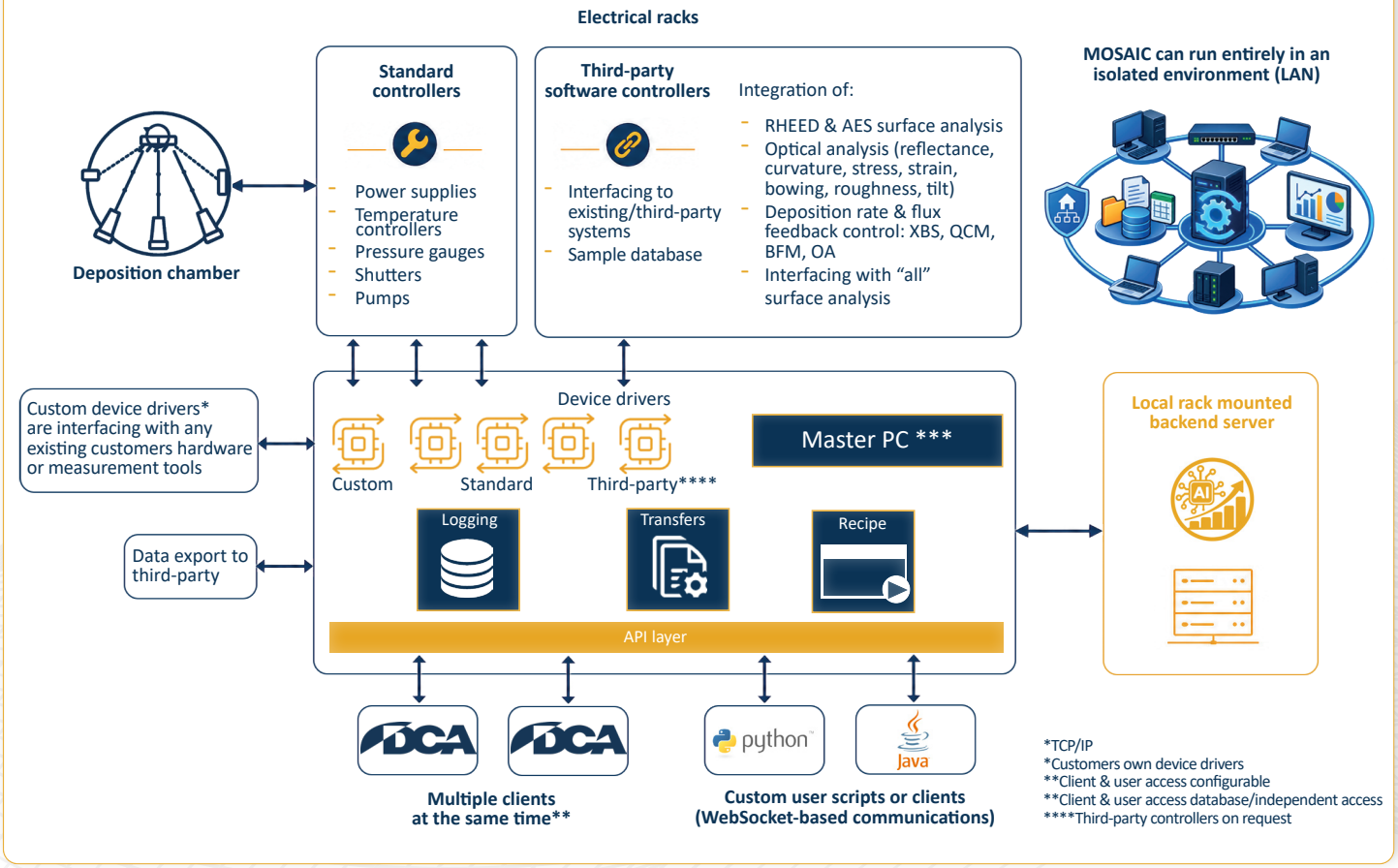
A clear API with Java and Python SDKs is available for deeper automation or integration.

Anomaly root-cause analysis



Flag any event and MOSAIC analyses the system parameters to identify the most likely cause. Optional SMS alerts can flag fault conditions on unattended runs.

How MOSAIC interfaces with your system



How MOSAIC runs a growth cycle

1 — Load & assign

Load the batch; MOSAIC plans the whole campaign and every transfer.

2 — Precondition & calibrate

Cleans and prepares substrates; automated flux calibration to target.

3 — Growth

Parallel layer growth across chambers; closed-loop source control holds fluxes steady.

4 — Cooldown

Controlled cooling; the next transfer or sample is prepared automatically.

5 — Unload & log

Full per-sample record saved, with an automatic end-of-run growth report.

AI-ready by design

- MOSAIC was built from the ground up to run pre-trained AI models.
- DCA's AI models are developed and validated before release as controlled, version software updates.
- The AI models begin with assisted parameter tuning and flux-drift compensation, and advancing toward self-driving deposition.

Automated growth-cycle management

- Parallel recipe execution
- Automatic transfer sequencing
- Optimised run times
- Full control during runs
- Pause, edit or override
- Automatic end-of-run growth reports
- Layer-based recipes, assigned by chamber
- Graphical editor and command library

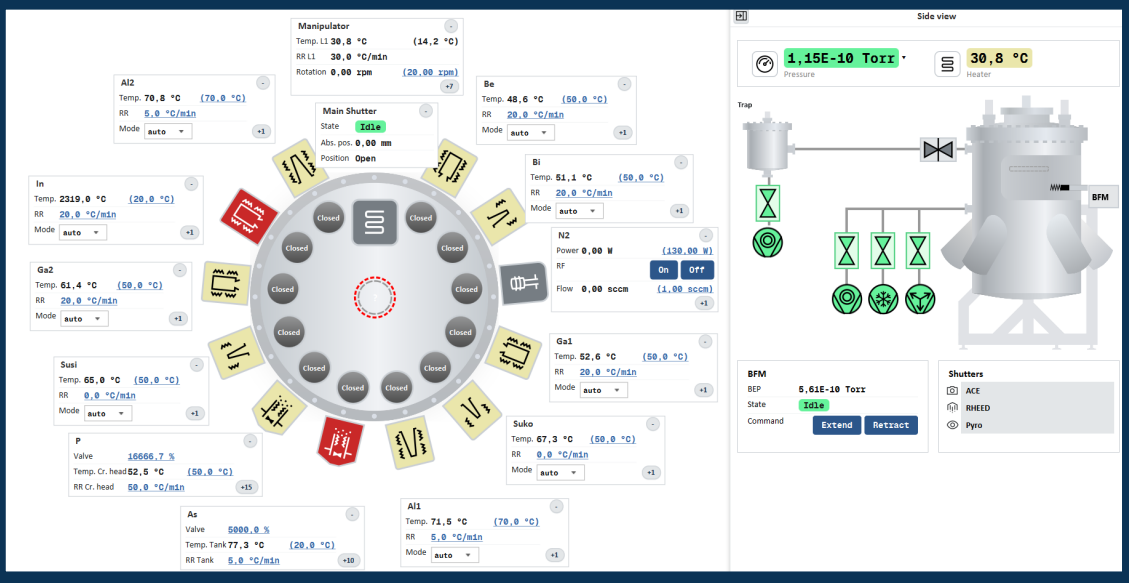
Continuous data logging

Every value and I/O channel is continuously recorded at 0.5 s intervals.

Older data is aggregated to minimise disk space while ensuring efficient storage and retrieval.

Data export and API access.

Chamber status



Specifications

Operating system	Configurable for **Windows** or **Linux** (long-term-support releases).
Connection	Single Ethernet (TCP/IP) connection between control PC and system; if the PC or connection fails, recipe execution stops and the system holds a safe state.
Recipes & campaign management	Layer-based, per-sample; parallel execution with automatic campaign-time and transfer optimisation - **improves campaign efficiency up to 30%**.
Calibration & flux control	Automated flux calibration; closed-loop source control keeps fluxes stable during growth.
Real-time control	All devices, gate valves and shutters; definable, prioritised fault handling with watchdog protection; hardware safety interlocks act independently of the software.
Root-cause analysis	Mark any process anomaly and MOSAIC will pinpoint the most likely cause - allows faster remedial action to reduce downtime.
AI-ready	Architecture ready to run AI models toward self-driving deposition; controlled, versioned model updates from DCA, installed when you choose.
Traceability & data	Continuous logging of every value and I/O channel; per-sample records of recipe version, measured values, alarms and operator actions; open analysis-ready files (tab-delimited) plus database logging; export and API access; configurable live/historic charts; equipment-state logging for OEE reporting; **automatic end-of-run growth report**.
Source management	Material-usage and cell-depletion tracking.
Simulation	Offline simulation mode for recipe testing and operator training.
Access & security	Encrypted operation within the local network — no internet exposure by design; configurable permission levels; designed to align with the EU Cyber Resilience Act.
Interfaces & API	SECS/GEM (SEMI E5, E30, E37) — GEM capability document on request; API with Java and Python SDKs; fully configurable GUI.
Integration	Add DCA or third-party sources at any time - integrated and tested at the DCA factory.

DCA supports updating of existing systems

Please contact DCA about MOSAIC on a new system, or as an upgrade to an existing DCA tool.

True UHV solutions for thin films since 1989

For further information please contact your local office:

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