‹LAB FORWARD›

‹LAB OPERATOR›

Laboratory Execution System

> Streamline and automate your laboratory processes
> Connect your existing hardware and software systems

> Ensure compliance and data integrity
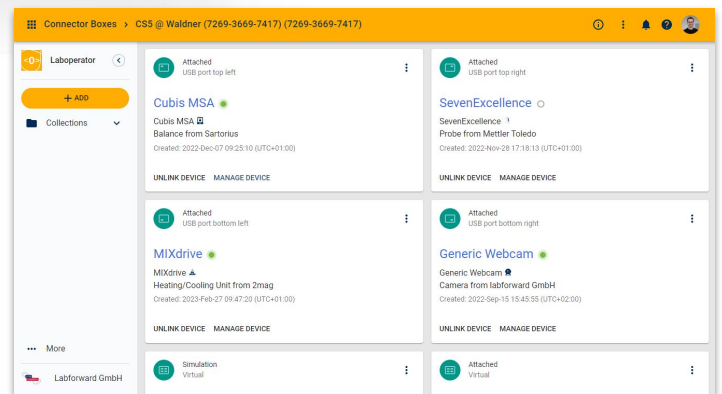> Enhance efficiency and data quality

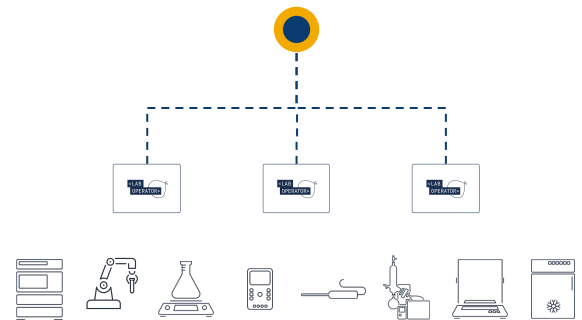ISO 9001, ISO 27001, GAMP5, FDA 21 CFR Part 11, ALCOA ++, EU Annex 11

Laboperator Connector

The No.1 laboratory device connectivity solution

The Laboperator Connector is a vendor-agnostic hardware solution which provides connectivity and data transfer capabilities to any device, regardless of device age, make, or model. Each Connector Box can provide connectivity to up to 4 devices (via a cabled connection) or you can directly connect to an unlimited amount of devices available in your network. You can remotely monitor and control your equipment or orchestrate it to enable workflow automation. With laboratory devices equipped to the Laboperator Connector, your data will be transferred automatically and securely to any target location.

Central connector box fleet management with over the air updates (OTA)

- ✔ Secure and compliant (GMP ready)
- ✔ Device connectivity enabled for your LIMS, ELN, ERP, etc.
- ✔ Virtual connector for Windows applications
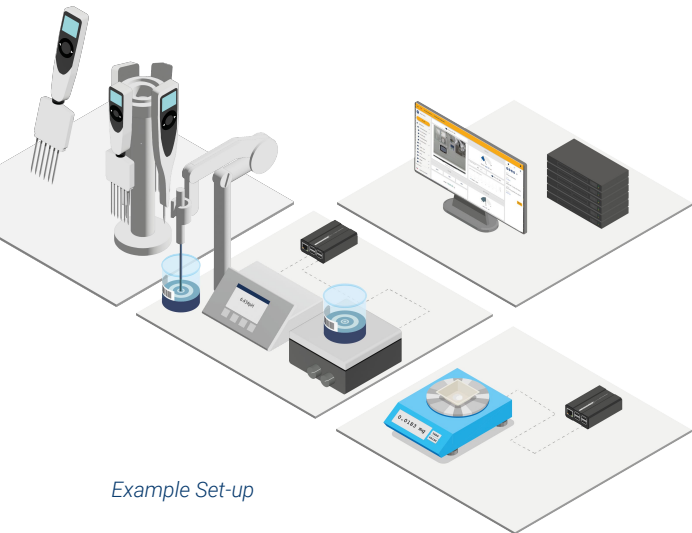- ✔ RS232, USB, SiLA 2, MQTT, REST, LADS, TCP/IP, file based integrations, etc.

Our partner network and device portfolio are constantly expanding. We've already integrated devices from

> 2Mag	> Hirschmann	> Lauda
> Agilent	> Huber	> Mettler Toledo
> Biotage	> IKA	> Sartorius
> Bischoff	> INTEGRA	> Tecan
> Büchi	> Julabo	> Vacuubrand
> Eppendorf	> Kern	> Universal Robots
> Heidolph	> KNF	… and many more

Reach out to discuss integration options for your devices

Digital Process Guidance
Workflows (digital SOP)

Example Set-up

Guided Digital Workflows

Working in a laboratory often requires that standard operating procedures (SOPs) are closely followed - particularly in GMP-regulated environments such as pharmaceutical QC. Laboperator, Laboratory Execution System (LES), allows you to **translate your SOPs into digital workflows** which guide laboratory technicians through experiments. The workflow system directly connects to your devices to transfer data or trigger actions automatically. The **complimentary audit trail** captures all relevant events and metadata enabling fully compliant workflow execution.

> Fully customizable workflow templates
> Configurable workflow runs
> Visual workflow editor for no-code workflow development
> Device connectivity for direct data transfer and automation
> Automated calculations and data visualization
> 3rd party system integration like ELN or LIMS
> Result exports to csv, xls, json
> Reporting engine for PDF report generation
> Notifications on events

✔ Enhance data integrity and compliance
✔ Automate calculations and documentation
✔ Increase efficiency
✔ Increase reproducibility

Application areas: Pharmaceutical QC, chemical development, environmental analytics, diagnostics, material science, food analysis, etc.

Digital Workflow in Laboperator
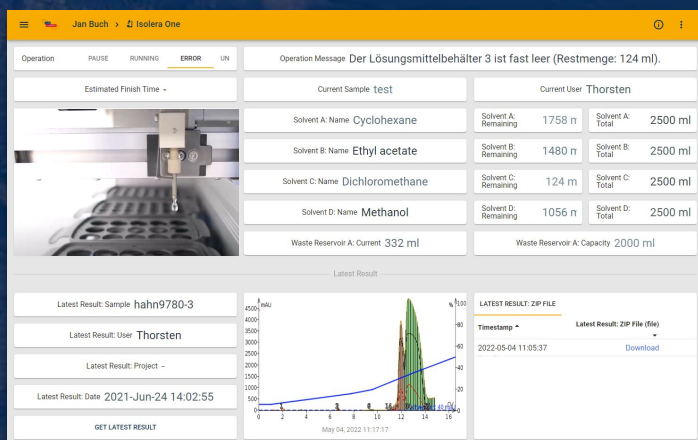
Laboratory Monitoring
Equipment and environmental monitoring

Device Monitoring

- ✔ Monitor devices in real-time
- ✔ Remotely control equipment from anywhere
- ✔ 24/7 oversight of device status
- ✔ Easily export device data

Environmental Monitoring

- ✔ Measure parameters such as temperature, humidity, motion, brightness, pressure, etc.
- ✔ Measure and minimize power consumption
- ✔ Increased oversight over laboratory environment
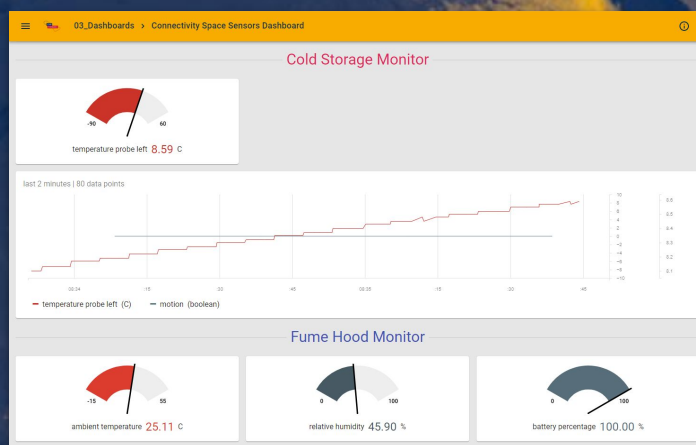

Device Monitoring
Use-case: Flash Chromatography Run Status

- > Receive real-time updates on your device runs and automatically visualize run data
- > Access device data anytime, anywhere
- > Set up customizable alerts regarding your device's status
  - > Ex: Laboperator warns the user that the Dichloromethane reservoir is nearly empty
- > Monitor run-times and equipment availability
- > Instantly export device data to your ELN

Environmental Monitoring
Use-case: Cold Storage Monitoring

- > Comprehensive cold storage monitoring solution includes sensors for parameter measures and software for creating dashboards and notifications
- > Protect valuable samples and ensure stable storage conditions
- > Increase your laboratory's sustainability
- > Customizable in-app or email notifications
  - > Ex: when storage parameters fall outside of a preset range
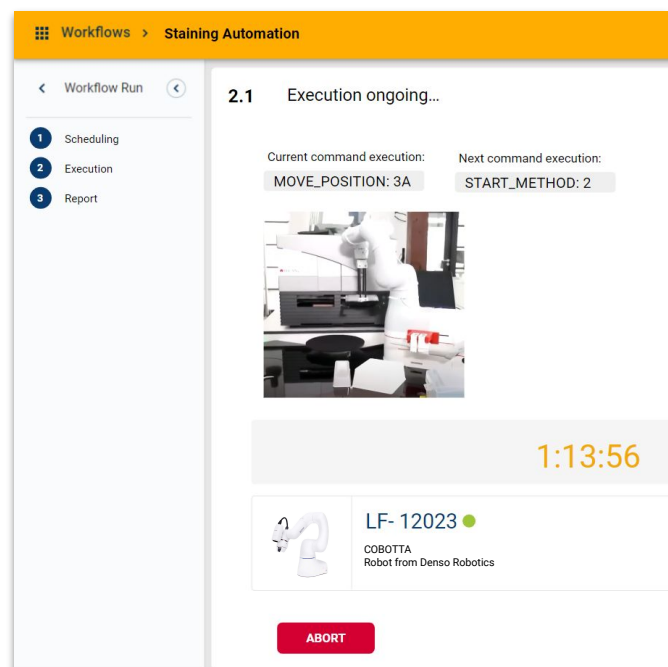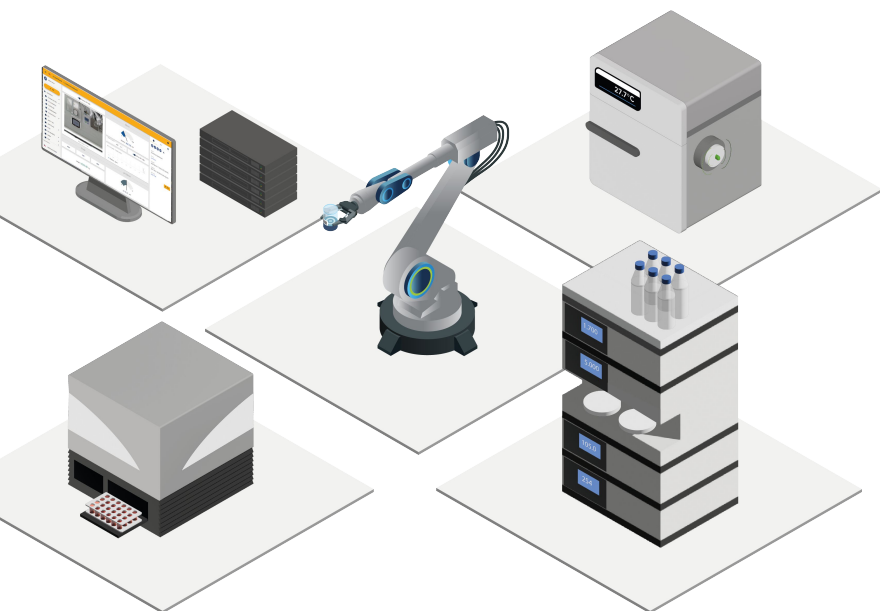- > Increase your laboratory's reproducibility

In collaboration with essentim
essential improvement.

Laboratory Automation
Device orchestration layer

Laboratory Automation

The Laboperator workflow engine is a powerful **orchestration** tool to **fully automate** device and data handling in laboratory protocols. Integrate any laboratory device from a scale to a liquid handling robot. Schedule executions via the Laboperator application and monitor the current run status from anywhere. Laboratory automation allows you to accelerate your process efficiency and bring your device utilization to the next level.

> Static or mobile robot integrations
> Complementary data-handling from all involved devices
> Orchestration based on trigger-action pairs, e.g. based on timers, device feedback, threshold values, in-process sensor data, etc.
> Fully customizable automation workflows
> Visual workflow editor for no-code automation-workflow development

✔ Take a leap in efficiency
✔ Eliminate repetitive tasks
✔ Enhance process quality and reproducibility
✔ Enable 24/7 operations in your lab

Example robots: UR10, KEVIN, techman, Denso, Aurovis Omron or any other current robotic system

Feature Overview
Standard features and functionalities

Digital workflows (Laboratory Execution System)
> Tables
> Calculations
> Timers
> Device command executions
> Device data retrievals
> Audit trail reason prompt
> Automations
> Comments
> Dialog boxes
> Check-boxes, drop-down menus, locked-fields, free text, fields, etc.
> Data validation and color indications
> Workflow reviews
> Visual workflow editor

Miscellaneous
> Audit Trail (incl. filtering and exports)
> PDF-reporting engine
> e-signatures
> Open API (RESTfull)

Device Connectivity
> Connector Box for hardware connections
> Virtual connector for windows applications
> File picker and folder uploader

Dashboards (Lab Monitoring)
> Line charts
> Gauges
> Tables
> Webcam streams
> Measurements
> Data exports as PDF, CSV, XLS, JSON
> data copy to clipboard

System Administration
> Roll-based access control system (RBAC)
> 2-factor authentication login
> oAuth integration
> LDAP integration
> Collections system for resource organization
> Searching, filtering and sorting resources
> Notification system (in-app and email)
> Global custom attributes
> Webhook subscriptions

Laboperator architecture

Laboperator is built on a server client architecture available in our public cloud, your dedicated cloud or for on-premises installation. It can be accessed from any browser enabled end-device.

Let's digitalize **your** Laboratory!

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