CASE STUDY

Installing Digital Tools at Calyxia with Revvity Signals: Accelerating Transition from IP Generation to Production

By Revvity Signals

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Introduction

For a growing, pre-revenue startup, knowledge is the first asset that will bring value to the company. That's why data collection and preservation are an early, critical priority—as was the case at Calyxia, a Paris-based chemistry startup developing polymeric microcapsules for multiple applications.

Calyxia sprung from the notebooks of postdocs in a university lab (ESPCI Paris, Harvard). In the years since its inception, the company has expanded from a small-scale demonstration at an industrial site to a team of nearly 100 people, freshly moved into headquarters that will support the production of the company's burgeoning product roster. This rapid growth necessitated a fundamental shift from paper-based data collection to a comprehensive digital system. The ability to collect, preserve, and easily access data was paramount for safeguarding intellectual property, optimizing resource allocation, and building trust with customers. Without a robust data management strategy, Calyxia feared losing invaluable insights, repeating costly experiments, and hindering its ability to demonstrate product efficacy and develop a strong intellectual property (IP) strategy.

To manage the digital transition and position the company to fully leverage its knowhow, Calyxia integrated Signals Notebook™ as its electronic laboratory notebook (ELN), laboratory information management system (LIMS), and equipment manager. By making Signals Notebook the cornerstone of its digital ecosystem, Calyxia transformed its data management to accelerate the transition from intellectual property generation to industrial-scale production.

> *"Signals Notebook is a highly versatile solution. We can configure it to do whatever we want."*
>
> - **Benoit Thiebaut**
>
> Analytical Chemistry Lab Team Leader, Calyxia

Digital Transformation: Addressing Pain Points

The paper-based notebook system presents numerous limitations for a modern laboratory environment. In Calyxia's case, data was often inaccessible, unstructured, and buried within physical archives. While reports and standardized standard operating procedures (SOPs) offered some data accessibility, these processes were human-resource intensive, selective, and ultimately led to the loss of a significant portion of valuable experimental data.

Beyond knowledge preservation, the company wanted to leverage a comprehensive digital approach for operational efficiency—automating data capture, integrating multisource data, and enhancing data accessibility. The young company needed trustable, traceable data both to inspire customer engagement and to support patent applications. Looking forward, Calyxia wanted an infrastructure that would enable the use of artificial-intelligence (AI) tools, preparing it for future integrations that would expand its capabilities for data-driven insights. In Signals Notebook, Calyxia saw an opportunity to build a unified digital ecosystem to support all its needs.

> *"The analytical lab has been the catalyzer for the adoption of a fully digital system— after only 18 months, we are capturing 100% of analytical work, including everything from production and most of what is produced at the R&D lab."*
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> - **Benoit Thiebaut**
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> Analytical Chemistry Lab Team Leader, Calyxia

Putting the Pieces Together

Calyxia strategically built a robust digital ecosystem with multiple third-party digital tools, all integrated within Signals Notebook, so that it would serve as a central hub for critical data capture and management. The ecosystem comprised:

- **Quarks Safety,** to manage raw materials, leveraging the ability to extract essential information (supplier, CAS number) directly from Material Safety Data Sheets (MSDS) into Signals Notebook upon product arrival. This streamlined the registration of new substances and containers, each tagged with a unique QR code.
- **SCorp-io,** which is capable of recording all sensor readings, production steps, and crucially, sample collection points and times. This ensured a direct link between production conditions and the samples taken for analysis.
- **Scaleway Virtual Machines**, which provided hosting environments for computation and analysis.

- **Kestra,** an orchestration tool to automate data pipelines.
- **PostgreSQL Database,** a central warehouse consolidating structured and raw data, indexed by sample ID, container ID, timestamp, and task ID.
- **Spotfire® and JMP,** visualization and analytics tools providing dashboards for cross-functional teams.

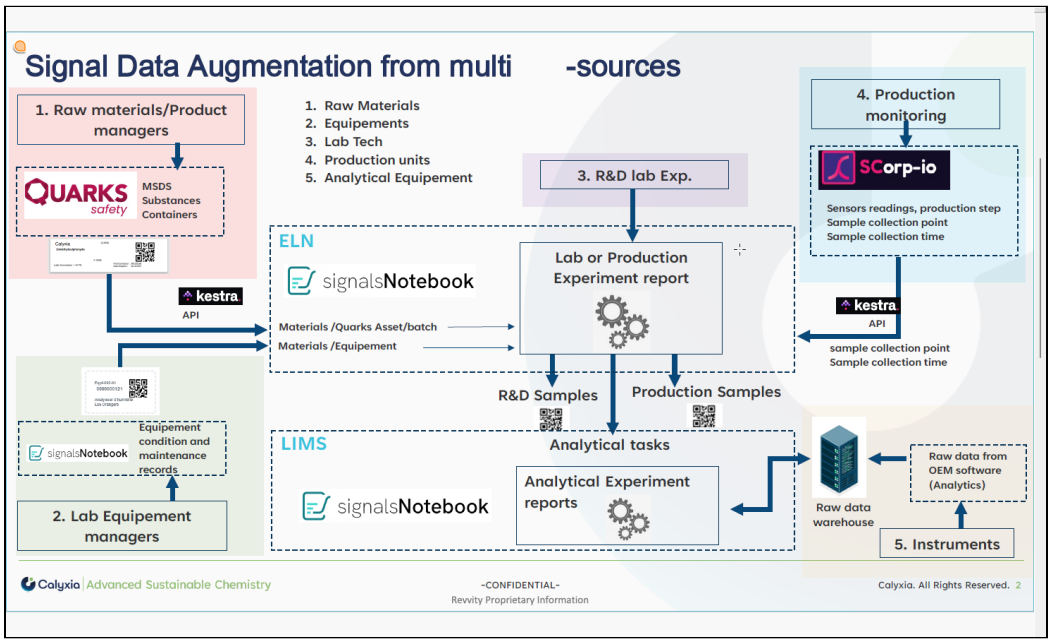

Figure 1: Calyxia integrates multiple third-party applications as data sources for its workflows, all of which are managed through Signals Notebook operating as an ELN, LIMS, and equipment manager.

Signals Notebook at the Core of Three Critical Functions

As the cornerstone of Calyxia's digital transformation, Signals Notebook was configured to serve three critical functions: LIMS, ELN, and equipment manager:

1. **LIMS :** By leveraging built-in task requests and utilizing third-party applications, the Calyxia team configured Signals Notebook to serve as an analytical LIMS—to streamline management of analytical laboratory workflows, track samples, and generate analytical reports. Users can request tasks through a standard operating procedure (SOP) and identify needed samples; then the analytical team produces reports. Signals Notebook is used to keep track of the raw files. Although not designed as a traditional LIMS, the highly versatile Signals Notebook manages the data flow from production to R&D, and is configured with rules to maximize data capture—from sample registration through full experiments. As a result, 100% of Calyxia's analytical workflows are now captured, just 18 months after implementation.

2. **ELN:** Lab technicians record experimental details, materials used, equipment, and the generation of samples. Data capture from sensor readings is imported from SCorp-io across installations, including sample collection times and sensor conditions. Raw data from instruments like chromatographs and spectrometers are also stored in the ELN. Visualization tools have plot-anything-against-anything capabilities drawing from the Signals Notebook data repository.
3. **Equipment manager:** Calyxia has added Signals Notebook–generated barcodes to all of its lab equipment as material resources. This makes it possible to record maintenance logs as experiments and cross-reference with experimental data, simplifying the process of identifying which parts of which experiments might need to be repeated. This integrated approach means that all data—from raw material details to equipment usage, experimental procedures, and analytical results—flow into a centralized PostgreSQL database. Signals Notebook serves as the master system for sample registration, with a unique Sample EID becoming the key identifier across all connected systems (including Quarks, Scorp-io, and Signals Notebook itself). This ensures seamless traceability and data integrity throughout the entire process.

The Transformative Impact of Signals Notebook

Calyxia's journey from a paper-based startup to a digitally integrated enterprise underscores the transformative power of a single, centralized, well-implemented solution. Signals Notebook, enhanced with third-party applications, provides comprehensive functionality spanning LIMS, ELN, and even equipment management —all in one integrated system.

Calyxia is now positioned for further enhancements to its digital capabilities. This includes improving the capture of formulation composition and process parameters, moving its monitoring dashboard from SharePoint into Signals Notebook, developing new custom dashboards to suit emerging business needs, and integrating high-throughput and robotic testing data—meaning a lot more data in the LIMS. The current foundation will also enable the company to embrace advanced AI tools, further accelerating their innovation.

Calyxia's experience exemplifies how a strategic investment in comprehensive, centralized digital tools—particularly a robust LIMS-ELN system—can empower a growing startup to effectively manage its knowledge, optimize R&D operations, and achieve its innovation goals.

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