

Merck Electronics Optimizes R&D Process with Signals Notebook

From Pilot to Production: Scaling and Customizing a Unified Inventory Management Platform

A large research and development (R&D) operation is just the sort of organization that can benefit from a unified inventory management platform that is integrated into an electronic laboratory notebook (ELN). A complex organization will also require some software customization. That was precisely the situation at Merck Electronics, a division of Merck KGaA, Darmstadt, Germany, as they embarked on the rollout of Signals Notebook.

With a clear vision and a strong implementation plan, they progressed smoothly from pilot to production, meeting specialized needs through close collaboration with Revvity Signals and in-house development of custom applications. The result is a global inventory system integrated into research workflows. Now with 550 users and 67,000 experiments on Signals Notebook, the organization is experiencing an array of benefits, from greater data sharing and collaboration to increased laboratory safety.

A Fragmented Data Landscape

Before implementing Signals Notebook, Merck Electronics had no centralized repository of inventory or experimental data. Experimental data were scattered over a fragmented landscape of applications and sources, with data on local computers, shared drives, and a few legacy electronic systems. Inventory management, including reporting on regulated chemicals, ranged from legacy applications to spreadsheets. Management of safety data sheets (SDS) was largely handled through paper printouts.

“Why do we need a good chemical inventory solution? Because in most experiments, materials are the key - whether it’s a reagent for synthesis, a component for formulations, or materials for application testing, they need to be managed. A chemical inventory is the solution. And preferably one that is tightly integrated into an electronic lab notebook.”

Dr. Mark Goulding, R&D Digitation Director, CTO Office, Merck Electronics

Merck Electronics identified Signals Notebook as the solution to centralize its inventory data in an organized ELN platform for productive and efficient R&D. With inventory management integrated into experiment workflows, Signals Notebook enables scientists to track usage without leaving experiments, ensuring that inventory levels are always up to date.

Powerful searching enables scientists to easily find materials—at the level of a building, container, or freezer. Researchers also have direct access to toxicity and hazard information right in their experiments, improving laboratory safety. With Signals Notebook, managing inventory is part of the natural flow of conducting research.

The goal for the implementation of Signals Notebook was to move Merck Electronics from a fragmented landscape of apps and sources to a single, more safety-conscious solution centered around the ELN (see figures 1a & 1b).

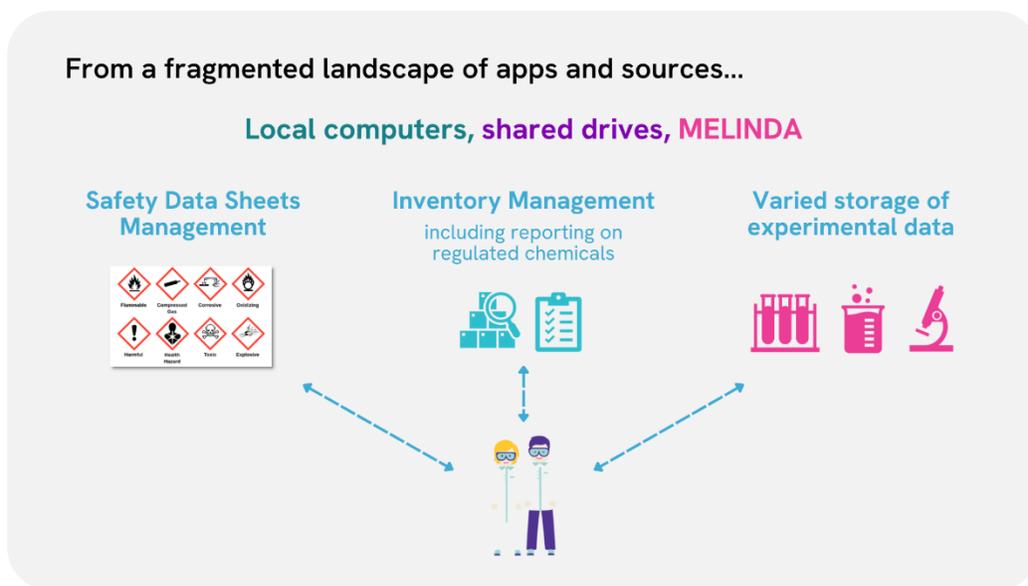


Figure 1a – Before Signals Notebook integration

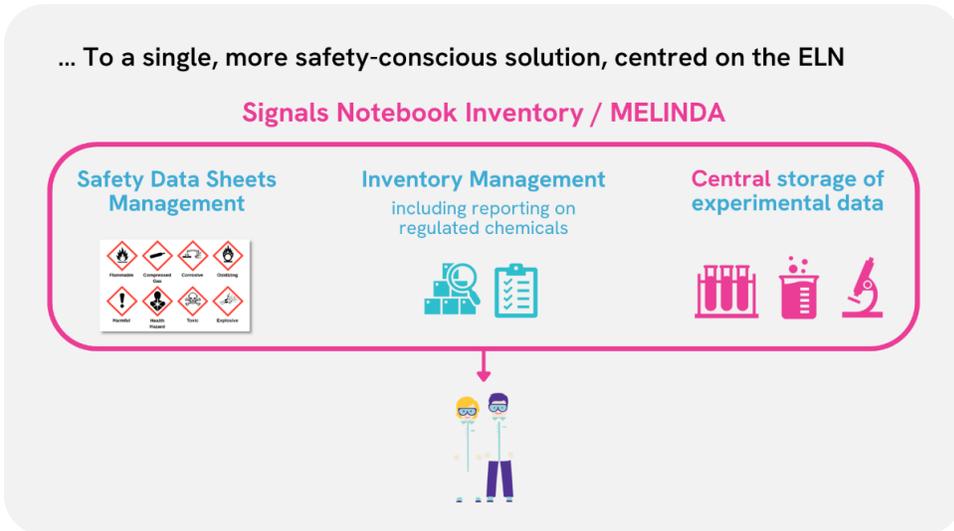


Figure 1b – After Signals Notebook integration

Collaborative Customization for a Complex R&D Operation

To prepare for the rollout of Signals Notebook, the Merck Electronics team prepared an initial evaluation within the organization’s ecosystem. First, they selected the sites and identified key users—people who understood inventory and would also be demanding enough to provide useful feedback. They then conducted the pilot, providing advice and troubleshooting on the fly, and gathering data from both users and administrators.

The implementation of Signals Notebook at Merck Electronics has two phases (see figure 2a & 2b).

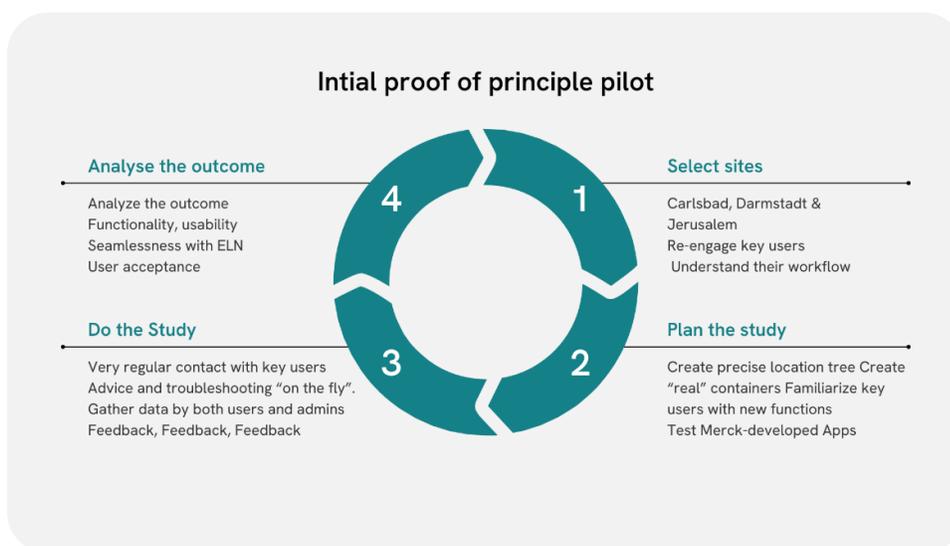


Figure 2a – Initial proof of principle pilot

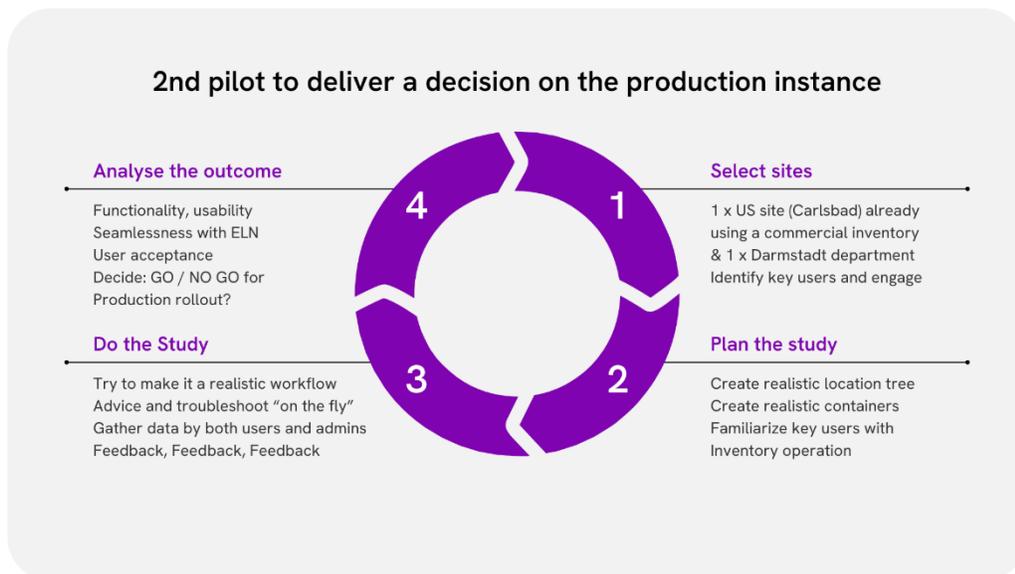


Figure 2b - Second pilot to deliver a decision on the production instance

That evaluation yielded practical data about specific areas of customization that local users wanted. To address many of those needs, Merck Electronics knew it could rely on support from the Revvity Signals team, who quickly went to work on a set of changes.

For other desired functions, the Merck Electronics team used Python to develop in-house solutions within Signals Notebook. Signals Notebook is a highly versatile and extensible platform that allows customers to add specific features and functions that are targeted to their industry, in-house workflows, and business objectives, including integrations that enable data to flow securely to and from other systems. The data is not locked away, but rather available for use downstream and in systems already in place.

For Merck Electronics, the flexibility of the platform allowed them to add custom features specific to their industry. Examples included notifications about approaching expiration dates, which is of particular importance when working with materials with a limited shelf life, and notifications related to material risks specific to the semiconductor field, such as ensuring safe storage of organic peroxides that can build up pressure within a container.

Once the custom features were ready, the team conducted a second pilot rollout – akin to user acceptance testing, which closely mimicked a production R&D inventory system. The results showed that the new features fully met users’ specific needs. With this successful customization, the team proceeded to the organization-wide implementation.

The Steps in the Rollout Process

The Merck Electronics team laid out a series of steps to ensure smooth rollout of Signals Notebook across its large, complex organization. These steps provide an excellent template for this process.

- Identify key users and managers at all sites.
- Communicate the plan.
- Understand user requirements for all locations.
- Create a plan to administer legacy data.
- Develop applications in-house to cover specific functional needs.
- Work collaboratively with Revvity Signals to address remaining needs.
- Install or connect hardware needed for inventory tracking (scanners and printers).
- Conduct user training sessions for administrators and end users.
- Carry out change control of the production environment.
- Perform user acceptance testing.
- Follow rollout with two months of “hypercare” to ensure smooth change management.

An Efficient R&D Platform for Experimental Data and Inventory Management

Merck Electronics has now rolled out Signals Notebook and its inventory functions across eight sites in its semiconductor business. The organization is experiencing numerous benefits, including:

- Improved material lifecycle management
- Better laboratory safety through in-experiment access to safety data
- Consistent recording and storage of R&D experiments
- Advanced analytics and data visualization, enabled by structured data
- Greater data sharing across R&D teams, boosting collaboration

- Significantly improved searchability of R&D data, reducing rework
- Tighter information security through controlled access, and
- Standardization that enables R&D scalability, and efficiency across a global organization.

Summary: A Unified Platform for a Global Organization

Merck Electronics, a large global R&D organization, transformed its fractured landscape of experimental data and inventory management into an efficient platform by implementing Signals Notebook. After an initial user evaluation to test the fit with the internal ecosystem, the Merck Electronics team worked in close collaboration with Revvity Signals to enhance functionality to meet the specific needs of their complex operation. The result is an integrated platform that has replaced disjointed legacy systems. With global standardized inventory management anchored in the ELN, Merck Electronics is now gaining notable benefits in inventory management, laboratory safety, and R&D efficiency, safety.

Learn more: [Signals Notebook](#) | [Revvity Signals Software](#)
