

CASE STUDY

How Voltaiq Helped Amazon's Lab126 Battery Program Accelerate Product Development

Amazon's Lab126 team is responsible for building a number of high-profile consumer goods – many of which require sophisticated battery power systems. Voltaiq is helping the Lab126 team consolidate, automate, and speed up activities by enabling them to automatically collect and analyze vast volumes of battery data.

This data includes voltage and current logs, as well as metadata about battery design and construction. By leveraging Voltaiq's Enterprise Battery Intelligence (EBI) platform, the Lab126 team can uncover crucial insights and causal linkages that influence battery performance and business outcomes.

- ✓ Using Voltaiq, the Lab126 team can quickly identify signs of degradation, early failure, structural problems, or materials contamination in the batteries they're designing into their products.
- ✓ The EBI platform automates data gathering and processing across the Lab126 battery testing operation, and unlocks enterprise-wide visibility and optimizations.
- ✓ The Lab126 battery team can now operate significantly faster, with more insight and greater automation across their product lines.
- ✓ Despite pandemic pressures, the Voltaiq platform enabled the Lab126 team to operate remotely with little to no disruption to battery development.

“Having a centralized hub for data is critical as battery projects become more complicated. Voltaiq helps us better visualize our battery data and enables us to build safer and more dependable devices.

—Denys Zhuo, Senior Battery Systems Engineer at Lab126.

Challenge: Managing Big Data to Gain Battery Insight

Amazon has several high-profile battery-powered product lines that have gained broad popularity with consumers, having introduced the Kindle e-reader in 2007, and later expanding to include products like Echo Buds, the Halo Band, and Amazon Astro. All of these products are powered by batteries. Because of the inherent complexity of batteries, battery system design includes steps to,

- Choose an appropriate battery chemistry and cell design,
- Identify a cell supplier that can deliver consistent quality,
- Fully characterize the battery's behavior across the full range of intended application scenarios,
- And make sure that as long as the product is used as intended, the battery will meet the product's warranty lifetime.

This process requires the team to test a large number of batteries (up to hundreds per new product line), and observe the detailed nuances of how each battery behaves as it is charged and discharged hundreds or even thousands of times. This work is done using specialized battery test equipment that produces large data files recording how the voltage and current rise and fall over each and every cycle, much like an EKG recording the battery's "heartbeat."

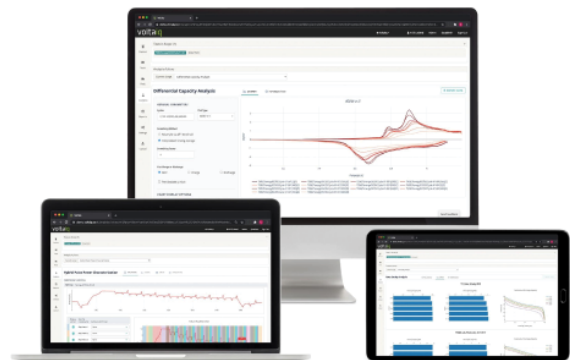
With this quantity of battery testing and data analysis required for each product line – and with product refresh cycles now being measured in months and not years – it quickly becomes a challenge to simply manage all of this data, let alone derive significant insights at scale.

Battery development operations were consuming significant resources, and the Lab126 team felt they could execute more efficiently.

Problem: Data Infrastructure & Battery Toolset Lacking

As the global wave of electrification continues to gain momentum, an increasingly broad set of companies will find that they need to develop a core competency around batteries, much the same as they have had to around the internet, and around microchips before that. As a clear industry leader, Amazon desires the very finest capabilities for testing and evaluating the batteries that power their products. They want to maximize value and insight from the mountains of data gathered by Lab126.

Typically, however, battery teams are missing both the IT infrastructure and the staff needed to properly manage and analyze the data volumes they face. Additionally, these same battery teams are under enormous time pressure to make design decisions that will have significant technical and financial impacts on the products they are bringing to market. Lab126 and thousands of other "battery-powered businesses" need a platform that can help them accelerate product development as they scale, with the confidence that comes from data-driven insights and decisions.





Solution: Launch Products Faster, Optimize Performance, Increase Reliability, And Minimize Risks

With the rapid expansion of the Lab126 battery program, the team began looking for ways to simplify, automate, and speed up their work. They found one with Voltaiq in 2016. The Voltaiq platform automatically aggregates and analyzes large quantities of battery data, both time-series logs of voltage and current, as well as metadata describing how batteries are built and operated, to reveal the key insights and correlations that drive battery performance and product success. Returning to the EKG analogy, just as a cardiologist can look at the waveform of a heartbeat and identify a murmur, Voltaiq analyzes current and voltage waveforms from a battery's operation to automatically identify signs of degradation and failure – things like unwanted chemical reactions inside the battery, signs of contamination in the battery materials, or physical deterioration of the battery's internal structure.

At Lab126, Voltaiq automates collection and processing of all data from across the Lab126 battery testing operation, “harmonizes” the data to a common format regardless of source, and makes this data and analysis instantly available to anyone on the team, wherever they happen to be.

By enabling enterprise-wide visibility, optimization, and decision making, the Lab126 battery team can move much faster, with better insight and greater automation across their product lines. When designing battery-powered products, Lab126 relies heavily on Voltaiq, which is now widely used in their daily operations.

Voltaiq also performed a significant role in keeping the Amazon Lab126 operational during the COVID-19 pandemic. As developers of physical products, the team was accustomed to working day-to-day at the Lab126 facility in Sunnyvale, California – suddenly the team found themselves working primarily from home. It was fortunate, then, that the automation and cloud-based nature of the Voltaiq platform enabled the team to work remotely with almost no impact to testing.

“As our team has shifted to a more remote work environment, Voltaiq enabled us to continue working well together as a team, limit the impact to battery testing and data analysis, allowing us to deliver on our objectives without any time delay.”

—Bryan Holmdahl, Senior Battery Design Integrity Engineer at Lab126.

Contact us and experience the Voltaiq difference today.

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About Voltaiq

Voltaiq has built the industry's first Enterprise Battery Intelligence (EBI) software platform, helping its customers optimize battery performance, reliability and financing, while avoiding costly recalls and catastrophic battery fires. Founded in 2012 by veteran battery and software entrepreneurs, Voltaiq's global customer base includes industry leaders in transportation, consumer electronics, energy storage, and the full battery supply chain. For more information, please visit www.voltaiq.com.