

# How Resonant Link Helped Longeviti Establish a Path to Product

## Understanding What's Possible

Longeviti Neuro Solutions was created by industry leaders to bring promising neuro-therapies from the lab to the commercial market. Their mission is to develop innovative solutions for complex brain surgery to return patients to anatomical normalcy while providing innovative functional neurotechnology.

When Longeviti approached Resonant Link, they wanted to understand whether a new device design they were working on with one of their medical device OEM partners would deliver the required performance. Key to their functionality was the ability to send wireless power into a miniaturized implant while meeting the FDA's tissue temperature limits.

Longeviti found that there were no commercially available tools that could capture the key performance metric – tissue temperature rise – for a wirelessly charged implantable device because it required complex electromagnetic, thermal, and electric circuit modeling. So instead of guessing and checking, they opted to use Resonant Link's Opportunity Study process to hone in on the best design and ensure a single design iteration.

## To Customize or Not to Customize

Resonant Link offers two options for companies who want to integrate the best wireless power into their application. The first is an Opportunity Study, which is what Longeviti chose to do, where Resonant Link evaluates the unique application and determines the best system architecture to maximize wireless power performance.

The second is to order one of Resonant Link's Demonstrator Systems, which are out-of-the-box wireless chargers available for purchase now that can also be customized to a specific application. Resonant Link offers multiple Demonstrator Systems, including a wireless charging platform for titanium-can implants, miniature implants, brain-computer interfaces, and high power implants such as total artificial hearts and ventricular assist devices.

Longeviti wanted to understand exactly what they would need to do to safely and seamlessly deliver the wireless power their device needed, and how that would influence their entire system design, so the Opportunity Study process was a perfect fit.



## Tools, Technology, and Team

What makes working with Resonant Link unique is their unmatched combination of the best tools, technology, and team, which leads to a high degree of trust. The Opportunity Study process leverages their leadership in all areas of wireless power and lasts for 5 weeks, with weekly 1-hour or less check-ins to share insights and feedback.

The Resonant Link team of wireless power experts, including electromagnetics, electrical engineering, and power electronics PhDs, use their proprietary tool called BIOPWR™ to model various designs and understand how different parameters affect performance. BIOPWR™ was built to optimize wireless power systems for medical device designs, and it's the only tool that combines EM, power electronics, tissue heating, and thermal dissipation to get to high-performing designs faster and to ensure they are replicable in the lab. BIOPWR™ has proven particularly valuable for medical device makers at the concept stage and it's also been used by established device teams to save years of engineering and get the next generation of their device to market faster. The result is that device makers know what will and will not work before they build.

The cornerstone of Resonant Link's wireless power system is their multi-layer self-resonant structure (MSRS), a first-of-its-kind coil structure that delivers 5-10x better performance than existing technologies across a variety of specs like charge speed, misalignment, implant depth, data rate, and more.

Resonant Link's innovative shielding and high frequency power electronics expertise also means electronics and batteries can be tightly integrated close to the wireless link without inducing additional losses, making smaller implants possible, and fast, dynamic controls ensure seamless charging for all patients.

Finally, through collaborating closely and listening to what success looks like, Resonant Link builds trust with their customers. That's exactly what happened with Longevity.

## A Challenge and An Opportunity

Resonant Link quickly identified a challenge and an opportunity with Longeviti's wireless design. Losses in the transmit coil were limiting the implant depth and misalignment of the system, while losses in the receive coil were limiting recharge rate. Furthermore, the location of the PCBs and battery led to excessive heat generation due to magnetic fields inducing eddy currents.

Resonant Link analyzed the fundamental problem space independent of coil technology to understand the optimal placement of components and operating frequency. Analysis showed that by balancing losses between the coils, increasing frequency, shielding electronics, and incorporating the MSRS coils there was a path to deliver the maximum power and spatial freedom specifications. Over the course of the coming weeks, different designs were configured to consider key patient experience tradeoffs such as transmit coil size versus misalignment, and receive coil size versus power.

By the 5th week, Longeviti had identified their preferred path to wireless power out of several options Resonant Link had presented. The time spent working with the Resonant Link team and the information shared over the course of the Opportunity Study process had helped them understand the benefits and tradeoffs of the different options and they were confident in their new approach. In less than two months, Longeviti had a path to productizing their device, with a deep understanding of the tradeoffs for wireless power, the space required, the budget needed for development, and next steps.

“

Resonant Link evaluated alternatives of safe wireless power and framed the model within our use case...Their recommended solution exceeded our expectations and validated Resonant Link's extraordinary expertise.

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—Brad Rabinovitz, COO of Longeviti

## Partners in Power

Resonant Link is the medical device industry's partner in power, on a mission to use fast, safe, and reliable wireless power to help people, businesses, and the planet thrive. That means creating not only the best wireless charging platform from a technology perspective, but also the easiest to use, and to make it affordable. Resonant Link performs the Opportunity Study at-cost, so our customers get the outputs they need, and accelerated R&D for their medical device, at a fraction of what it would cost to build an in-house team, or even dedicate in-house resources to a similar project. Resonant Link is invested in our customers' long-term success and that's good for everyone, especially patients.