CHOOSING TECHNOLOGY FOR AN INNOVATIVE STARTUP

Optimizing Design and Costs to Make Farm-to-Table Proximity A Reality

The Challenge

Making farm-to-table produce 100 feet or less. Verdical is a startup "letting freshness and flavor rule" by eliminating the need for delivery and logistics for produce. In order to provide immediate and efficient access to living food to anyone, anywhere, through innovative growing platforms, Verdical needed sensors, lighting, and connectivity. They were faced with many differing technologies to choose from to design maximum efficiency. TE Connectivity (TE) supports Verdical in many interconnected design choices, lowering the price point of their products, while increasing reliability and profitability.

Aligning of Mission

TE's relationship with Verdical began with a chance meeting on a shuttle bus at the Smart Kitchen Summit in Seattle. Verdical CEO Andrew Deitz overheard TE's Terrence Murphy and Matt Marciniak talking about startups and how they make decisions on their initial bill of materials on first-generation products. Deitz jumped in and asked about TE and why Terry and Matt were at the summit, and that started a working relationship that benefits both parties.

> "WE WOULD'VE PROBABLY SPENT TWICE AS MUCH ON A LESS RELIABLE SOLUTION IF WE WEREN'T WORKING WITH TE."
>
> – ANDREW DEITZ, CEO VERDICAL

Verdical's Deitz explained: "Mission alignment is important to us. We see food as the center of community and environment. That really resonated with Terry and Matt, especially around TE's purpose of creating a safer, sustainable, productive and connected future. Once you have values aligned, it accelerates partnership and trust."

TE's interest and shared purpose led the conversation to more specifics around what Verdical wanted to do. Deitz explained: "We had real decisions to make on what sensors we needed—what do we need to do and how do we need to do it? In a startup,

Featured:

Verdical

Country:
USA

Industry:
A Berkeley, California based company developing a platform for growing food and connections

Challenges:
Identifying and designing in technology including sensors, lighting and connectivity for maximum efficiency

Solutions:
- HTU21 temperature and humidity sensor
- Parts of intelligent BUS system
- Contactless power
- IP67 rated lighting connectors
- Power connectors
- 2-pin connectors for sensors

Customer Advantage:
Leveraging TE's engineering expertise and product knowledge to optimize the design of their first product as well as limit costs and accelerate speed to market

you need to be a great generalist and don't always have deep domain expertise. TE knows every sensor in the market; we don't."

Murphy, who is director of business development for TE's Appliances business unit, commented: "Right off the bat, based upon what their product was and its purpose being around connecting people directly with their food and where it comes from, we knew that Verdical's mission aligned with TE's. Listening to their story, we were intrigued by the problem they were aiming to solve—increasing access to quality, variety and taste of produce—and we knew we could help Verdical achieve their goals and build a better connected, smarter device."

Verdical's Product

Verdical empowers food service providers to own flavor, freshness and optimize nutrition. Verdical's sustainable and space-efficient platforms for growth use multiple sensors and horticultural LEDs to make growing on-site year round as easy as inserting seed pods and pushing a button. The space-efficient modular design scales up or down, meeting the needs of any size of space.

TE's Approach

Mohammad Ahmed, a senior manager for R&D/product development engineering at TE, joined the team consulting with Verdical to help optimize their design as well as their bill of materials. His goal was to help them achieve the "first-time right" design to keep costs down and accelerate their time to market. Ahmed explained: "Many times, startup companies do not have the experience or expertise to optimize their designs. It's a competitive market out there, so we worked with Verdical to optimize their bill of materials to potentially generate maximum profit."


"BEING ABLE TO RUN EVERYTHING WITH NO WIRING INVOLVED IS REALLY AN ELEGANT SOLUTION."

– ANDREW DEITZ, CEO VERDICAL

By choosing the right components early in the design process, less time is required later on for verification and testing. Ahmed coached Verdical's design team and helped with the system design, electrical design and determining specifications for parts such as connectors, sensors, actuators, pumps and the microcontroller. He helped educate them about requirements for safety regulations, like UL and IEC, so their design would be more likely to pass certifications and go to market quickly.

Ahmed asked Verdical what the essential pieces of the product were they wanted to ensure to include first. In collaboration, he sat with the Verdical team to review and optimize system engineering design. With the idea that Verdical would get all the basic features right in phase one, Ahmed refined what features were "must have" and what is "nice to have" in order to plan the release of a more advanced model next.

As a result, Ahmed helped them with the power supply, sensing, algorithm and software. He also gave them information on lighting and how they can use TE's existing portfolio of sensors and connectivity solutions to make the product all come together.
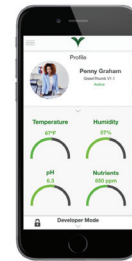
Verdical towers use horticultural LEDs and various sensors to make growing year-round as easy as inserting seed pods and pushing a button.

Optimizing Performance and Cost

A key part of Verdical's product revolves around sensing technology—to monitor light, heat, and water levels to maximize yield in a small space. Ahmed said: "They asked for recommendations on what types of technology or sensors to put into place to monitor soil, light, heat and plant health.

I examined their system, electrical and mechanical design and helped them figure out how many and what type of sensors were needed, where each sensor should be deployed for maximum efficiency, and how to properly power those sensors."

Deitz said: "A number of times, TE was able to help us figure out solutions that we had little knowledge of. For example, at the bottom of our growing column is a tank that holds water that the user will

GROW YOUR MENU

"OUR SYSTEM WILL BE AT OR BELOW THE COST OF COMPETITORS' WITH SIGNIFICANTLY MORE FUNCTIONALITY—ALL DUE TO UTILIZING THESE TECHNOLOGIES THAT ALSO ARE USED IN OTHER INDUSTRIES."
– ANDREW DEITZ, CEO VERDICAL

Verdical allows food service providers to grow all of their greens and herbs onsite by offering them an easy to operate, highly efficient food growing platform. The space efficient modular design scales to meet the needs of any size restaurant, hotel, school or cafeteria.

need to refill. We thought we needed to measure how much water is in the tank, and completely overengineered a solution. Meeting with Mohammed, he said we actually didn't need to know how much water is in it, we just needed to know whether it's empty or full. That's an important difference."

The pump that moves the water around the tank changes sound when there's a low level of water. Mohammad suggested they measure sound instead of water—a solution that was more reliable and required fewer sensors, less cost and less power.

"We would've probably spent twice as much on a less reliable solution if we weren't working with TE," Deitz added. "Yes, we would've known how much water was in the tank down to the milliliter, but the point is we didn't need to know that."

TE helped the startup team gain a deep understanding of how certain technology is used in other industries and how that technology can be applied to Verdical's growing column. Because Ahmed works across different industries, he gave Verdical a better perspective from which to, as Deitz says, "bring out our best 1.0 product. It's kind of like having a personal shopper to bring out your best self."

Verdical's product leverages technology often used in refrigerators, washing machines and autonomous cars. For example, Deitz and his team could better understand how to measure moisture levels for soil health by learning how sensors in a washing machine or dryer work that measure moisture in clothing and what kinds of conditions the sensors are built to endure.

In addition, being able to learn how wireless power products can be used with moving parts in other products made it easy to deal with movable parts on their own product. Verdical's growing platform is designed to be easily maintained. There is one moving part for users to open a drawer and pour water in to refill the tank. They wanted to be sure that when the drawer is open, there is no risk to their customers because of the proximity of power and water. Ahmed suggested TE's ARISO contactless connectivity solution, which gave Verdical more design flexibility and confidence in the durability of their design.

"Being able to run everything with no wiring involved is really an elegant solution," said Deitz. "When you go back to other systems out there, our system will be at or below the cost of competitors' with significantly more functionality—all due to utilizing these technologies that also are used in other industries. We're just applying it to our multi-billion dollar industry of food."

Some TE products in the unit so far include:

- HTU21 temperature and humidity sensor
- Parts of intelligent BUS system
- Contactless power
- IP67 rated lighting connectors
- Power connectors
- 2-pin connectors for sensors

Outcomes for Verdical and TE

The relationship between Verdical and TE has been beneficial for both parties. First, for Verdical, they have been able to leverage TE's engineering expertise and product knowledge to optimize the design of their first product, as well as limit costs and accelerate speed to market.

Deitz remarked: "As a startup, we tend to make decisions quickly and look for that right mix of price and reliability. In development, we always talk about getting things that are good, low cost and on-time. TE has been very useful in that regard. It's nice to have a part catalog the size of TE's and then have someone roll through it in their head and say, 'here's what you need,' rather than us trying to figure it all out and find it on our own. I think that's been very helpful for us, plus it's helping accelerate us to market."

In turn, TE has benefited from Verdical's feedback regarding our strengths and the gaps we need to fill to serve more startups in an even better way. Plus, by implementing our contactless power connectors and parts of our intelligent BUS system into Verdical's design, TE is able to demonstrate our technology leadership through these advanced development platforms in an innovative product that completely aligns with our purpose.

te.com

1-1773955-2   **06/18**   **Original**