

Power Takes Flight

By: Richard Cadena

Is wireless power transmission in our future?

Many years ago, I predicted that Dallas-based Vari-Lite, the moving light manufacturer, would be bought by Dallas-based Southwest Airlines and that they would develop self-flying moving lights. So far, this hasn't come true, and I'm starting to think it might not happen.

I was thinking about it again recently because a question was posed in preparation for an event in which I was invited to speak, called "Backstage Passes" in Austin, hosted by Olden Lighting. The question was, "How has the lighting industry changed since you started, and where is it headed next?"

The answer to the first part of the question is easy. LEDs have easily been the single biggest game changer since I got into the lighting industry in 1886 (give or take 100 years), followed, in the far distance, by pixel mapping and networking. The second part of the question is a bit harder. I have ideas about where the industry is headed, and they don't involve flying fixtures...or do they?

For the past three or four years, I've been working with an LA-based company, Overdrive Energy Solutions, powering stages using battery/inverters. Battery technology has the potential to change power distribution on stages as we know it. The goal has been to reduce the carbon footprint of shows, and the low-hanging fruit is music festivals, where diesel generators have been used for ages. We've successfully replaced them with batteries at many festivals, including Lollapalooza, Burning Man, Coachella, Luck Reunion, Healing Appalachia, and many, many more. But I think this technology could lead to bigger changes in the industry. That's because almost 100% of our gearulti-

mately uses low-voltage DC supplied by switch-mode power supplies that are powered by intermediate-voltage AC (100VAC to 240VAC). The power supply converts AC to DC for the devices, and it loses energy to inefficiency in the process. Why don't we eliminate the middleman and go with straight DC? It could potentially cut down on the size, weight, and cost of devices because they wouldn't need switch-mode power supplies any longer. Maybe that will happen in the future. How far in the future is anyone's guess.

In the meantime, let's get back to those flying lights. We're already flying lights on drones, but those lights, of course, are very small and not nearly

powerful enough to light a stage. But who's to say it can't happen? The biggest obstacle right now is size, weight, and energy storage. To power one moving light powerful enough to light a stage for the duration of a show requires about five kilowatt-hours (kWh). A battery of that size weighs about 100lb, and the fixture plus the drone to fly it would add another 100lb or so. But wireless power transmission could potentially allow a significant weight reduction. You read that right; I said wireless power transmission. Before you dismiss the idea altogether, think about this: It's already been done.

According to The University of Texas at Dallas (hmmm, there's that town again), a team of researchers has been working on developing power beaming over long distances to recharge unmanned aerial vehicles, or



One of the biggest challenges in powering stages with batteries is managing the state of charge. Wireless power transmission could be the next breakthrough.

drones, while they are flying, since 2024. Other researchers have recently set a record for wirelessly transmitting power over the longest distance. The team, which includes the US Naval Research Laboratory and the High Energy Laser Systems Test Facility, is funded by the Defense Advanced Research Projects Agency of the US (DARPA). They were able to beam 80W a distance of 5.3 miles for a period of 30 seconds.

I'm going to go out on a limb and say that the live event production industry will probably never make self-flying truss or fixtures. It would be too costly and too complicated. Think of the liability involved in flying thousands of pounds of gear over people's heads, supported only by the energy stored in batteries or beamed through the air.

But all technological developments potentially give us new tools that could be used in live event production. Imagine, for example, beaming power over a short distance to recharge battery-powered uplights. Or wirelessly recharging large battery banks that are powering a stage. Managing the state of charge on the battery in shows is one of the most challenging aspects of those events. In short, anytime we can avoid running cables, especially feeder cables, we can save time and usually money.

Power distribution technology has not changed significantly over the last hundred-plus years, but there are serious changes coming in that arena. Of course, this is but one facet of the industry that I believe will change dramatically in the coming years. AI is the elephant in the room, and it will drive research and development in so many areas, including live event production.

While I'm aware that laboratory research and even breakthroughs often do not make it to the commercial stage, I'm also aware that we live in exponential times where technology is developing at breakneck speeds. The technology for beaming power exists today, but whether it will ever be affordable and reliable remains to be seen. But I think we're in for quite a ride. 