SHAKY CONNECTION?

Five lighting designers address five topics concerning the uneven state of the smart-lighting market

By Paul Tarricone

Several years ago, *LD+A* sponsored a panel discussion at LightFair that touched on careers and growth areas in the industry. At the close of the session, the panel was asked to vote on which of the following two "hot topics"—light and health or connected lighting—would be the biggest job creator over the next few years. The panel's vote was unanimous in favor of connected lighting. But as circadian strategies have taken hold and COVID-19 has created a potential niche market for germicidal lighting, one has to wonder how the vote would come out if taken today. Indeed, smart lighting application is still limited, as only about 1% of installed lighting systems are equipped to leverage connectivity between lighting devices and with other building systems, according to a December 2019 DOE study.

Ultimately, specifiers and their clients hold the key to connected lighting applications. With that in mind, we asked five lighting designers to comment on the state of play in IoT. Our panel consists of Ardra Zinkon, president/director of lighting, Tec Studio, and chair of the IES IoT Committee, Jered Widmer, a principal with The Lighting Practice, Susannah Gilbard, partner with Lightcraft Group, Kris Sandheinrich, a principal with KGM Architectural Lighting, and Seth Ely, senior lighting designer with Stantec.

How excited are your clients (e.g., end users, architects, et. al.) about IoT and connected lighting?

Zinkon: I think there is definitely intrigue about potential opportunities and the many ways that connectivity can be leveraged as a feature. Because of the success of many of the smart home products on the market (like Amazon Alexa), clients understand the connectivity potential on a personal level.

Widmer: Most of the buzz that I've heard is from the end users (building owners, building management and developers). These folks tend to "get" more of the marketing for this technology and want to learn more—to figure out if it's right for them.

Ely: End users and owner occupants have expressed a great deal of excitement, with portfolio owners leading the way in adoption.

Gilbard: For our firm it seems entirely dependent on what type of client. Architects and private firms are not asking at all. Every developer asks, but in the end, very few are really interested in pursuing.

Sandheinrich: We work with a variety of clients, from private home-owners to large developers. Most interest is coming from tech clients who have a strong interest in all things electronic being part of an integrated system with a variety of options for control. We are seeing interest from tech-savvy homeowners who are pushing for the smart home experience. The idea of lights turning on, sound systems playing music and doors unlocking themselves when we pull into our driveway is a great example of how smart homes can operate. Even simpler homeowners like the idea of being able to activate lights from the car so you can enter with a bag or two full of groceries and not have to reach for light switches.

Given the buzz around IoT and connected lighting, has interest to date met, exceeded or fallen short of your expectations?

Zinkon: Definitely fallen short. There are added complexities and responsibilities that come along with IoT and connected lighting that make adoption slow. While clients are initially intrigued, they are not prepared to develop a sequence of events and/or analyze the data in order to take advantage of the benefits of connectivity (yet). In addition, with the many challenges owners face with the pandemic, different vertical markets are rethinking how they move forward with projects. It's interesting, because I think the connectivity that IoT offers could really be an asset for many of these markets during this unprecedented time.

Widmer: I think the interest in this technology is in line with what I would expect. While it has been around for a while in some form or another, it still hasn't matured in a way that is practical for some applications. Couple that with the lack of saturation with lighting manufacturers, and IoT and connected lighting has some limitations.

I think there is also a big learning curve that needs to be addressed in the AEC industry to fully take advantage of IoT and connected lighting. From the specification side, a lot of specifiers and design teams don't fully understand IoT and how to properly execute it on a project. When does IoT need to be brought to the table? What is the cost impact? Who needs to be at the table? On the installation side, a lot of contractors do not have the knowledge and training to properly price a project and then install the necessary infrastructure correctly. On the end-user side, a lot of facility folks don't have the proper staff, background or knowledge to ensure such a system can flourish in their building. There are still a lot of folks out there accustomed to maintaining older, simpler technology and the thought of a complex, inter-connected ecosystem is scary. Is it maintainable? What happens if it "breaks"? Can I fix it and maintain it?

Sandheinrich: In terms of the consumer, expectations are probably low on average and then spike for the tech-specific consumer. A lot of consumer demand is being met with the ability to download the right smart phone app and get user friendly controls of lighting and other electronic devices.

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>
> *Sandheinrich*

Ely: Stantec has identified IoT and connected lighting as an area of significant growth, as a part of our smart buildings/smart cities strategy. Client interest has exceeded our expectations and we see significant growth opportunities, given the IoT and connected lighting's potential to better support end users and create optimized facilities.

Gilbard: Most manufacturers taught the huge benefits of not having wire and conduit and homeruns to fixtures. Although the cost saved in wire and conduit to each fixture is significant, the huge amount of Cat5/6 cables in the ceiling, space for LAN room entry, rack space, some additional HVAC, and the fact that POE does not in and of itself save electricity, make the overall cost more or less the same. As the wattage of luminaires decreases through advances in technology and the POE run maximum wattage increases, I believe there will be more adoptees.

Is your firm already playing in this space? Or does it expect to in the future?

Widmer: Our firm is wading into the water. Our applications are mostly retail-based and we have

benefited from a lot of hand-holding with the manufacturers to understand how it works. Selecting a manufacturer early in the process that has a robust platform/solution and taking advantage of their resources has proven very helpful to learning how to properly execute the technology. Having an end user that understands what they are getting and how it will change their internal processes is also important. They need to have the capacity and willingness to adapt to fully take advantage of IoT and connected lighting benefits.

Sandheinrich: We certainly have seen an uptick in smart wireless lighting controls and in integrated control and wiring systems that reduce installation costs. POE for example can provide lighting power and control data over a simple cat 5 cable. Long-life batteries allow for wireless lighting controls and daylight/occupancy sensors that can be installed anywhere—even on glass. Smart wireless and integrated control systems are taking over for most projects from a 15-story TI office buildout to a smaller intimate restaurant.

Ely: Yes, Stantec has been engaged in IoT and connected

lighting in a wide range of project sizes and sectors. End users have come to expect increased connectivity and that includes the capabilities of IoT and connected lighting. As a result, the space is expanding across all budget ranges. For fully developed smart building integration, IoT and connected lighting provides a digital backbone that supports many sensor systems and use cases. For budget-driven projects, manufacturers are offering lighting control systems with scalable IoT capabilities or IoT capabilities managed by the manufacturer.

Zinkon: Our firm offers both lighting design and technology design (all low voltage systems), so we are well suited to tie the two disciplines together, we've had multiple preliminary discussions with design teams about this technology, but project owners have not yet pursued. We are located in the Midwest and until it starts to penetrate more specific vertical markets everywhere, we may still have some time before owners are willing to invest in this and for this trend to move forward full speed. I think part of the challenge is that the expectation (due to the success mentioned before with Amazon Alexa), many clients are not prepared for the full responsibility of the system or all the additional design integration that has to occur. They are on the "end user" side of that experience.

Gilbard: We have provided a few projects with POE and connected lighting—time and technology will tell.

What market sectors seem best positioned to leverage this technology?

Sandheinrich: Big tech for sure. How long until online retailers are tracking my movement and purchases in a big-box retail store? Specific to lighting—when technology can provide significant reduction in construction costs, everyone will get on board. Only when privacy concerns become an issue will there be push back on the technology.

Ely: IoT and connected lighting systems can significantly improve end-user productivity. For instance, nurses spend 40% of their time locating equipment and connected lighting could optimize the workflow if key pieces of equipment could be located using connected lighting systems paired with IoT sensors. In workplaces, similar infrastructure can increase employee efficiency in address-free workplaces and assist with wayfinding. Facilities management teams can leverage these systems to reduce response times and streamline procurement and back stocks. There are similar applications across all sectors. Because IoT and connected lighting bring physical assets into a digital environment, our relationship to these assets fundamentally changes.

From a broader smart cities perspective, these systems could be used to help citizens locate available amenities and track maintenance/service needs. There are also opportunities in transit as well. IoT and connected lighting can provide insights into how people use spaces for optimized service and routes, while maintaining privacy requirements.

To address issues relating to COVID-19, the integration of sensors within IoT and connected lighting systems provides opportunities to support contact tracing and work creatively with mechanical system designs to support intelligent ventilation strategies.

Gilbard: We see a lot of interest from the higher ed sector and from manufacturing. Higher ed in particular would like their campuses to be fully connected and controlled from a common system. It's totally understandable and with one client to answer to, it's very doable.

Zinkon: Clearly retail is already taking advantage of the technology, I think there is strong evidence of a return on investment and therefore it is an easier cost to bear. We've actually completed a number of parking garages in the downtown Columbus, OH area over the past several years and the city is now adding connected technology to assist travelers. Serving on the IoT committee, we have discussed endless opportunities and the varied markets for which it could be useful. We see the potential for application and benefits in so many ways moving forward.

Widmer: Big-box retail and smart cities have been the big-gest adopter of IoT and connected light, based on what I've seen and read. For both of these sectors, it offers a lot of benefits that can be quickly seen after installation. I think healthcare is also in a position to leverage this technology. The complex programming and functions of hospitals could reap a lot of reward from a properly integrated IoT solution. Couple this with the current trend/interest to implement tunable white and/or circadian lighting technology, healthcare facilities could more effectively execute both design strategies together as they upgrade facilities.

What has been the greatest obstacle to implementation so far?

Widmer: Knowledge and understanding—this is key to the entire process. From getting owners/end users on board and allowing the design team to properly specify/document the system, to ensuring the project is priced and installed correctly, and the end-users have the know-how to manage and maintain the ecosystem. I think there are still a lot of unknowns/uncertainties that cause a breakdown somewhere in the process and kills the idea of implementation.

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Widmer

Sandheinrich: Antiquated ways of thinking. Technology manufacturers who are committed to proprietary programming versus open-source programming may eventually be left out in the cold. If my light fixtures can't talk to my refrigerator, something is being left off the table.

Gilbard: The limitation of wattage on each Cat 5/6 cable. Until we can run perhaps (10) 30-W fixtures on one cable, the benefits for most clients are limited.

Ely: The obstacles to implementation include legacy practices and the lack of a standards-based approach within the IoT and connected lighting ecosystem. For design teams and end users, the process of bringing lighting onto the network requires a significant change in design criteria and operational policies. For manufacturers and vendors, system performance and capabilities can be encumbered by legacy products that were created for non-networked environments. The same factors that have created the currently siloed building systems need to be managed to create an IoT and connected lighting platform that fully leverages its potential. Cyber security and data privacy require significant review based on a client's requirements. In the IoT connected lighting landscape, some manufactures are better positioned than others to provide support.

Zinkon: I think the greatest obstacles are a mix of upfront cost and long-term management for the client. It does require additional effort on the owner to manage the system and not all owners have the capacity to implement an IoT solution. The other concern that I feel obligated to mention is the lack of industry standards at this time and concern over data exposure, security and privacy. The state of California has passed legislation requiring certain cybersecurity features on connected devices, and the DLC allows manufactures to report adherence to certain security standards within their products. I suspect additional legislation, standards and listings will be forthcoming and hopefully the work of the IES IoT Connected Lighting Committee can help design teams and owners better understand how to implement this new trend. ◎