

SSL Postings

U.S. DEPARTMENT OF ENERGY

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The Big Connection

It's no secret that the explosion of connectivity triggered by the advent of the Internet of Things (IoT) is also impacting the lighting industry – to such an extent as to constitute what many are calling a "second lighting revolution." The first lighting revolution, of course, was ushered in by LEDs – which, because of their ease of integration with microelectronics such as network interfaces and sensors, have helped make the second revolution possible. At [DOE's third Connected Lighting Systems \(CLS\) Workshop](#) – held two weeks ago in Santa Clara, CA – thought leaders from the lighting and IT industries came to grips with the reality of what it will take to bring this second lighting revolution, with all of its enormous potential, to full fruition.

The most important ingredient that's needed, without a doubt, is cross-cutting [collaboration](#), the spirit of which was apparent everywhere you looked at the event. With DOE playing its customary role of catalyst and convener, it was clear that presenters and attendees alike were eager to share information, as they consulted with, referred to, and acknowledged one another repeatedly. It's a good bet that those who didn't know each other at the workshop's outset were well acquainted by the end.



Although connected lighting has a ways to go before things really take off, it was encouraging to see so many signs of progress. One such sign was the frequent expression of strong opinions, which led to animated discussions, and which typically occurs with emerging technologies at a point when people start to "place their bets" on the approach they think will end up winning out. For example, Kevin Fitzmaurice of Georgia Power encouraged the industry to "let go of 0 to 10-volt" and standardize on a two-way communication protocol such as DALI (digital addressable lighting interface) for connecting external networked lighting controllers

with LED streetlights, noting DALI's maturity and proven track record. Peter Duine of Philips LED Electronics agreed DALI is a good starting point for connectivity inside the fixture (intra-luminaire), notwithstanding the challenges that still exist in using DALI for broader networked room control. When it came to communications between luminaires (inter-luminaire), some clear contrasting positions emerged among the panelists, with Erik Davidson of Cortet by CEL weighing in on the side of Zigbee and Simon Slupik of Silvair advocating for Bluetooth. Although betting on different horses, the speakers seemed to agree that it's time to get out of the starting gate and make interoperable connected lighting happen.

Speakers and audience members also spent some time discussing what combination of connected-lighting value propositions will become compelling in the marketplace. While some believe systems that deliver a number of well-established lighting-control strategies (e.g., occupancy, task-tuning) using components that are easy to configure and interoperable might make a mark, others aren't so sure – noting it's unlikely that the cost of a fully connected system will be justified in many applications solely by the energy savings delivered by lighting-control strategies. If that's indeed the case, other valuable capabilities will need to be realized and, perhaps, targeted for specific applications. One concept that kept cropping up was "lighting as a service," which was mentioned by a number of workshop presenters, including Chris Brown of Wiedenbach Brown and Gabe Arnold of the DesignLights Consortium®. Lighting as a service turns the conventional business model on its head, essentially doing away with capital investments and upfront costs for customers, making lighting a service that's paid periodically, like a monthly billed security service, and that's provided by companies that own and maintain the hardware.

While it was clear that many in the industry are indeed starting to "place their bets," it was equally clear that there are still many unknowns. Michael Ring of Star Lab gave us a wakeup call (literally – using an air horn) on cybersecurity. His talk was followed later by a panel of cybersecurity experts from the Mitre Corporation, Xilinx, and the U.S. General Services Administration. The overarching takeaway was that there's a growing commitment to take cybersecurity very seriously, and that the best approach is a proactive one that includes resiliency and recovery, and that leverages the experience and high level of expertise that's been developed over the years for other industries that underwent a "connected" revolution.

Such revolutions turn industries upside-down, and that's what connected lighting systems are poised to do. A workshop session on user perspectives flipped the focus 180 degrees away from "what industry thinks users want from connected lighting systems," to reveal what might be accomplished if users take a more active role in exploring and defining needs. Panelist Lisa Newman of Oregon Health & Science University recounted her organization's experience with a design process for a new building that brought together the various "siloes" within her hospital system to determine their interlocking needs. DOE invited Lisa in the hopes that her experience in defining and refining user needs at her hospital might illustrate how the type of high-value user needs connected lighting systems might meet are not necessarily obvious to outsiders, or even to the often-siloes insiders in

a given institution. However, processes that bring together the diverse stakeholders within an institution and identify common issues, and that debate solutions from all perspectives, have high potential to generate needs that might be turned into CLS specifications. These are likely to vary greatly from one customer segment to another. Lisa noted that many of the resultant needs identified flew in the face of commonly held beliefs of what would, or would not, be an effective change. Further, her presentation made it clear that users often need help in articulating their needs, which can get tangled up by their assumptions about what can and cannot be done – and that we've barely scratched the surface of understanding those needs, and how connected lighting can address them.

Much, much more was covered at the Santa Clara workshop. The inputs will be invaluable in helping to guide DOE planning. The discussions clearly struck a chord, and resulted in consensus on some near-term efforts that DOE will help facilitate. But even though we continue to drill down deeper into connected lighting, there's so much more ground that still needs to be covered – and so much more information yet to come, from DOE's [Connected Lighting Test Bed](#) and other sources. So stay tuned.

For those of you who missed the workshop, and those who attended but would like something to refer back to, the presentations are posted on the [DOE SSL website](#), soon to be followed by workshop highlights.

Best regards,
Jim Brodrick

As always, if you have questions or comments, you can reach us at postings@akoyaonline.com.