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Networking:

Universes of data across the universe

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A casino for *Oceans 13* was built on Stage 16 at Warner Brothers. Multiple universes of DMX512 controlled the lighting.

Networking: Universes of data across the universe

BY **BOBBY DECHELLIS**

MY FIRST UNION SHOW was *Oceans 13* at Warner Brothers. Most people outside of IATSE in Los Angeles probably aren't familiar with Stage 16 at Warner Brothers and how big it is. "Massive" is an understatement; with the pit open it's around 100' from the floor to the perms. There is a bathroom up high because the hike up the stairs is that long. Warner Brothers even had special longer lengths of cable made to accommodate the size of the stage. Within this behemoth, the construction crew had built a fully functioning casino. Hundreds of slot machines, blackjack and craps tables, even a welcome desk for check in. To accommodate this monster, we had several megawatts of power energizing everything available to the gaffer at the time: maxi brutes in green beds, 20ks for slashes of light through the door, hundreds of PAR cans peppered the tables and slot machines, fluorescent globes lit up soffits for what seemed like miles, and an untold amount of tiny tungsten globes illuminated all the eye candy. But the biggest challenge with all of this was the earthquake scene. At some point Danny Ocean and his crew of misfits would manufacture a tiny earthquake causing every bulb in the casino to flicker or shut off.

Not really understanding what the seasoned vets were saying at the time, I kept hearing, "We're going to have three universes of DMX!" It seemed to be a big deal, they frequently discussed how this was normal for an entire show and not just a single stage. The whole casino, our massive data rig, ran on an Expression 3 board programmed by the best boy between timecards. When the day came, the effect went off without a hitch, and I'm fairly certain the

Labeling, color coding, and neatly dressing the cables are key to making a system that works and is maintainable.

lighting gag was received better than the movie itself.

I now have 16 years in the union, and I have been fortunate enough to continue to work on larger productions. As I worked my way up the blue-collar ladder, I became a Rigging Gaffer in my own right, and I was even able to hire my dad, a rigging gaffer with decades of experience under his belt, as he approached retirement. I have spent the last few years working on LED volumes; the most recent show is *The Mandalorian*. We definitely don't use megawatt generators or have rivers of 4/O, but we have sets with over 20 universes of single-channel blinking LEDs. While keeping power clean and distributing it appropriately has been and is still part of the job description, my number one focus is the distribution of data across multiple sets, stages, and locations.

When I started, a gaffer called out for light and the most difficult it got was when it had to be on a dimmer channel. Typically, hot power (non-dim) and scrims would suffice. Today, every light on every setup, not just the rigged lights, needs data. Our first unit carries over eight universes in their truck package and second unit is right around seven. Creating a system that allows for, not only the standard crew, but the huge influx of day-players the show sees, to be able to easily and efficiently get lights into their correct universe is a challenge. Jeff Webster, the gaffer on *The Mandalorian* and my wonderful boss, let me know when I started the show that the biggest issue he faced was the time it took to get the right light into the right universe during set ups. Sets are extremely dynamic environments; plans change last minute, and tempers can flare, making it difficult to remain calm and take the steps necessary to give the task of "plugging in light" the time it deserves. The culture on set outside of the set lighting department has not evolved enough to understand that "plugging in light" is no longer just plugging in a light. As a rigging gaffer, I never want to hear people ask, "Why is this taking so long?"

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My approach for data management is similar to how we used to manage large traditional dimmer rigs. While managing 100+ universes of sACN can seem daunting, I'll take it over ten full universes of Socapex any day. As with all good rigs, we start with labeling, which includes color codes and unique cable identifiers. On each stage we have any number of "data spiders," from two all the way up to 12. Every spider has a switch, node, and several optical splitters. Each spider is assigned a letter and each cable's label reflects its spider's letter and port number. This allows any juicer on set to trace a cable back to its source quickly for troubleshooting. "Uni #1" just doesn't cut it anymore. We use managed switches as our data backbone and several studio VLANs connect our stages together. As cost and complexity are always a factor, each floor distro has an unmanaged switch and a node. Sometimes more is required, but we always start there.

Having the network at every box allows myself and the shooting company to be ready for anything. I like to call it "infinitely expandable." We attempt to run any lights that require 100+ channels directly on Ethernet as network devices are typically cheaper than DMX512. Up high we use a tiered approach with what we call "chicken sticks." The top row is fiber, the next is Ethernet, and the last being DMX. *The Mandalorian* has no "standing sets," we are constantly re-rigging and re-routing our resources.

Labels on Velcro tabs allow a stage lighting technician to easily label DMX512 ports to show what universe is being served.

Like most crews, my rigging crew takes great pride in the up high rig but most first unit juicers on the show rarely set foot in the perms. The real tricky part is going from the network to the lights on set. Although there seems to be a new light every week, manufacturers are slow to build products that help with the data infrastructure and distribution.

Last season someone finally heard my complaints, and I was able to work with RatPac Controls and build a polished version of what

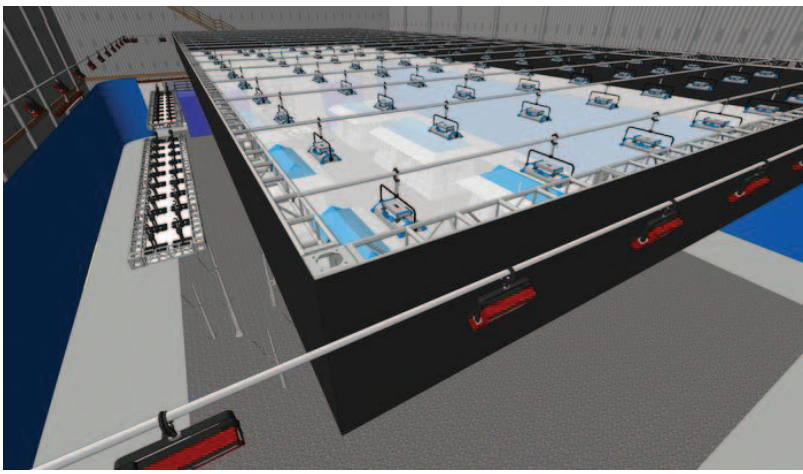

PHOTO COURTESY OF THOMAS HOWARD.

3D plots are useful for planning a rig, and also helpful for convincing producers to understand what is needed by the rigging gaffer and the lighting crew to get the job done.

I call a "distro topper." Their Data Sphere is a node, switch, and two optical splitters in one. Each distro on set has one sitting on top of it. I am able to give one splitter to the fixture team and keep the rest open for first unit.

From the distro we make "super-duper bates:" two DMX cables taped to a traditional 100 A bates cable where they plug into a PDB (power distribution box) on set. Each PDB has Velcro and colored labels for all the most important first and second universes. This allows a first unit set lighting technician to address a node port to whatever universe they want and quickly attach a Velcro label in the front letting everyone know what universe is being sent out the XLR ports. Every single light on set, from those little blinking LEDs to the latest and greatest LED moving head and even 20ks, needs a 5-pin XLR or Ethernet port. Dimmer infrastructure is no longer built into the rig, every light is treated as a "smart light." New quiet tungsten dimmers are kept near or next to the head on set turning traditional lights into smart lights.

Directors, producers, and DPs demand control in real time to tweak each and every light to exactly what they want.

While labels and colored gaffer tape do a lot of the heavy lifting in the rigs these days, the most crucial change for me is the rigging programmer and draftsperson. Tom Howard is the rigging programmer on *The Mandalorian* and, while I have a

fantastic crew of riggers, I couldn't imagine doing the show without him. Tom is beyond a wiz on all of the major console platforms and drafts full 3D plots in Vectorworks as fast as anyone I have ever seen. What used to be my lone wolf position is now a full collaboration between Tom and myself. We plan out patch lists, rigging maps, and universe distributions together. By the time the pallets of cable and lights arrive, Tom has maps ready for the riggers with patch lists and programming instructions. I see this position as a must for the majority of shows moving forward. Productions are demanding more and more efficiency, the days of barroom napkin plots and winging it no longer suffice. Producers want to know what you're doing, and why you're doing it. Visualization is key in getting producers to understand why I need what I need. A 3D plot makes a bold statement in a matter of moments and says far more than I could in meeting after meeting built around, "Why are we doing this?"

I used to look for the biggest and strongest to hire for rigging; now attention to detail is second to none.

The linchpin of this new system is the lighting console programmer and far too often I see first unit programmers wearing more hats than they should. I can't remember the last set I was on where the DP (director of photography) didn't speak directly to the programmer. With 8k monitors and a DIT (digital imaging technician), people are seeing the damn-near finished product in real time. This demands perfection from the lighting rig and the lighting crew. Colors are shifted tiny fractions in 16-bit modes, output levels of LEDs are changed 1% up and down. Directors, producers, and DPs demand control in real time to tweak each and every light to exactly what they want. A double just doesn't cut it anymore, no pun intended. Set lighting technicians (SLT) aren't immune to the changes either, as most now carry a Swisson tester or some facsimile.

I don't see these advancements slowing down, in fact, I believe the responsibility for set lighting will evolve far beyond what we are currently doing. As the wireless spectrum gets more and more crowded and other departments require data moved around the set, I see this falling to our lighting network and its evolving complexities. The cables may be getting lighter but SLTs and radio technicians (RT) can no longer get away with the "set it and forget it" mentality.

Everything we do now requires more attention and more care; lights have an insane number of options and if that obscure sub menu of each style of product doesn't match then neither will the

Definitions

First Unit Juicer – The set lighting technician on set. Physically sets lights for each shot and runs the power and data necessary to each light.

First Unit Programmer – Runs the lighting console during filming.

Rigging Programmer – Patches lights, creates plots for first unit, and tests rigged lights.

Gaffer – Head of the entire lighting department. Runs all the onset lighting and tells the rigging gaffer what lights he/she wants rigged.

Rigging Gaffer – Person in charge of the lighting rig, plans out cable runs, how to hang the lights, and sets up power/data distribution for the first unit team.

Best Boy – Logistical second in command for the lighting department has a first unit and rigging counterpart. Hires technicians, manages equipment check-in and returns.

Socapex – Multistrand cable. Essentially six extension cords wrapped together allowing for voltage control (dimming) of six independent lights.

Optical Splitter – Receives DMX and "splits" the signal from one port to many ports.

Unmanaged Switch – Receives networking information and "splits" the signal from one port to many. Plug and play, no set-up required.

Managed Switch – Receives networking information and "splits" the signal from one port to many. Allows for more complicated segregation of the data, use of VLANs, IGMP, and other advanced networking protocol. Not plug and play; needs to be set-up first.

VLAN – Virtual Local Area Network. Allows for the separation of various network "streams" within the same cable and/or switch. Several network protocols can coexist on the same physical devices without affecting one another.

Network Protocol – The type of data and how it's being transmitted over the network.

Node – Takes lighting networking information and translates it to traditional DMX. Goes from Ethernet to DMX.

light. It either all works, or it doesn't. Even though we don't have 100,000 A to worry about these days, there are more twisted pairs and micro terminations that determine the success of a rig than I like to think about. I used to look for the biggest and strongest to hire for rigging; now attention to detail is second to none.

My family and I often have Sunday dinner at my parents' house and, although my father has long since retired as a rigging gaffer, he loves hearing about all the new stuff we are doing on set. He may not understand what sACN is or Ethernet protocols but his lessons and the way he managed his rigs are the same ones I use. One of his "isms" he would often repeat is that at its heart rig gaffing is a training job. As a rigging gaffer, you're constantly training people in your department and in other departments. You can rarely staff a full crew with people that understand all aspects of the job they've been hired for. Few people in lighting understand how it all comes together and even fewer people in other departments have any understanding of the quantum leap lighting has taken. They think programmers just sit there all day and rigging techs are just cable jockeys. I find myself training production staff. Teaching them what we are doing and why we have to do it. Most unit production managers (UPM) go off budgets from 20 years ago that don't include rigging programmers or have any mention of a draftsperson. Transforming rigs to accommodate technology is easy, changing the mindset of the money people is the difficult part.

The complexity of a modern lighting rig simply requires more collaboration. We can't just have 10,000 A of power ready and plug in whatever shows up. When a gaffer used to ask for ten 10ks, no rigging gaffer in the world would rig 1,000 A of power for them. They would rig double or triple anticipating additions or changes. Often times I see rigs being stingy with their data: rigs that need four universes of data are rigged with only four universes of data. Networking has allowed us to have whatever we need it. ■

Bobby DeChellis is a Rigging Gaffer in IATSE Local 728. He is a 16-year member and is a second generation member; his father Michael DeChellis was a rigging gaffer as well. He was born and raised in Southern California, where he still resides with his wife and two kids. His credits include *Avengers*, *Mindhunter*, and *The Mandalorian*.