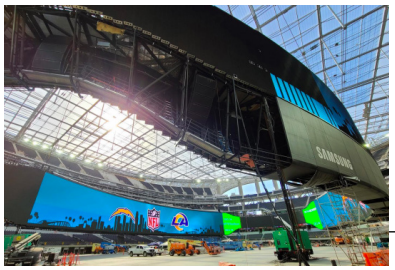

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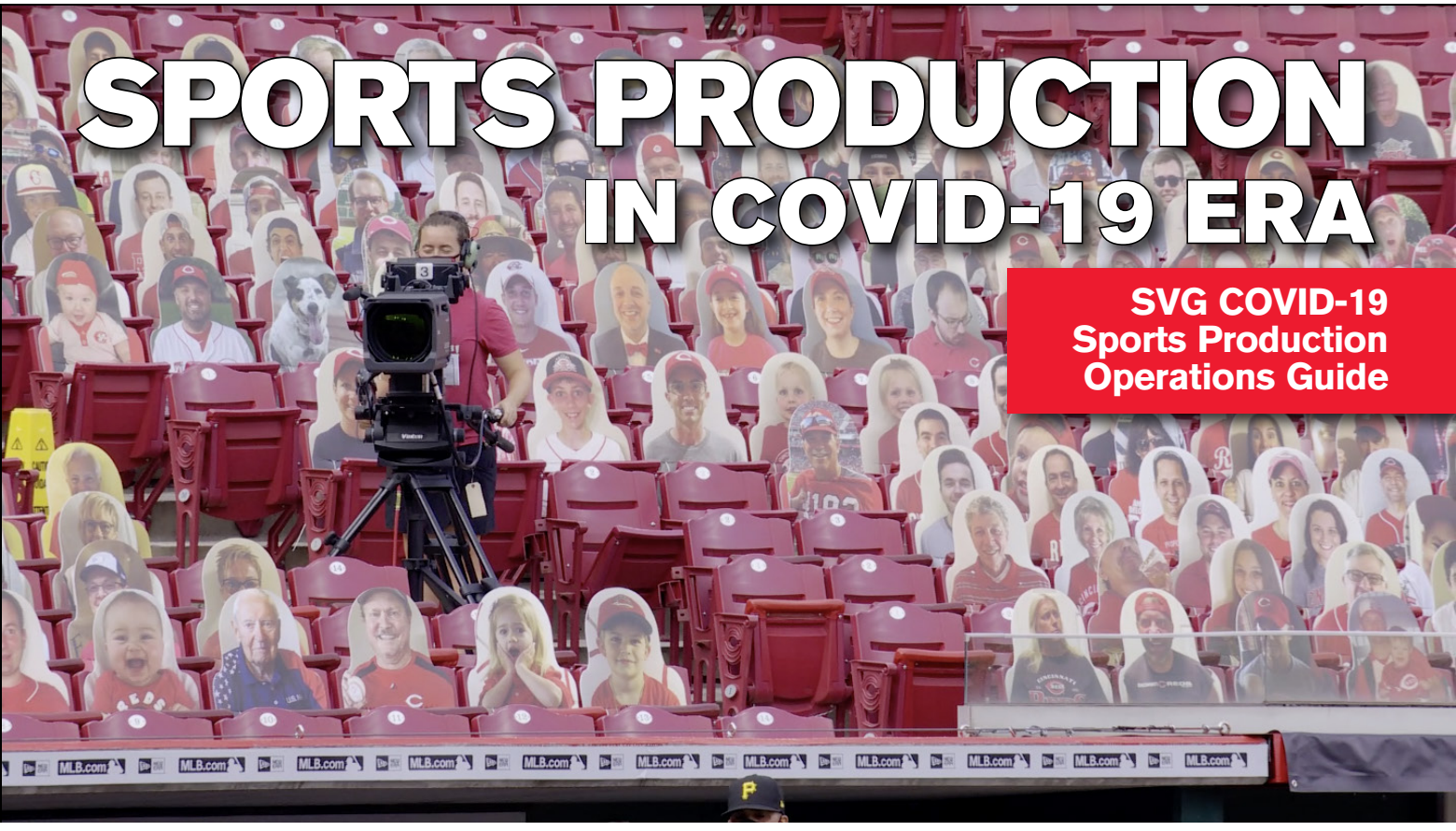

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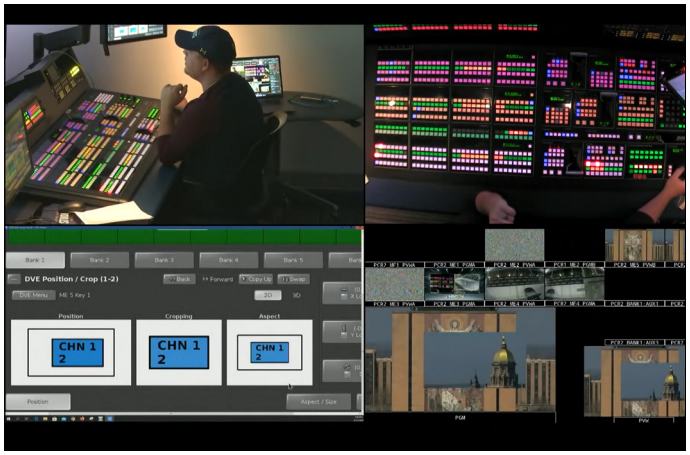
Remote Commissioning and Training For a New Broadcast Facility

By the BeckTV Engineering Team

It's difficult to imagine a more collaborative or hands-on process than the technical commissioning of a new broadcast facility for live sports. In pre-pandemic days, commissioning new equipment and training personnel involved intensive, face-to-face interactions between manufacturers, operators, and engineers. Consider, for instance, a trainer and 15 facility personnel sitting together in a room for a session on a new switcher or replay system, where they could actively touch the equipment, see first-hand where the signals were going, and engage in a free-flowing question and answer session.

Such a scenario is currently not possible in our new normal of social distancing, travel limitations, and the remote workflows that most media organizations have had to adopt, almost overnight. And yet, we've seen no slowdown in the development of new broadcast facilities and expansion/upgrading of existing capabilities. Effective commissioning and training processes have never been more important nor more in demand, which means engineering and integration firms need to take a different approach in providing comprehensive services.

The good news is that today's advanced teleconferencing and audio/visual technologies have enabled a new remote model for high-level commissioning and training that can yield benefits over both the short and long terms. This model has been field-tested and refined to provide facilities and their personnel with a safe remote working experience that matches the quality and thoroughness of the conventional model.



In this paper, we will describe the tools used to capture and transmit a variety of visuals that together account for critical elements of system usage and training — including essential components for creating a control-room-like environment for training as a remote service. We will also describe how this new model leverages various broadcast systems' existing remote management capabilities more fully and efficiently.

> ELEMENTS OF A REMOTE COMMISSIONING AND TRAINING SOLUTION

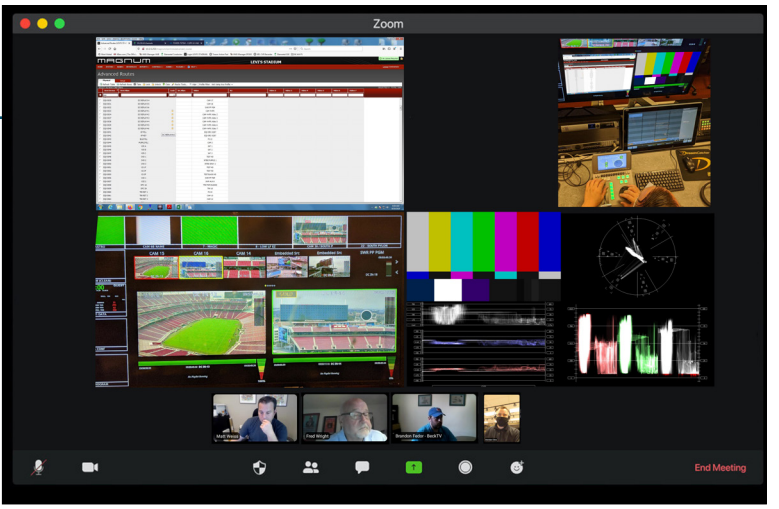
By and large, most of the equipment necessary for adequate and effective remote training and commissioning already exists within a typical broadcast control room or media organization. For instance, most broadcast facilities utilize multiviewers, webcams, waveform monitors, scan converters, and more. In addition, nearly every modern enterprise is expanding its use of online video conferencing tools such as Zoom, Teams, and GoToMeeting.

An effective remote training/commissioning setup requires a knowledgeable engineer working on-site to create the virtual environment. With slight modifications to the setup, depending on whether the task is commissioning or training, the engineer can install all of the tools required (essentially the same tools that would be needed for on-location training and commissioning).

One important component for commissioning is a virtual QC station that uses a combination of webcams and multiviewers to enable third-party vendors to verify remotely that their equipment is functioning properly; for instance, whether a switcher is outputting video. Just as they once did onsite, vendors should be able to walk up to the virtual station and see what's going on. This can be accomplished with the right mix of laptops and webcams installed onsite. The incorporation of a local QC waveform and vector scope can provide further data for troubleshooting.

Again, the onsite engineer is key here to creating a local workflow by which output from all equipment can be presented as seamlessly as possible to remote personnel. One technique is a composite video of everything people need to see with their eyes that can be streamed to an open collaborative meeting platform. The engineer leverages webcams to capture any local monitor wall that is helpful to view, or to provide "over the shoulder" video of trainers or technicians as they operate a piece of equipment. All output from facility cameras and critical computers equipped with the necessary software can be combined as extracted video and input into the facility's pre-existing house multiviewers.

The multiviewer output is then fed into the videoconferencing platform using a video-to-USB capture device on the hosting



workstation to facilitate a collaborative virtual meeting room environment. This robust presentation offers critical information for troubleshooting and an open forum for vendors and other personnel to discuss issues and ask questions; in other words, a virtual experience that facilitates (or closely approximates) the back-and-forth interaction that might take place in an onsite, in-person setting.

The videoconferencing system, of course, is a vital link here — and the service needs to be able to support both spontaneous, continuous collaboration (think of being able to pop in and out of a meeting room with a couple of colleagues over the course of a day, in an ad hoc, unscheduled way as needs arise) and also the ability to break off into separate, smaller groups to discuss issues. Zoom, for instance, offers the ability to set up conference bridges and virtual meeting spaces for 24 hours at a time, and its "breakout room" feature enables the spontaneous gathering of smaller groups.

> THE REMOTE MODEL IN PRACTICE

One BeckTV client, a major global sports origination facility, launched just before the pandemic changed the world. This client's build is technically advanced and complex, with an IP infrastructure based on SMPTE ST-2110 technologies — together with an assortment of new vendors that are still refining their own SMPTE ST-2110 and NMOS capabilities and approaches.

Brendan Cline, BeckTV's director of engineering, is overseeing training and commissioning for this project and has a unique perspective on the challenges and rewards of the remote model. "For this project, we had a double-edged challenge: commissioning a large volume of equipment based on bleeding-edge technology, plus finding a way to get it all done remotely," he comments. "Advanced logistical planning was critical, as was asking all the right questions up front and making sure the right people were communicating and the right people were getting trained."

"As with other remote projects, this build requires an always-on and accessible virtual meeting room that provides all the tools and information needed to troubleshoot problems, as well as solid remote network connectivity to allow vendors to access all of the necessary equipment," adds Paul Nijak, senior engineer. "Remote personnel need to be shown everything the commissioner or trainer is doing onsite, just as if they were physically sitting in the same room."

> A PRODUCTION APPROACH YIELDS A VERSATILE AND VALUABLE RECORDING

The remote commissioning and training scenario described above is, in effect, a broadcast production — leveraging broadcast equipment ranging from cameras and multiviewers to the switchers and other equipment on which the team is being trained. The environment, in effect, is a remote control room that enables everyone involved — from the vendors testing the equipment to the technicians and operators learning how it operates — to work together simultaneously and, in essence, "build a show." As such, the new facility is left with an invaluable asset: a high-production-value record of the entire process that can be leveraged well into the future.

Project Engineer Brock Raum comments, "After all, we're talking about commissioning a broadcast facility and training people that work in video. Why not repurpose the gear we're installing in such a way that serves both goals? The training session recordings are turning out to be even more valuable than the standard onsite training we've seen through the years. Since the recording is very information-rich, it's a highly effective tool for training new operators down the road, or simply giving current operators a refresher on things they might have forgotten."

> A MODEL FOR THE LONG HAUL

In the short term, a remote model for commissioning and training is the safest option. With minimal personnel actually onsite, facilities are able to maintain the necessary social distancing for their teams, without missing any key milestones for getting the facility up and producing.

"In the longer term, we expect this model to be yet another silver lining of the pandemic — a proving ground for permanent remote commissioning workflows that will yield not only new efficiencies and cost savings but also a high-value record for future reference," adds Senior Engineer Paul Kast.

Whether commissioning and training happens onsite or remotely, there are several key tenets that will always apply when building out and launching a new broadcast facility. One of the most important is to select an integration partner that has a solid grounding in sports production. The right partner will spend the up-front time needed to truly understand the project objectives and the client's individual requirements. From there, it's critical to understand how best to approach commissioning and training in a way that does not waste vendors' time and provides operators with the skills and tools they'll need in the most effective and relevant manner possible. <