Facility Description

Caterpillar, a Fortune 100 company, has several facilities throughout North America dedicated to the training of its dealers, service professionals, and heavy machine operators. While in training, these professionals learn all aspects of the machines and receive full demonstrations on the capabilities of the various products. The goals of these facilities—located in Edwards, IL, and Tinaja Hills, AZ— are to ensure a level of expertise and safety for all. Each year, professionals from around the globe are brought to these locations to experience and learn about all that is Caterpillar.

Objectives

The training and demonstration facilities move thousands of people through a variety of classrooms, auditoriums, and demonstration grounds yearly. When the company was looking to upgrade various systems used to facilitate learning, show the use of equipment, or announce new types of heavy machinery, it turned to its long-term partner Pearl Technology. The goal of the project was to ensure a quality learning environment for both local and remote participants, along with creating a world-class demonstration experience. The team at Caterpillar wanted to focus on their clients first and foremost with the need of creating a consistent user experience across all facilities for a worry-free, seamless familiarity for their instructors.

"We have been working with Caterpillar on audiovisual systems at its various facilities for many years, and have a long-standing track record of successful installations with the company. Because of our reputation and strong relationship, CAT once again called on us to help execute its vision."

-Jeremy Caldera, Executive Vice President

Spaces & Challenges

Classrooms

At both facilities there are a variety of classroom spaces that are used for education and training. The existing systems utilized improperly sized aging projection, no capability for remote participants, and many had no capability for digital video inputs.

After evaluating all spaces, Pearl Technology crafted a plan to enhance room visualization and audio intelligibility. This included utilizing various standards such as AVIXA Display Image Size for 2D Content in Audiovisual Systems (DISCA) and Audio Coverage Uniformity. Based on several criteria, the displays in each room were carefully selected and feature a variety of technology including high resolution laser projection, flat panel displays, and direct view LED.

Combined with upgraded video over IP switching, the addition of high-resolution cameras and strategically hidden ceiling microphones, all rooms feature the latest in audiovisual technology that will serve them for years to come. Each facility offered many classrooms and divisible spaces that required independence, combining, and overflow to accommodate the wide variety of groups and participants.

Auditoriums

Larger auditorium spaces are featured at each facility. These rooms offer the same technology as the classrooms but on a much larger scale. These auditoriums offer additional audiovisual support with larger displays, mix-minus audio reinforcement/conferencing, capabilities for panel discussions, and the ability for the Caterpillar television production team to connect and take control of the system for larger events that may be broadcast locally or even worldwide.

Desert Demonstration Grounds

Caterpillar also desired outdoor space, the Desert Demonstration Grounds, to allow clients to see the machinery at work in real-world environments—while hearing from the operators what they are doing—from a grandstand location. Due to space constraints, it was necessary to utilize the same audio system to simultaneously allow for operator communication between different machines not heard by the grandstands and for an announcer to present from the stands.

This posed several challenges for the Pearl Technology design team due to distances, ease of operation, ruthless desert environmental conditions, and flexibility of wireless frequencies due to unregulated transmissions across the border, to name a few.

Pearl Technology was able to utilize high-end wireless microphone and ear monitoring technology that utilized custom designed quadversity RF over fiber antenna systems. These antennas were placed in the hills of the desert area and because of their remote location are all powered from custom solar panel arrays all hidden into the landscape. The operators of each machine can hear each other on the right side of their headphones while listening to what is being sent to the grandstands from their left headphone.

The built-in microphone headset allows for operators to speak and with the use of a switch determine if they wish to speak through the grandstands PA or privately with other nearby operators. The limited space required customization of body pack transmitters and receivers that can be held on a body vest or quickly removed to be placed in charging bays.


Demonstration Arena

The demonstration arena features a viewing gallery that allows clients to see the heavy machinery firsthand. The previous capabilities of the system feature basic audio playback along with manually operated cameras that can zoom in on the machinery to be displayed on monitors. Caterpillar wanted to enhance this experience and improve overall quality of what can be seen with more detail.

To solve this, the team at Pearl Technology upgraded the overall video quality and switching—along with making the system more user-friendly. An enhanced audio system and the addition of a nearly two-story-high 48:9 dvLED video wall brings the experience of Cat's clients to the next level. Instead of drawing attention away from the equipment to the monitors, clients can now see what is happening on the screen behind the equipment, allowing for simultaneous viewing of the equipment itself and the screen.

The capability now exists to show presentation data on the equipment, a wireless video feed from the operators focused on control operation, and exterior views of specific, close-up parts of the machinery.
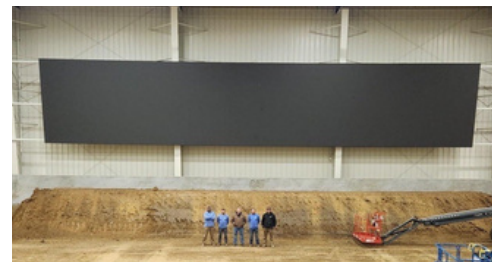
Outcome & What Is Next?

The success and implementation of these systems has enhanced the experiences and ability to learn for the thousands of Caterpillar clients that visit these facilities. These successes have led to the Caterpillar executive team engaging and collaborating with Pearl Technology for discussions about what the future brings to these training and demonstration facilities.

What is the audiovisual refresh cycle and what is technology roadmap for Caterpillar?

What technologies such as virtual or augmented reality can be combined for learning, training, simulation, and actual remote controlling of real-world equipment can be utilized?

These are the questions currently being discussed to further the success and mission of these and other global facilities.