



eliko

Case Study: How next- generation location technology empowers live events at EMPAC

Knowing the location of your artists on stage can bring your immersive ideas to amazing live shows and interactive videos. Read about Curtis R. Priem EMPAC's cooperation with Eliko to get inspired!

Background

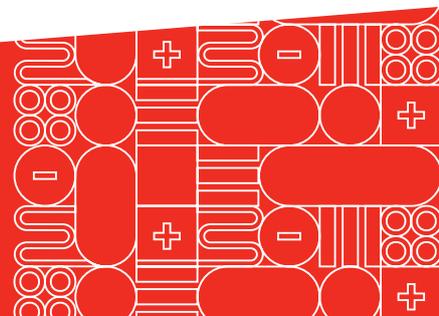
The Curtis R. Priem Experimental Media and Performing Arts Center (EMPAC) is a multi-venue arts centre at Rensselaer Polytechnic Institute in Troy, New York.

EMPAC is where the arts, sciences and technology meet under one roof and breathe the same air. Four exceptional venues enable audiences, artists and researchers to inquire, experiment, develop and experience the ever-changing relationship between our senses, technology and the world we create around us. EMPAC is an icon of the new polytechnic, a new paradigm for cross-disciplinary research and education at Rensselaer.

The 220,000-square-foot (67 000-square-metre) building includes many firsts in the fields of acoustics, performing arts infrastructure and architectural engineering. The integration of these features with audio, video, lighting, computer and stage rigging networks makes EMPAC the ideal environment for human interaction with digital media.

Both a performing arts centre and a research and production facility, EMPAC provides an environment that supports the realization of complex artworks and research projects at any stage, from inception to completion.*

* EMPAC website:
<https://empac.rpi.edu/about>





CHALLENGE

In some projects, artists are interested in live interaction between media and performers on stage or in a studio. There is typically more than one person on stage at a time and these actors and dancers sometimes need to be projected on. Both criteria present obstacles for typical video capture interaction.

Eric Brucker, lead video engineer of Curtis R. Priem EMPAC, said that the main challenge before using the time-of-flight (ToF)-based Ultra-Wideband (UWB) tracking system was tracking in darkness to project the lighting precisely on the dancer.

"The infrared systems," he explained, "can easily get confused when we need to track more than one target, so we were searching for something not visual or infrared."

SOLUTION

The Curtis R. Priem EMPAC engineers and Taiwanese artists from YiLab integrated various tools into the complex system for sound, graphics and interactivity. Eliko's UWB-based real-time tracking system for artists on stage was integrated with their high-resolution Wave Field Synthesis (WFS) array as a stage reinforcement option. They used the complex solution for both research and immersive performance shows. Usually, the artists put the location tag into their pockets and the tracking area is covered with anchors for creating a UWB network to track them.

"When researching the solutions on the market, we liked that Eliko's UWB-based real-time location system (RTLS) had a very high refresh rate and was very accurate."

Eric Brucker, Lead Video Engineer of Curtis R. Priem EMPAC

They desired a solution that would provide precise and reliable location data and would also be easy and cost-efficient to maintain.

Last but not least, they needed to find a solution and integrate it into their systems in the nine days they had left until the first live show! Since the artists had come from Taiwan to the United States, many of the ideas were realised during that short rehearsal period, so they adapted to them.





TECHNICAL SPECIFICATIONS

This project comprised five primary systems:

- **WFS** (wave field synthesis) is a spatial audio rendering technique that places virtual sound sources in real space.
- **Max** is a visual programming platform for sound and multimedia. They used Max for controlling moving lights. Max was also used on an additional computer to control the WFS.
- They used an **Intel RealSense depth camera** and Touchdesigner, a node-based visual programming language for real-time interactive multimedia content. Touchdesigner also parses the location information and passes it on to the other systems.
- **Resolume** is a VJ software and media server that controls projection using the location data to focus the projections on or near the dancer(s).
- **Eliko's KIO RTLS**, a precise Ultra-Wide-band (UWB)-based real-time location system (RTLS), was added to the Touchdesigner machine and passed on that data as well as the infrared data. With only two days working with the new system, the artist first used both the RTLS and infrared during the work-in-progress showing.

"Setting up the systems and integration was fast and easy. We used a Disto from the centre of the tracked area to find the location of each anchor, which resulted in a 15-20-minute set-up time. Filtering the data and scaling was very simple using Touchdesigner. The tracking rate for the moving tags was set at 10 Hz (10 times per second), but most of the time, even a quarter of that speed would be acceptable. I am proud that the system was able to be implemented so quickly."

Eric Brucker

Benefits of KIO RTLS in the system:

- Precise and reliable location tracking
- High update rate
- Fast set-up time
- Easy to integrate and implement
- Cost-efficient





RESULTS

Knowing the location of artists on stage opens up a previously hidden world of ideas for immersive live shows.

Eliko's precise tracking solution has benefited many stakeholders:

- The lighting designer and projectionist know the position of artists precisely and can bring their immersive ideas to amazing live shows.
- The artists are more confident in their synergy with the technology and lights and can focus solely on their performance.
- The audience can enjoy amazing live shows as the solution creates an engaging experience for the audience.
- The Cognitive and Immersive Systems Lab (CISL) has expressed interest in integrating a solution like this into their situations room.

"We were delighted with the results of combining Eliko's precise UWB tracking with our wave field synthesis as well as dance while moving from research mode to performance mode during the first event."



Eric Brucker

Next steps

EMPAC engineers are further developing the solution.

"We have extended the tracking area and will keep experimenting with KIO and use it in our next shows as well. We have since upgraded the system to six anchors and four tags. Eliko has also provided us with a software update that enabled the possibility of a UDP connection, which will sim-

plify things when we only need to use the WFS. We hope that Eliko will offer an OSC option in the future, which is the most common language that our systems can speak natively. With its simple solution, Eliko is a serious competitor in our industry among other solution providers that offer many options and are much more expensive as well,"

Eric Brucker

About Eliko

Eliko provides precise and reliable real-time location services that employ UWB networks. Eliko's mission is to bring game-changing tracking networks to industrial organisations for higher visibility, security and productivity. However, we are also keen to empower other innovators on their journey to develop mission-critical digital solutions in other industries, such as entertainment. Eliko's UWB networks are highly flexible and scalable in order to suit multiple indoor location opportunities and address new relevant use scenarios. In addition to EMPAC in New York, our customers include Le Puy du Fou Theme Park in France, Dimension Data and others.

Contact us at sales@kiortls.com to discuss your tracking needs.