eliko

Case Study

Supporting Real-Time Location Tracking for Punchdrunk's LANDER 23

REAL-TIME
LOCATION
TRACKING

At Eliko, we have spent years refining Ultra-Wideband (UWB) technology to handle the most demanding industrial and commercial environments. When Punchdrunk, pioneers of immersive theatre, approached us for **LANDER 23**, we knew it would be a unique and complex environment for real-time location technology. Unlike a controlled warehouse or factory floor, this was a dynamic live entertainment setting where reliable spatial data played an important role in supporting the audience experience.
This case study outlines how we deployed our real-time location system (RTLS) to support participant tracking across a complex multi-level industrial space in London, providing reliable data for an ambitious immersive experience.

THE CHALLENGE
Mapping a Challenging RF Environment

The venue for LANDER 23 is a large-scale industrial building. From a radio propagation perspective, the site presented several significant hurdles that made traditional location technologies like Bluetooth (BLE) or Wi-Fi-based RSSI unsuitable.

1. Architectural Obstacles and Multipath Interference
The building's skeleton consists of heavy concrete beams and thick columns. Concrete is notoriously difficult for radio signals; it causes high attenuation and reflects signals, leading to multipath interference. In an RTLS context, this means signals bounce off surfaces and reach the receiver at different times, which can cause "ghost" positions or significant jitter.

Furthermore, the experience design required a complex internal layout, with multiple rooms, corridors and industrial features that created a challenging signal environment.

2. The Two-Floor Verticality Problem
One of the most complex aspects of the project was the multi-level nature of the environment. In location tracking systems, distinguishing between levels can be challenging, particularly in buildings with dense materials and overlapping signal paths. The system therefore needed to support reliable level differentiation as participants moved through the experience.

3. Dynamic User Density and Movement
The project required simultaneous monitoring of multiple participants during live sessions, with the system needing to support movement through a complex environment.

- **Responsiveness:** To support the live experience, the system needed to deliver frequent, responsive location updates.
- **Latency:** The location data had to be delivered with minimal delay to support a smooth and coherent experience for participants and operators.

THE SOLUTION
A High-Density UWB Infrastructure

To meet these requirements, we chose a high-density deployment of our UWB-based RTLS. UWB is uniquely suited for this environment because it uses very short pulses (nanosecond-wide) across a wide frequency spectrum. This allows the system to distinguish the direct path signal from its reflections, effectively mitigating the multipath issues caused by the building's concrete and metal. Moreover, we have designed a unique active-passive two-way ranging protocol (AP-TWR) for UWB that allows for both high positioning frequency and better robustness of the location data.

1. Strategic Anchor Placement
We deployed a high-density anchor network across the space. Our engineering goal was to maintain strong coverage and redundancy across a highly fragmented layout, ensuring that tags could continue to provide useful location data even in areas with signal obstruction.

- **Network Design:** We designed the system layout to support accurate and stable location tracking across the experience.
- **Multi-Level Tracking:** The system was configured to support reliable participant location across multiple levels, helping operators maintain a clear view of movement throughout the environment.

- **2. Hardware Performance: The Tags**
Participants were equipped with compact Eliko tags designed to sit comfortably within the experience.
- **Throughput:** The system was configured to support multiple participants at once, while maintaining regular location updates throughout the experience.
- **Throughput:** Given the physical nature of the experience, the tags needed to be robust enough for a live, participant-led environment.

3. Technical Integration and Support
Integration was a key part of our solution. Our RTLS provided flexible integration options, allowing the technology to support Punchdrunk's wider technical system.

Throughout the setup phase, our technical staff worked closely with the Punchdrunk team. Working within a live production schedule, our team remained flexible and responsive throughout the setup phase. We assisted in fine-tuning the anchor network and optimizing the software filters to ensure the smoothest possible movement visualization for the team captains.

RESULTS
Reliability in a High-Stakes Environment

The deployment supported the transformation of a challenging industrial site into a complex immersive experience.

- **Accurate Team Coordination:** Operators were able to monitor participant movement in real time, supporting coordination across the experience.
- **Environmental Robustness:** Despite the complex build and challenging signal environment, the system provided strong coverage across the experience, supporting reliable participant tracking in key operational areas.
- **Vertical Accuracy:** The system supported tracking across a multi-level layout, helping the production team maintain a clear operational overview of participant movement.
- **Operational Stability:** Over the course of the project, the system provided an important layer of technical support for the live operation.

CLIENT FEEDBACK

A project of this complexity requires a partnership that goes beyond a simple vendor-client relationship. Punchdrunk's technical team highlighted the importance of our collaborative approach:

"The Eliko team were absolutely instrumental in turning the ambitious technical vision for Punchdrunk's Lander 23 into reality. Faced with the challenges of a vast industrial space and a very demanding production schedule, they consistently exceeded our expectations at every stage of the project. Their teams demonstrated exceptional dedication, flexibility, and problem-solving abilities, adapting rapidly to our evolving requirements and helping us deliver an ambitious immersive experience on time.

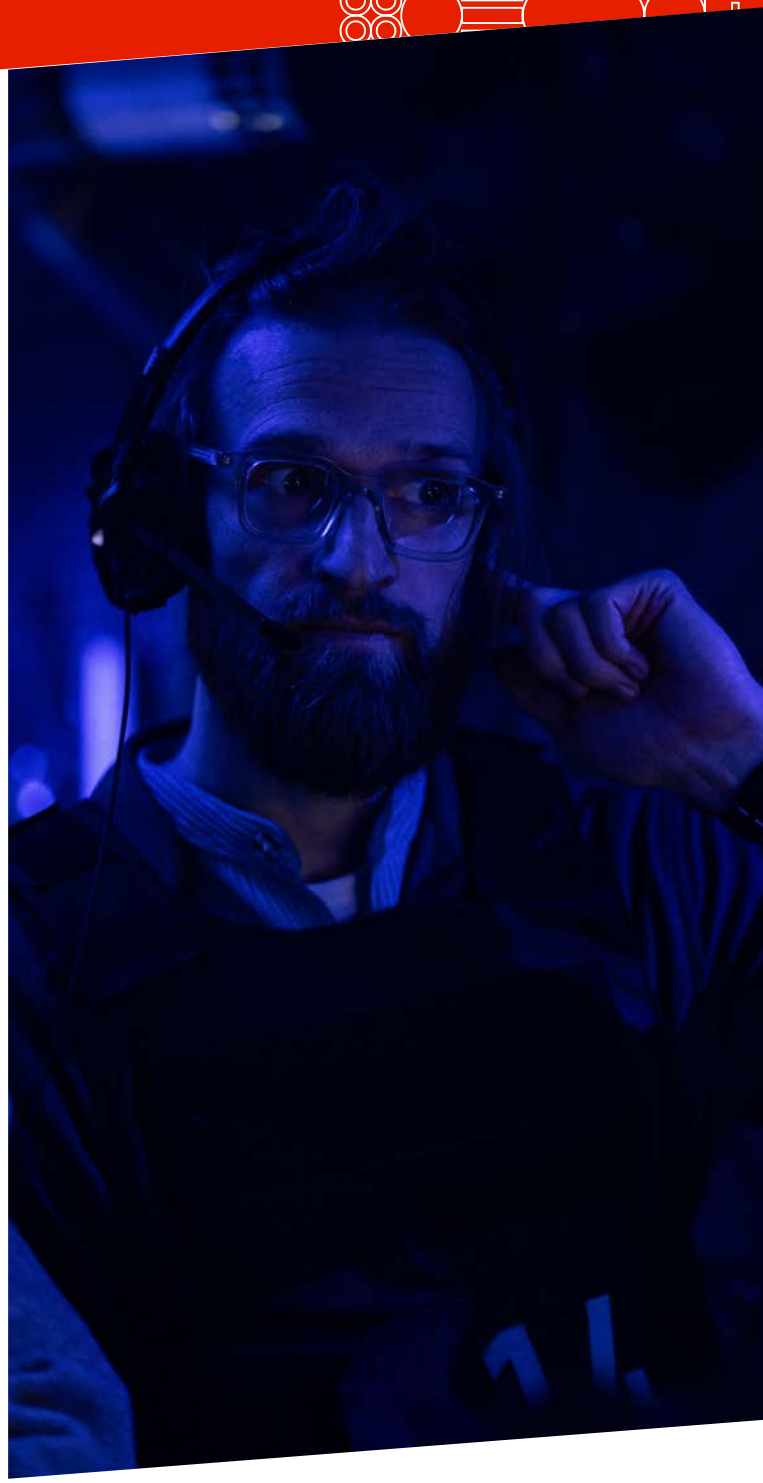
Quite simply, Eliko was a key partner in making Lander 23 the experience we envisioned, and we couldn't have achieved the same level of execution without them."

— Punchdrunk Executive Team

PROJECT OVERVIEW

A project of this complexity requires a partnership that goes beyond a simple vendor-client relationship. Punchdrunk's technical team highlighted the importance of our collaborative approach:

Metric	Details
Location	London, UK
Venue Type	2-Storey Industrial Building
Technology	Eliko UWB RTLS
Tracking Frequency	Up to 10 Hz (10 updates/second)
Movement Speed	Walking and Jogging
Structural Obstacles	Concrete beams/ columns, plywood, drywall
Tracking Frequency	10 Hz (10 updates/ second)
Movement Speed	Walking and Jogging
Structural Obstacles	Concrete beams/ columns, plywood, drywall



CONCLUSION

LANDER 23 is an example of how real-time location technology can support complex live entertainment environments. By combining hardware, system design and technical support, Eliko contributed to the delivery of an ambitious immersive experience in a challenging industrial setting.

Whether it's a warehouse, a construction site, or a two-story industrial theatre, our system provides the reliability and precision required when every centimeter—and every second—counts.

Find out more:
www.eliko.tech
Contact:
sales@eliko.tech