Extended Reality for Chemical, Biological, Radiological, and Nuclear (CBRN) Training

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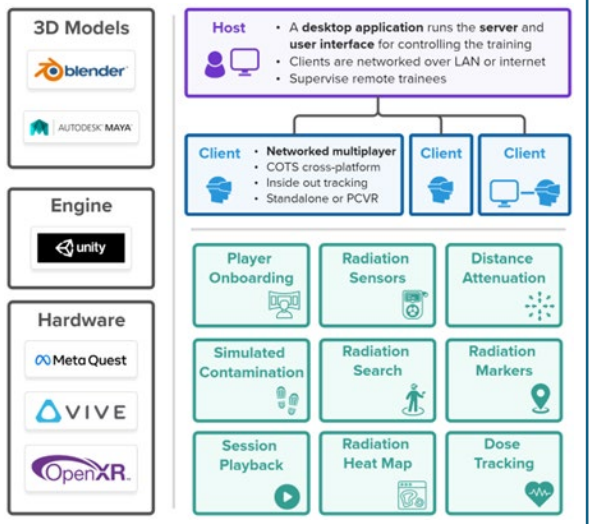
Introduction

Current Chemical, Biological, Radiological, and Nuclear (CBRN) training is a mix of equipment training, tabletop exercises, functional exercises, and full-scale exercises. Such exercises are resource intensive and often lack elements of realism. Training using dispersed live radioisotopes is particularly cumbersome and constrains the diversity of available scenarios. Noblis' networked virtual reality application for CBRN training provides a safe-to-fail environment that unlocks the diversity of available scenarios, practically eliminates reconfiguration time, and automates metric collection and reporting.

Methods



Results

The Extended Reality (XR) Chemical, Biological, Radiological, and Nuclear (CBRN) Training prototype provides teams with an immersive, simulated training environment to practice their tactics, techniques, and procedures for radiological survey and search missions. Built using Unity3D, the application has two components: (1) a desktop application for the training controller and (2) a virtual reality app for trainees. With networked multiplayers, teams can train together in real-time.

The training incorporates dynamic, simulated radiation fields and a simple contamination model. Trainees use virtual handheld radiation detectors to locate radiation sources. When the trainee finds the source, they place a marker on the source. For added realism, players can become contaminated when contacting a radioactive source. Contaminated players spread radiation throughout the environment, thereby increasing the risk of teammate contamination and adding realism.

The trainer uses a desktop application to monitor trainees' actions, histories and radiation doses in real time. The trainer can focus on specific users, toggle between views, create time-stamped notes, and view a radiation heat map. The training sessions are recorded. These features combine to provide an auditable record of training and enables detailed trainee feedback.

Conclusion

The resulting virtual reality app allows for safe and rapid CBRN training exercises. The trainee is in an environment that allows them to carry out their objectives while working as a team. Furthermore, the trainer can appropriately evaluate the trainee's performance and can replay their actions. Extended Reality (XR) Chemical, Biological, Radiological, and Nuclear (CBRN) training blends modern technology with practical training practices to facilitate impactful exercises.

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