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Approaches to Development of Fully Immersive Training

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Trends and use cases in xR training and simulation

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TRENDS

- Strong investment into xR-based training solutions

- Collaborative Cloud Environments

- Department based unified training (infantry, aviation, etc)

- Using AI for real-time procedural rendering of high-fidelity terrains

- Use of peripherals (treadmills, submillimeter tracking, haptics)

- Component based development

- Real army equipment integrated with xR sensors

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IMPLEMENTED USE CASES

- Hand/Arm/Body interaction with, and manipulation of firearms and their moving/external parts (bolts, triggers, magazines etc.)

- Virtual avatar for psychological and simulation purposes

- Multi-user environments with non-verbal communication
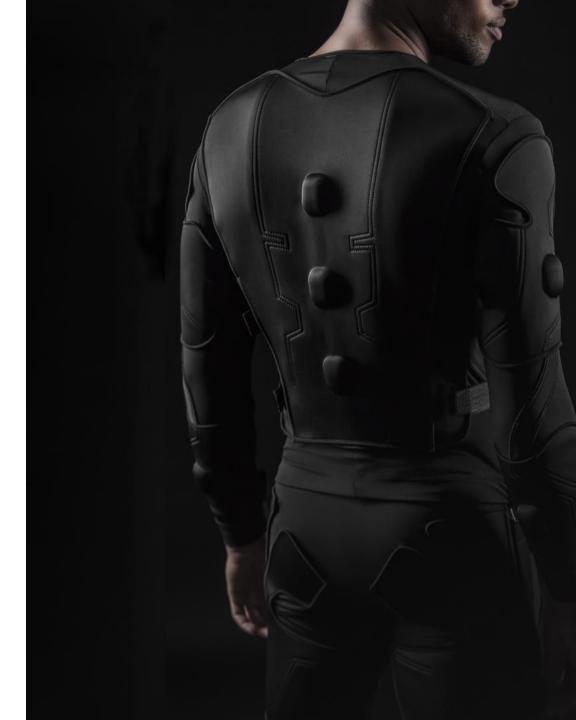
- Simulation of muzzle blast

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POSSIBLE USE CASES

- Multi-user interactions (such as stacking at doorways for room clearing with hands on shoulders)

- Simulation of impacts, explosions (both soft and pain generating)

- Assist trainers assess participants in a more in-depth physiological manner

- Allow adjustment of simulations in real-time according to the physiological response of participants

- Use as a testing tool to watch for negative responses to the simulation stimuli (duress, sickness (especially motion sickness), declines in health, etc.)

12 KEY ELEMENTS FOR IMMERSIVE TRAINING

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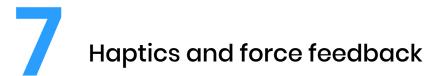**1** Human-eye resolution HMD

2 Content

3 Spatial Audio

4 Biometrics

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12 KEY ELEMENTS FOR IMMERSIVE TRAINING

5 Positional tracking

6 Full-body tracking

7 Haptics and force feedback

8 Gun Replicas

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12 KEY ELEMENTS FOR IMMERSIVE TRAINING

9 5G as a network

10 Edge/Fog computing

11 Artificial Intelligence

12 Cloud-based Engine for Unified Training Environment

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xR Training Concepts

- **VR Training**

- **AR Training**

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VR Training Concepts

- Training area – from 1.5 meters *1.5 meters

- Positional tracking via IR, floor/ceiling, cameras, RF

- Inertial based full body avatar tracking with haptic feedback and biometry

- Tracked military grade weapon replicas

- Standalone/Tethered HMDs

- Unified control center to generate and personalize scenarios using AI procedural rendering

- Edge computing

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AR training concepts

- Training area – unlimited

- RF/GPS positional tracking

- Haptics for pain simulation

- Military grade weapon replicas

- Standalone AR helmets/glasses

- 5G to cover entire training field

- Edge computing

- Unified control center to generate and personalize scenarios using AI procedural terrain details rendering

- Command center with spectator mode and high precision replays

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- Advanced Haptics

- Electrical Muscle Stimulation (EMS)

- Transcutaneous Electrical Nerve Stimulation (TENS)

- Heat Control

- Motion Capture

- Biometrics

Haptic feedback system | Heat control system | Motion capture system | Biometry system

Thank you!

ANY QUESTIONS?

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