AVRT
ADAPTIVE VIRTUAL REALITY TRAINING

The AVRT platform:
The Adaptive Virtual Reality Training solution:

Utilising the latest cutting-edge virtual reality technologies, the AVRT platform provides organisations with the ability to train for situations that would otherwise be logistically challenging or cost prohibitive.

Following intensive development and feedback from over 80% of UK Police forces, the AVRT platform for National Decision Model scenario, judgement, less-lethal and firearms training simulations is available now.

The AVRT platform uses fully immersive, free-roam wireless technology, coupled with multiple real-feel weapons and equipment. There are no controllers, no buttons to learn and no multiple-choice menus to interrupt the learning – user adaption time is virtually zero.

The system is a delivery method for existing curricula and frameworks - Instructors can live role-play against trainees by voicing and managing the actions of multiple VR characters or let pre-scripted or AI-driven scenarios run to completion.

Movement and actions within the system are natural, intuitive and comfortable to allow trainees to focus purely on learning outcomes.

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AVRT System Software Capabilities:

• Networked multi-user capability – any combination of human vs digital characters or human vs human.

• Base library of 3D environments, digital subjects and 3D weapons to be used in scenarios.

• Fully dynamic scenario controls including deployment of fully controllable and AI-driven scenario actors.

• Highly controllable and adaptive waypoint and cover system for AI digital characters.

• Target shooting scenario for VR familiarisation (100m range and 360° target scenario).

• Highly functional User Interface to allow customisation of objectives and scenarios.

• Full 3D replay facility including first person view and shot placement for effective After-Action Reviews.

• Capability to integrate 3rd party hardware such as haptic suits and gloves.

• Options to develop the software and hardware platforms further, based on requirements.

The AVRT platform is a new way of training that will supplement the toolkit of trainers:

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The AVRT platform isn't intended to completely replace traditional scenario training or live exercises, more to add realism and repeatability to scenario and decision-based training.

More repetitions of critical training activities for neutral or saved costs is a key benefit of VR training with AVRT.

The AVRT platform gives trainers the ability to see through the eyes of the trainee in order to better understand their decision making.

AVRT Law Enforcement Datasheet

Element	Detail
Maximum tracked area	Unlimited (standard is 100 sq m but is fully modular)
Tracking type	Sub-mm accuracy, 6DoF IR external tracking
Portability	2-3 x tactical hard cases + matting as required
Maximum users	Unlimited
Weapons per user	5+
Weapon types	Real-feel firearm weapons with gas-blowback recoil. Custom built less-lethal weapons such as CED.
HMD Resolution	2064 x 2208 per eye (Oculus/Meta Quest 3)
Scenarios	Unlimited – build custom scenarios from the library
Scenario types	Full, live, instructor-led role-play or pre-scripted
Communication	Self-contained, secure wi-fi network

Natural Actions and Movements:
Fully Free-Roam and Wireless Technology

The AVRT platform is built on reliable, self-contained consumer technology to avoid the need for costly custom-built VR hardware. Wireless hardware allows for natural movements and actions on a completely free-roam tracking area. Officers can train in standard tactical kit, greatly reducing the potential for training scars.

This approach results in virtually zero adaption time for trainees, leaving them to focus on the learning outcomes.

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Train Anywhere, Anytime:
Fully Configurable and Scalable Training Environment

The AVRT free-roam tracking system uses a fully configurable training area and can be set up in any reasonably-sized open space. The tracking area can be scaled to any size to suit the training requirement with no impact on tracking effectiveness. The AVRT system is fully portable, giving greater flexibility to training programmes. Any venue can be a training venue so Officers can train in operational locations and be ready to go when duty requires it.

Train with Familiar Equipment:

Simulated real-feel weapons and hardware

Added to the VR hardware is industry-leading technology in the form of custom weapons and active real-world props based on less-lethal weapons, Firearms and Equipment that are in use around the world. Virtually any weapon can be built into the platform.

These include less-lethal devices such as Conducted Energy Weapons and Pava/CS as well as Carbine and Pistol weapons. Weapon use is intuitive, gives haptic feedback to the user and can be holstered into existing tactical equipment to give a more natural training experience.

Exceptional After-Action Reviews:
Detailed Full 3D and First-Person replays

Scenarios can be viewed from the Officer's perspective so that the trainer and the rest of the training group can see exactly what was seen at the time the action was taken. The whole training session can be recorded for review later if the organisation requires this. Replays can be reviewed from any perspective within the scenario using a free-roaming camera. Advanced metrics display shot placement, distances, reaction times and Officer biometric data throughout the training scenario and replay.

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Challenge Officers Every Step of the Way:

Completely Adaptive and Controllable Dynamic Scenarios

The AVRT instructor console allows configuration and adaptation of fully interactive scenarios according to how Officers are performing. This includes defining the environment, characters, clothing and weapons during training setup and changing character behaviour, aggression, actions and even lighting conditions while the scenario is running live. The same scenario can have different outcomes for users that have trained with it previously or a fully repeatable situation can be configured for formative and summative assessment purposes. The AVRT system is significantly different from passive 3D video VR training.

Networking allows Officers to train together in the same virtual and physical space.

The system uses existing trainer skillsets to deploy established curricula and frameworks and can deliver current learning outcomes out-of-the-box with no costly changes to content or scenarios required.

More Training for Lower Costs:

A Blended VR approach can Increase Repetitions Whilst Saving Costs

Equipment use is simulated so single or restricted use items such as ammunition, Conducted Energy Device (CED) cartridges and batteries are not wasted, saving costs for training sessions. Firearms, CED and PAVA/CS can all be simulated within the system. More training for lower costs is the ultimate aim.

Additional cost savings are driven through using virtual characters (both pre-scripted and fully instructor controllable) for detailed multi-actor scenarios, saving costs of expensive safety staff and role-players.

Denied environments are available within the system, reducing the need for expensive construction of locations or hire of venues.

Depending on the size of the force, saving just 2-4 CED training cartridges per officer, per year has the potential to make the system cost neutral or better on that area of Police training alone.

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The AVRT platform in use:

The AVRT system has been trialled successfully at Derbyshire Constabulary, British Transport Police, the Civil Nuclear Constabulary and Essex Police. Below is some feedback from users:

"Having been in the unfortunate position to have been threatened with knives on numerous occasions, I can say that the feeling that the VR gives is the same as real life situations, whereas the HALT training suit does not. I would say the VR prepares officers who have not been in those situations to act as per the training and not panic. I feel we owe it to the public to invest in it now and to be at the forefront of VR training as it adapts and evolves to a point where one day it will replace traditional training such as the HALT scenarios."

Experienced STO (Specially Trained Officer – Taser) – Derbyshire Constabulary

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"VR technology is undoubtedly the future for CED training. We need to embrace it and continue to help with the development to keep improving it. The AVRT system is by far the best training aid I've ever seen and am really looking forward to continuing to use it in the future".

"I can't believe just how immersive the VR environments are"

"It's great how we are able to draw and holster weapons in our operational holsters".

Experienced Taser Trainers – Derbyshire Constabulary

The AVRT system isn't just about Weapons-based training:

AVRT is working with UK Police forces assessing the system for comprehensive Police use including areas such as:

- Initial Police Officer recruitment
- Basic Officer training scenarios such as scene management, situation de-escalation and vulnerable persons
- Domestic Violence and sensitive situation training
- Public Order training
- Diversity and judgement scenarios
- Community engagement such as Police Encounter Panels and public critical incident assessment boards.

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The AVRT Command Pack and all 12 AVRT HMD packs visible – HMD, Headphones, charging cables and weapon power banks (removed for transit)

The AVRT Command Pack, 12 HMD kits (6 visible), 6 CQB Carbine Rifles and 8 Pistol weapons

The AVRT system is not experimental or a proof-of-concept.
In its Military configuration, it is used by the Singapore Army. Their 12-user system was purchased and deployed in July 2023

The system includes 20 weapons across 3 weapon types and the largest portable VR tracking system in the world at 400 sq. metres

AVRT and advanced technologies:

The AVRT team work with technology companies such as Teslasuit, SenseGlove and Delta Kinetic to integrate their advanced products into the AVRT platform to achieve the best outcomes for users and trainers alike.

Advanced haptics provide consequences for scenario-based training actions and even blue-on-blue incident simulation.

Contact details for AVRT:

info@avrt.training

+44 1279 600171 / 07972 172872

avrt.training

www.linkedin.com/company/avrt-training