Brigade Command post running a simulation for IDF commanders. Photo courtesy Elbit Systems

Virtualized expertise - How VR is honing peacekeeping skills

Virtual reality (VR) has gone through a growth spurt over the last five years courtesy of the video games industry. The sophistication of these programs and the proven capability to secure revenue streams have propelled the technology forward to pioneer new applications in the field of mission-critical instruction. But how does the technology translate, and what can be achieved with it over conventional educational methods?

Laurence Russell, News and Social Editor, Global Military Communications

Technology has been augmenting the power of education for decades now, although the power of dynamizing the delivery of knowledge goes beyond schools and academia. In the case of instructing for mission-critical tasks, many experts insist there is no substitute for genuine experience.

Military staff, first responders and operators in remote or dangerous environments are all faced with a variety of life or death challenges, for which the dry dictation of conventional teaching can only offer so much. To some extent, true understanding of effective mission-critical procedure comes from being in the situations themselves, using one's actual senses, making quick decisions, and physically applying oneself.

Of course, plunging inexperienced personnel in at the proverbial deep end, where their unfamiliarity can translate into serious injury and the loss of life, has always been less than ideal.

The power of VR has been wishfully conceived as a potential answer to this ever-present difficulty. To place prospective staff in simulations of the high-stakes situations they may encounter and have them face a realistic representation of true danger could result in recruits with more hands-on experience than have been deployed in history.

It would appear we are approaching, or perhaps truly entering the era in which VR instruction can derive a kind of first-hand experience for mission-critical operations. In the short term, digitization of training allows for prospective personnel to undertake effective instruction without creating an unnecessary risk of infection among staff.

On a longer timeline, beyond the present pandemic, advanced VR training has the potential to create a more sophisticated, cost-effective route to the instruction of personnel, keeping the human element of military capability sharp for the ever-evolving global landscape, especially in light of the growing power of new technologies and cyber threats.

The training of pilots has always been a huge focus of electronic training, although modern technology has begun to perfect the art, producing remarkably professional airman unprecedentedly quickly at lower costs.

Nellis Air Force Base opened their Virtual Test and Training Centre (VTTC) on August 17th which the US Air Force declared would "house the future of joint aerial combat training." The VTTC incorporates multi-domain scenarios, providing exercises across air, space, and cyber domains.

"The VTTC is a great complementary piece to live-fly sorties," stated Peter Zupas, USAF Warfare Center analyst. "It will allow personnel to increase the number of sorties that otherwise wouldn't be regularly available to them in live-fly. However, simulators are no substitute for live-fly operations."

First response simulations – A small step toward police reformation

Military servicemen aren't the only faction that stands to benefit from the potential of VR training. The first responders keeping peace in our own streets are just as worthy of its many insights.

A promotional image showcasing the Collaborative VR Procedural Trainer. Photo courtesy of ARVR SIM

Axon, a global competitor in public safety technologies, recently announced a set of six VR training programs designed to instruct US police officers in peer intervention, post-traumatic stress injury procedure, and mental health awareness.

Peer intervention details the specific circumstances in which an officer can safely and professionally intervene when they recognise a fellow officer performing inappropriately. The two associated scenarios have the learner make active decisions as they respond to a noise complaint, and address a homeless person on business property, whilst the learner's partner expresses an outspoken bias against both subjects.

All of these simulations have been constructed with a concerted interest in promoting empathy and recognising a sense of community with the people the police serve, alongside the necessities of officer preparedness and safety by drawing from the expertise of community advocacy groups, mental health organizations, clinicians, and law enforcement experts.

"Knowing when and how to stand up to your peers can be difficult in any industry," explained AI Ethics Board member and former police chief Kathleen O'Toole. "But especially in policing when faced with potentially volatile situations. Immersive training like this is very impactful as it trains officers to recognize when peers are acting inappropriately and empower them to intervene properly, resulting in successful, non-violent outcomes."

Rick Smith Axon founder and CEO added: "After the events of this year, and the many tragic events that preceded 2020, it is clear that we need to offer law enforcement proactive versus reactive tools for reducing the use of force. Being trained on when not to deploy force is just as important as tactical training on how to deploy force, and that is what we are addressing with these new training modules. Our mission has always been to protect life and this training is a big step towards that goal."

Of course, over recent years, the American people have agonised over the right way to reform its law enforcement services when they prove themselves unworthy of service. With expansive institutionalised change unlikely, the power of education from within departments adding a vital human element to an officer's instruction could prove a valuable source of change.

Engineering walkthroughs – High-risk maintenance without the danger

VR training can enrich the private sector too. Mission-critical roles also exist in remote and dangerous environments tackled by industry, many of which are realising the value of capitalising on VR technology.

Ultra-realistic simulations of industrial procedures free from the safety hazards associated with them, such as toxic chemicals, live electrical wires and other environmental threats could prove extremely useful to preserving the wellbeing of the experts responsible for them.

Evergy, a Missouri-based electric utility company is exploring a customized training module to instruct engineers on various repairs associated with critical high-voltage substations. Participants of these modules must complete a series of precautions and tasks associated with the machinery, which is exhaustively rendered with the use of 3D scans of the real systems for total accuracy.

Any mistakes a user makes will be logged and explained to them in detail, so that they can learn in real-time, without the

danger of coming to real harm. This can allow instruction bodies to produce engineers who are already aware of the potential risks they may encounter, since they've already seen and understood them from a first-person perspective, with visual, audial, and even tactile realism.

Command exercises – Using war games to master strategy

Command personnel must too engage with these applications. As the ability to move and manipulate massive amounts of information increases, so too does the already myopic complexity of tactical data to commanders.

A commander's ability to quite literally see a situation unfold from both the eyes of their soldiers and orbital vantages, besides an unprecedented wealth of ISR data, quickly makes the work of effectively directing assets around split-second changes almost too elaborate for the human mind. The power of technology is thoroughly necessary to keep pace here.

Part of that work comes from the agility of automated systems doing some of the thinking for us, but the human element can never be compromised for. The expertise of commanders themselves is perhaps the most vital aspect of a mission-critical operation.

Elbit Systems' Brigade and Battlegroup Mission Training Center, aims to address this concept, catering to the Israeli Defense Forces (IDF) by simulating a number of scalable brigade-level exercises for up to a hundred trainees at a time, each with unique command responsibilities.

These simulations feature potentially thousands of assets, a large tactical landscape, and unexpected complications that appear in real-time, such as sudden loss of communication performance, potentially requiring time-sensitive re-organization. Even weather conditions can be replicated.

These simulations are further complexified by the work of an exercise director, who controls the challenges facing trainees and can introduce any number of unforeseen obstacles to keep the programs fresh and challenging after trainees master its initial difficulty.

An after-action review and debrief function enables synchronized playback of the entire exercise from any given trainee's vantage so that instructors can walk through specific victories or failures in the simulation, second by second.

Command-level exercises have been conducted for years, however the real-world scale of setting them up, complete with actual troops, is not necessarily a sustainable option, especially when it comes to the effective simulation of cutting-edge technologies and multi-domain engagement.

The potential for new standards of military expertise offered by frequent VR instruction could herald a degree of engagement intelligence advanced enough to not only better protect assets but allow for faster and more comprehensive ending of hostilities.

The seminal supreme art of war is said to be the subdual of one's enemy without fighting, a prospect so civilised, it has long been considered entirely unrealistic. However unlikely, the boundless potential of technology compels us to at least aspire to such things.

This, and so much more could be possible with the power of first-hand education that might be realised through the nature of VR training. **GMC**

Photo courtesy of Shutterstock/Preechar Bowonkitwanchai