I/ITSEC 2019
EVENT REPORT
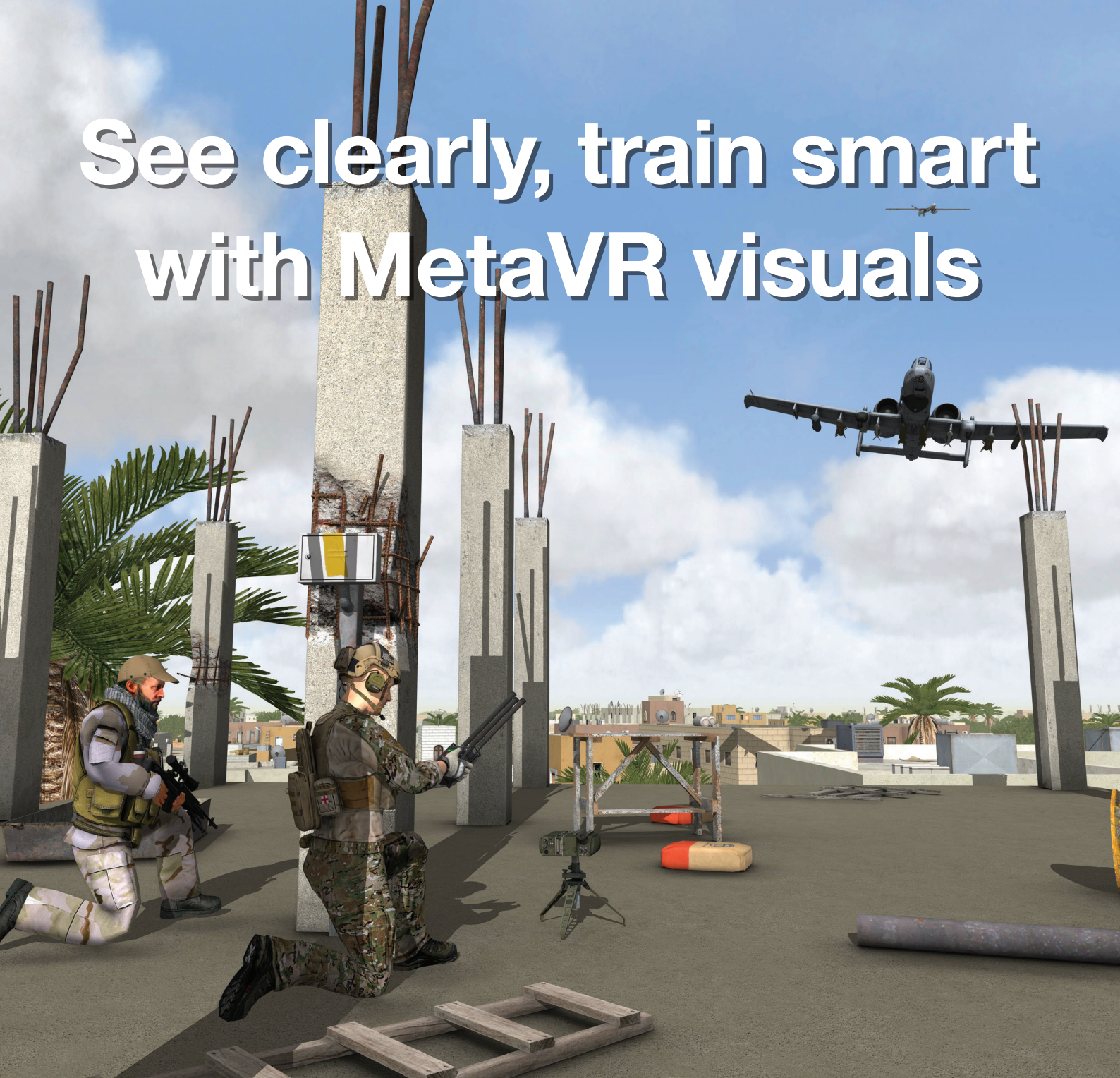
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IMMERSIVE REALITY

The annual I/ITSEC conference held in Orlando, Florida, offers companies big and small the opportunity to showcase their latest advances in modelling, training and simulation. In addition to new technologies, this year's event focused on power- and space-related questions that have been at the forefront of military debates throughout the year.

COVER: The future of simulators likely sees a mix of VR and larger, static systems. (Photo: Adam Wakeling)

System deployability and the need to be able to provide operators with training at the point of need emerged as a driving trend at this year's I/ITSEC conference, as the ever-increasing fidelity of virtual reality (VR) and demand for mobility proved key contributing factors in the developing military market.

In addition, reduced acquisition costs and rapid platform delivery mean that VR and AR technologies are ideally placed to garner further market penetration in an era where cost points and speed of delivery are paramount.

POWER COMPETITION

Setting the tone for the event, the USAF Vice Chief of Staff Gen Stephen Wilson pointed to China as being the greatest state competitor and one that in future could approach conflict as a peer rival to the US. The re-emergence of great power competition has been a running theme at US-based defence shows throughout the year, as the West, and the US in particular, seeks for ways to contend with China and Russia.

Interestingly, Wilson said that the space domain would now be the key environment within which conflict would be won or lost. 'Space is essential. If we lose [in] space, we lose. Period,' Wilson warned attending delegates.

Wilson went on to say that China's advances over the past generation were born from an 'all-of-nation' effort that saw industry and the military working hand in glove. This alignment of industry and military is not replicated in the West, a key talking point during the week.

'For many years China was considered backwards, a developing state, [but] in the past four decades their growth has been tremendous. China is a legitimate competitor,' Wilson stated. 'China is all in to win, it's an all-of-nation effort and what they call military-civil fusion.'

Wilson added that not only is China 'a competitor' but that in many respects it holds an advantage over the US in areas such as purchasing power, number of STEM graduates

Epic Games, showcasing its Unreal Engine architecture, is looking to leverage its experience in synthetic environments for the military training and simulation market. (Photo: Richard Thomas)

and its efforts in VR, machine learning, space and hypersonic technology. In space, China achieved a global first in January 2019 when it landed a rover on the dark side of the Moon.

'Fast forward ten years and ask yourself who the peer and who the near-peer will be,' Wilson noted.

DELIVERING CHANGE

To this end, it was imperative that the US win the so-called 'war of cognition' and deliver next-generation technologies in VR and AR to the military. According to Wilson, this would need to be a

'whole-of-nation' effort to deliver change 'at the speed of relevance', referencing the slow pace of military procurement programmes.

Indeed, later in the week the US military acquisition process was highlighted as one of the 'biggest challenges' for simulation OEM MetaVR, according to W Garth Smith, co-founder and president of the company.

In an effort to create faster pathways for industry to get on contact to develop new technologies the USAF had created pitch days for companies to make their cases to the service, with decisions taken

the same day regarding investment. At I/ITSEC 2019, a total of six small businesses new to working in defence – DTI, Information Systems Laboratories, King Crow Studies, Perceptronics Solutions, PlaneEnglish and Take Flight – each won $1 million contracts following their proposals to the USAF.

According to the event organisers, I/ITSEC is the largest event of its kind in the world serving the military training and simulation sector, with more than 17,000 attendees and 550 vendors present at the Orange County Convention Centre in Orlando.

CROSS-INDUSTRY INNOVATION

Technology from the gaming and entertainment industries is also helping drive development in the sector, through VR and the utilisation of ever-more advanced synthetic environments for military users to utilise as tactical planning and mission training tools.

One such company taking its first steps into the market is Epic Games, which exhibited the capabilities of its Unreal Engine software architecture that already drives many of the simulators on the show floor, including the V-22 maintenance training system being showcased by US-based OEM Raytheon and Bohemia Interactive Simulations' (BISim's) VBS3/4 synthetic tactical training system, among many others.

However, with the Unreal Engine open source it is freely available to anyone looking for a software engine to base a solution on. To this end, Epic Games said that it would offer

is expertise and advice gained from decades of experience garnered in the commercial sector to military customers on a membership basis through its Unreal Enterprise Programme, which was launched in 2015.

NUMBERS ON THE BOARD

Although an event not renowned for headline-grabbing contract announcements and platform delivery timelines, some companies did utilise I/ITSEC in such a way, such as the above-mentioned BISim with its new VBS4 architecture. Company officials revealed that the first customers of the latest iteration of its training environment would be the Swedish Armed Forces and Norway's Kongsberg Defence and Aerospace.

Later in the week US-based civil search and rescue training company Priority 1 Air Rescue was added to the list of VBS4 operators.

BISim officials described VBS4 as a whole-earth virtual desktop trainer and simulation host that allows users to run military training scenarios from the tactical level down. The new system was described as a 'step change' in capability for performance, modularity and ease of use, using the VBS Blue engine.

Training initialisation, editing and scenario updates have been significantly improved, officials said on the show floor, and functions that previously took up to 2h to action can now be done 'in minutes' following the new iteration's development across a number of years.

It is known that the US Army has put a significant level of funding into the development of VBS4, in particular the whole-earth capability.

SOLUTIONS ON DISPLAY

Another industry development fell to Raytheon, which will deliver nine of its second-generation V-22 digital maintenance trainers to Marine Corps Air Station New River, North Carolina, for use by the Naval Air Systems Command's (NAVAIR's) aircraft school by April 2020. This is the first batch of what could be a 54-unit order to aid US service students working towards maintainer qualifications for the tiltrotor aircraft.

The second-generation iteration, debuting at I/ITSEC 2019, was developed from the first-generation system also utilised by NAVAIR. The new system features hardware modifications for ease of use and handling, and two additional touchscreens (for a total of three) that digitally replicate the interior and exterior of the V-22. The nine deliveries will comprise eight student systems and one instructor system.

Using the virtual V-22 maintenance trainer provides a 30% reduction in student training time compared to fully real-world programmes, Raytheon officials disclosed. The new system incorporates a number of hardware modifications.

Raytheon's latest iteration of its V-22 digital maintenance trainer is being delivered to Naval Air Systems Command in 2020. (Photo: Richard Thomas)

A plug-in VR headset can also be used by the system, giving students an immersive experience in the environment, and further represents the need to harness easy-to-use, plug-and-play capabilities for the next generation of forces personnel.

Additionally, Raytheon demonstrated its prototype VR Soldier Virtual Trainer solution for the US Army's Soldier/Squad Virtual Trainer (S/SVT) requirement, part of the service's Synthetic Training Environment efforts. According to the US Army, the S/SVT is intended to be an integrated training system for home stations or deployed units.

The S/SVT requirement is intended to enable improved training for weapon skills development and joint fires (both qualification and certification) and use of force training.

Raytheon's offering to the requirement allows up to 47 users operating in a cloud-based synthetic environment, with real-world hardware configurable for representation in the digital world, as well as programmable systems available on demand.

Ongoing and future developments to the system include the

integration of haptic gloves to provide more tactile feedback in the virtual space, as well as incorporating non-lethal secondary capabilities such as the Taser system into the synthetic depiction of the real-world rifle.

CONTRACTS WON

Meanwhile, Ohio-headquartered Treality SVS won a contract to provide two glass mirror collimated visual CD Series systems for C-130H and C-130J full motion trainers to an unspecified international customer.

Configured as cross-cockpit collimated display systems, the displays provide large unobstructed horizontal and vertical fields of view (FOVs). This is a significant win for the company and follows on from the upgrade for the USN's MH-60 simulators awarded over three years ago.

In addition, the company is working on a project that uses glass mirrors and a single projector to provide a 210x45° FOV display. The major benefits of such a system, as well as the obvious cost saving in using fewer projectors, is that there are no colour, brightness or geometry matching issues.

It is also understood that Qatar will receive P5 Combat Training Systems (CTS) from Cubic Global Defense for this Eurofighter training programme for the 24 aircraft on order. The contract, awarded by BAE Systems, includes the airborne pods, ground subsystems and logistics support.

The P5 CTS provides combat aircraft with a live training capability

The mobility of VR-based solutions allows the delivery of training systems at the point of need. (Photo: Richard Thomas)

More than 17,000 attendees and 550 vendors were present at the Orange County Convention Centre in Orlando for I/ITSEC 2019. (Photo: Adam Wakeling)

through recording the live air picture and mission data, assessing weapon engagements and relaying time, space and positioning information between aircraft.

The P5 CTS is the USAF and USN's respective programme of record for Autonomous Air Combat Manoeuvring Instrumentation (AACMI) systems, and it has also been exported to numerous customers throughout the world.

The system is also embedded within the F-35 fighter jet, and this is leading to its increasing share of the global AACMI market at the expense of alternative AACMI products. The P5 CTS is expected to be supported by the USAF through 2030 when it will be replaced by SLATE.

LOOKING AHEAD TO 2020

Nevertheless, despite the growing move towards VR, larger, fixed simulators remain vital for the military training environment, being able to offer more capable overall systems compared to more mobile systems. It is likely that a blend of the two types – fixed and mobile – will be used at different stages of a training programme to teach or refine techniques. There

is also a need to avoid 'negative training' through the overuse of VR and other extended reality tools.

Time will tell if the US can win its so-called 'war of cognition' and work with industry to more quickly provide training solutions to its forces, and also how industry itself will continue to develop VR and other extended reality offerings. It seems a good idea then to return to I/ITSEC in 12 months' time to see how much of the ambition is made reality, and whether that reality has been made possible by the virtual and real-world systems of tomorrow. ■

SHEPHARD