Nuanced networks
Linking virtual simulators

TAKING AIM
Virtual small arms trainers

SIMULATION EPICENTRE
Orlando examined

G-FORCE IN ACTION
Live airborne training

SHEPHARD
Known as the epicentre of US simulation and training and HQ for numerous companies, DoD procurement agencies and academic research facilities, Orlando is also home to the I/ITSEC 2016 event. By Miles Quartermain

The Sunshine State is bisected by the Interstate Highway 4 (I-4), running more than 200km from Tampa in the west to Daytona Beach in the east. From a political and cultural perspective, the 14 counties bordering the highway – the infamous ‘I-4 corridor’ – are home to 40% of Florida’s registered voters; the ‘swing part of the swing state’. From a modelling, training and simulation point of view, the I-4 corridor acts as one of the industry’s major arteries, with Orlando the beating heart at its centre. Florida houses around 27,000 workers in modelling, simulation and training, and Orlando encompasses more than 12,500 of them. Over 100 companies in the industry – including some of its leading names – are headquartered or have major presence in Orlando and along the corridor. The military has centred much of its simulation development and procurement in the area, and the academic world has responded, by creating and nurturing a wealth of research, development and pedagogic facilities in Orlando, Tampa and Gainesville. In addition, the National Center for Simulation is based in Orlando.

Destination Orlando

Lockheed Martin’s Mission Systems & Training HQ is in Orlando. Shown here is the company’s F-35 FMS, complete with the Rockwell Collins visual system. (Photo: Lockheed Martin)
The Greater Central Florida area is a major component of the US simulation and training industry. To visitors of the Interservice/Industry Training, Simulation and Education Conference (I/ITSEC), which takes place in Orlando in early December every year, this will come as no surprise.

Hosting upwards of 500 exhibitors and tens of thousands of visitors and delegates, I/ITSEC is a bellwether for the industry. Local participation (as well as strong organisational support from government entities) characterises what has become the annual place to be seen and heard if you want to be taken seriously in this community.

Industry hub
‘The I-4 corridor, and Orlando in particular, is really the three-legged stool of our industry,’ said Chris Stellwag, director of marketing communications for defence and security at CAE, based in Tampa. ‘There is a confluence of players – government, industry and academia – that has made central Florida the go-to venue for just about anything in the modelling, training and simulation world.’

Why is this important? From one perspective, it is quite simple. The area just has too much competence, capability and credibility not to be considered the hub of the industry in the US (and its influence on the broader, global marketplace is not inconsiderable either). From another point of view, it offers a bright spot in a somewhat beleaguered world in which military spending cuts have had a detrimental effect on hundreds of previously healthy companies.

In a recent local interview, Tom Baptiste, the former USAF lieutenant general who now serves as president of the National Center for Simulation, explained why. ‘In an austere budget environment, one of the big challenges for combatant commanders is to maintain the readiness of the force with less money… and simulation in many ways is a safety valve – a stopgap that is part of the solution. It’s a cost-effective alternative to high-cost live training,’ he said.

There is, of course, an ongoing debate regarding the scale of benefits that simulation can give the military, and about whether or not there is a ‘silver bullet’ solution to the eternal conundrum of balance in the LVC training model. To a degree, that is not relevant in an examination of the Orlando–I-4 corridor area as an epicentre for US training innovation. The area has it all as far as the ability to provide integrated, cross-fertilised and effects-centric training solutions is concerned.

Major facility
CAE is a case in point. CAE USA in Tampa is one of the world’s oldest simulation and training companies, tracing its history back to Reflectone in 1939 and later as part of British Aerospace. Acquired by CAE in 2001, the Tampa facility now houses about 500 staff – of whom over half are systems, software or aerospace engineers, according to Stellwag – and is now the second-largest single facility in the company, ceding first place only to corporate HQ in Montreal, Canada.

‘Tampa is certainly a major facility for CAE, with more than 23,000m² of space and all disciplines housed here,’ he said. ‘We conduct all systems and software engineering for our US military programmes here, and we leverage the entire corporation’s capabilities where it makes sense. The “metal might get bent elsewhere” [in the company] as we take advantage of manufacturing economies of scale, but otherwise we develop, integrate and deliver the training systems and solutions required for the US military side of our business out of CAE USA in Florida.’

Those US military programmes highlight just how comprehensive the CAE product and service range is. The company has an enviable and highly visible reputation for aircrew training – in both the military and civil aviation domains – but it is also strongly engaged in maritime and healthcare solutions for American customers.

For the USAF, CAE USA is prime contractor for the MQ-1 Predator and MQ-9 Reaper Aircrew Training Services programme, as well as the KC-135 Aircrew Training System, which has one training site at MacDill AFB, in Tampa. Under subcontract to Lockheed Martin, the company designs and manufactures weapon systems trainers and other devices for the Hercules C-130J, HC-130J, MC-130J and AC-130J, as well as providing contractor support services to the C-130H Aircrew Training System.

At sea and as part of Team Seahawk, CAE USA is prime contractor for the USN’s MH-60 Seahawk tactical operational flight trainers, weapons tactics trainers and avionics maintenance trainers. The company also supports MH-60 FMS and is a prime contractor for the T-44C Aircrew Training Services programme, and designer and manufacturer of the Mission Crew Trainers for the Undergraduate Military Flight Officer programme. Under subcontract to Boeing, CAE is developing and building devices for the P-8A
Poseidon maritime patrol aircraft, including the operational flight trainers, now located at NAS Jacksonville in Florida.

For the army, the company leads the Fixed-Wing Training Program and will build a new centre in Dothan, Alabama, to deliver classroom, simulator and live flying instruction for army aviators. Further demonstrating the bandwidth of CAE’s capability, the company owns an operates an independent C-130 Training Center in Tampa, providing aircrew and maintenance crew training for operators of the C-130E/H transport and utility aircraft, as well as offering glass cockpit conversion training.

CAE’s presence in Florida is not solely due to an accident of history. ‘Like other companies, we are here – to be frank – because this is where much of the money gets spent, at least for army and navy systems. CAE USA is the single largest component of the company’s global defence and security business, and that is due in large part to the way in which we have been able to forge strong “doorstep” relationships with the buyers and industry partners based in and around Orlando,’ stated Stellwagon.

He went on to explain that there is a CAE office in Orlando itself, with some 40 or so staff, but that it is a long way from being ‘just a sales office. We have a centre of excellence in Orlando, which we created for working on database solutions and tools such as the Common Database (CDB). We also have programmes with the US Joint Staff and the Open Geospatial Consortium that are centred on the facility there,’ he added. It is worth noting that in addition to all the above, CAE Healthcare is also based in Florida, with its HQ in Sarasota, slightly south of the I-4 corridor – a company that has a not inconsiderable military component to its business.

Central solution

At the other end of the industrial scale – and taking front and centre position in Orlando itself – is Serious Simulations, a company that has established a reputation in a very short period for innovation and problem solving.

‘The initial niche we have approached is the individual/small group market for fully immersive simulations,’ explained the company’s CEO, Chris Chambers. Adding human motion and an advanced interface to existing solutions, Serious Simulations has addressed the requirement for soldiers to train in a realistic, high-fidelity immersive simulation – “one in which the visuals don’t turn with the user’s head, for example’ – in full kit, with minimal disruption between equipping for training or for ‘live’ operational requirements – an example of the ‘train as you fight’ philosophy.

Within little more than a year of being in business, the company established a name in the market place and was soon perceived by customers and peers alike as a resource for agile and original thinking. ‘Why not?’ appears to be a mantra Chambers and his rapidly growing team fully embrace, questioning some of the fundamental underpinnings of more traditional solutions and seeking more graceful and – above all – cost-effective methods of providing effective training capability.

‘We did actually buy some [intellectual property], but to be honest, we have invented about 97% of the new technologies we are offering,’ he said.

The company’s problem-solving attitude is apparent in some of the current developments rapidly gaining traction with military customers. For example, the provision of its zero-frame latency wireless video formatter, integrated into existing training solutions, has resulted in substantial improvements in fidelity and realism of the visual component of simulations.

‘We saw some serious deficiencies and looked around for a leverage-able solution,’ explained Chambers. ‘We found 1920x1080px resolution was already available in the cellphone industry so we took that, fed it through some customised frame rotation software and ended up with a solution that hugely enhances the training experience. The reduction of the additional 17 milliseconds of time that more traditional solutions inject into visual data processing may not sound like much, but it is more than enough to take that capability up a significant step.’

The application the company ‘was pretty much founded to create’, according to Chambers, is a range of wireless data-sensing skins and interfaces for real infantry weapons. Fitted to a soldier’s actual weapon, the unobtrusive housings are applied direct to the lower receiver by the trainee, using a single screw, and provide for realistic training operations in a wide variety of tactical situations.

A pneumatic-powered blank-fire capability – with a reservoir capacity of 250 rounds – adds to the realism of any applicable scenario. ‘The previous Dismounted Soldier Training System was relatively cumbersome and constraining, so by offering an indoor-friendly blank-firing capability with externally mounted sensors, we were able to provide a highly realistic training environment for the customer – using real weapons,’ Chambers pointed out.
Using this as a basis, Serious Simulations has ‘pressed the pedal to the metal’ and rapidly moved into parallel applications, such as vehicle-mounted machine guns. Chambers says the application will initially be tied to Bohemia Interactive Simulations’ VBS3 software, but standalone variants are also on the cards. And as if the military market was not enough to keep it busy, the Serious Games team is busily developing business opportunities in such diverse (but technically similar in some of their requirements) fields as professional sports and infectious disease control.

‘What we are about, fundamentally, is providing professional trainers for individual and small groups of trainees with solutions for tasks and missions that cannot be trained live – or can only do so with an unacceptable level of risk in terms of safety or effectiveness,’ he stated.

Academic encouragement

Companies like Serious Simulations do not spring full grown from nothing, of course, despite the occasional appearance to the contrary. The University of Central Florida (UCF) in Orlando plays host to a number of budding and growing enterprises in Research Park Central Florida, which has become a virtual extension of the campus. Chambers’ company benefited from this incubator-style facility for much of the period it was going through its initial labour pains.

‘The first draw was the location – there are the four services, seven federal agencies and scores of companies co-located in the Research Park. Then there was the issue of outstanding people in leadership and great facilities. It’s OK to speculate whether we would still have succeeded, but in a different way, without that period of support and nurturing [from UCF]. The reality is, however, we succeeded with it,’ he said.

Companies small and large benefit from a studied and comprehensive attitude towards the development of research and teaching facilities by the academic community occupying the I-4 corridor. UCF in Orlando, the University of South Florida in Tampa and the University of Florida in Gainesville are leaders in their fields and have devoted considerable effort to creating an environment from which companies and organisations focused on the modelling, simulation and training business – especially for military and aviation requirements – can benefit.

‘CAE’s workforce here is pretty heavily biased towards technical capabilities, and we find recruitment from the universities in the state to be particularly advantageous,’ said Stellwag. Higher education in Florida is particularly cost-effective for state residents and that has a knock-on effect on recruitment for local companies, he added. Graduates find it particularly attractive to be able to move into a job – a reasonably well-remunerated one if they have the requisite technical skills – that will keep them in central Florida.

UCF created the Institute for Simulation & Training (IST) in Orlando over 20 years ago, and has developed one of the nation’s first (and arguably leading) multi-disciplinary degree programmes in modelling and simulation. According to an institute spokesperson, ‘more than 900 students have graduated from IST, with a minimum of one year working on modelling and simulation-related research projects. Most have secured related positions in industry and government.’

With a research faculty approaching 70, supported by 100 staff and over 100 intern students, IST has established modelling and simulation as a recognised discipline and has secured well in excess of $200 million. Much of that funding has come from the various agencies of the DoD, but IST also has a broad range on non-defence sources of funding and research requests, ranging from mineral resource exploitation to medical procedure simulation.

The proximity of the university to Florida’s ‘Space Coast’ provides an additional focus. IST research covers a wide range of disciplines, but the four broad areas of focus include simulation technology, human/systems integration, computer-generated reality and performance assessment and enhancement.

Historic development

The third leg of the stool is government. As long ago as 1966, the army and navy sent groups of simulation experts to Orlando to commence design and development of a range of systems and individual devices at what was then the US Army Air Base Orlando and has subsequently become the Orlando Naval Training Center. Half a century later, the area plays host to the largest single concentration of military simulation and training professionals in the country.

The Army’s Program Executive Office for Simulation, Training and Instrumentation (PEO-STRI) exists to ‘develop, acquire and sustain simulation,
training, testing and modelling solutions to achieve army readiness’, according to its mission statement.

In collaboration with the navy, PEO-STRI has been instrumental in the development of flight simulation to its current level. During the Vietnam War, the army operated more helicopters than the other services combined, and reacted to a capability gap in synthetic training in a manner that has given rise to an entire industry.

In contrast, it was actually the navy that first developed the Multiple Independent Laser Engagement Systems – later procured by the army and laying the foundation for an entire line of development of laser engagement systems in service across the globe.

Whatever the historical origins, it is certain that the increasing concentration of simulation and training capabilities and interest – from the military perspective – in the Orlando area has been a spur to intellectual progress, economic development and capability extension. The ‘follow the money’ principle of rapid business growth has drawn companies large and small to the area, prompted academic regeneration and nurtured disciplines and intellectual capabilities that service one of the few areas of growth for companies addressing military markets.

Gen Douglas MacArthur once famously opined that ‘in no other profession are the penalties for employing untrained personnel so appalling or so irrevocable as in the military’. The DoD presence in Orlando and Greater Central Florida takes that concept as the cornerstone of its mission to train and prepare the nation’s military, and as result, it provides the genesis of a great number of the initiatives, technologies, innovations and capabilities that make the industry what it is.

Encompassing customer, supplier and research entities, leveraging an established reputation for being the most military-friendly state in the country, from the perspective of support and facilitation, Florida boasts nearly 18,000 private sector defence companies. Maybe not all of them should be counted among the organisations forming the simulation and training ‘cluster’ based around the I-4 corridor, but there are enough of them to make the designation ‘Epicentre Orlando’ one that resonates.

That will be obvious to anybody who visits I/ITSEC at the Orange County Convention Center this December. As a venue for innovation, the event will be instructive. The continuation of Operation Blended Warrior is intended to document lessons learned and overcome hindrance to and facilitate identification of true plug-and-play integrated LVC approaches to distributed training.

For many of the companies attending, it should also be profitable. I/ITSEC 2015 was only the second time Serious Simulations had exhibited at the convention and Chambers concluded, enthusiastically, that ‘it was a truly great decision for us. The opportunity to network with the user and supplier communities was invaluable. So many of the contacts we made are local and therefore easy for us to access. We walked away with real requests for quotations.’

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