



TRAINING AND SIMULATION



THE THREE SWORDS Interview

Phil Draper, Head of the Computer-Assisted Exercise (CAX) Support Branch since November 2016, discusses JWC's simulation technologies and turning points. "The most challenging warfare scenarios are the ones we are now replicating," he says, "complex, large-scale kinetic operations against a capable opponent with a highly developed and focused doctrine."

Interviewed by Inci Kucukaksoy, Public Affairs Office, and Lieutenant Colonel Andrew White, British Army, Head CIS Branch, Joint Warfare Centre

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Phil Draper

Mr Draper, thank you very much for this interview. Considering that all JWC exercises are computer-assisted, can you give us an update on JWC's simulation architecture? What's new?

— It is my pleasure to talk to you. The major change for this year is our move to a new version of the core simulation system that we use to support exercises here at the JWC. The Joint Theater Level Simulation (JTLS) Version 5 is a radical step forward in capability and allows us to address significantly larger operational domains than in previous iterations.

As NATO's primary user of CAX support tools and software, what types of technology does the JWC employ?

— NATO, as a whole, is a major user of Model-

ling and Simulation technology and is continually looking to exploit this key enabling capability, driven by ACT's Transformational activities. What sets the JWC apart is the scale and complexity of the exercises that we execute. The key challenges we face are the requirement to model activity across the complete spectrum of warfare and to present the outcomes of that endeavour directly into the Training Audiences' Command and Control (C2) systems in a seamless and transparent way. If we do our job well, the Training Audience should be unaware that CAX support exists; they should truly train as they fight. To that end, we employ a range of simulation systems and support tools, but our vision is actually to keep the technology as agile and flexible as possible. As my great predecessor, Professor



Erdal Çayırıcı, used to say: “As complex as necessary. As simple as possible.”

Regarding live, virtual and constructive simulation environments, can you tell us where does the JWC stand?

— The Joint Warfare Centre is tasked with the conduct of joint operational level exercises; and for that reason, our tool set is focused primarily on constructive simulation systems (simulated people operating simulated equipment is one useful definition of constructive tools). This is because constructive simulations lend themselves most readily to representing the manoeuvre of corps-sized land formations, maritime missions consisting of multiple task groups, and air activity measured in the hundreds of sorties per day. However, we also have the capability to produce simulated full motion video using virtual simulation systems (real people using simulated equipment), and the Combined Joint Operations Centre (CJOC) set up during an exercise can also be considered as part of the virtual spectrum as, in this case, the personnel working in the

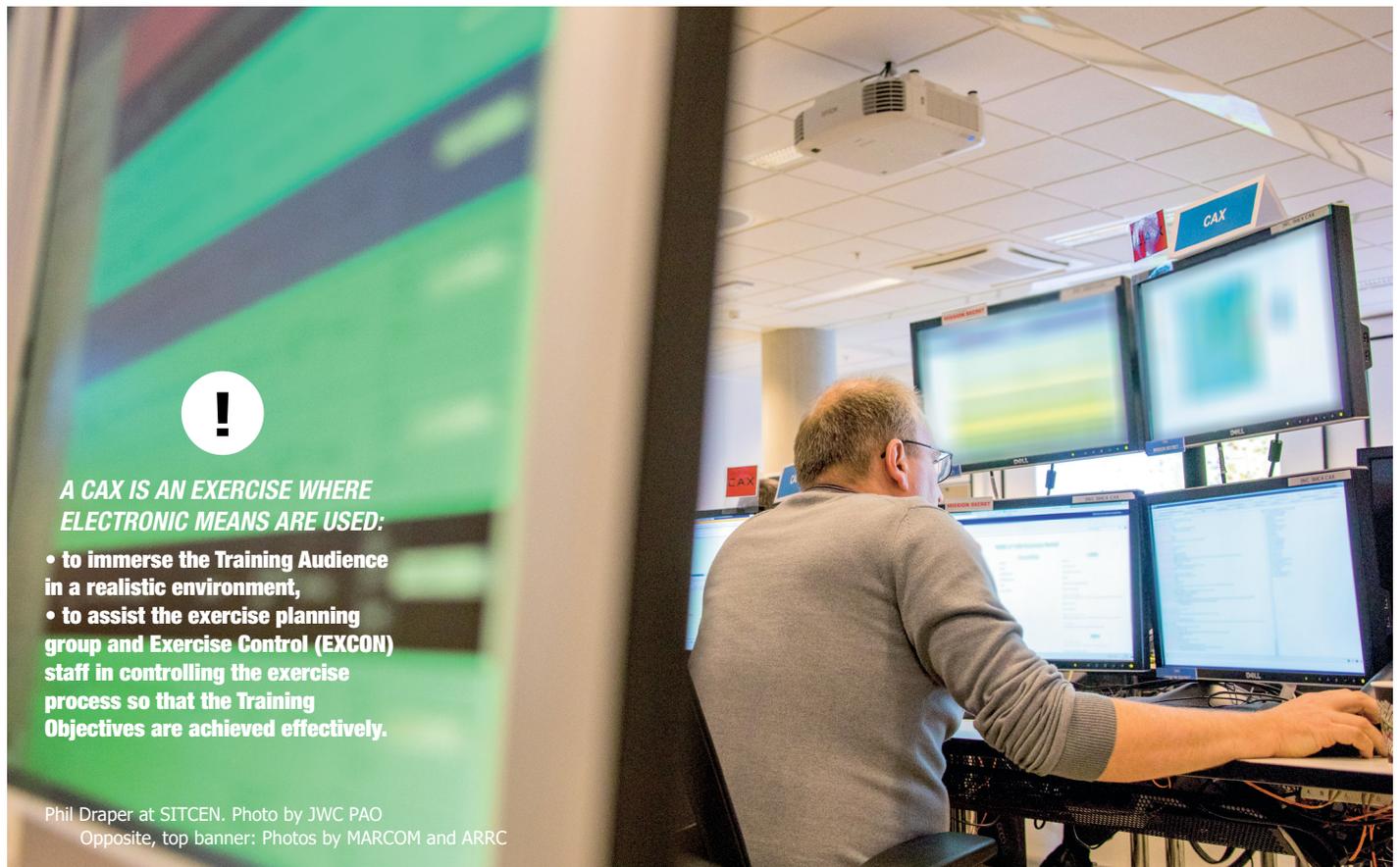
CJOC are operating systems stimulated in part by our simulation architecture.

CAX is a great training tool, but does it also highlight our weaknesses? What is the greatest area of risk for CAX?

— Delivering a CAX, or Computer Assisted Exercise, is the mission of the whole of the JWC. CAX Support Branch is charged with providing Modelling and Simulation support to the exercise enterprise. A good CAX should highlight weaknesses, as that is the single best way to identify where, we, as an organization need to improve in our core mission, ensuring the safety of the Alliance and its Members. The greatest risk for the technical element of a CAX is that the benefits of using simulation support are outweighed by the resources required to prepare and deliver that support during exercise execution. We endeavour to ensure that our simulation systems are as current as they can possibly be in terms of fidelity and data accuracy to ensure that we deliver value across all of the domains represented in exercises of the scale and complexity that the JWC provides.

How does the return of large-scale exercises effect CAX?

— The major impact on this recent change is on the effort required to build the simulation databases that represent large scale operations conducted at high-intensity and on the number of personnel required to execute them. A secondary effect is the impact on the simulation systems’ ability to represent not just operations of this scale, but also high-intensity warfighting across the Joint Operational Area (JOA). This places even more emphasis on the requirement for us to get our parametric performance data for weapon systems correct, but also to understand how changes in doctrine and the operational art can be accurately represented in a synthetic environment. We have many challenges to face, but that is what makes this a fascinating time to working in this field for NATO. For example, the virtual battlespace for TRIDENT JAVELIN was very complex. We built five corps down to battalion level and the scenario called for hundreds of ships and aircraft to all be operating in the battlespace at the same time. It was extremely challenging from



A CAX IS AN EXERCISE WHERE ELECTRONIC MEANS ARE USED:

- to immerse the Training Audience in a realistic environment,
- to assist the exercise planning group and Exercise Control (EXCON) staff in controlling the exercise process so that the Training Objectives are achieved effectively.

Phil Draper at SITCEN. Photo by JWC PAO
Opposite, top banner: Photos by MARCOM and ARRC





Phil Draper during a briefing.
Photo by JWC PAO

a simulation perspective as well as from the manning and management side. We learned a huge amount about our strengths and weaknesses and that can only prepare us better for the challenges to come. It took nearly two years to plan and prepare for this exercise because of the scale of the databases that were needed, but also because of the additional planning burden related to the size of the exercise environment. Ivan Vianello and Luca Sacco from the CAX Support Branch led the planning and execu-

tion of this exercise, and they did a fantastic job, but it required the whole Branch to come together to prepare and deliver the training effect required. I am enormously proud and privileged to be part of this team.

You talked about the operational art and warfare. How can we be sure to best prepare NATO for the future?

— I am not a military expert, so there are much better qualified people to answer that question

than me. However, as an operational analyst by background, I can say that history holds many lessons. In that regard, I would say be careful in predicting the next conflict, it will not be the one you expect. Assume that your opponent is capable, determined, prepared and effectively equipped. That assumption leads to better training and helps avoid the pitfall of underestimating the enemy. From a simulation perspective, we try to build these capabilities into the OPFOR Order of Battle, even if that sometimes leads to criticism that the enemy is too capable. Better to have a capable simulated enemy where the only casualties are virtual, then an unrealistically weak opponent that may lead to negative training.

In your opinion, what would be the most challenging warfare scenario to replicate in a synthetic environment?

— Probably the ones we are now replicating! Complex, large-scale kinetic operations against a capable opponent with a highly developed and focused doctrine. We have much to learn in order to do this better, and simulations need to be enhanced to better reflect the complexity and depth of the emerging future battlespace, but we are in an excellent position to make the required developments.

Computer Assisted Exercises are cost-efficient. But, are they realistic enough?

— Computer Assisted Exercises have their

NEED TO KNOW

The extract below was originally published in The Three Swords Magazine, Issue No. 23.

By Andrzej Wnuk,
JWC Modelling and Simulation Engineer



"... [The] scripted material, called Main Events List/Main Incidents List (MEL/MIL), focuses on Exercise and Training Objectives identified during exercise design. MEL/MIL is intended to stimulate the Training Audience (TA) with a series of challenges that they would need to

address in an actual real-world operation. It is also possible to script new material during the execution phase of the exercise depending on how the exercise evolves and how TA performs. This approach, which allows adaptation of MEL/MIL during execution, is termed Dynamic Scripting. Dynamic Scripting is challenging and requires rapid production of material in a controlled environment. Scripting is supported by a range of simulation tools, and it is essential that these two exercise components work seamlessly together to support training delivery. Simulation is used to regulate and determine the location, status and condition of all the military and civil entities and systems deployed in the synthetic exercise environment.

Simulation is also used to maintain a consistent white truth of the operational area at any point in time, and to portray a sided intelligence view of the battlespace, which is dependent on the side's intelligence and sensing assets and efforts. Through mediation tools, the simulated environment is fed to the TA Command and Control (C2) systems, so that TA perceives the operational environment through their own native planning and execution environment, ensuring that they train as they fight. Hence MEL/MIL designs the flow of an exercise, which is implemented and supported by simulations in a JWC delivered Computer Assisted Exercise (CAX). MEL/MIL and simulation tools are components characteristic of a CAX."



“Better to have a capable simulated enemy where the only casualties are virtual, then an unrealistically weak opponent that may lead to negative training.”

place in the continuity of training required to prepare forces for the full range of mission types they may encounter. Even a simulation professional must concede that while CAXs are a key component in training they are but

one tool in the range available. The JWC has a particular mission, which is to help prepare the NATO Command and Force Structure headquarters for their role. The CAX approach developed at the JWC is particularly targeted on the pursuit of that goal.

What are some of the most exciting developments in virtual/simulation technologies in the world right now? When can we expect to see them at the JWC?

— Much of the development in Modelling and Simulation has focused on the tactical domain in recent years, which is understandable given recent history and a focus globally on counter-insurgency type operations. I would expect recent global political developments to refocus emphasis on large-scale constructive technologies. Therefore, I think, within the next five years we will begin to see interesting opportunities related to improvements in the domains of big data, Modelling and Simulation as a service, and enhanced representation of the information domain.

The JWC is not just a training centre; it is also a warfare centre. How about a name change: Joint Warfare and Simulation Centre? Would you agree?

— Hah! No, tempting though it is to elevate the importance of one’s own area, I think the JWC’s strength is in its “One Team” approach. It is not just CAX Support Branch and simulation that makes the JWC a warfare centre, but the combination of all domains, the Main Events List/Main Incidents List (MEL/MIL)



from the Content Branch, enemy capabilities from the OPFOR Branch, Media Simulation, Experimentation... and the list goes on. The expertise that resides across the JWC personnel is extremely impressive and the ability to find warfare related support in-house is one of the real pleasures about working here. I think we should stick with the name Joint Warfare Centre, and continually strive to add more warfare related activity into all we do professionally.

According to a recent article, to test the skills of any technical expert in the world of Information Technology (IT), the ultimate question to ask is: Star Wars or Star Trek?

— At the risk of appearing picky, I don’t work in IT. It is a common misconception, but CAX Support is much more to do with operational research and Modelling and Simulation skills than it is to do with IT. We use IT in much the same way as all specialists at JWC do—as an enabling technology to deliver effect. Besides both of the choices provided are clearly inferior to *Dr Who*. ✦



ABOVE: Dr Who changed the world for the better, therefore justified the praise. Photo by Shutterstock



CAX replicates the Training Audience’s subordinate units on the ground, in the air and on the sea. **RIGHT:** The JTLS viewer, which projects the map on the left.

