

The virtual battlefield

The Combined Arms Tactical Trainer demonstrates the 'art of the possible' in synthetic environments – and is about to make it real for British armed forces

Today's battlefield is a complex and unpredictable place, which has made simulating it a major challenge. The Combined Arms Tactical Trainer (CATT) has risen to that challenge. Already a success with the US Army, the UK's Ministry of Defence is creating its own CATT installation in Warminster, and this was recently the site of a demonstration designed to show both the development status and potential of CATT, as well as the astonishing capabilities of synthetic environments generally.

It is now possible to replicate a single weapons system – a gun, aircraft, tank or missile launcher – with great fidelity, and synthetic fighting has become a crucial element in training and in developing the techniques, technologies and tactics of the future. CATT takes this a stage further by creating a virtual world that is more complex, interactive and, to some extent, unpredictable.



The CATT facility at Warminster

The human factor

Human performance is known to be one of the most critical factors in determining victory or defeat. Training systems that simulate battlefield environments are becoming highly sophisticated in replicating human behaviour. But the most accurate way of doing this is to use real people, interacting with each other on the virtual battlefield.

CATT integrates a variety of simulators so that combatants can fight alongside – or against – others using a variety of weapons. The fully interactive, networked simulators, plus command, control and communications workstations, replicate the vehicles and weapons systems of a Battle Group and its combat support elements, operating on a simulated real-time battlefield.

“When the CATT system enters service in the UK, it will be the largest and most complex virtual training facility in the world, with over 100 interconnected manned simulators operating on a 100km x 100km training database,” explains Rick Perez, Lockheed Martin project director for CATT. “The technology that is being incorporated into CATT represents the latest developments in areas such as high fidelity graphics, computer generated forces and high-speed networking.”

In its main simulator hall, the UK CATT system will include 70 combat vehicle simulators, 16 generic vehicle simulators, 12 dismounted infantry simulators, plus room for expansion. It can, in addition, link to simulators on other sites.

The need for such systems is pressing, for both training and for evaluation of new systems prior to acquisition.



Mike Holstead (left), program manager at DPA with Rick Perez, the Lockheed Martin project director for CATT

Environmental considerations put limitations on live testing and training. There are also demands to cut costs, while at the same time the systems under test are more complex and demand more data to ensure valuable and meaningful results.

Operational first

Lockheed Martin Information Systems was the first to produce an operational distributed interactive simulation (DIS) system. This was the Close Combat Tactical Trainer (CCTT), part of the CATT system for the US Army. CCTT combines armour, infantry, logistics, artillery, mortar and aviation units in a synthetic battlefield depicting real-world terrain. Combatants move, shoot and communicate on this battlefield by operating with or riding inside combat vehicles and employing simulated weapon systems. All of the CCTT components passed rigorous US Army validation against actual weapon



Armoured vehicle simulators

systems, tactical doctrine and behaviours. CCTT provides real-time, interactive collective task training for units from individual crews to battalion task force levels, with growth capability to regimental task force.

The UK CATT installation at Warminster is due to go into service in May 2002. But already, some 15 months before that date, the team responsible for the system – Lockheed Martin Information Systems working with partners Alenia Marconi Systems, SAIC, MoD and DPA – were able to show its capabilities to an invited group.

The Cohesion in Training and Acquisition Demonstration highlighted not only the capabilities of the core system, which is already stable, but indicated future possibilities by tying in other simulation systems. These were in various states of readiness, but they gave a taste of what CATT can do. For example, the



Major General Peter Gilchrist, executive director 2, DPA

simulators at Warminster were linked to DERA installations in Malvern and Bedford.

The simulated Joint Attack scenario incorporated a wide variety of elements, from Vehicle Specific Simulators (VSS) of the Challenger 2 Tank and Warrior IFV, through Generic Vehicle Simulators operating as Stormer/HVM Air Defence assets through to BAE Systems' Hawk aircraft simulator. The demonstration showed CATT's abilities not just for the future of training but also for areas such as synthetic environment-based acquisition and operational analysis.

“Today our Armed Forces need to be both agile and flexible,” said Major General Peter Gilchrist during his keynote speech at the demonstration. “The MoD must find ways to ensure that individuals and units can train for the full spectrum of conflict, making best use of the training facilities available. The emphasis is now on Joint Operations. Yet although we are increasingly going on operations together, our ability to conduct joint training is limited due to its cost and the availability of equipment and training areas. If we are to train effectively, we must first explore how distributed simulation might contribute to training for the complex operations we may be involved in.”

The demonstration at Warminster showed the ‘art of the possible’ in synthetic environments, and how that will soon become reality.



After action review facility

Benefits of CATT

- Complementary to both skills training and field training.
- Realistic level of manoeuvre and procedural training in an unconstrained virtual battlefield.
- Includes all arms of service in the same training environment.
- Better preparation for more effective field training.
- Lower environmental impact.
- Lower training costs.
- Higher availability of equipment.