CCDG KEYNOTE ADDRESS

‘The future of Defence simulation’

Introduction

I welcome the opportunity to address the Simtect 2006 simulation conference and exhibition. I will cover four issues in my address today:

- The key challenges to force modernisation
- what I require from simulation to meet those challenges
- my perspective on the future of simulation in Defence
- the challenges and opportunities for industry.

Key challenges to force modernisation

The five key challenges to force modernisation as I see them are:

- First, that all future operations will be joint and our armed forces will need to operate seamlessly. We are already working towards a seamless force but the complexity of the task is enormous.
- Second, the integration of communications, both within the ADF and with allies, is vital to operate as a superior networked force, improving reach, speed, lethality and interoperability- but it is a challenge technologically and doctrinally.

- Third, the advanced technology that underpins force modernisation is expensive and developing cutting-edge defence capability comes with significant business risks in implementation.

- Fourth, maintaining an interoperability competitive domestic defence industry that can develop, sustain and support defence assets will be critical for Australia's force modernisation but made difficult by Australia's size and potential for economies of scale.

- Fifth, developing and maintaining our own skilled workforce is its own challenge. Recruitment and retention of a technically capable force will be increasingly difficult in a strong and growing economy.

What I require from simulation

These are significant challenges to achieving my Group's mission – "to shape Defence's future joint war fighting capability". I achieve that mission by helping the Department to achieve the CDF's vision for an ADF that is balanced, networked and deployable by delivering a $50billion DCP through the provision of high quality decision making information to government. What does this mean in terms of workload?

- Last year there were 26 projects advanced for Government approval, which represents a total project cost of about $2.7 billion

- Over the current year we plan to progress 29 projects worth around $2.1 billion, in addition to the C-17 project which will cost in the order of $2bn.

How, then, does simulation help me and Defence? Within the DCP an estimated $1.2 billion is cited for simulation investment across at least 50 projects. The complete detailed listing of this simulation investment is available in the 'Defence Current and Future Simulation Projects 2005 -2015' available at the ADSO booth. Some significant examples include the Joint Combined Training Centre (JP2098), flight simulators for the ARH (Air 87), JSF (Air 6000), UAV (Air 7000 Phase 1), artillery replacement gunnery trainers (Land 17), driver trainer and gunnery trainer for Abrams tanks (Land 907), and on board training system for AWD (Sea 4000).

The DCP is a huge program that, in some cases, defines the ADF's capabilities for a generation or more. To achieve the correct balance of capabilities across the wide spectrum of Defence activities I need decision support tools. Simulation is an aid to many of these tools. Simulation offers a number of benefits in the support of capability development, it's greatest is in providing us with a window to future warfare. It offers the opportunity to "use" as yet un-fielded weapon and support systems along side current ADF capabilities to determine possible future force mixes to support the development of documents such as the DCS and the DCP. Simulation also gives us the ability to compare a range of alternative capabilities

within a single consistent environment. In Defence, we are looking increasingly to simulation to help us take much better account of the complexity, dynamics and uncertainties of modern warfare.

The utilisation of simulation as a tool for capability development is supported by the strengthened two pass system that allows a higher proportion of project funds to be spent on early analysis to provide better and more relevant information to Government and to ensure that projects are less likely to develop problems during the acquisition phase. In particular, the ‘Kinnaird Review’ recommendations “to seek early industry engagement in the capability development process” and “commitment to spend a larger proportion of funds during the early stage of projects on analysis and verification of options” are likely to result in a greater focus on simulation to develop, test and evaluate current and future capability options for first and second pass business cases.

Simulation will not only allow defence to look at the risks involved with technology, cost and schedule of a project, it will also demonstrate how a particular capability improves the ability of Defence to meet the strategic needs of the government. (I made a comment here ref a task to AIRCDRE Kym Osley in relation to engaging industry and employing simulation in the process we are adopting for assessing new entries into the DCP)

It is in the support of such analysis where I see great value in the use simulation. However, there is still a great deal to be achieved before simulation meets my needs in this area… but we are moving forward. Some examples.

Over the last 18 months the Australian Defence Simulation Office, together with DSTO, Army Simulation Wing, ADFWC and industry, have been developing a number of tools to support capability development.

One example from the minors is the exploitation of the virtual battlespace (VBS) simulation. VBS is a relatively low cost system that was modified to determine its ability to meet defence training needs. VBS proved quite successful in these demonstrations, with Army procuring a corporate license to allow improved utilization of the system. Further development work is occurring to demonstrate the utility of a system like VBS being linked to a larger constructive simulation such as Joint Semi-Automated Forces (or JSAF).

Whilst VBS has given Defence immediate results, other work has been undertaken on the JSAF constructive simulation. This work has allowed JSAF to be used recently to support ADFWC in the execution of an operational training exercise (VITAL PROSPECT 06). JSAF is also being prepared to support force options testing. Additional tools; such as a C4I Gateway, a logistics component for JSAF, and an order of battle tool are being developed.

Simulation tools to support operations planning and the implications of network centric issues on command structures are also being developed through the minors program.

Defence, together with industry, has already achieved success in the utilisation of simulation to support capability development. Some recent success stories were the AEW&C, ARH and AWD;

- ***AEW&C:*** *simulation was used extensively to support the acquisition of this capability. Through efforts such as DSTO's Armchair Warrior program, not only were critical operational and crew environment issues identified and addressed, the crew experience in the simulation advanced the knowledge and expertise of the first crew. They became 'pre-adapted' to the new capability in the acquisition phase, with the effect of delivering an immediate improvement in Defence's preparedness for the AEW&C's acceptance into service.*

- ***ARH:*** *DSTO's land operations division (LOD) played a leading role in the evaluation of the ARH capability through systems experimentation in the Synthetic Environment Research Facility (SERF). The experimentation series is assisting in the development and testing of the doctrine and techniques, tactics and procedures for the ARH in a combined arms team context.*

- ***AWD****: simulation support is being used extensively to develop the AWD capability. CDRE Andrew Cawley is*

providing a special presentation on 'air warfare destroyer project – simulation case study'

Simulation governance

Appropriate leadership and governance is required to achieve the full potential of simulation across all application areas.

Defence's investment in simulation will require careful change management- not the least of which is to manage simulation as a capability. A central element of this change will be the need to consider and develop simulation capability as a connected whole and not simply as a collection of discrete parts. This requires governance and coordination in capability development.

To provide leadership in simulation, I have taken responsibility for simulation governance and LTGEN Gillespie, Chief of Joint Operations, has accepted responsibility as the Joint Simulation Capability Manager. Together we see simulation having significant application in the areas of war games, research, development, experimentation, acquisition, training and operations. Of significant interest to me is the use of simulation to:

- Advance 'jointery' across the ADF and interoperability with our allies.
- Increase levels of operational preparedness through training and capability development support.

- To support NCW implementation both horizontally and vertically throughout Defence.
- To better support all Defence experimentation activities in a consistent and coherent manner.
- Enhance our capabilities via approaches that challenge our people with the diverse threats that the future may present.

To provide direction on Defence's future simulation needs and investment priorities the Australian Defence Simulation Office is developing the Defence Simulation Capability Guidance. As this capability guidance is an internal document, ADSO are also developing a roadmap to inform the larger Defence and external simulation community on how Defence's simulation capability will develop. The Defence Simulation Forum, which reports to me, is taking an active role in the formation of these documents to allow me to better assess and respond to our future.

Future of simulation in Defence

I'll now talk about the future of simulation in Defence. Defence activities, by their nature, cannot be effectively tested in a real environment until 'the house is burning and the fire brigade is needed'. Simulation offers Defence the opportunity to test its capability in an environment as close to reality as can be developed.

In Defence, we recognise that simulation can fit into almost every aspect of what we do, and that it's not just limited to

simulators and training. Simulation tools are, for example, essential for our management. This is because of the complexity and the range of functions that we perform, and because we operate in a business of high uncertainty, where small changes in scenarios and inputs can drastically change outcomes.

While the opportunities for training are obvious, the Defence White Paper implies a range of other openings for the simulation industry in previously unexplored or under-developed fields such as logistics, risk management, futures analysis, business systems and planning. The White Paper also acknowledges the important role simulation and modelling can play in identifying new and emerging technologies and developing tactics, doctrine and capability in response to these technologies. In particular, it recognises that the way we fight is changing. Smart use of technology is the key to maintaining the edge, and simulation and modelling can guide both the selection of technology and its method of use. The implementation of Network Centric Warfare concepts and the increasing use of unmanned platforms are technology-supported developments that will involve significant simulation elements.

We do need to ensure our technology is as up to date as possible to host our innovations. While simulation is more about people than technology, the dramatic advances in recent

years in computer processing power and networking mean that we have to stay abreast of hardware and software to benefit the people side of the equation, particularly for training. And that means dollars.

I have indicated that there are areas other than training where simulation can offer benefits. However, changes are still occurring within Defence training with the Joint Combined Training Centre, JP2098 being the most significant change. As stated by Minister Hill in an announcement on 29 July 2004:

- *"The joint combined training centre initiative will provide vital training experience for the Australian Defence Force as well as provide a valuable boost to local communities. The JCTC initiative will establish a network of state-of-the-art facilities where Australian and US forces can undertake joint training, supported by improved instrumentation and simulation."*

Although the project has a timeline to only support Exercise Talisman Sabre 07, I expect this type of simulation capability to be further developed and used for most Defence exercises. (I made some comments here regarding the future utility and link between the JCTC and the implementation of NCW)

Future warfare may well see the distinctions between different environments become increasingly removed. Ships, submarines, aircraft and land-based systems for example will be able to engage targets in other environments. With on-board training systems and 'mission rehearsals' – where users are

trained via simulation devices built into the actual equipment they operate – the ability to prepare for operations will be improved. This use of on-board simulation will enable defence personnel to “train as we fight” and “fight as we train”. Such changes mean that defence will also have the means to effectively measure this capability and benchmark it against future capability. An example:

- ***RAN/USN synthetic training****: in May 2006, the first in the series of synthetic training exercises with us pacific fleet elements was conducted. This exercise, known as pacific coalition fleet synthetic training, networked the Australian combat system training simulators at HMAS Watson with two us guided missile destroyers and a cruiser equipped with on board training systems and used a scenario based on RIMPAC 2006. The outcome is to enhance coalition force interoperability training and combined mission rehearsal capability. For the participants, the virtual theatre of operations may be the same or very near the same as any place on earth. By replicating specific features of topography, political situation, military presence and environmental conditions, forces can virtually meet their joint and coalition partners on any playing field at any time, although the forces may be well dispersed across the globe.*

In fact, it may well eventuate that Australia will not be able to participate effectively with other nations in exercises such as RIMPAC or operations such as Desert Storm if it can't participate in the preparatory simulation phases of the activity. We cannot afford to ignore the necessity to attain an effective distributed simulation capability thinking that it will only impact our training capability.

A more general question about simulation for Defence training purposes that often arises is this: How is the right investment balance to be struck between "live" and "simulation-supported" training? For military training - striking this balance continues to be a matter for military judgement - applied on a case-by-case basis.

This topic continues to occupy us – together with our overseas counterparts – as we think about how to plan for future investment in simulation. The cost and effectiveness issues – that this balance of investment question raises in practice - and the rewards for getting the answer right for defence - will be profound over time.

We know that simulation is a valuable complement to "live training" for many reasons:

- The cost of live-training continues to go up;
- The need to present challenges to trainees that only simulation can provide in peacetime;

- Personnel safety, legal and overall risk-reduction reasons;
- The ability of simulation to help train personnel - in some cases on the move – on deployment – to refresh perishable skills and learn new ones – available 24 hours a day - 7 days a week;
- The ability to train to operate in teams – even if remote from team members – as might well happen in real operations;
- Interacting with simulated events – experiencing cause and effect;
- And operating over a network that may itself be contrived to suffer simulated damage.

And there's increasing evidence that you can get more value from live training once you've been through some preliminary, simulation-supported training. It's tough to put a dollar value on some of these things – but then it's always been tough to quantify in financial terms the benefits of training – ask anyone in the training business.

To get an insight into some of our simulation training initiatives, a limited demonstration of current JCTC simulation capability is on show at the ADSO booth and I encourage you all to talk to the team further.

The increased use of simulation in capability development, together with other Defence activities, has prompted the consideration of a need for suitable facilities to provide this support, potentially within Canberra. A possible outcome from such a support facility is the capability for senior decision-makers to visualise together the impacts of key investment decisions they have to make:

- By taking them through graphic portrayals of cause and effect in the future battlespace
- Testing assumptions they may need to make -
- Seeing what works and what doesn't -
- What the implications might be –
- The ripple-through effects of contingencies -
- And of military responses to them.

The support facility may take the form of

- A collaborative environment where sponsors, analysts, scientists and engineers can understand future system requirements - explore new concepts and evaluate solutions.
- A distributed collaborative capability - connected to other facilities - so that all participants can simultaneously share simulation capabilities - scenario visualisation - electronic seminar support and related analytical tools.

Linkage on an “as required” basis to the growing list of specialised industry and DSTO simulation facilities would be a key feature. The initiative would undoubtedly need support from our colleagues in industry and academia – and benefit strongly from our continuing collaboration with our overseas partners. The challenges in achieving such co-operative arrangements between industry, DSTO and defence could be many but the benefits for all are significant.

I see a steady expansion ahead in Defence’s take-up of simulation - and in the requirement for industry and academia to support it.

As stated earlier, I wanted to finish this address with some key challenges and opportunities for industry.

Challenges for industry

I put forward the following challenges for industry:

- How do you intend to help me to achieve my mission?
- How will you obtain my confidence in the use of your simulations?
- How will you provide clear and realistic information on simulation capabilities to Defence? This may also include greater Defence access to industry simulation capabilities for evaluation.

- How can we overcome the barriers of using industry provided simulation? This includes barriers for collaboration within industry.
- How do we achieve all this with ‘value for money’ in mind?

Opportunities for industry

Opportunities where I see a greater need for simulation support from industry are:

- Concept and capability development experimentation support;
- High value and complex projects throughout life;
- Operations, especially for planning, mission rehearsal and NCW;
- In-service support for the upkeep of simulation systems;
- Support to simulation supported exercises such as Talisman Sabre.
- Business and finance; and
- Logistics support.

Finally, simulation is a growth capability in Defence and has an important strategic role in our current and future ‘complex and networked world’.

I wish you every success with the SIMTECT conference and exhibition and look forward to a long partnership between defence and the Australian simulation sector into the future.