

The Australian Joint Combined Training Capability – Reality or Fiction

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ABSTRACT

In July 2004, the Australian Minister for Defence announced that a Joint Combined Training Capability (JCTC) would be developed in Australia for bilateral activities with the United States, and that the initial JCTC would be demonstrated at Exercise Talisman Sabre in June 2007. The JCTC vision is for “enhanced high-end, bilateral training in order to increase and measure operational capability and preparedness, improve interoperability, and facilitate capability development”. This JCTC vision is built upon four major pillars; Realistic Combat Training, Common Ground Truth, Adaptive and Credible Opposition Force (OPFOR), and High Quality Feedback.

The JCTC project to deliver the required outcomes had to be established from nothing, with limited access to appropriate development facilities and minimal Commonwealth personnel to manage the project. To deliver the Simulation and Support System (SSS) of the JCTC a unique management structure was established that involved the Australian Defence Material Organisation (DMO) managing the project with support from the Australian Defence Simulation Office (ADSO) and various commercial organisations. The delivery of the JCTC needed to blend two different organisational philosophies, whilst also delivering a capability where exact project deliverables had not been defined.

The lessons learnt during the JCTC development and implementation deal as much with organisational and cultural aspects as for technical difficulties. The JCTC required the integration of at least seven simulation systems (two live, four virtual and one constructive) together with other support tools and systems, and the development of the network over which the JCTC would function. Integration of at least three of the systems was further complicated by the equipment/system still being in the process of contractual acceptance by the Commonwealth, thus impacting the methodology that could be utilised during integration activities.

However, perhaps the most significant aspect of the JCTC is not what it delivered, but what it will start. The JCTC has required the Australian Defence Organisation to look at what it is trying to achieve in Joint and Combined training. Whilst the initial changes may be small, as the necessary organisational structures are developed to support the Joint and Combined training the momentum for the implementation of an even more robust JCTC will become obvious. Technology is just a small component for the future of the JCTC; it is the organisational structures and training concepts that will determine its success.

This paper will present the valuable knowledge gained from JCTC events relating to the JCTC Simulation and Support System (SSS) component. It will address associated lessons learnt in this context, from the perspective of the Australian Defence Simulation Office.

1 INTRODUCTION/BACKGROUND

In July 2004, the Australian Minister for Defence announced that a Joint Combined Training Capability or JCTC would be developed in Australia for bilateral training with the United States. This announcement followed an AS/US Interoperability Study that had been conducted during 2003 and had recommended additional investment in bilateral training. The Ministerial announcement indicated that the initial focus of the JCTC would be on the Shoalwater Bay Training Area (Figure 1), and that the initial capability would be demonstrated during Exercise Talisman Sabre 2007 (TS07) which was to occur in June 2007. The Shoalwater Bay Training Area occupies 454,500 hectares (or 1754 square miles).



Figure 1: Shoalwater Bay Training Area

At the time of the announcement there was no project approved for the delivery of this new capability, and the first task for the personnel within the Capability Development Group [1] would be to achieve a combined first pass / second pass approval under the processes being established following the Kinnard Review of Defence Procurement.

Government approval was received in December 2005, with the JCTC vision [2] being to “enhance high-end bilateral training in order to increase and measure operational capability and preparedness, improve interoperability and facilitate capability development”. To achieve this vision the JCTC envisioned four pillars (taken from the JNTC pillars); Realistic Combat Training, Common Ground Truth, an Adaptive and Credible OPFOR and high quality feed back. (Figure 2). The eventual capability delivered would address three of the four pillars.

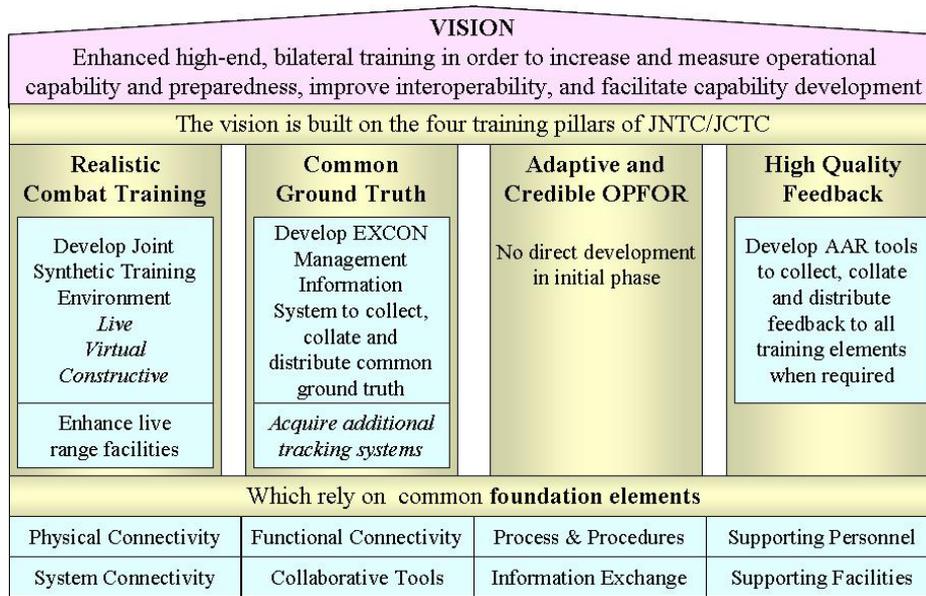


Figure 2: JCTC four pillars

The deliverables that were defined in the Project Acquisition Plan for the JCTC were as follows:

- a. An instrumented Urban Operation Training Facility (UOTF) at Shoalwater Bay Training Area,
- b. An Urban Assault Range near-by the UOTF,
- c. An Exercise Control Facility at Shoalwater Bay Training Area,
- d. Training Network - Joint Network for Experimentation, Simulation & Training (JNEST) later renamed the Defence Training and Experimentation Network (DTEN),
- e. Simulation Backbone,
- f. Collaborative Tools,
- g. Personnel & Support,
- h. Information Exchange Agreements,
- i. Synthetic Training Environment (STE) – Joint Simulation Capability (JSC) – Integrate Existing Capability,
- j. STE – Live Land Combat Training Centre Live Instrumented System (CTC-LIS),
- k. STE – Virtual (and Live) Maritime – Maritime Warfare Training System (MWTS) with existing links to On Board Training System (OBTS),
- l. STE – Live Air - Air Combat Maneuvering Instrumentation (ACMI),
- m. STE – Virtual Air - Hornet Air Crew Training System (HACTS),

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- n. After Action Review Tools,
- o. Exercise Control Management Information System (EXCON MIS) – AS development to deliver MIS for TS07 and establish the foundation for future Australian Defence Force (ADF) joint training,
- p. STE – Virtual Air - US AC-130 Gunship,
- q. Live Land Interoperability - Between AS and US land instrumentation systems,
- r. Exercise Control Management Information System (EXCON MIS) – AS development to deliver persistent MIS for ADF joint training,
- s. STE – Enhanced Joint Simulation Capability,
- t. STE – Live Maritime - OBTS, and
- u. Additional Tracking Systems.

The broad structure is shown diagrammatically at Figure 3.

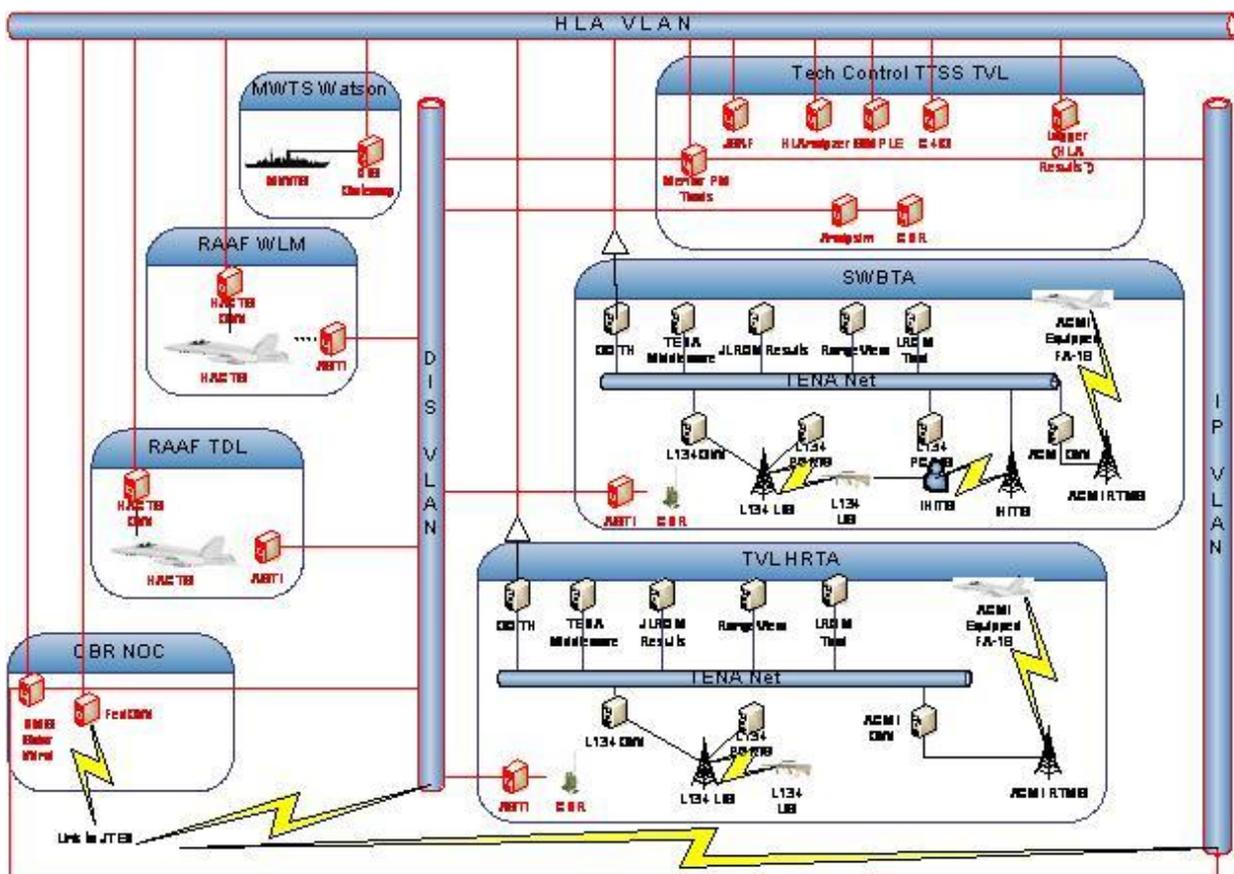


Figure 3: JCTC SSS Deliverables

2 PROJECT DEVELOPMENT

The establishment of an organisation to deliver the JCTC SSS project deliverables was difficult due to a lack of perceived experience within the Defence Material Organisation (DMO) with regard to simulation system integration skills. To overcome this shortfall, the Australian Defence Simulation Office (ADSO) effectively acted as the prime integration agent on behalf of the DMO.

The governance structure needed for the JCTC project was unique within Defence. A Project Steering Group at the one star level was established with representation from all major project stakeholders (sponsor, customers and developers). A core membership was established with representation from DMO (as delivery agent), the Capability Development Group (as Sponsor) and the Australian Defence Simulation Office (as JCTC SSS acquirer). The stakeholders included the Chief Information Officer Group, Defence Support Group and the ADF Warfare Centre. Figure 4 shows this unique structure.

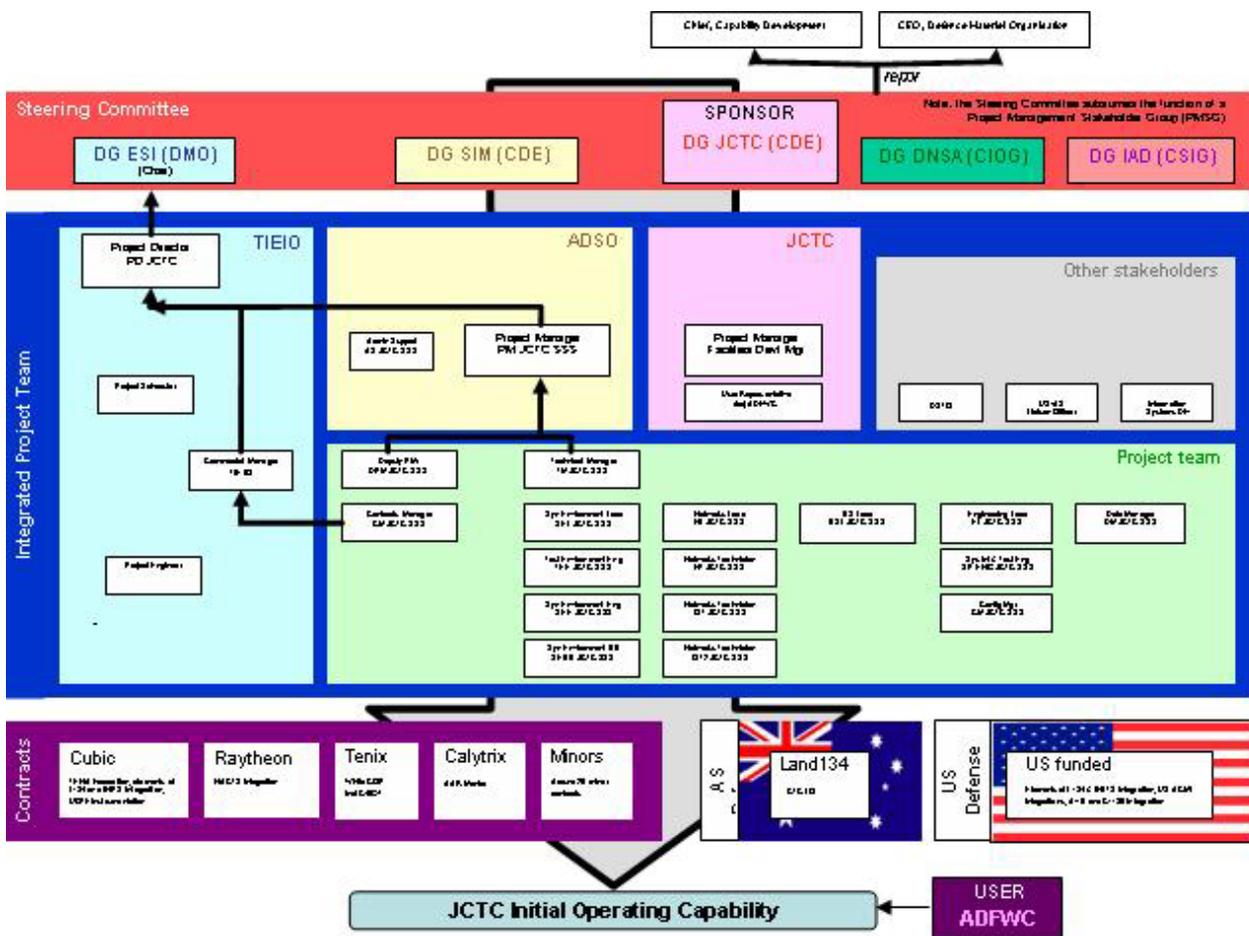


Figure 4: JCTC Organisational Structure

The JCTC SSS Development Office was a combination of seconded Commonwealth personnel, contractors provided via US Department of Defense (DoD) and Australian Defence Organisation (ADO), and company staff contracted to deliver each discrete product. This combination of contract types and contractors (at least seven companies some with multiple funding sources) established another unique series of management issues. Also, there were no dedicated Commonwealth positions established to complete the SSS Development activities.

One of the first lessons learnt within this project was the need for a clearly defined customer requirement. Due to the project not being requested by the customer organisations, the scope of the project approved by Government was extremely open allowing a wide range of actual delivery outcomes. Whilst this would have worked well if early engagement with the customer organisations had occurred, the compressed timeframes, multiple customer groups, lack of resources within customer groups and lack of customer buy-in through the initial project development meant that in many instances the Development Office made assumptions on what the customer needs were to allow the delivery timeframe to be met. Thus, once an effective dialogue was established with many of the user groups there were concerns that the project would not deliver to their perceived needs.

Another issue within the project was the definition of the project deliverable, “JCTC is to demonstrate its initial operating capability during Exercise Talisman Saber 2007”. At times there was confusion between organisations as to whether the JCTC was demonstrating at, or supporting Exercise TS07.

However, the most telling issue to be raised during the project establishment was the cultural difference between the two organisations that were tasked with the delivery of the SSS. Overlaid by a contractual mechanism arguably not designed for this form of delivery, the DMO and ADSO were not culturally aligned with regard to the ambiguous corporate processes, with each placing differing emphasis on certain requirements. This led to problems between the principal groups that were tasked with delivery.

Whilst the project initiation caused several problems, it did ensure that the project commenced procurement activities at the earliest possible moment and that an appropriate architecture was utilised to support the SSS. The cultural issues were eventually mitigated but never truly overcome, though an understanding was eventually achieved between stakeholders through robust intervention by the JCTC Steering Group.

Administered by a newly appointed Project Director and a Project Manager, a “get well” program was initiated, to ensure that scope and risks were clearly defined, and once defined were able to be managed until delivery. This placed an increased work burden upon team members during this get well period, but without this effort the likely success of the JCTC SSS would have been extremely low.

The early problems with the project inevitably led to delivery compression. The original plan had a five stage delivery process for the synthetic environment, with each delivery providing an increment in JCTC capabilities. Parallel with this synthetic environment activity was the development of the Defence Training and Experimentation Network (DTEN). Whilst the synthetic environment progressed, the network delivery became problematic. The network establishment constrained the delivery capability of the JCTC.

Staff turnover was also a major issue during the project, which impacted the “corporate memory” of the team. During the project all three principal members of the Steering Group changed; whilst the Project Director, Project Manager, Systems Engineer, Network Manager, Network Technician, Assistant Project Manager, ILS Manager and Synthetic Environment Technician all changed at least once. However, whilst turnover was an issue the re-affirmed determination of a dedicated team of professionals ensured delivery.

3 DEPLOYMENT

The development of the DTEN proved to be the critical component in the deployment of the JCTC SSS capabilities. The Simulation Backbone and associated tools were completed in early 2007 but could not be effectively tested until the network was deployed. The network was established with less than a day to spare before the commencement of the TS07 exercise proper. This late deployment meant that the entire TS07 was the integration test for the JCTC SSS.

During the preparation of the Synthetic Environment the team encountered a couple of unexpected issues that extended the delivery of certain components. The Hornet Aircrew Training System (HACTS) is a simulation system that is capable of being networked. However, the JCTC team discovered that whilst it was capable of being networked the Technical Assistance Agreement that the Commonwealth had with the respective US organisations did not extend to the networking of the HACTS beyond other HACTS sites. It really does pay to know the fine print on these types of agreements. The other major lesson the team learnt was don't be the first to introduce a new piece of cryptographic equipment. The JCTC purchased its cryptographic equipment as part of a large Defence buy, but unfortunately we were the first to want to use the items. We had to wait for approximately six weeks whilst the items went through the required approval process.

During the months preceding the TS07 event, the team was becoming aware manpower within the office would be insufficient to support the surge numbers required for TS07 site operations and delivery. Although late in the schedule, JCTC SSS made an estimate of the total support needs across eight potential sites (several of which were greenfield sites) and met these with contractor support.

At the completion of the deployment period (ie at the Startex for TS07) the JCTC had achieved the following:

- a. established network nodes at 5 out of 7 locations,
- b. had gained Technical Assistance Agreement through an approved amendment to allow the networking of the HACTS,
- c. been granted an “Interim Authority to Operate” for the DTEN for the period of the exercise, and
- d. developed facilities at Shoalwater Bay Training Area to support exercise control and urban operations training.

The deployment phase had its own set of issues and lessons. For example routine field maintenance disabled a poorly secured fibre connection. Storms and flooding of the ADFWC Exercise Control Building the weekend prior to the exercise added to the pressure of the deployment. The Surge Contract worked well because of the experience of the personnel provided. However, rather than a heroic one off contract a better contracting model needs to be established that allows the contractor to be paid for maintaining the experience of surge personnel in the operation of the DTEN and the JCTC Simulation and Support systems.

The lack of personnel and the urgency of delivery during the latter part of the project meant that support documentation had not been completed appropriately which impacted the deployment phase. Many aspects of deployment that should have been tested in a laboratory environment had to be trialed during the deployment. This made network establishment somewhat difficult.

4 DELIVERY

Although the project suffered a catalogue of issues, the JCTC through sheer determination and revamped planning, did achieve almost every deliverable that was contained within the Government's project approval documentation, though there were varying levels of success. The extraordinarily tight schedule resulted in many cases where the JCTC team were still conducting testing or overcoming integration issues during the actual exercise period. The network node for the UOTF was achieved three days prior to the first use of the facility, whilst connectivity between the Simulation Control Centre and the training area where the Live, Virtual, Constructive demonstration was to occur was achieved two days prior to exercise commencement.

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One of the major oversights that occurred during the deployment phase was the implementation of a coordination cell. Limited resources and late integration of systems meant that the level of coordination required between sites was much greater than originally envisaged. This meant that the Voice over Internet Protocol (VoIP) system was overwhelmed, and senior management could not keep pace with the activities occurring at the three major sites and the Network Operations Centre. The implementation of a more expansive VoIP system, together with landlines and a web-based coordination page should alleviate many of the issues encountered. The late implementation of many of the systems meant that documentation was either incomplete or non-existent at the commencement of the exercise. This lack of documentation made troubleshooting far more difficult and also meant that the exact baseline configuration of many systems was unknown.

5 SUCCESS

TS07 covered several Australian Defence Training Areas, and involved a wide range of military activities. Reference 3 details what activities occurred during the TS07 event more broadly with photographic repositories. TS07 was considered an overall success in achieving the defined exercise objectives.

Regardless of what the limitations of the JCTC systems were due to late delivery, little testing and poor documentation, the JCTC was able to meet all except one of the Government’s requirements. The JCTC:

- a. demonstrated a Live, Virtual and Constructive (LVC) training event where the simulation greatly enriched the training outcomes,



Figure 5: Virtual UAV Picture from LVC Training Event

- b. demonstrated interoperability between US and AS live instrumentation systems,
- c. delivered an major Urban Operations Training Facility, and



Figure 6: Urban Operation Training Facility at Shoalwater Bay Training Area

- d. provided a number of tools/systems to help the exercise control staff in the delivery and evaluation of TS07.

For a first effort, the capability that the JCTC delivered to the TS07 training audience and exercise control staff was impressive. However, the ability to replicate these efforts and provide a meaningful ongoing capability is limited in the short term due to the need to review and complete tasks that were “truncated” to achieve the delivery date.

The JCTC SSS team had defined the technical support infrastructure to a reasonable level, but failed to adequately address the operational support required for the direction and control of virtual exercise assets. The lack of time for integration testing meant that there were several areas of delivery where a large amount of “polish” was missing. Issues such as entity machining between the different systems and “drift” issues on some of the live systems are just two examples of the areas where improvements could be made.

The skill and dedication of a number of personnel to the delivery of this project was the difference between success and failure. The first efforts of the JCTC team post TS07 will be to make the systems more robust, with improved documentation to make the JCTC SSS deployment process more systemic.

6 FUTURE DIRECTIONS

TS07 demonstrated the capabilities of simulation to a much wider audience in Australia than had previously been possible. The ability of simulation to enhance training was not limited to the tactical audience. Through the targeting of selective components of the command structure, the JCTC was also able to simulate a “vertical” training activity relevant to Joint Fires.

The JCTC intends to be utilised for more than the Talisman Sabre series of exercises if the expenditure on the JCTC SSS is to be justified. The JCTC needs to be able to support training activities across a large spectrum of size and complexity, and to be seen as part of the normal method of training rather than a “special” ability reserved for major bilateral exercises.

The catalyst effect that the JCTC will have upon the Joint Training environment will be the most beneficial outcome of the project. The JCTC has provided a means for the provision of joint assets to training activities that would not be possible without virtual assets. This capability will increase the focus on joint training outcomes because costs have been a major determinant in the provision of real assets. The ability to provide virtual joint/combined assets, the provision of immediate and meaningful after action review, and an improved focus on continual joint training are all important legacies of the JCTC involvement in TS07. TS07 also allowed the JCTC to engage a larger audience than had previously been possible regarding the abilities for simulation to provide meaningful training beyond initial individual skills-based systems. It is extremely important that the JCTC converts this exposure into tangible outcomes.

As part of this process the JCTC is providing regular support the Army’s Combat Training Centre to increase the breadth of the training experience through the provision of virtual assets (UAVs initially, with aircraft simulators upon the establishment of a persistent DTEN) and integrated “live” training with ACMI equipped aircraft. Consideration is also being given to the type of support that could be offered to the Royal Australian Air Force major exercise Pitch Black during 2008.

The JCTC that was demonstrated at TS07 was only a subset of the capabilities that can be delivered as the necessary supporting infrastructure and systems are completed. The ability to rapidly support new training concepts means ready access to data (geospatial and entity level) are vital, together with an architecture that supports integration of new systems through a standardized gateway procedure. Many of the limitations in the use of the JCTC into the future will not be due to technology but will be because of more mundane issues such as the competition within limited military budgets to secure the necessary resources, in the form of both funding and personnel.

7 CONCLUSIONS

The JCTC demonstrated to the ADO what could be achieved through the use of networked simulations in a live, virtual and constructive environment. It also demonstrated the ability for bilateral training to also occur within this distributed construct.

There were several areas within the delivered JCTC SSS capability where further refinement and work is needed as compromises were required during the JCTC development to achieve the extraordinarily tight delivery timeframe. The impact and benefits of the JCTC and the SSS component won’t be measured by the achievements at TS07, rather the true benefits of the work and effort of a number of dedicated personnel during the JCTC project will be in the change that the JCTC is able to initiate in the joint training environment.

The ADO has also learnt some valuable lessons in the delivery of this form of synthetic training capability and will use this knowledge to refine our approaches to meet the growing demand in live, virtual and constructive simulation.

In addition, the old training paradigms will need to change to meet the increased flexibility required of today's defence forces, and whilst the JCTC as currently delivered is not the solution, it is a window to the future of Joint and Combined, Training.

8 REFERENCES

- [1] Capability Development Group website. www.defence.gov.au/capability/.
- [2] Capability Development Group Joint Combined Training Capability website www.defence.gov.au/capability/jctc/.
- [3] Australian Department of Defence, Talisman Sabre 2007 website. www.defence.gov.au/exercises/ts07/default.htm.

