Australian Government

Department of Defence

DEFENCE SIMULATION MANUAL

The *Defence Simulation Manual* (SIMMAN) is issued for use by Defence personnel and is effective from the date of publication.

We have authorised this manual on advice from the Vice Chief of the Defence Force as our principal adviser on all aspects of simulation.

Dennis Richardson
Secretary

D.J HURLEY
General
Chief of the Defence Force

Department of Defence
CANBERRA ACT 2600

11 October 2013

Sponsor:
Vice Chief of the Defence Force

Sponsor contact:
Head Joint Capability Coordination

Effective Date: 11 October 2013

Review Date: 11 October 2018

Defence Simulation Manual

First edition 2013

Publisher

Defence Publishing Service
Department of Defence
CANBERRA ACT 2600

FOREWORD

Simulation is utilised in the Department of Defence to support a large number of business functions and Australian Defence Force capabilities. In the Defence White Papers of 2009 and 2013, Government has directed Defence to increase the use of simulation and has recognised its importance as an enabler for operations and training, research and development, and in supporting decision-making for our business processes. Simulation is such a pervasive capability that it requires Defence enterprise level coordination governance and management.

This *Defence Simulation Manual* articulates the Defence Simulation Policy and provides the authority and guidance for the governance of Defence Simulation Capability and its application.

Chapter 1 of this Manual is the policy statement, authorised by the Secretary and Chief of the Defence Force, as required by the System of Defence Instructions, and supersedes Defence Instruction (General) OPS 42–1—*Defence Simulation Policy*. The Manual also incorporates, as chapters, the specific policy and guidance of the Service and Group heads related to their responsibilities.

The Defence Simulation Capability and its components are to be governed in accordance with this policy, to promote visibility of, accessibility to, development and use of, the simulation assets across Defence. Services and Groups should seek every opportunity to use this governance framework to support the effective and efficient employment of simulation.

Chapter 1 provides the authoritative policy for Defence simulation, while an introduction to simulation, its application in Defence and associated terms and concepts, is outlined in Chapter 2. Chapter 3 provides guidance on governing and managing simulation capability. Services and Groups should also refer to Chapters 4, 5 and 6 for technical and investment guidance through the Capability Systems Life Cycle. Policy of the individual Services is provided in Chapters 7, 8 and 9. Chapters 10 and 11 provide guidance on the technology aspects of the simulation capability and its utilisation in joint capability.

Through the implementation of this policy, the investment in and utilisation of the simulation capability in Defence will be coordinated and governed to optimise use of existing and new capability to meet the expectations of the Government.

M.D. BINSKIN, AO
Air Marshal
Vice Chief of the Defence Force

AMENDMENT CERTIFICATE

Amendment number	Chapter(s)	Amendment	Effected date
AL1	Chapter 1	Minor editorial	24 Apr 14
AL2	Chapters 2 and 6	New chapters	19 May 15

CONTENTS

CHAPTER 1

DEFENCE SIMULATION MANUAL

INTRODUCTION

1.1 Simulation is a capability that enables many aspects of Defence's mission, and is referred to generically as the Defence Simulation Capability (DSC). It is a governed matrix of constructive and virtual environments, component models and time and task sensitive integration of instrumented live ranges and systems. The DSC exists on stand-alone and distributed systems and services that exchange data on dedicated and ad hoc simulation networks. The network component of the DSC is referred to as the Defence Synthetic Environment (DSE) where common re-useable data, models and services are hosted and where distributed simulation take place. The DSE is part of the Defence information and communications technology (ICT) environment as Defence moves towards a Single Information Environment (SIE). In general, it includes simulations owned and used by Defence and those used and owned on behalf of Defence. The strategic purpose of simulation in Defence is articulated in the Defence Simulation Strategy and Roadmap.

1.2 Simulation is an integrated enterprise capability that enables Defence to:

a. lift the excellence of individual and collective training by the provision of realistic training supplemented, by an immersive synthetic environment

b. analyse and fully understand the cost of capability and through life ownership

c. provide enhanced support to decision-makers

in a cost-effective and efficient manner.

1.3 Defence invests in simulation through a number of mechanisms, including major simulation projects, Defence capability projects where simulation is a component, minor capital projects, direct acquisition and in-house development of simulation services and products and the ongoing sustainment of existing simulation capability.

1.4 Simulation is applied widely in many aspects of Defence capability. The roles and application within Defence Groups ranges from basic use and support to major capability management. These roles and applications are highlighted in the *Defence Simulation Strategy and Roadmap*, which compares simulation application areas across the simplified Defence Business Model.

POLICY STATEMENT

1.5 As an enabling capability, simulation is to be coordinated at the enterprise level.

1.6 Simulation must be governed and managed efficiently across the Defence enterprise through the full Capability Systems Life Cycle, to ensure that it is fit for purpose, is appropriately integrated with, and supported by, the underlying information and communications technology (ICT) environment, and to ensure the maximum utilisation of simulation products and services with minimal duplicated investment.

SCOPE

1.7 The *Defence Simulation Manual* (SIMMAN) is applicable to all Defence personnel whose duties involve the definition (needs and requirements) for acquisition, in-service operation and disposal of any element of the DSC.

GOVERNANCE

1.8 Effective governance of simulation in Defence is essential to ensure the capability is effective (delivering an enterprise wide simulation capability and enhancing Defence capability), efficient (delivering cost-effective simulation and saving resources), viable and sustainable, and that the investment leverages existing capability wherever possible across the enterprise. This policy includes guidance for simulation interoperability with allies and acknowledges an enduring reliance on Defence industry as a major contributor to the simulation workforce.

1.9 As an enabling capability, the DSC is a contributor to many Fundamental Inputs to Capability (FIC) elements. As the evolution of simulation systems is driven by computing and networking technologies, the DSC is intimately dependent on wider Defence ICT systems, and the Defence Simulation Architecture (DSA) is part of the Defence Enterprise Architecture. These factors require governance via an authoritative framework to ensure uncompromised functional performance of the whole system, which is measured through the performance measurement indicators defined in the DSA. The governance framework covers the component elements of the DSC, the relationships between the components and the underpinning ICT systems.

1.10 The governance and management of the DSC is achieved through a combination of enterprise level coordination and individual Service, Group and Agency responsibilities, reflecting the roles in the *Defence Simulation Strategy and Roadmap*.

1.11 Effective governance of the DSC and coordination of activities concerning the DSC require:

a. executive policy coordination—governing application of the DSC within the Defence environment and management of the DSC as an enabling capability

b. technical governance—achieved through an authoritative framework of endorsed standards and models as part of the Integrated Defence Architecture (IDA) and a managed Defence Synthetic Environment (DSE) including dedicated and ad hoc simulation networks

c. enterprise level FIC coordination—enabling access to industry expertise (workforce), facilitating international interoperability, assuring sustainability of the capability as a whole and guiding enterprise level investment

d. security considerations—Capability Managers and owners of simulation systems must be cognisant of security policies, and make decisions based on sound risk analysis and mitigation strategies. Such systems include networked and stand-alone systems as well as the data contained within them

e. networked provision—the Chief Information Officer (CIO) is responsible for the networks and associated services that host simulation systems, excluding military platforms, weapons and sensors, or their internal embedded systems

f. Group level capability management and governance

g. coordination with other Defence enterprise authorisations such as Chief of Air Force (CAF) (Airworthiness) and Chief of Army (CA) (Technical Integrity of Land Materiel) and Chief of Navy (CN) (Technical Regulatory Authority for Australian Defence Force (ADF) maritime materiel).

DEFINITIONS

1.12 A list of definitions that apply to this chapter is in Annex A.

SPONSORSHIP

1.13 The Vice Chief of the Defence Force (VCDF) is the primary sponsor of the SIMMAN in the role as Joint Capability Authority.

1.14 Service Chiefs and Group Heads are secondary sponsors for the Service and Group-specific aspects outlined in the SIMMAN.

AUTHORISATIONS

1.15 Chief of Joint Operations (CJOPS) is authorised to issue the remainder of the SIMMAN chapters and can amend the structure and content of the SIMMAN as necessary in the role as Capability Coordinator for simulation across Defence.

1.16 Service Chiefs and Group Heads may authorise subordinate appointments to amend the Service and Group-specific chapters in SIMMAN.

ROLES AND RESPONSIBILITIES

1.17 The VCDF will direct development and maintenance of the SIMMAN.

1.18 Service Chiefs and Group Heads are to develop and maintain the Service and Group-specific chapters in the SIMMAN.

1.19 The following Services, Groups and Agencies have established their lead simulation business units, coordinating and managing the simulation capability within the scope of the respective organisations:

a. As Capability Managers, the Service Chiefs and Deputy Secretary Intelligence and Security control a range of modelling and simulation systems supporting activities such as individual and collective training and education, joint exercises, mission rehearsal exercises/activities, after action reviews, weapons performance, tactical development, experimentation, analysis, decision support and reporting.

b. CJOPS, manages and utilises simulation capability in support of planning for operations, and joint/combined training activities and the development of distributed mission training. CJOPS also sponsors the Simulation Certification process, which supports capability development. The Australian

Defence Simulation and Training Centre (ADSTC) as the J7 Branch within Headquarters Joint Operations Command (HQJOC) operates the Defence Training and Experimentation Network (DTEN) for the ADF, and links to the United States Joint Training Enterprise Network (JTEN).

c. CAF as the Defence Aviation Authority and Deputy Chief of Air Force as the Operational Airworthiness Regulator, are responsible for governance of aviation simulation systems as defined in Defence Instruction (General) (DI(G)) OPS 02–2—*Defence Aviation Safety Program* (http://intranet.defence.gov.au/home/documents/DATA/ADFPUBS/DIG/go02_2.PDF).

d. CA is responsible for assuring technical integrity of all ADF land materiel as defined in DI(G) LOG 4–5–015—*Regulation of the Technical Integrity of Land Materiel* (http://intranet.defence.gov.au/home/documents/DATA/ADFPUBS/DIG/GL4_5_015.PDF).

e. CN is responsible for assuring technical integrity of all ADF maritime materiel as defined in DI(G) LOG 4–5–012—*Regulation of technical integrity of Australian Defence Force materiel* (http://intranet.defence.gov.au/home/documents/DATA/ADFPUBS/DIG/GL4_5_012.PDF).

f. Defence Materiel Organisation (DMO) is responsible for the acquisition and sustainment of a large number of simulation systems in Defence. The DMO also delivers engineering services related to the simulation system it acquires and sustains.

g. Defence Science and Technology Organisation manages and develops modelling and simulation systems and experimentation networks across the organisation in support of Defence outcomes.

h. The coordination with other Defence enterprise authorisations such as CAF (Airworthiness), Chief of Army (CA) (Technical Integrity of Land Materiel), and CN (Technical Regulatory Authority for ADF maritime materiel).

i. CIO is the Capability Manager for the emerging SIE, which includes systems and networks that the DSC utilises. The CIO's responsibilities relevant to the DSC include: the development of Defence ICT policy, concepts and doctrine; advising Defence Committees on ICT issues; the development of a single Defence ICT architecture, including standards and products lists; establishing priorities and engagement strategies for ICT interoperability with other Australian Government agencies, allies and Coalition partners; and coordination of ICT related fundamental input to capability issues. Whilst Service Chiefs and Head Defence Intelligence Organisation manage the modelling and simulation systems, CIO manages the networks, links and associated media which connect the DSC. These include the DTEN which connects to the United States JTEN, the Combined Federated Battle Laboratory Network which among other tasks, provides access to Coalition simulation networks and North Atlantic Treaty Organisation simulation networks and the future simulation network being acquired under the Defence Capability Program.

j. The Strategic J6 (Head of ICT Operations Division, Chief Information Officer Group (CIOG)) is responsible for the efficient operation of the emerging SIE and for providing strategic planning, coordination, implementation and synchronisation of Communication Information Systems (CIS) and electromagnetic spectrum (EMS) support to Chief of the Defence Force through VCDF and CJOPS. The Strategic J6 also exercises end-to-end technical control of all ADF military communications. Where simulation systems concerning SIE, EMS, and/or interface with CIS, Strategic J6 must be consulted.

k. Other Groups have lesser numbers of modelling and simulation applications in support of their core business functions including individual training and education, analysis and reporting on Defence estate, human resources, finance and preparedness.

1.20 In order to manage the DSC effectively, this Instruction provides Defence with enterprise wide authority for coordination of activities concerning acquisition and management of the capability at Group and Defence enterprise levels, including policy and governance as well as technical advice for Defence simulation standards and architecture.

1.21 Key roles in DSC coordination are:

a. **Joint Capability Authority (JCA).** The JCA is responsible for ensuring that new and extant capabilities are developed in accordance with Defence policy, concepts and doctrine; and for appointing where necessary capability coordinators to coordinate the generation and sustainment of specific joint capabilities that support Defence.

b. **Joint Capability Coordinator.** VCDF as the JCA, delegates the Defence wide simulation coordination responsibility to CJOPS. As such CJOPS is responsible for coordinating the enterprise governance of the DSC, including:

(1) the overarching Defence simulation governance framework—framing enterprise simulation policy development and coordination, and guiding the application of the simulation within the Defence environment and its management and sustainment as an enabling capability

(2) developing and maintaining an evolving framework of endorsed definitions and standards

(3) in consultation with Services and Groups, developing and delivering common enterprise level training on simulation concept, theory and practice

(4) in consultation with other Defence enterprise authorities, developing and maintaining an authoritative technical framework—the simulation business domain—as part of the IDA

(5) under the guidance of the ‘hybrid’ model developed by the CIOG as the CC for Defence ICT, configuration management of the DSE, including common simulation data, models, applications and licences shared between Services and Groups

(6) coordinating Defence contributions for international simulation interoperability through a number of coordination mechanisms internal and external to Defence

(7) supporting Defence investment in simulation by coordinating access to simulation industry expertise (workforce)

(8) monitoring investment in Defence simulation.

c. **Deputy Chief Joint Operations (DCJOPS):**

(1) DCJOPS reports to the Joint Warfare Council on Defence simulation governance and coordination matters conducted by the ADSTC.

(2) DCJOPS is also the nominated Capability Coordinator for Joint Simulation projects.

d. **Director-General Australian Defence Simulation and Training Centre (DG ADSTC).** Is to:

(1) coordinate development of the Defence simulation governance framework and support the implementation of the framework

(2) DG ADSTC is the technical advisory authority for the development and maintenance of the Defence simulation standards framework and Defence Simulation Architecture, and provision of advice on their use.

e. DG ADSTC is also the HQJOC J7, responsible for both the design and conduct of joint collective training and the enabling simulation support. J7 chairs the O–6 level Joint Collective Training Working Group which is a forum to resolve issues relating to joint collective training.

1.22 Key roles in the implementation of this Manual include the Capability Managers and Group Heads who govern, maintain and use simulation capabilities in their respective organisations. Capability Managers and Group Heads are to:

a. develop, maintain, and implement their Group policy on investment and management of simulation capabilities and systems, cognisant of JCA, CIO, Capability Coordinator—Geospatial Information, and Service Chiefs' (with ADF technical regulatory authority) policy and direction where the capability possesses attributes that affect interoperability with systems in another Group or contribute to re-useability in other Groups

b. through their respective simulation offices, ensure appropriate though life support and maintenance for Service Group sponsored and/or managed simulation systems

c. manage the Group simulation capabilities and systems to ensure that they contribute to simulation asset re-use across Defence enterprise through cross-Group coordination mechanisms.

STRUCTURE

1.23 The structure of SIMMAN is as follows:

a. Chapter 2—‘Introduction to Simulation’.

b. Chapter 3—‘Policy Guidance on Governing the Defence Simulation Capability’.

c. Chapter 4—‘Technical Guidance on the Defence Simulation Capability’.

d. Chapter 5—‘Enterprise Level of Fundamental Inputs to the Defence Simulation Capability’.

e. Chapter 6—‘Best Practice and Guidance’.

f. Chapter 7–11: Services and Groups policy chapters.

1.24 Proposed release dates are in Annex B.

IMPLEMENTATION

1.25 The release of SIMMAN replaces DI(G) OPS 42–1—*Defence Simulation Policy* and provides:

a. governance and policy for the DSC

b. technical advice and guidance on enterprise simulation issues.

1.26 Groups and Services are responsible for ensuring that appropriate arrangements and resources are in place to enable the implementation of the SIMMAN where applicable.

1.27 ADSTC is to coordinate effort among Groups to develop Defence simulation policy and governance requirements, and to share and re-use existing simulation systems and/or components/models/data across Defence as well as with external and Coalition partners through the governance framework and Defence Simulation Minor Capital Program.

1.28 ADSTC is to maintain enterprise representation with appropriate national and international partners and organisations and facilitate information sharing between enterprise level and Services and Groups, and individual representation with peer groups.

1.29 DG ADSTC is to establish and maintain a standing offer panel of simulation service providers for Services, Groups and Agencies to access.

1.30 DG ADSTC is to establish and maintain the Defence Simulation Steering Group which is to be a 1-star or Senior Executive Service Band 1 level forum represented by Services and Groups responsible for the management and/or coordination of simulation capability within their respective Groups.

1.31 Defence Services and Groups with responsibilities for acquiring and managing simulation capability and/or systems are to develop and implement within their respective organisations instructions and/or policies, which:

a. seek every opportunity to re-use simulation capability/systems and/or components during concept proposal, capability development, system acquisition or modernisation by seeking technical advice from Joint Capability Coordination Division on simulation standards and architecture

b. contribute to effective management of the DSC through participation in the Defence simulation governance structure

c. re-use and/or share their respective simulation capability and components/models/data with other Groups or Services.

MONITORING AND REPORTING

1.32 DG ADSTC will:

a. liaise with relevant representatives from all Services, Groups and Agencies to review and coordinate existing simulation capabilities and planning requirements

b. conduct periodic update and dissemination of information of simulation capabilities and components/models/data to promote re-use.

1.33 Project sponsors and managers are responsible for advising DG ADSTC through the governance working groups when a simulation system/capability is to be acquired, in order that its re-use potential can be assessed and realised where appropriate.

1.34 Groups and Services simulation offices are responsible for advising DG ADSTC when a simulation system/capability is to be decommissioned.

RELATED POLICY

1.35 DI(G) OPS 02–2—*Defence Aviation Safety Program* ((http://intranet.defence.gov.au/home/ documents/DATA/ADFPUBS/ DIG/go02_2.PDF).

1.36 DI(G) LOG 4–5–015—*Regulation of the Technical Integrity of Land Materiel* (http://intranet.defence.gov.au/home/documents/DATA/ADFPUBS/DIG/GL4_5_015.PDF).

1.37 Joint Capability Instruction No 8/13—*Joint Collective Training and Supporting Simulation Framework* (http://intranet.defence.gov.au/DRMS/uR4423/R16468791.pdf).

RELATED DOCUMENTS

1.38 *Australian Defence Simulation Glossary* (http://intranet.defence.gov.au/vcdf/sites/JCC/docs/Australian_Defence_Simulation_Glossary.pdf).

1.39 Defence Committee Agendum 56/2010.

1.40 Defence Simulation Standards Guide and Baseline (http://intranet.defence.gov.au/vcdf/sites/JCC/comweb.asp?page=49675&Title=Defence%20Simulation%20Manual).

1.41 *Defence Simulation Strategy and Roadmap* (http://intranet.defence.gov.au/vcdf/sites/JCC/ docs/SIMStrat_update.pdf).

Annexes:
1A Definitions
1B Release dates

ANNEX 1A

DEFINITIONS

Defence means the Department of Defence, Australian Defence Force (ADF) and the Defence Materiel Organisation (DMO).

Defence civilian, as defined in section 3 of the *Defence Force Discipline Act 1982* (DFDA), means a person (other than a Defence member) who:

a. with the authority of an authorised officer as defined in the DFDA, accompanies a part of the ADF that is: outside Australia, or on operations against the enemy, and

b. has consented, in writing, to subject themselves to ADF discipline while so accompanying that part of the ADF.

Defence employee means a person employed in the Department of Defence under section 22 of the *Public Service Act 1999* (the Public Service Act).

Defence member, as defined in section 3 of the DFDA, means:

c. a member of the permanent Navy, the regular Army or the permanent Air Force; or

d. a member of the reserves who: is rendering continuous full-time service; or is on duty or in uniform.

Defence personnel means all Defence employees, Defence locally engaged employees overseas, Defence civilians, Defence members and the equivalents from other Defence organisations on exchange to Defence.

External service provider means a contractor, consultant and/or professional service provider engaged by Defence.

A **simulation** is the execution of a model over time. Simulation is an abstraction of a defined reality for a specific purpose. For example, if a three-dimensional model of an armoured vehicle is instructed to move across a model of terrain over time, a simulation is created. Alternatively, discrete event simulations can be used with building and estate models to enhance traffic flows and optimise estate usage.

A **model** is a physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process. Examples: mathematical models of sensor response or digital information flow over a network, or computer-aided design models of building, armoured vehicles, aircraft, or physical and cognitive process modelling of human beings. Note: modelling refers to the process of creating models.

The **Defence Simulation Architecture** (DSA) describes the Defence Simulation Capability (DSC). The DSA is a compliant segment of the Defence enterprise architecture. It provides an overall structure and scope of the DSC, as well as detailing views of the specific technical descriptions and integration protocols required for the governance of the DSC, including its development. In capability development terms, the DSA is progressively acquired by the full suite of acquisition methods, including non-equipment procurement, rapid acquisition, minor and major capital projects, including projects where simulation is part of a larger capability.

Simulation in Defence is a capability that enables many aspects of Defence's mission, and is referred to generically as the **Defence Simulation Capability** (DSC). It is a governed matrix of computer-based constructive and virtual environments, which includes data exchange with instrumented live ranges and systems, distributed and stand alone systems. In general, it includes simulations owned and used by Defence and those used and owned on behalf of Defence.

The **Defence Synthetic Environment** (DSE) is a time and task-based configuration managed environment, comprising 'common' services, data and applications, hosted on public, Defence and specialised networks. The DSE is constructed as a service oriented architecture environment to facilitate evolution and component reuse as Defence's demand for simulation evolves. The DSE is compatible with Defence's preferred information and communications technology architecture.

Integrated Defence Architecture is the Defence collective intent for its future enterprise architecture by documenting the endorsed strategic performance, business, services, data and technology direction to be used as a collective reference for planning and architecting.

ANNEX 1B

RELEASE DATES

The proposed timeline is as following:

Dates	Chapters	Remarks
20 November 2013	Chapter 1	Endorsed by the Secretary/Chief of the Defence Force
June 2014	Chapter 2, 3, 5 and 6	Endorsed by the Vice Chief of the Defence Force (VCDF)
End of 2014	Chapter 7–11 (Services and Groups chapters, excluding Army)	These are the Service and Groups chapters and will be endorsed by the VCDF and respective Deputy Group Heads
Mid 2015	Chapter 7–11 (Service and Group chapters—Army)	These are the Service and Group chapters and will be endorsed by the VCDF and respective Deputy Group Heads

CHAPTER 2

INTRODUCTION TO SIMULATION

References:

A. Abt, C 1970, *Serious Games*, New York: The Viking Press
B. Sawyer, B 2010, Speech at GameTech 2010, Orlando
C. *Defence Simulation Strategy and Roadmap*
D. *Australian Defence Simulation Glossary*

INTRODUCTION

2.1 This chapter introduces modelling and simulation related concepts that are commonly used in Defence. Defence's existing simulation capabilities are typically extensive and comprehensive. There are significant capabilities within each of the Groups and Services, acquired through Foreign Military Sales or industry, with most of the simulation capability operating on an ICT infrastructure within Defence. Simulation is an integral part of Defence's training capabilities, and supports Defence in making informed organisational, personnel and capability decisions.

WHAT IS SIMULATION?

2.2 The general term 'simulation' encompasses two main concepts:[1]

a. Modelling – creating a representation of something.

b. Simulation – using a tool (such as a computer) to imitate the dynamic characteristics of a real world system.

2.3 A model is a physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process. Some models are representations of physical objects, such as an armoured vehicle, and may be designed to function like the real thing. Other models are representations of a conceptual process, such as human behaviour, and are used to help understand the system, entity, or process they represent. The fidelity required of a model depends on the purpose of the model, and cost and benefit need to be balanced to achieve the fidelity required. Technical aspects are included in more detail in later chapters of SIMMAN.

2.4 Simulation is defined as the execution of a model over time. For Defence purposes it can be said that simulation is an abstraction of a defined reality for a specified purpose.

2.5 There may be a requirement to validate the modelled representation of the 'real world', as well as validate the execution of the model in a simulation. This drives the need for a robust verification, validation and accreditation (VV&A) program where simulation is being used to learn about or explore the real world – either for training or other applications.

[1] For endorsed definitions please refer to the Australian Defence Simulation Glossary. Explanations provided in this Chapter are intended to expand on the definitions featured in the glossary to provide the reader with a greater understanding of the subject.

THE CASE FOR USING SIMULATION

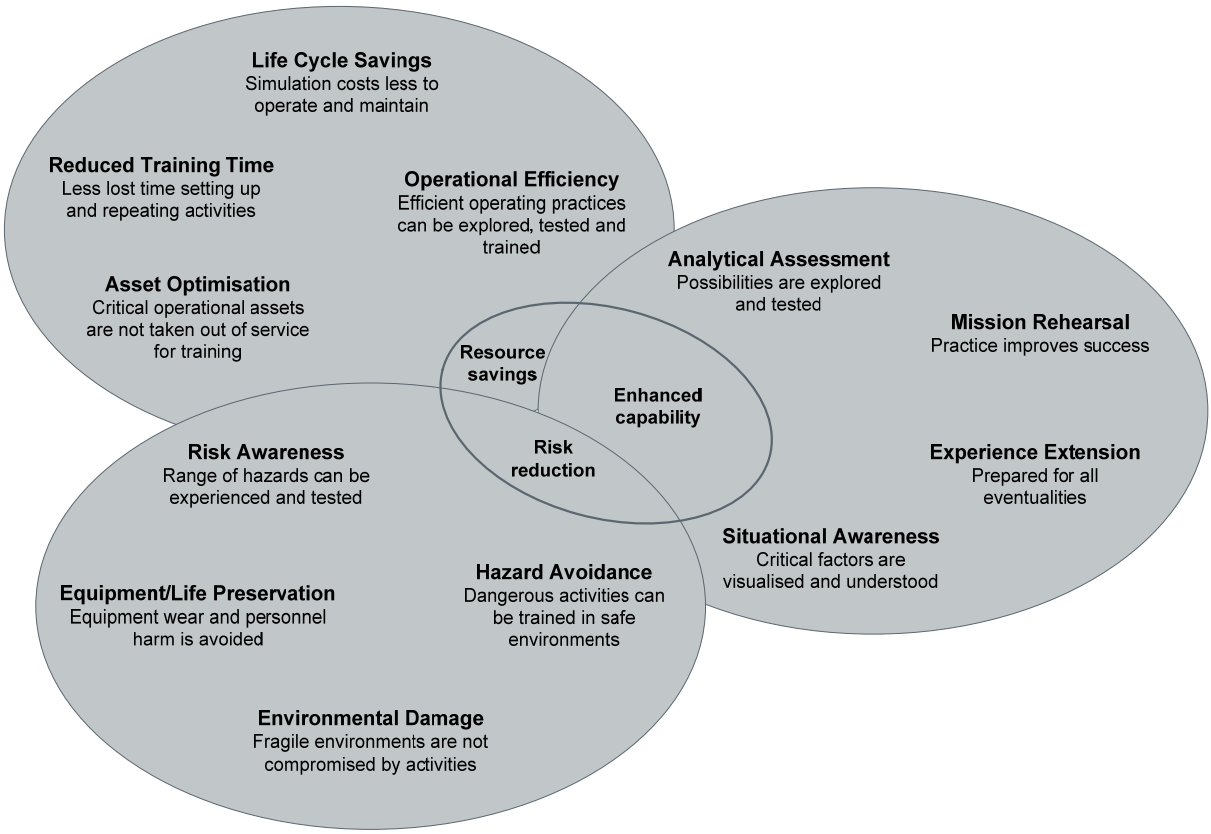
2.6 Simulation can:

a. enhance capabilities;

b. save resources; and

c. reduce risk.

Figure 2.1: Benefits of Simulation



2.7 Simulation can provide a number of benefits to Defence. Some examples of these benefits are identified in Figure 2.1. Other benefits can include:

a. effective and efficient instructional utility;

b. objective student/trainee performance analysis and feedback;

c. an ability to record and store performance information and replay past lessons learnt;

d. analysis of capability and engineering trade-offs;

e. test and adjust planning and decision making assumptions;

f. consistent and repeatable competency assessment baseline testing; and

g. accident investigation and prevention analysis.

WHAT FORMS CAN SIMULATION TAKE?

2.8 Simulation is often categorised as being virtual, live and constructive. These are common terms representing different styles of simulation, but are not absolute terms with respect to design or implementation.

a. **Virtual simulation** involves human-in-the-loop in order to exercise motor control, decision-making or communication skills. The human element of a virtual simulation is not modelled. Examples of virtual simulations include individual aircraft simulators, weapon system simulators, or virtual prototypes.

b. **Live simulation** involves real people operating real systems. Traditionally having a training focus, live simulation represents military operations using military personnel and equipment, in which experiences are simulated using near-combat conditions. A subset in this category is live instrumented simulation involving real people, operating instrumented weapon systems on training, test, or exercise ranges.

c. **Constructive simulation** involves simulated control entities (including agents) operating simulated battlespace systems. Real people make inputs to such simulations, but are not directly involved in determining the outcomes. For example, a military user may input data instructing a unit to move or engage an enemy target. The constructive simulation determines the speed of movement, the effect of engagement with an enemy, and any battle damage that may occur.

SIMULATIONS, SIMULATORS AND TRAINING DEVICES

2.9 **Simulations and Simulators**. Most simulations and simulators in use by Defence rely on data provided through some form of software support package. However, the definition of simulation in para 4 allows for the inclusion of physical artefacts. To understand simulation, it can be seen as a “running” simulator or (a set of) models. For example, sectioned sub-components of major platforms are considered as simulators as long as the artefacts are designed with accuracy to reflect the real design; when the simulators are “running”, they demonstrate the operation of the real systems over a discrete period of execution time. Computer-aided simulators are usually physical representations of an immersive work environment, which is then stimulated by visual, aural and physical effects. These effects can be presented by physical “mock-ups” or by complex simulation applications, which may often be integrated with distributed, constructive applications. Simulators may collect user data during simulation (execution of the simulator), which can be re-used for feedback and training of other platform operators.

2.10 **Training Devices**. Training devices can be considered as models which do not generally store, collate or distribute data related to the training event and are not capable of being connected with local or distributed training simulations. An example may be a cut away of a diesel motor displaying internal functions of a compression ignition engine, or an aircraft fuselage mock-up used for firefighting training.

2.11 **Training devices, simulations and simulators** may be used for individual or collective training, or have an application in both. The requirement for simulation applications and simulators to comply with Defence standards and architectures is based on how the artefact is intended to be used. For example, the compliance requirement of a device whose purpose is solely for isolated use and does not need data from another system will be different from that of a simulation that is intended to be interoperable with many other simulations (and/or) real systems at a joint or combined level.

2.12 **Training devices and simulations** used for platform specific training may be unique or standalone assets as they may not share or require the use of Defence level data for their operation. Simulations and simulators which contribute to the collective capability for a Service or Group need normally be capable of providing data to other Defence simulation users or downloading and benefiting from enterprise data storage and applications. More detail on simulation architecture and standards is featured in Chapter 4.

SERIOUS GAMING AND EMERGING TECHNOLOGIES

2.13 Integrated, distributed, online, commercial gaming is driving a rapid technical advancement in human/computer interaction and low cost, high fidelity, visual immersion. This development has caused a reversal of the flow of technology from military to civilian environments, through the military uptake of ‘serious games’. In the article Serious Games, Abt defined them as having ‘…an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement’. The application of serious games has expanded into areas other than education. Ben Sawyer, the founder of Serious Games Initiative & Games for Health, referred to serious games as games or game-like applications designed for purposes beyond entertainment, including education, defence, health, workforce design and more. They allow the user to be immersed in a virtual environment and learn skills and knowledge through the play medium. For example, users can learn technical and behavioural skills and gain spatial and situational knowledge from playing games designed for those purposes. In Defence, serious games are used to rehearse, train or explore military options in a simulation of real-world events or processes.

2.14 The majority of serious gaming software uses commercial gaming engines and models developed for a mass market. They offer potential of lower financial and technical risks during acquisition and through life support than a product built specially for the military. They are also typically reliable as they have had extensive commercial verification and validation due to the scale of the market. The user interfaces of commercial simulations are generally simple and intuitive. As military demographics evolve, many more trainees will be more able to process instruction through serious game applications and will actually expect more of their training to be conducted in serious game/simulation environments.

2.15 Continued evolution of Modelling and Simulation (M&S) into effective decision support tools will require the integration of emerging technologies such as Augmented Reality (AR). Current research suggests that AR will be the most effective stream of reality modification in terms of simulation and decision support. Virtual environments will continue to be important in game playing and training, but the effect of being able to digitally manipulate a person’s view of reality will be the key element in development of M&S as a decision support tool.

2.16 M&S support to training, skills development, and decision making will continue to evolve as model based simulations and serious games converge. However, just using serious games does not necessarily lead to desired outcomes; needs and requirements must be clearly identified before making the decision on the type of training tools and fidelity.

DISTRIBUTED SIMULATION

2.17 In addition to the simulation utilisation that is confined to single, isolated applications developed for a specific purpose, Defence has seen rapid advancement of computer-based technology that allows once isolated systems to be connected together to form complex systems. Computer-based simulation can utilise these same connections to help us to understand, train for and analyse the complexities of modern warfare and military capabilities.

2.18 Distributed simulation takes several independently constructed simulations and provides the means to combine them together to create larger, more complex and challenging simulation environments for training and decision support.

SIMULATION INTEROPERABILITY STANDARDS

2.19 Distributed simulation is enabled by common interoperability standards, of which two major ones are:

a. Distributed Interactive Simulation (DIS); and

b. High Level Architecture (HLA).

2.20 There are a large number of bespoke systems that may not be DIS or HLA compliant organically; they can still interoperate with other systems by using more complex interface programming than those which are DIS or HLA compliant out of the box.

2.21 Simulation owners may also develop and maintain an interface gateway between DIS and HLA based simulation systems.

DISTRIBUTED INTERACTIVE SIMULATION

2.22 Distributed Interactive Simulation (DIS)

a. DIS is an IEEE standard (1278) for conducting real-time wargaming across one or more host computers. A synthetic environment is created through real-time exchange of IEEE 1278 compliant, protocol data units (PDUs) between distributed, computationally autonomous simulation applications in the form of simulations, simulators, and instrumented equipment interconnected through standard computer communicative services. The computational simulation entities may be present in one location or may be distributed geographically.

b. In DIS compliant simulations PDUs are the basic elements for the exchange of data. For example, entity, logistics and data characteristics information.

HIGH LEVEL ARCHITECTURE

2.23 High Level Architecture (HLA):

a. HLA is an IEEE standard (1516), a framework within which simulation architectures can be defined. It includes major functional elements, interfaces, and design rules, pertaining to all the simulation applications concerned. HLA is designed to support the combining of simulations to allow the conduct of distributed simulation exercises. HLA is foremost a software architecture for developing and is defined by a set of principles (instantiated by the IEEE 1516 standards).

b. In HLA terminology, each component software simulation is called a federate. A set of participating federates and the run-time infrastructure (RTI) (or combined simulation system) is known as a federation. HLA allows each federate to specify what information it will generate (and in what format) and what data it receives. It is through this common interpretation of shared data that the federates interact within a single virtual environment. HLA is system/product vendor specific and relies on application programming interfaces (API) to work between systems.

CURRENT USES OF SIMULATION

2.24 The Defence Simulation Strategy and Roadmap has identified eight application areas for the use of simulation in Defence:

a. **Research and Development** – supports the operational and technical analysis throughout the design and development phases.

b. **Capability Development** – supports a risk based approach for ensuring that a well resourced capability is maintained to support the development, acquisition and integration of capability.

c. **Simulation support to decision making for routine business** – supports resource planning and allocation for sustaining systems through-life, encompassing logistics and maintenance support from planning to operations.

d. **Acquisition** – determines and refines user requirements, system design, prototyping, and system testing and evaluation for procurement decisions.

e. **Preparedness simulation for forecasting and options analysis** – supports decision making in the areas of capability and force structure analysis, including preparedness and resourcing studies from tactical operations, operational and theatre level through to campaign and strategic levels.

f. **Individual and collective training** – covers the routine development of skills in combat and non-combat roles.

g. **Mission rehearsal** – supports mission specific training that prepares personnel to employ forces, use systems and apply technologies for the mission.

h. **Support to operational planning, execution and other high consequence planning** – assists the conduct of operations with just-in-time planning information, providing decision support during military operations.

2.25 In Defence, simulation is used broadly in both the military and civilian arms. Its application is across all Services and Groups to support decision making and enhance military capability.

2.26 In short, simulation can enable a range of Defence activities, including supporting analysis for decision makers throughout the capability life cycle, simulation supported research and development, military experimentation, capability/options development, and simulation enabled acquisition and sustainment. There is an increasing utilisation in individual, collective and joint training and mission rehearsal where simulation systems interact with command, control, communications, computer, intelligence, surveillance and reconnaissance (C4ISR) systems. While quite mature in education and medical domains, simulation application in Defence decision support is a growing area.

2.27 Simulation supports corporate decision makers on personnel, finance and facilities issues.

2.28 Sponsors of simulation systems need to be aware that these systems require a number of underpinning components, for example, intelligence data and associated security, ICT, as well as their own resources. Whilst simulation is not an isolated technology stream, it has a uniqueness, and thus requires a suitably skilled workforce to support it.

THE DEFENCE SIMULATION CAPABILITY

2.29 The simulations and simulators in use in Defence are an enabling capability that supports many aspects of Defence’s mission. These assets are generically referred to as the Defence Simulation Capability (DSC). As an enterprise enabling capability the DSC can be viewed as a governed matrix of assets which contribute to live, virtual and constructive environments in use in Defence. DSC assets can also be used in component models and discrete time bounded tasks which integrate instrumented live ranges and physical assets for testing, evaluation or training. Aspects of the DSC exist on stand-alone systems but the effectiveness of the DSC is better realised when assets are hosted on distributed networks such as the Defence Training and Experimentation Network (DTEN) where the data can be shared with other simulators, systems and (where authorised) with other networks, such as the US Joint Training and Experimentation Network (JTEN) or Coalition Forces BattleLab Network (CFBLNet).

THE DEFENCE SYNTHETIC ARCHITECTURE

2.30 The Defence Synthetic Architecture (DSA) is a segment of the Defence enterprise architecture designed to promote the shared use of extant simulation infrastructure across Defence business and ensure that users do not develop or acquire simulation assets which duplicate functionality or diverge from the strategic direction. The DSA details the specific technical descriptions and integration protocols required for the development and governance of the DSC.

2.31 The Australian Government has mandated the use of Australian Government Architecture Reference Models. Defence also requires the use of Australian Defence Architecture Framework (AUSDAF) to describe architecture.

2.32 Currently, the DSA is described through a controlled set of Reference Models in accordance with Australian Government requirement and the DSA Architecture Disclosure document with supporting artefacts in accordance with AUSDAF requirements. The DSA will continue to provide through a portfolio of programs and projects: frameworks of standards, policies, procedures, practices and skills; and an evolving collaborative infrastructure of services, systems, skilled people, and knowledge, information and data management. This enables the practical intercommunication and interaction of both legacy and emerging simulators, simulation devices and simulation facilities, wherever they may be located, both internal and external to Defence.

THE DEFENCE SYNTHETIC ENVIRONMENT

2.33 The Defence Synthetic Environment (DSE) is defined as a configuration managed environment, comprising common services, data and applications, hosted on public, Defence and specialised networks. The DSE is being constructed as a service oriented architecture environment to facilitate evolution and component reuse of Defence's demand for simulation services. The DSE is designed to be compatible with Defence's preferred ICT architecture.

2.34 The DSE comprises the following five layers:

a. **Standards** – The DSE provides standardisation of simulation protocols and formats to enable interoperability between the numerous simulation systems and their associated applications. The standards layer includes simulation entity and object enumerations, HLA and its associated Federation Object Model (FOM) and DIS standards.

b. **Gateways** – The DSE provides a number of gateways to enable the interoperability between various extant and future systems and simulation protocols including HLA and DIS gateways that allow legacy systems to interoperate with compatible federations.

c. **Data and repositories** – Integral to the successful employment of simulation in Defence is the quality and availability of data used by simulations. Simulation data encompasses entity and object data, geospatial data and simulation system information (technology data). The DSE will provide the repositories and catalogues for these data types so that simulations across Defence are common and consistent in their representation of Defence capabilities.

d. **Development of applications and services** – The development and application layer provides the tools necessary to create and maintain the DSE core components, including specialist tools to support DIS, HLA and associated DSE products. These include data loggers, emulators and test beds.

e. **Live, Virtual and Constructive components** – The live, virtual and constructive (LVC) application layer of the DSE provides an extensive set of tools to support various training, experimentation and development applications. The LVC application layer is able to be configured and extended to enable the user to undertake a variety of tasks.

Annex:
2A Examples Of Simulation In Use

ANNEX 2A

EXAMPLES OF SIMULATION IN USE

DEFENCE APPLICATIONS

1. Modelling and simulation has broad applications – both in Defence and non-Defence contexts. Here are just a small number of Defence-related examples, grouped into the eight application areas identified in the *Defence Simulation Strategy and Roadmap.*

2. Research and Development:

a. Modelling of the positioning of land-based radar systems to maximise the instantaneous probability of detection, taking into account overlapping coverage regions.

b. Using modelling to study the robustness of communication network topologies.

c. A night-vision laboratory at Defence Science and Technology Organisation (DSTO) simulates the effects of flying helicopter formations at night, to study the effects of infrared lighting.

d. The Integrated Avionics System Support Facility (IASSF) provides a simulated environment to test F/A–18 avionics, avionics software and system behaviour on the ground without the initial need for real F/A–18 flight testing.

3. Capability Development:

a. DSTO has undertaken a research approach to explore helicopter defensive tactics against a generic man portable surface to air missile.

b. Using simulation to study how people alter their decision-making and interactions with other military personnel when they are influenced by certain factors, such as heat, tiredness, consumption of stimulants like caffeine, as well as battlefield experience and cultural factors.

c. DSTO’s Future Operations Centre Analysis Laboratory (FOCAL) provides a large collaborative semi-immersive virtual reality display environment to explore new paradigms for situation awareness and command and control in military operations centres.

d. The One Semi-Automated Forces (OneSAF), developed for the US Army, is acquired and used by DSTO for training and experimentation purposes.

4. Simulation support to decision-making for routine business:

a. Simulation for Defence's replacement patrol boat project included reliability modelling, logistic support system design and simulation, use of optimisation techniques to simulate annual and life cycle operational plans and life cycle cost modelling to identify cost drivers, refine design and fine tune the integrated support system solution.

5. Acquisition:

a. A simulation environment that allows for rapid integration and usage of new models of physical systems and human operators was used to evaluate competitor Airborne Early Warning and Control (AEW&C) aircraft in specific missions.

b. Operations Research was used to analyse air-to-air combat related to the possible acquisition of a major new air capability.

c. The environment was extended in an exercise that involved an assembled AEW&C crew viewing an air picture presented on a screen in real-time, and controlling many aspects of the platform through a graphical user interface. These include the movements and sensor usage of the aircraft. Enemy and Allied Forces were inserted and controlled to provide a total air picture of the scenario.

6. Preparedness simulation for forecasting and options analysis:

a. A modelling and simulation capability is used to analyse the impacts of networking on a force: that is, for exploring the concepts of Network Centric Warfare (NCW). The study of NCW is primarily focused on understanding the effect that exchange of information within a group of coordinating forces has on their effectiveness, especially the dynamic interactions from command and control to communication and decision-making.

7. Individual and Collective Training:

a. A Mine Warfare and Clearance Diving gaming capability for the Royal Australian Navy.

b. Training courses, delivered over the internet, embodying simulation to improve knowledge transfer.

c. Personnel weapons training simulation systems to train in weapons handling, and target identification.

d. A live simulation environment which will be used to train and evaluate combat team leaders and their combined arms teams in a realistic battlefield environment. The system will simulate direct and indirect fire weapons effects and other area effects, in the live domain.

e. An Advanced Ground Based Air Defence Simulator used to train target recognition, acquisition and missile deployment.

f. Black Hawk Full Flight and Mission Simulators enhance both aircraft handling skills and operational experience.

g. The AEW&C platform has both an Operational Flight Trainer (for training pilots) and an Operational Mission Simulator (for training and testing the sensor system operators).

h. Part-task trainers at HMAS WATSON develop skills in radar, sonar and missile systems. Team capabilities are developed in ship operations room simulators.

i. Training simulators located in Australia, manned by real ship's crews, were networked with similar simulators in the US, including an operational US Navy ship, for Fleet Synthetic Training exercises.

j. Aviation – for example evacuation training;

k. Medical – surgical and anaesthesia training simulators, and simulation mannequins to provide clinical skills training to health personnel.

8. Mission Rehearsal:

a. Simulating a landmine route clearance task.

b. Using a desktop flight simulator to review, optimise and rehearse a mission route profile from initial entry to egress from the target area.

9. Support to operational planning execution and other high consequence planning:

a. Agent technology, which simulates human behaviour to an extent is being considered for use in the Joint Strike Fighter cockpit to assist the pilot in making optimum decisions during conflict.

b. Using a real-time virtualisation of the battlespace to gain situational awareness and test battlefield strategies.

OTHER APPLICATIONS

10. Education:

a. This is an additional area identified where simulation is seen increasingly employed.

b. Australian Defence College has been exploring how simulation applications may assist and enhance education. An example is the simulation use in the Army Advanced Operations Course.

11. Simulations and simulators are used in other application areas, some of which may be utilised in Defence:

a. Transport – post-accident analysis, and work-force team training; and

b. Manufacturing – rapid prototyping and testing, optimisation of equipment and assembly lines.

CHAPTER 6

BEST PRACTICE AND GUIDANCE

INTRODUCTION

6.1 The acquisition and use of simulation within Defence varies widely in both the type of simulation and its application. A number of best practice guides have been developed to assist Defence personnel and supporting industry in order to:

a. appreciate the use of simulation for their application;

b. define simulation requirements;

c. analyse the cost/benefit of simulation; and

d. acquire the appropriate simulation.

6.2 This chapter is broken into three elements:

a. identifying simulation in support of the Capability Systems Life Cycle (CSLC);

b. simulation needs analysis; and

c. investment in simulation, including proposal and certification guidance.

6.3 The guides introduced by this chapter are designed to assist anyone, even if they have not been exposed to simulation, to determine if and how simulation might be used to support, or solve problems. Separate guides have been developed to address each stage of the CSLC. While these CSLC guides can provide an understanding of how simulation could be used to solve a problem, they are not intended to provide a method for selecting between a range of simulation solutions or technologies. That problem is addressed by use of the Simulation Needs Analysis Guides (SNAGs) to identify, define and justify a simulation solution. The first SNAG has been developed for simulation applied to training & education: the Simulation Needs Analysis Guide for Training (SNAG–T).

6.4 The remainder of this chapter provides an introduction to each of the best practice guides.

CAPABILITY SYSTEMS LIFE CYCLE SIMULATION SUPPORT GUIDES

6.5 **Capability Systems Life Cycle Simulation Support Needs Phase Guide.** The Needs Phase Guide has been designed to assist Defence personnel working in the Needs Phase of the CSLC to identify and plan simulation support to assist the Needs Phase activities. It will aid Defence staff to understand where and how simulation can contribute to the process of refining judgements in the decision-making that leads up to, and concludes with, the Government endorsement of the Defence Capability Plan.

6.6 **Capability Systems Life Cycle Simulation Support Requirements Phase Guide.** The Requirements Phase Guide has been designed to assist Defence personnel planning for, and working in, the Requirements Phase of the CSLC in considering how and where simulation may be used to support capability

development. It will aid in applying simulation to gain knowledge about capability options being considered through the first and second pass process—and to undertake steps to appropriately resource identified requirements for simulation support.

6.7 **Capability Systems Life Cycle Simulation Support Acquisition Phase Guide.** The Acquisition Phase Guide has been designed to assist Defence personnel planning for, and working in, the Acquisition Phase of the CSLC in considering how and where simulation may be used in support of acquisition activities and outcomes. It will aid in identifying and sourcing available simulation capabilities and simulation support services to assist project staff with designing, acquiring and delivering effective capability systems.

6.8 **Capability Systems Life Cycle Simulation Support In-service Phase Guide.** The In-service Phase Guide has been designed to assist Defence personnel who are planning for, and working in, the In-service Phase of the CSLC to consider how and where simulation may be used in support of in-service activities and outcomes. It is designed to help staff identify, plan for, and source simulation capabilities and simulation support to improve Defence capacity to operate and support capability systems more effectively and efficiently.

6.9 **Capability Systems Life Cycle Simulation Support Disposal Phase Guide.** The Disposal Phase Guide has been designed to assist Defence personnel planning for, and working in, the Disposal Phase of the CSLC to consider how and where simulation may be used in support of disposal activities and outcomes. It will aid in identifying and sourcing available simulation capabilities and support services to assist staff with determining life of type and options for disposal of Defence capabilities.

SIMULATION NEEDS ANALYSIS GUIDES

6.10 The Simulation Needs Analysis (SNA) process provides a structured methodology for Defence personnel to analyse simulation requirements. The SNA process is tailored into guides for different application areas such as: training, capability development, or acquisition. The first guide has been written for the training application area and is known as the Simulation Needs Analysis Guide for Training (SNAG–T). Plans are being developed for other SNAGs for other simulation application areas.

Simulation Needs Analysis Guide for Training

6.11 The SNAG–T is a web-based tool that assists Defence personnel analyse their simulation requirements within the training application area. The SNAG–T supports the development of acquisition business documents throughout the CSLC, such as:

a. Simulation Options Brief;

b. Feasibility Report including Options Analysis;

c. Initial Business Case;

d. Capability Submission;

e. Simulation Business Case; and

f. Project/Contract documents including a Functional Performance Specification;

g. The SNAG-T process has five main steps:

(1) Context Analysis – Identification of key outputs required for the simulation business document, assessment of level of detail required for the analysis, initial assessment of time and resources, task planning and timeline.

(2) Identify Options – Identification of the workplace need, establishment of the minimum training requirements and training tasks, identification of simulation and non-simulation options through market research.

(3) SNAG–T Kernel – Analysis of simulation specific topics to determine the feasibility or Cost/Benefit of each simulation option recommended by Identify Options.

(4) Value for money assessment – Comparison of cost/benefit assessments for the individual simulation and non-simulation options, determination of the best value for money option to meet the workplace need.

(5) Business Documents – Use analysis generated through the SNAG–T process to develop the required simulation business document.

6.12 The user documentation is built into the SNAG–T tool, which can be found on the Australian Defence Simulation and Training Centre (ADSTC) intranet page.

GUIDANCE ON SIMULATION INVESTMENT

6.13 **Defence Simulation Investment.** Services and Groups invest in simulation mainly through major projects and minor programs, with some other simulation systems being brought in during capability sustainment. Simulation sponsors and owners need to consider the following factors when deciding on investing in simulation:

a. Applying simulation to Defence outcomes. Sponsors should be able to identify where simulation may be applied to support Defence outcomes at each phase in the CSLC. There is no ‘one-best way’ to apply simulation, so the guidance is generic.

b. The benefits of simulation. Where simulation can provide significant benefits is a fundamental factor to acquire a simulation capability that suits the purpose. Getting this right will help in the development of simulation strategies by identifying areas where simulation business cases should be raised – and to reduce ‘missed opportunities’ (situations where simulation can provide clear benefits that outweigh its cost).

c. Estimating the cost of simulation. Sponsors need to estimate the cost of simulation as part of the overall acquisition and sustainment costs of capability. It is important to keep in mind that simulation systems have their own total cost of ownership, and often, require specialised personnel to operate and maintain. Chapter 5 of SIMMAN has more details on this.

6.14 **Defence Simulation Proposal Development.** A simulation proposal is a main means to acquire simulation capability through the Defence Simulation Minor Capital Program, which is maintained by the ADSTC. The proposals must be robust and based on sound business and engineering principles. ADSTC assesses proposal submissions with the following aspects:

a. why the proposal should be considered;

b. what issues the proposal should discuss;

c. the value, costs and risks of the proposed simulation investment; and

d. the critical points to reviewing and refining the proposal.

6.15 **Simulation Certification Process.** This process is mandatory for all DCP projects. It is a three stage maximum process depending on whether simulation will be acquired through the major project concerned. Where the project will not acquire simulation, a stage one certificate stating no further requirement will be issued to the project which then exits the certification process. Although the process is only mandatory for DCP projects, it is useful for all simulation acquisitions and major upgrades; therefore, it is recommended sponsors and managers become familiar with the process particularly with some of the templates used. The goal of the process is to increase visibility of existing simulation capability, reuse and share Defence owned simulation assets. Chapter 5 provides more details.