



DEFENCE INSTRUCTIONS (GENERAL)

Department of Defence
CANBERRA ACT 2600

3 October 2001

Defence Instruction (General) OPS 42-1 is issued pursuant to section 9A of the *Defence Act 1903*.

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Secretary

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Admiral, RAN
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LIST B—ISSUE NO OPS B/9/2001

New instruction

OPS 42-1 [Defence simulation policy](#)

Single Service filing instructions

This instruction should be filed as:

1. NAVY OPS 68-1
2. ARMY OPS 55-1
3. AIR FORCE OPS 5-33

DEFENCE SIMULATION POLICY

INTRODUCTION

1. Defence looks increasingly to simulation as a way to help decision makers take better account of the complexity, the dynamics and the uncertainties that pervade modern warfare. The Defence Efficiency Review, the Australian National Audit Office report on Defence Aerospace Simulators, and the *Defence 2000 White Paper* underlined key future roles for simulation. Issues raised in the *Defence 2000 White Paper* highlight the potential for simulation support to war games and analysis, research and development and experimentation, acquisition, training and operations.

2. Simulation is already widely used and with demonstrable benefits for Defence training purposes. Training continues to be a growth area for simulation in Defence. Increasingly, simulation also offers decision makers a cost-effective means to investigate new ideas, test assumptions, evaluate alternative options for action and develop responses to situations before they occur. Fundamentally, simulation helps people to gain and sustain knowledge—to look at and to prepare for the future.

3. Within each Defence Group, varied use is already made of simulation. Several Groups have simulation policy and planning documents appropriate to their areas of application. However, overall policy direction and coordination of simulation initiatives across the Defence Groups concerned offer the potential to increase the effectiveness of the applicable activities within them. There are strategic issues regarding the development and use of simulation which affect each Group but which are not within the responsibility of any particular one to address for the eventual benefit of Defence as a whole. A Defence policy on simulation has therefore been developed to address these strategic simulation issues from a Defence-wide perspective. It establishes the rationale for and sets the context for the Defence Simulation Plan. The latter prepares the way ahead for the coordination of future component and subordinate plans and the management of Defence simulation investments.

AIM

4. The aim of this instruction is to promulgate a policy that will guide the development and use of simulation in Defence.

SCOPE

5. This instruction addresses modelling and simulation activities which are either computer-based or computer supported¹. Hereafter in this document, computer-based or supported modelling and simulation activities are collectively referred to as 'simulation'.

DEFENCE VISION FOR SIMULATION

6. The vision for simulation in Defence is as follows:

**Defence exploits simulation
to develop, train for, prepare for and test military options for Government
wherever it can enhance capability, save resources or reduce risk.**

7. In practice this will mean that:

- a. simulation will be employed and managed effectively,
- b. the profile of simulation in Defence will rise significantly,
- c. simulation will become integral to the way Defence does business,
- d. simulations will be combined to address broader issues than they can address individually, and

¹ A **model** is defined as a physical, mathematical or otherwise logical representation of a system, entity, phenomenon or process. A **simulation** is the implementation or exercise of a model over time.

- e. the military options which are the focus of simulation effort will be those that result from both contemporary and future warfighting concepts.

8. The conceptual vision for simulation in Defence, which provides the context for this vision statement, is in [annex A](#).

RATIONALE FOR THE VISION

Benefits of simulation

9. By substantially helping our people gain and sustain knowledge that is directly relevant to their spheres of activity, simulation makes a key contribution to developing Australia's 'knowledge edge'. For example, simulation enables individuals and groups to learn and master the operation of equipment, develop and assess tactics, derive courses of action, and evaluate different force structures across a wide range of scenarios. Simulation provides knowledge and experience which would be too costly, too risky, or impractical to gain by other means.

10. The benefits of simulation can be usefully summarised in terms of:

- capability enhancement—for example, by supporting the development, selection and life cycle management of weapon systems in the Australian Defence Force inventory;
- resource savings—for example, by reducing the need to use more expensive, operational assets for training and analysis tasks; and
- risk reduction—for example, by supporting both training in and the analysis of life threatening situations without endangering life.

Application areas

11. Defence has a significant investment in simulation for training purposes, and this role will continue to grow in importance. However, there are other significant and emerging application areas for simulation, which are identified in [figure 1](#). [Figure 1](#) also identifies the Defence Groups to which the application areas relate. An entry in the table indicates that an application area relates to a Group's core function, rather than to an activity in which it may have some involvement.

		SIMULATION APPLICATION AREA								
		Training	Force Assessment	Experimentation	Research and Development	Acquisition	Life-Cycle Management	Crisis Management and Planning	Mission Rehearsal	Conduct of Operations
DEFENCE GROUP	OUTPUT									
	Operations	•	•	•				•	•	•
	Navy	•	•	•	•		•	•	•	•
	Army	•	•	•	•		•	•	•	•
	Air Force	•	•	•	•		•	•	•	•
	Strategy	•	•	•				•		
	Intelligence	•	•	•	•			•	•	•
	ENABLING									
	Matériel					•	•			
	OWNER SUPPORT									
	Capability		•	•		•	•			
	Science and Technology		•	•	•					
Finance		•			•					
Personnel	•	•								

Figure 1: Defence Groups and their supporting simulation application areas

STRATEGIC ISSUES FOR SIMULATION

12. The formally endorsed documents identified in [paragraph 1](#), highlight strategic issues relevant to simulation in Defence. The issues focus on ensuring that the most effective use is made of current simulation capabilities while actively pursuing opportunities presented by future investments in new and improved approaches. Priorities are on harmonising relevant activities to obtain the best return on existing and future investments while avoiding duplication of effort. Specific strategic issues for simulation are:

- a. education processes to raise awareness, build confidence and manage user expectations;
- b. defining and growing the necessary skills and experience within our people;
- c. establishing and implementing guidelines for simulation acquisition and use;
- d. securing benefits from the coordination of simulation activities across Defence;
- e. enabling beneficial collaboration both within Australia and with overseas partners;
- f. keeping pace with the appropriate developments in simulation technology;
- g. ensuring the right levels of participation by Australian industry and academia; and
- h. developing structures for the effective management of investment in simulation.

13. These strategic issues have guided the development of Defence's current approach to simulation, as described in this policy. The elements of this approach are:

- a. a Defence simulation management structure;
- b. a set of practical issues to guide simulation project development;
- c. a set of strategies to achieve Defence's vision for simulation; and
- d. a plan for implementing this policy.

DEFENCE SIMULATION MANAGEMENT STRUCTURE

14. Implementation of Defence's vision for simulation requires a management structure which facilitates communication and cooperation throughout Defence. The Defence simulation management structure has three key elements.

Defence Simulation Forum

15. The Defence Simulation Forum (DSF) is the peak coordinating body for simulation in Defence which provides a senior, unifying component of the management structure. It deals with the strategic issues impacting upon the development and use of computer-based modelling and simulation across the Defence Organisation. Membership is drawn at the one-star level from the principal stakeholder communities. Members guide Defence simulation policy direction, coordination and collaboration initiatives via the Director-General, Simulation (DGSIM) who chairs the forum. DSF members are responsible for ensuring that DSF decisions are implemented within their Defence Group.

16. The detailed responsibilities and composition of the DSF are described in [annex B](#).

Australian Defence Simulation Office

17. Australian Defence Simulation Office (ADSO) is a branch within the Australian Defence Headquarters with the roles of policy direction, collaboration, and coordination of simulation activities across Defence. The branch has prime responsibility for developing and overseeing the implementation of Defence simulation policy and the Defence Simulation Plan. DGSIM is responsible to the Head Knowledge Systems for leading the work of ADSO.

18. The detailed responsibilities and composition of ADSO are described in [annex C](#).

Simulation Coordination Groups

19. Each Defence Group represented on the DSF is to establish a Simulation Coordination Group (SCG). The role of the SCGs is to guide the development of simulation activities within each Defence Group. Each SCG is to be of a size, level, structure and composition appropriate to the current and planned involvement in simulation activities by that Group. In particular, SCGs may be either an extant organisation or a committee of representatives drawn from throughout the Defence Group.

20. The detailed responsibilities and composition of the SCGs are described in [annex D](#).

External organisations

21. Though not a formal part of the Defence simulation management structure, the simulation industry and overseas Defence and related simulation agencies have an important role to play in achieving Defence's vision for simulation. Consequently, ADSO and the Defence Groups represented on the DSF are to establish links with external organisations appropriate to their levels of simulation activity. Formal agreements of mutual benefit are to be developed where appropriate. Particular consideration is to be given to the simulation activities of organisations with whom Australia needs to have defence interoperability.

PRACTICAL ISSUES FOR SIMULATION

22. While simulation has broad applicability, analysis is required to determine whether simulation offers a suitable and viable solution for a particular situation. The decision to progress a simulation project needs to be informed by an assessment made against the following criteria:

- a. **User requirements**—who wants the simulation?—why?—to do what exactly? In particular, what questions are to be answered with the help of simulation?—or what training needs are to be met?
- b. **Representations**—how are people and things with their dynamic behaviours and interactions in various environments going to be represented inside the simulation?
- c. **Data availability and reliability**—how well can these representations be activated?—does the necessary data exist?—can the appropriate data be found?
- d. **Technology**—how can the ideas embodied in the answers to [subparagraphs a.](#), [b.](#), and [c.](#) of this paragraph be made to work effectively for the user via appropriate technologies?
- e. **Confidence building approaches**—how is 'fitness for purpose' to be assessed to establish both the overall credibility of simulation outcomes and the necessary levels of user confidence in them?
- f. **Cost/benefit**—how are the returns on investment to be determined and expressed in order to secure both the initial and the continuing resources needed to build, deploy and use the system?

23. These criteria prove to be the key to forming the necessary professional judgments about the long-term viability and success of a simulation project. Consequently, all proposals for future simulation projects within Defence are to be framed in accordance with these criteria. Existing projects are to be re-evaluated against the criteria where there is management benefit from doing so. ADSO is to provide guidance to assist those developing simulation proposals to complete the necessary assessments.

STRATEGIES TO ACHIEVE DEFENCE'S VISION FOR SIMULATION

24. The achievement of Defence's vision for simulation depends on a number of key factors. This section describes the strategies required to successfully address these factors.

Manage simulations effectively

25. Simulations often represent a considerable investment in dollar and workforce terms. Effective management is necessary in order to secure and maintain the maximum advantage available from the investment. Defence will implement measures to increase the effectiveness of simulations through improvements in the management structure and processes for simulation requirement definition, acquisition, and implementation phases.

Increase the use of simulation in Defence processes

26. Defence will use simulation where it can enhance capability, save resources, or reduce risk. An active program is required to identify candidate opportunities for using simulation, and to evaluate the viability of doing so. For example, training can be enhanced through the use of collective and mission-level simulations. Course of action development may use simulation based Decision Support Systems and war gaming to analyse and choose the optimum course of action. Materiel acquisitions can be analysed and supported by the use of simulation. Intelligence work may be assisted by simulation of the key elements of overseas forces. Through combining these efforts with others the military options for Government will be developed and supported by simulation.

Combine simulations for greater benefit

27. As simulation becomes a normal part of the Defence way of doing business certain simulations will be combined to address issues that are broader or at a higher level than one simulation on its own may be able to provide. Through combining simulation practice and outcomes, higher level analysis and collective training to support military options for government will be provided. Note that in this context, simulations may be combined by direct physical link or by some other means of information transfer. Further, the combining of simulations is to be subject to assessment by the same six criteria, described in [paragraph 22.](#), as are individual simulations.

Ensure adequate personnel

28. A key requirement to enable Defence to achieve its vision is to have access to suitable personnel, at all levels, with an understanding of simulation, and how to use it to support the Defence mission. This expertise need not solely exist within Defence; Australian industry and academia need to be an integral part of this process so that they can support and enhance Defence's capabilities. In turn, industry and academia need to be supported by Defence and informed of Defence requirements. Defence will identify and implement measures to ensure that suitably trained, qualified and experienced personnel are available to support simulation.

Ensure simulation life cycle support

29. Like any capability, simulations require support throughout their life cycle. This support is required during the concept development, requirement definition, acquisition, in-service and disposal phases. It includes activities such as research, development, design, data provision, system integration, logistics support, maintenance, and upgrades. Support may be sourced from within Defence, or from industry, or from other public sector agencies. In some instances, provision of these services by Australian organisations will be desirable or essential. Defence will identify and implement measures to ensure adequate support for simulations throughout their life cycle.

Secure access to data to support simulations

30. Access to adequate data is essential to support the development and through-life management of simulations. The data concerned includes not only data about the entities and elements of the natural environment which are being simulated, but also design, maintenance and similar data about the simulation itself. Defence will implement measures to ensure that it has access to, and where appropriate ownership of, data of the quality required to support approved simulation activities.

POLICY IMPLEMENTATION

Defence Simulation Plan

31. ADSO, in consultation with the DSF, is to develop and implement a Defence Simulation Plan. The Plan is to describe:

- a. the individual tasks necessary to implement the strategies described in this policy,
- b. the interdependencies and interrelationships between those tasks, and
- c. the agencies responsible for executing those tasks.

32. The Defence Simulation Plan is to be issued under the authority of Vice Chief of the Defence Force.

Supporting policies and plans

33. Defence Groups are to develop and implement subordinate simulation policies and plans. These documents are to detail how the requirements of this policy and the Defence Simulation Plan, along with simulation requirements specific to that Group, are to be implemented. The content, format and structure of these documents are to be consistent with the degree of simulation undertaken within the respective Group.

34. Where appropriate, technical supporting plans and similar documents are to be raised under the Defence Simulation Plan. The sponsorship, format and content of these documents are to be determined by ADSO in consultation with the DSF.

SPONSORSHIP AND REVIEW

35. ADSO is the sponsor of this instruction. ADSO is to review the instruction, and implement any necessary amendments, on an annual basis. Amendments are to be agreed in consultation with the DSF.

Annexes:

- A. [Simulation in Defence—conceptual vision](#)
- B. [Defence Simulation Forum](#)
- C. [Australian Defence Simulation Office](#)
- D. [Simulation Coordination Groups](#)

Sponsor: ADSO

SIMULATION IN DEFENCE—CONCEPTUAL VISION

Introduction

1. This annex provides an articulation of how simulation is to be used in Defence in the 2010–2015 time frame. Its purpose is to provide focus and future context for the Defence simulation policy and, in turn, the Defence Simulation Plan.

Ubiquity of simulation

2. In 2010 the broad role of the Defence Organisation remains similar to that of 2001, namely to provide the Australian Government with the ability to use military means to defend Australia and its national interests. What has changed is that simulation is now a ubiquitous element of all the activities which Defence undertakes as part of that role. It is a fundamental and integral part of **all** the Defence processes which ultimately generate the ability to provide military options to Government.

3. The long standing importance of simulation to the training of Defence personnel has grown. Simulation allows individual skills and knowledge to be gained and maintained with economy and safety and with considerable benefit in terms of personnel effectiveness and readiness. In particular, simulation has become the key to maintaining the required levels of readiness where insufficient real world training resources are available to meet the training and readiness requirements of complex systems of systems.

4. Simulation support to training extends well beyond the individual; collective training may occur between a few individuals or extended to include large formations or groups, including those from allied nations. The ready availability of economical networks of simulations means that individuals and groups can regularly interact with each other, to resolve conceptual, doctrinal and procedural differences, to 'socialise' and build trust, and thus to increase their cohesion and effectiveness when conducting real operations. Significantly, simulation does not replace the fundamental need for exercises and 'live' training activities, but it allows those exercises to focus on high value training evolutions by allowing the preparatory activities to be undertaken, in advance, in virtual environments.

5. The integration of simulation into Defence processes has extended far beyond training. Simulation routinely supports planning and decision making in departmental processes and in operations. For example, simulation support ranges from the analysis of financial investment decisions to the forecasting of workforce requirements, from the shaping of future warfighting concepts to the evaluation of specific weapon platforms, from the analysis of future security threats to the evaluation of modifications to weapon systems. In particular, simulation underpins the Defence Experimentation Framework established in 2001. The Framework supports experiments and analysis for strategic guidance, capability, acquisition and operations development processes. The suite of modelling and simulation tools supporting the Framework is managed by the Defence Science and Technology Organisation in accordance with the Defence Simulation Policy and Plan.

Coherence

6. The simulations used in Defence are not a disparate collection of isolated entities, but are part of a coherent suite. They draw from a common pool of data and assumptions, and consequently the results from different simulations are consistent by virtue of a common foundation. Moreover, the relationships between one simulation and others are known; they mimic the relationships between the real world entities or processes being simulated. The results from one simulation are linked to other simulations reflecting the relationships between the real world processes. For example, the parameters generated by a simulation of the logistics system are used as inputs into simulations for operational level planning. This achieves coherence at a given time.

7. There is also coherence through time. The simulations used in Defence are selected and implemented so as to provide a coherent sequence of simulation support to Defence capabilities throughout the capability management cycle, as noted in the description of the Experimentation Framework.

Management of simulation

8. Defence's significant investment in, and reliance on, simulation has been the impetus for the development of effective simulation management structures and practices. Most importantly, the use of simulation is driven by an identified and verified need, rather than by the availability of suitable technology. Defence personnel embrace simulation but understand that it is not a universal panacea. The assessment of factors such as feasibility and cost/benefit are used when determining whether simulation offers a suitable solution to a particular problem.

9. Defence no longer simply acquires simulations. Instead, Defence secures access to simulations by a variety of processes which may or may not involve ownership. Selection of the appropriate access process balances the imperatives of the application against Defence financial and business drivers. However, under all of these processes, Defence secures the ability to effectively and economically adapt the simulation to evolving needs throughout its life.

10. As the use of simulation in Defence has expanded, so too has the opportunity to minimise the incremental cost of each simulation. Clear and coordinated requirements have combined with developments in simulation technology and standards to create significant opportunities for reuse of simulations and simulation elements, and the development of 'omnibus' simulations which address a number of related needs.

11. The development of simulation management processes has been matched by the development of simulation management structures. An effective network of individuals and agencies with simulation responsibilities provides the coordination necessary to define and implement Defence's simulation needs.

Enabling effective simulation

12. The successful integration of simulation into Defence has been possible because of the effective implementation of enabling functions. In the case of data, Defence has recognised the critical importance of data to simulation effectiveness, and the long lead times which involved in its acquisition. Consequently, there are processes in place to predict and meet future data requirements. Similarly, the long-term viability of simulation requires access to life cycle support functions, such as design and maintenance services. Defence has access to these services from both within and outside the Department, and has measures in place to ensure continuing access.

13. While these enablers are important, Defence recognises that the effectiveness of simulation depends on people. All Defence personnel have a basic understanding of simulation and its potential. They view it as an ally, and not as a threat to their position. Defence managers are particularly familiar with simulation's advantages and limitations. Consequently, simulation is automatically considered as an integral part of the business of Defence.

Summary

14. By 2010, simulation is ubiquitous, coherent, well managed and well supported. It is used throughout Defence, not only for training of Australian Defence Force members but also for decision support and planning in all departmental and operational processes. Consequently, exploiting simulation enhances Defence capability, saves resources, and reduces risk. However, simulation has become more than a simple tool. By allowing desired effects to be achieved with less effort than would otherwise be the case, simulation has become a real and effective force multiplier, and an essential part of Defence's role of providing military options for Government.

DEFENCE SIMULATION FORUM

Responsibility

1. The Defence Simulation Forum (DSF) has responsibility for:
 - a. providing contributions to and endorsement of Defence simulation policy and the Defence Simulation Plan;
 - b. endorsing Defence-wide strategies for securing benefits from the development, acquisition and use of simulation;
 - c. the raising, coordination and reporting of specialist Defence working groups to address appropriate topics;
 - d. advising on developments in simulation as appropriate within Australia and overseas; and
 - e. endorsing Defence-wide strategies for meeting the training requirements for personnel involved in simulation development, acquisition and use.

Composition

2. The DSF is to contain representation for all Defence Groups which use or support simulation. The composition of the DSF as at the issue of this instruction is as follows:
 - a. Australian Defence Headquarters, represented by Director-General, Simulation (DGSIM) (chair of DSF);
 - b. Navy, represented by Director-General, Navy Personnel and Training;
 - c. Army, represented by Commander Combined Arms Training and Development Centre;
 - d. Air Force, represented by Director-General, Policy and Planning—Air Force;
 - e. Operations, represented by Chief of Staff Headquarters Australian Theatre;
 - f. Strategy, represented by Director-General, Military Strategy;
 - g. Science and Technology, represented by Leader Defence Science and Technology Organisation Simulation Hub;
 - h. Materiel, represented by Director, Aerospace Simulator Systems Project Office;
 - i. Intelligence, represented by Director-General, Scientific and Technical Analysis;
 - j. Personnel, represented by Director-General, Defence Education and Training Policy;
 - k. Finance, represented by Assistant Secretary Investment Analysis; and
 - l. Industry, represented by President Simulation Industry Association of Australia.

3. Representatives from other Defence Groups or agencies may be added to the DSF, on the recommendation of the DSF and Australian Defence Simulation Office (ADSO), subject to the approval of Head Knowledge Systems.

Meetings

4. Meetings of the DSF are to be convened as deemed necessary by DGSIM, in consultation with the DSF. ADSO is to provide the secretariat for DSF meetings.

AUSTRALIAN DEFENCE SIMULATION OFFICE

Responsibilities

1. The Australian Defence Simulation Office is responsible for:
 - a. formulation of appropriate guidelines for the development, acquisition and use of computer-based modelling and simulation systems in Defence;
 - b. securing benefits for the Australian Defence Force (ADF) from the coordination of computer-based modelling and simulation activities in Defence;
 - c. promoting interoperability within Defence and with overseas partners to facilitate mutually beneficial collaboration;
 - d. participation by Australian industry and academia in Defence computer-based modelling and simulation activities to achieve the highest leverage for the Defence effort;
 - e. encouraging growth within the Defence Organisation of the skills needed in personnel who can then take full advantage of the opportunities offered by computer-based modelling and simulation for the enhancement of ADF capability; and
 - f. sponsoring simulation developments, acquisition and activities which cross boundaries between Defence Groups and which may therefore be under-resourced.

SIMULATION COORDINATION GROUPS

Responsibilities

1. Simulation Coordination Group (SCG) responsibilities include:
 - a. management and coordination of Group simulation and related activities;
 - b. provision of advice to the Group's Defence Simulation Forum member;
 - c. coordination of Group simulation and other activities to implement the requirements of this policy and the Defence Simulation Plan;
 - d. the development and issue of Group-specific simulation policies and plans; and
 - e. liaison and coordination with Australian Defence Simulation Office and other Group SCG, particularly for issues which cross Group boundaries.

Composition

2. SCG are to be of a size, level, structure and composition appropriate to the current and planned involvement in simulation activities by its parent Defence Group.