THE USE OF SIMULATION AND GAMING FOR NATIONAL SECURITY TRAINING AND PLANNING WITH REFERENCE TO SELECTED CASE STUDIES

by

WILLIAM JOHN WAGNER

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Soli Deo Gloria.

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ABBREVIATIONS

AAR	After action review
CDSP	Chief Director Strategy and Planning
CIA	Central Intelligence Agency
CLW	Center for Land Warfare, USAWC
ConSim	The SANDF Centre for Conflict Simulation
CSL	Center for Strategic Leadership
CSW	Center for Strategic Wargaming, USAWC
DoA	Department of the Army (US)
DOD	Department of Defence, South Africa
DoD	Department of Defense, United States
DWG	Department of War Gaming, USAWC
ELOs	Exit Level Outcomes
ENSP	Executive National Security Programme
Excon	Exercise control
FRG MoD	Federal Republic of Germany Ministry of Defence
ISSUP	Institute for Strategic Studies, University of Pretoria
JSC	Joint Staff Course
MEL/MIL	Master event list / Master incident list
MSG	Models, simulations and games
NATO	North Atlantic Treaty Organisation
NSC	National security council
OPFOR	Opposition forces
PESTMEL	Political, economical, social, technological, military, environmental and legal elements of national power
RTF	Real time factor
SA	South Africa

SA DOD	South African Department of Defence
SANDC	South African National Defence College
SANDF	South African National Defence Force
SCE	Strategic Crisis Exercise
SEEG	Strategic Experiential Education Group, USAWC
SFPF	Strategy and Force Planning Faculty, Naval War College, Newport.
Simcen	Simulation centre
Simcon	Simulation control
SimEvent	Simulation event
STARTEX	Start date and time of the exercise
UK MoD	United Kingdom Ministry of Defence
UN	United Nations
US	United States of America
US DoA	United States Department of the Army
US DoD	United States Department of Defense
USAWC	US Army War College
WFP	World Food Program
MSEL	Master Scenario Event List

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SUMMARY

THE USE OF SIMULATION AND GAMING FOR NATIONAL SECURITY TRAINING AND PLANNING WITH REFERENCE TO SELECTED CASE STUDIES.

by

William John Wagner

SUPERVISOR: **PROF. A. DU PLESSIS**

DEPARTMENT: **DEPARTMENT OF POLITICAL SCIENCE**

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The aim of this study is to provide a critical analysis of the use of simulation and gaming for the training of national security practitioners and the application thereof as a decision and planning support tool in national security planning. The aim of the study emanates from the research question, namely: *Can strategic level simulation and gaming be used effectively to improve the quality of national security training and planning?* This leads to the two subsidiary questions, namely: *Which simulation and gaming practices are used on the national strategic level?* and: *How effective is the use simulation and gaming practices on the national strategic level for training, as well as planning and decision support?*

As a point of departure, selective theoretical perspectives with regard to strategy, national security and simulation and gaming were provided. Strategy was the first concept to be defined and levels of strategy were explained. Strategy was followed by the concept of national security. Security and the different schools of thought on security provided the background to the deliberation on national security, including the elements of national power. In preparation for the reflections on simulation, the needs of the national security practitioner, as well as the planning and decision support for national security planners were considered. Modelling, simulation and gaming were also discussed, giving some thought to game theory as well.

The fundamentals of two specific SimEvent types, namely seminar gaming and conflict gaming were subsequently analysed, along with several examples of each. This was

followed by an evaluation of two case studies. The first case study involved seminar gaming at the South African National Defence College (SANDC). A brief overview of simulation and gaming in the South African National Defence Force and specifically the SANDC provided the background for the description of the gaming activities at the SANDC. Seminar gaming was used in this case study, but for several reasons, including the lack of time and commitment, simulation and gaming at the SANDC was terminated. The second case study involved the Strategic Crisis Exercise (SCE) at the United States Army War College (USAWC). Conflict gaming, as a form of wargaming, is used in this case and, given the fact that this event is a formal scheduled activity in the residential course, as well as the importance attached to the game by the USAWC, it is repeated annually. The SCE is a high profile event on the calendar of the USAWC and is annually completed with good results.

This study confirmed that strategic level simulation and gaming could be used effectively to improve the quality of national security training and planning. It also pointed out that seminar gaming and conflict gaming can be utilised for strategic level simulation, specifically for national security purposes. The study also indicated that the use of simulation and gaming for training and planning on the strategic level can only be effective if strategic level processes and structures are in place and if the organisational culture favours experiential training by means of simulation and gaming.

Key terms
conflict game
gaming
military strategy
national power
national security
national security practitioner
national strategy
security
seminar game
simulation
strategy
theatre strategy
wargame

CHAPTER 1

INTRODUCTION

1. GENERAL INTRODUCTION

The words 'simulation' and 'gaming' often conjure up visions of computer-generated maps, moving icons and even 'intelligent' computers, mostly used for recreation and fun. Furthermore, as a training and planning tool, simulation and gaming[1] is generally seen as belonging exclusively to the military, particularly to be used in tactical level exercises. However, nothing could be further from the truth. On the one hand, numerous simulations and games are employed in the business, medicine, educational and government environments, not only to educate, train and develop personnel, but also to do research and planning. On the other hand, in the military context, simulation and gaming is also used at the strategic level. In 1824, observing the young Lieutenant Von Reisswitz's board game, Prussian General Von Müffling (in Garrett & London 1970) stated that "(i)t is not a game at all, it's training for war. I shall recommend it emphatically to the whole army", establishing thereby simulation and gaming as an effective strategic level training and planning methodology.

When thinking of national security, the traditional view, involving mostly external military threats to the state, is often held (Ajoob 1995:7). However, the human-centric approach, emanating from the Third World[2] view of security is not only based on military, but also on political social, economic, environmental and technological threats (Buzan 1991:116). Given this extended perspective and the complexity of planning for the diverse, though integrated national strategic environment, national security practitioners need to be educated and trained and their strategic thinking and analytic skills need to be developed. Strategic planners also need tools to support their planning processes in order to be

[1] Given the interrelationship between simulation and gaming, as described by Greenblat (1988: 14) and Brewer and Schubik (1979: 3), the phrase 'simulation and gaming' will, for the purposes of this study, be regarded as a singular concept.

[2] The Third World can be defined as "(t)he economically underdeveloped countries of Asia, Africa, Oceania, and Latin America, considered as an entity with common characteristics, such as poverty, high birth rates, and economic dependence on the advanced countries" (Chaliand n.d.: 1) and "a group of countries which have colonial histories and which are in the process of developing economically and socially from a status characterized by low incomes, dependence on agriculture, weakness in trading relations, social deprivation for large segments of society, and restricted political and civil liberties" (Smith 2003: 1). The terms 'South' and 'Developing World' can also be used, but given the collective nature of the expression 'Third World', the latter is used.

effective in planning contemporary national security. Simulation and gaming, of which numerous examples exist in South Africa (SA) and several other countries, can provide the means to develop these much-needed planning skills and support tools in support of strategic planning.

2. THE AIM OF THE STUDY

The aim of this study is to provide a critical analysis of the use of simulation and gaming for the training of national security practitioners and the application thereof as a decision and planning support tool in national security planning. Visits to the Industry/Interservice Training, Simulation and Education Conference (I/ITSEC) in Orlando, California (2003) and the Defence Simulation and Training Conference in London (2005), as well as literature searches and conversations with practicing strategists confirmed that simulation and gaming of strategic level activities, for example national security planning and execution, is an area of uncertainty which is shunned rather than explored. Hence this analysis of simulation and gaming on the strategic level, particularly with regard to national security, is justified.

3. FORMULATION AND DEMARCATION OF THE RESEARCH PROBLEM

The aim of the study generates the research question to be addressed, namely: *Can strategic level simulation and gaming be used to improve the quality of national security training and planning?* This is not a trivial problem. Since most simulations and games are executed on the tactical level, which is tangible and easily replicated, strategic level simulations and games, specifically those regarding national security, are generally neglected, primarily due to the complexity of strategic level characteristics. In order to answer the research question, the study will firstly define and arrange the various levels of strategy, providing an understanding of the strategy hierarchy. This is important, as the few practitioners who operate on the strategic level generally find it difficult to comprehend the subtle differences between the different levels. Furthermore, as national security planning is primarily done on the national strategic level, knowledge and insight into this level are of the utmost importance. Security and national security are also deliberated to provide an awareness of strategic level characteristics, which have to be modelled and simulated. The study will, secondly, analyse modeling, simulation and gaming in order to clarify perceptions and misconceptions with regard to these three concepts. By distinguishing between various types of simulations and games, their applicability to the field of national security, can be better understood. This evaluation is based on the proposition that there exist various types of simulations and games, each with its own

unique attributes, that allow particular types of simulations and games to be better suited for either training or planning support.

This leads to the first sub-question, namely: *Which simulation and gaming practices are used on the national strategic level?* It is postulated that seminar games, as well as wargames, better known at this level as conflict games, are the most appropriate for the purposes of national security training and planning. This proposition is tested by critically analysing the selected case studies, involving the use of simulation and gaming practices. The second sub-question follows from this analysis, namely: *How effective is the use of simulation and gaming practices on the national strategic level for training, as well as planning and decision support?* It is postulated that both seminar gaming and conflict gaming are well suited for training, as well as for planning and decision support, provided that the gaming is focused on the aim and the objectives of the event. The answer to this sub-question will be based on a critical analysis and comparison of several examples and the two case studies.

In view of the nature and scope of the strategic level, national security, and simulation and gaming, this study is demarcated as follows:

(a) Conceptual demarcation. The study is confined to the concepts of national security, models, simulation and gaming, training, as well as planning and decision support. With regard to national security, although other national strategic domains will also be mentioned, only national security, being the main focus of this study, will be discussed in detail. Simulation and gaming, as well as models used for purposes of simulation and gaming, will be discussed in terms of application without the use of advanced mathematics and applied mathematics. The discussion will also include examples of different simulation and gaming methodologies, such as seminar gaming and wargaming, used in the Rand Corporation seminar game on Portuguese Local Government (1999) and turn-based gaming used for the Bolivia 1999 National Security Exercise, undertaken by the United States (US) Southern Command and the School of High National Studies of Bolivia (EAEN) (Cobb 2000). For the purposes of this study, the concept of training will include education and development. It is, however, acknowledged that the making of security practitioners includes a wide spectrum of training, educational and other developmental activities, but the main focus will primarily be on the training component. Planning, in support of strategic decisions, will be viewed in its broadest sense and not only in terms of decision support by means of Operations Research.

(b) Demarcation according to the level of strategy. The levels of strategy, also known in the military as 'levels of war', as well as the simulation and gaming activities associated with these levels, are considered. However, the national strategic level, with specific reference to national security, and simulation and gaming practices at this level, constitute the main frame of reference.

(c) Geographic demarcation. Although various case studies from several countries will be referred to as examples, only two case studies, respectively from SA and the US, will be analysed in depth. The US case study is used because the field of modelling, simulation and gaming is highly advanced in this country, whereas the South African case study provides a perspective of simulation and gaming, still in the process of being developed. These case studies include a series of exercises. In the case of the US it is the *Strategic Crisis Exercise* of the US Army War College (US DoD 1995 and 1999b); and in the case of SA it is the joint venture of the South African National Defence College (SANDC), the South African National Defence Force (SANDF) Directorate Military Strategy and the Institute for Security Studies of the University of Pretoria (ISSUP) (SA DOD 2002 and 2004).

(d) Temporal demarcation. Given the rapid development of simulation theory and technology, the time-frame of this study covers the period between 1985 and 2006. For background purposes, references are, nevertheless, frequently made to older examples.

4. RESEARCH METHODOLOGY

This research has an experiential approach whereby information is gathered through a literature study of relevant documents in a descriptive-analytical manner and extracted from selected (short) case studies of national security simulations. The information is subsequently analysed and assessed in a non-quantitative comparative manner in order to comment on best simulation and gaming practices. Four research methods are applied.

The first method involves observation and related intelligence gathering methods, such as informal discussions and a literature study. The second method entails the analysis of the case studies. These examples of strategic level games are analysed and critiqued with the aim of learning from their experiences, subsequently integrating these in order to propose new game methodologies. Additional examples are referred to, but are not

comprehensively analysed as case studies. The third method involves experimentation by using a suitable game to observe and evaluate the application of various options based on lessons learnt from other strategic level games. The series of South African exercises, as an ongoing venture of the Executive National Security Programme (ENSP) of the SANDF, provide a representative example of the use of this methodology. By evaluating past games and implementing interim improvements as a form of experimentation, further improvements can be identified, implemented, assessed and optimised. The fourth method is that of comparison. By comparing several games, it is possible to extract and integrate the best techniques and procedures to be utilized in strategic level training and planning support.

5. OVERVIEW OF LITERATURE

Given the nature of the subject and the focus of the research, a wide spectrum of literature sources are consulted, covering the following areas:

(a) Literature on the science of simulation. Greenblat's *Designing games and simulations* (1988), Brewer and Shubik's *The war game (1979*), as well as the US DOD *Training with simulations* (1999a) are the main sources regarding the theory of simulation. Although this is not a study on mathematical modelling, Brams and Kilgour's *Game theory and national security* (1988) and Dresher's *The mathematics of games and strategy* (1981) provide additional insight into game theory.

(b) Literature on the levels of strategy. In order to provide insight into, explain and understand the levels of strategy and in order to subsequently link these levels to the national security level and ultimately national security, the classic views of Clausewitz in *Vom Kriege* (1972, but first published in 1832), Collins (1973) and Liddell-Hart (1954), as well as the modern outlook of Yarger (2002), Nikols (2000) and Owens (2000) are used to provide most of the information.

(c) Literature and national security. Buzan's *People, states and fear* (1991), Ajoob's *The third world security predicament (*1995) and Job's *The insecurity dilemma* (1992), supported by several other related sources, provide a clear definition and understanding of national security. In addition, Jablonski in the *US Army College guide to national security* (2006) is used as the primary source with regard to the elements of national power.

(d) Case studies and examples. The discussion and evaluation of the two case studies are based on information provided by and literature of the RSA DOD and the US DoD. In the case of the RSA DOD, various recent documents, used to execute and evaluate the series of South African exercises, are used to provide insight into the South African case study. The US DoD case study is described and analysed with reference to original exercise documents from several Strategic Crisis Exercises held since 1996.

6. STRUCTURE OF THE RESEARCH

The study follows a standard research process with a theoretical framework, a main body and conclusions divided into five chapters.

Chapter one provides a general introduction, followed by the research problem and the demarcation thereof. The research methodology is also described, indicating analysis, experimentation, observation and comparison as the four research methods used. An overview of the literature consulted for the study and the structure of the research conclude this chapter.

Chapter two presents selected theoretical perspectives on simulation and gaming in national security. Firstly, the concept of strategy and the levels of strategy are analysed; secondly, the concepts of security and national security are discussed; and thirdly, based on the previous discussion, the skills and competencies, as well as the training and planning support needs of the national security practitioner are examined and evaluated. Models, simulations and gaming are also considered in terms of definitions, realism and accuracy, as well as game architecture. A brief explanation of game theory and a conclusion on the theoretical perspectives brings this chapter to a close.

Chapter three focuses on the fundamentals of seminar and conflict gaming. Firstly, seminar gaming is analysed and evaluated in terms of structure, its characteristics as a true game and the use of scenarios in the seminar game. Secondly, examples of national security simulations through seminar gaming and an illustrative narrative, explaining the execution of a seminar game, provide further insight into seminar gaming. Wargaming as conflict gaming is addressed in the same manner as seminar gaming. An analysis of conflict and the simulation of the various levels of strategy, namely the theatre strategic level, the military strategic level and the national strategic level, produce the elements of conflict gaming as a sub-set of wargaming. Examples of strategic level conflict gaming, as

well as a second illustrative narrative demonstrate the effectiveness of conflict gaming in simulating national security.

In Chapter four the selected case studies, one from South Africa and one from the US, are analysed and critiqued in order to find the strengths and weaknesses, as well as the advantages and disadvantages of each, This provides the basis for the evaluation of the two gaming types and the synthesis of improved simulation methodologies to be used for training and planning support.

Chapter five provides the evaluation that summarises the findings of the study, commenting and providing conclusions on the suitability of simulation and gaming for training national security practitioners and as a planning tool on this level.

7. CONCLUSION

This introductory chapter provided the framework for the rest of this dissertation and stated the research question, namely whether strategic level simulation and gaming can be used effectively to improve the quality of national security training and planning. The study was demarcated in conceptual, geographic and temporal terms, and the methods of analysis, experimentation, observation and comparison were identified to critically assess the case studies. However, in order to assess the extent to which simulation and gaming are indeed ideal tools for national security training and planning, selected theoretical perspectives of simulation, gaming and national security need to be considered.

CHAPTER 2

SIMULATION, GAMING AND NATIONAL SECURITY: SELECTED THEORETICAL PERSPECTIVES

1. INTRODUCTION

This study analyses the use of simulation and gaming for purposes of training national security practitioners as well as for purposes of planning and decision support in matters of national security. Therefore, in order to understand the complexity and assess the potential of simulation and gaming for the above purposes, it is necessary to clarify the underlying concepts of strategy and national security, as well as models, simulation and gaming. This is not done with the aim of clarifying and debating these concepts as such, but merely to contextualise the national security environment of simulation and gaming as a training and planning tool for the national security practitioner

The aim of this chapter is therefore to define and explain these concepts and to provide a conceptual basis and framework for the analysis and assessment of the case studies. This includes an analysis of the challenges concerning simulation and gaming, that influence the prospects and constraints pertaining to its use as a training and planning tool. Subsequently, the emphasis is firstly on the concepts of strategy and national security, thereby synthesising a generic definition of strategy and identifying the levels of strategy relevant to the case studies. A brief overview of the competing schools of thought on national security provides the background for the selection of a definition, with thoughts on human security and the elements of national power providing the framework for further discussion. Secondly, the national security practitioner, including his/her skills, knowledge and competencies, as well as the resultant training and planning support needs, are profiled. Thirdly, a detailed explanation of the differences and relationships between models, simulation and gaming concludes the chapter.

2. STRATEGY AND THE LEVELS OF STRATEGY

As a point of departure, by defining strategy and clarifying the levels of strategy, it is possible to clarify the concept of national security and its position in the strategic hierarchy. Since there is no single definition and in order to provide a representative definition of strategy, the views of several strategists and philosophers are discussed and integrated into a single stipulative definition. The levels of strategy, also in military literature (US DoD 1993: 1-3) referred to as the ‘levels of war’, are subsequently identified and clarified.

2.1 The concept of strategy

The insight of two military philosophers, namely Carl von Clausewitz and Basil Liddell Hart provides a point of departure for a definition for strategy. Clausewitz, in *Vom Kriege*, (1972: 211 and 271) declares that "*(D)er Krieg (ist) nicht bloss ein politischer Akt, sondern … eine Fortsetzung des politischen Verkehrs … durchfuhren desselben mit anderen Mitteln"* [war is not merely an act of policy, but … a continuation of political intercourse, carried on with other means]; and accordingly defines strategy as "(g)*ebrauch der Gefechte zum Zweck des Krieges*" [the use of engagements for the object of the war]. In a similar context, Liddell Hart (1954: 335 and in Nikols 2000) describes strategy as the art of distributing and applying military means to fulfill the ends of policy. Observing that both actually provide the same definition and by changing the definition from a specific to a generic application, strategy can be defined as the art of distributing and applying the means necessary to fulfil the ends of policy. This definition confirms Lykky's theory (in Yarger 2002), which states that strategy is concerned with ends, ways and means. As indicated (see Figure 2.1) the relationship between the Clausewitzian / Hartian definition and the Lykkian 'ends, ways, means' theory is evident from equating the 'art of distributing and applying' with the 'ways', and rest of the definition with the 'means' and the 'ends' respectively.

Figure 2.1. The definition of strategy and Lykky's 'ends, ways, means' theory

(Adapted from Liddell Hart 1954: 335 and Nikols 2000)

Given Clausewitz's military definition of strategy and expanding Liddell Hart's definition from a military specific format to a generic format on to which Lykke's 'ends, ways, means' concept is super-imposed, strategy can be defined, in the context of national security, as

the ways of distributing and applying the national means necessary to fulfil the ends of security policy

2.2 The levels of strategy

The nature and scope of military activities have increased from ancient wars of single battles, to wars comprising of a limited number of local battles, to modern wars determined by campaigns and operations executed globally. As the scope of military action grew, a need was identified to distinguish between different levels of strategy. The US Army War College (Yarger 2002) recognises the hierarchical nature of strategy and cites three levels, namely national security strategy (also known as grand strategy), national military strategy and theatre strategy. Both Owens (2000:430) and Dupuy (1987:70), however, equate theatre strategy with operations or operational art and not with strategy. The SANDF (RSA DOD 2002b) acknowledges national strategy, departmental strategy, also known as defence strategy, and military strategy.

The aim of this discussion on strategy and its different levels is to create an understanding of the factors and threats that have to be considered when analysing and simulating activities on the various levels. An understanding of the various levels will also aid the demarcating of the level of national security that will be addressed in this study. Since this dissertation involves two case studies, one South African and one from the US, the following hierarchy of the levels of strategy, accommodating both theories, will be used. The three levels mentioned are the following:

(a) National strategy. National strategy, also known as grand strategy (Collins 1973:14) is defined as the art of utilizing national resources in order to promote and protect the vital interests of the state. In this respect, a vital interest is defined by Nuechterlein (in SFPF 2000: 121) as “an issue … so important to a nation’s well-being that its leadership refuses to compromise beyond the point that it considers tolerable.” Carpenter (in SFPF 2000:173) describes a vital interest as “something for which … (a country) must be prepared to wage a major war”

(b) Military strategy. Military strategy has a peacetime and wartime component. In peacetime, military strategy is the art of deploying and preparing military forces to deter war. In wartime, it “guides the employment of military force in pursuit of victory” (Owens 2000:430).

(c) Theatre strategy. Yarger (2002) maintains that theatre strategy is "the art and science of developing integrated strategic concepts and courses of action directed toward securing the objectives of national and alliance or coalition security policy and strategy by the use of force, threatened use of force, or operations not involving the use of force within a theater"

From these definitions of the various levels of strategy, it is clear that there are distinct differences between these levels. National strategy does not involve only military power and military resources, as seen in both military and theatre strategies, but contains all national resources as its 'means'. Furthermore, as the aim of national strategy is to promote and protect the vital interests of the state, it focuses on the application of political, social, economic and, in the last instance, military concepts. This, in turn, implies not only war fighting concepts, but also other 'ways' of dealing with a threat to these vital interests, for example co-operation agreements, economic co-operation and even sanctions. Military strategy uses the military component of a national security strategy and schedules the military preparations and resources accordingly, while theatre strategy directs war fighting on a large scale. It is also argued by Otis (in Newell and Krause 1994: 31) that each level of strategy operates in two dimensions, namely planning (or preparation) and current operations (or execution). As this study concentrates on the use of simulation for training and planning, it implies that the first dimension is primarily addressed, although reference is occasionally made to second dimension events as well.

The division between the various levels is, however, not as clear-cut as the definitions suggest. Krulak (1999) demonstrates the present situation with regard to peacekeeping operations and the effect that tactical decisions of single junior leaders could have on all levels of strategy in his narrative on the 'three block war'. The narrative describes the situation of a US Marine Corps corporal confronted by an array of tactical challenges in the span of a few hours and within the space of three contiguous city blocks. Not even the size of forces can clearly define the levels of strategy, aptly demonstrated by shots fired by a single person starting World War I and a single bomb, dropped by a single aircraft bringing about the end of World War II (Dupuy & Dupuy 1993:1017 and 1308). Therefore, in determining the level of strategy, the effect of the plan or action, rather than the plan or action itself should be evaluated.

3. NATIONAL SECURITY

As it is the aim of this study to analyse the use of simulation and gaming for the training of national security practitioners and the application thereof as a planning and decision support tool in national security planning, it is important to define and understand the concepts of security and national security. Since models, simulations and games on the national strategic level, specifically when representing national security aspects, are of a highly aggregated level and not only of a military nature, it is necessary to analyse the descriptive components of national security, that provide the bases for the relevant models.

3.1 Security

Security is conceptualised from several points of view, including the political, cultural and economical domains. This leads to a variety of definitions, which in turn lead to different perceptions of actions or phenomena that constitute security threats. Threats are central to the idea of security, as stated by Buzan (1991: 18) when he referred to security as "the pursuit of freedom from threat". Jackson (1992: 81) and Mathur (1996: 304) both confirm this view. Job (1992:15) contends that there are four "distinct securities", namely the security of the individual, the security of the nation, the security of the regime and the security of the state, each with its own particular threats. By analysing the different views of security and the relevant threats as expressed by four schools of thought on security, namely the Classical School, the Modern Western School, the Third World School and the African School, a background is provided to the concept of national security.

3.1.1 The classical school

Before World War II, security was thought to be based on an external military threat (Ajoob 1995: 5), and was described as "the protection of the state from armed attack" (Mathur 1999: 78). The advantage of this conceptualisation, which became the dominant security paradigm, is that the threats to security can readily be recognized and identified. Only two questions need to be answered, that is, whether or not the threat emanates from outside the borders of the country and whether or not it is of a military nature. As a result, and arguably to the detriment of this school of thought, this narrow conceptualisation provided a restrictive view of security and the exponents of this school would therefore discard issues such as crime, corruption, AIDS, poverty and illegal immigration, or even natural phenomena, for example drought, as security threats.

3.1.2 The modern Western school

The post-World War II era evolved into the Cold War era during which the classical school remained dominant. However, systems thinking, the new evolving international post-Cold War world order, international relations resulting from the emergence of major powers and the interdependence of states also involving a myriad of international organisations and non-state actors, changed the nature and scope of threats to security. A new definition emerged (Ajoob 1995: 7), namely "(the) protection from external threats of a state's vital interests and core values". This definition opened the possibility of identifying new threats not previously taken into account. No longer was a threat restricted to a military nature, but it could now be economical, societal, political and even environmental. The state, more specifically the heads of state and government, could securitise non-military events and issues by pronouncing them to constitute threats to security because of the fact that they compromise a country's vital interests and core values. However, with the restriction of still having to be external in origin, not all internal factors, for example crime within the country, would be regarded as a threat. This allowed the US Central Intelligence Agency (CIA) to name narcotics entering the country, and the Clinton administration to mention AIDS in Africa, both non-military but still external, as threats to US security (Tenet 2004).

3.1.3 The Third World school

Buzan (1991: 113 & 116), while arguing the situation with regard to weak and strong states, is of the opinion that weak states, which are by definition mostly Third World states, are more vulnerable to external and internal threats than strong states. This implies that the definition of security for weak (Third World) states should differ from that of Western states. He subsequently lists military, political, societal, economic and ecological threats as hazardous to security. Mathur (1996: 305), from an Indian perspective, is similarly of the opinion that security should include the preservation of territorial integrity against external threats, the protection of the economic system, the promotion of 'core values' and national interests, the protection of the constitutional order, and the protection of the diversity of the society. Mathur thus paves the way for an even more open and inclusive outlook on security than Buzan.

Given Buzan's and Mathur's views, the Third World security definition could include all external threats that could have immediate and future political effect on the state. Table 2.1 shows the differences between First World and Third World views on national security.

Table 2.1. Comparison of First World and Third World views on security

First World	Third World
The military threat is primary. Other threats have little influence.	The political threat is primary. All other threats can influence the political sphere.
Low vulnerability due to strong power.	Highly vulnerable due to weak power.
Focus more on international security.	Focus on national security.
External focus	External and internal focus

(Buzan 1991 and Ayoob 1995)

3.1.4 The African school

Jackson (1992: 88) is of the opinion that, given the extreme weakness in terms of military, scientific and technological power, as well as the indifference of the rest of the world to Africa's internal strife and the abhorrent internal security situation in many African countries, Africa has its own school of thought on security. After considering the above factors, Jackson concludes that the African view of security and specifically national security, is in essence the same as that of the rest of the Third World, but that it also considers and tends to emphasise internal factors to a greater extent. African security can thus be seen as protection against all internal and external threats that could have an immediate or future political impact on the state. Using this definition, all factors mentioned previously, including internal AIDS, corruption, crime, poverty and ethnicity could be securitised and therefore regarded as threats to security.

3.2 National security

Given Job's differentiation between four "distinct securities"(1992:15), namely the security of the individual, the security of the nation, the security of the regime and the security of the state, national security is broadly defined as the security of the state. The state would, in Buzanian terms, imply the nation, the regime, the territory and its sovereignty (Buzan 1991:57). Within this definition, however, there exist two common approaches to national security, namely the traditional approach and the human-centric approach.

3.2.1 The traditional approach to national security

The traditional approach to national security stems from the classical school of thought on security. This approach originated in Europe and other developed Western countries where economic, social and political systems are well developed and they do not pose a threat to national stability. From this perspective, the broad definition of national security is extended to read "freedom from external physical threat" (Louw 1978: 11). The UN Development Report (UNDR) (UN 1995:14) calls this approach "nuclear security" and provides three definitions, namely "security of territory from external aggression", "protection of national interests" and "global security from the threat of a nuclear holocaust". From the above it is concluded that traditional national security, based in classical security thinking, is focused on the state, which includes the people, the territory, the government and its sovereignty. It relies on military power, alliances and diplomacy for its survival (Louw 1978: 22). Buzan (1991:116) confirms this conclusion in addressing national security threats, by stating that "(m)ilitary threats occupy the traditional heart of national security concerns."

3.2.2 The human-centric approach to national security

According to the *Bonn Declaration* of 1991 (in Solomon 1998), human security, as an approach to national security, is "the absence of threat to human life, lifestyle and culture through the fulfilment of basic needs." The 1994 UNDR (UN 1995:24) also declared that "(i)t is now time to make a transition from the narrow concept of national security to the all-encompassing concept of human security." Subsequently, the United Nations Commission on Human Security (UN 2003: 12) defines human security, as "to protect the vital core of all human lives in ways that enhance human freedoms and human fulfilment". Similarly, Mahbub ul Haq (in Alkire 2001: 6) provides a concise definition of human security, describing it as "freedom from fear and freedom from want". The human security approach to national security clearly has its roots in the Third World and African schools of thought on security. This approach focuses on the protection of the individual, as a member or citizen of the state. Therefore, protection of the individual against 'fear and want' implies protection of the state itself. This view, however, means that national security entails more than protection against external threats. The human security approach, according to the 1994 UNDR, addresses economic, food, health, environmental, personal, community and political security. This is also the view held by Buzan (1991: 116) as he lists military, political, societal, economic and ecological threats to national security as well and concludes that there are "rather dramatic changes in priority among them" and that this change in priority is the "main driving force behind the shift from the

narrow military agenda." He, however, raises his concern with this broader approach as he argues the difficulty of determining whether a threat, as previously listed, is serious enough to constitute a national security threat or not (Buzan 1991: 115).

Although Buzan (1991: 50) is of the opinion that "(t)here is no necessary harmony between individual and national security", South African president Thabo Mbeki (RSA The Presidency 2005) in his 2005 State of the Nation Address to Parliament, emphasised the importance of human security as an element of national security. The UN Commission on Human Security (UN 2003: 11) also has a very definite view on the relationship between human security and national security as it states:

"This understanding of human security does not replace the security of the state with the security of people. It sees the two aspects as mutually dependent. Security between states remains a necessary condition for the security of people, but national security is not sufficient to guarantee peoples' security."

The above deliberations clearly indicate the state of the current debate with regard to the nature and scope of national security. Considering national security as security of the state, it would imply the security of its people as well. However, adding the 'from external threats' of the traditional approach, would simply suggest a military and diplomatic point of view and it would become a matter of Brams and Kilgour's Deterrence and Threat games (see the discussion on Game Theory). The opposite argument with regard to human security is that the extent of national security could be so all-inclusive and absolute, that the very existence of national security becomes superfluous. Du Plessis (1998) expresses concern with the new trend in national security thinking very well as he stated that "recent changes in conceptualizing security mirror changes in the strategic milieu to a far greater extent than they actually reflect changes in respect of the concept's intrinsic nature and real meaning." For this study, however, the focus remains on the security of states and national security is regarded as the relevant and more contemporary concept. Using President Mbeki's view, as previously referred to, this paper subsequently defines national security in a comprehensive manner as the freedom of the state from all threats.

3.3 The elements of national power

The simulation of national security at the strategic level requires components, which can adequately describe or represent the characteristics of national security. In order to find such components, the elements of national power need to be addressed. In

dealing with the elements of national power, the issues of national capability and the instruments of national power will also be taken up.

In order to understand the concepts of elements, capabilities and instruments of national power, national power itself must first be defined. Political scientists, however, have diverse opinions and definitions of the concept of national power. Gray (1999: 301), supported by a similar definition provided by Collins (1973: 273), defines national power as "(t)he sum total of any country's present and projected capabilities derived from political, economic, military, social, scientific, technological and informational resources in context with geographical circumstances." Lerche and Saide (1979: 61) go so far as to replace the idea of 'power' with 'capability' in order to "preserve the necessary connection with policy and action". Jablonski (in Bartholomees 2006: 140) quotes Organski who defines national power as "the ability to influence the behaviour of other actors in accordance with one's own objectives." Jablonski continues to describe national power as multidimensional with its elements being interrelated 'means' to national strategic 'ends'. He is also of the opinion that national power is relative and only applicable in relation to other states, that it is situational and therefore only applicable in specific situations and, lastly, that national power is contextual. Integrating the above views and ignoring the term 'capability' for now, national power can broadly be defined as the means of the state, applied to fulfil its national ends. In terms of national security, as previously defined, national power is the 'means' which ensures the freedom of the state from all threats.

Applying the views of Jablonski, as maintained by the US Army War College (in Yarger and Barber 1997), the elements of power are the means, mentioned in the above broad definition, which are applied to fulfil national ends. The College cites natural determinants, which include the geography, population and natural resources, as well as social determinants, including the political, economic, military, and informational elements. Several other lists of elements or determinants of national power exist. The US DoA (Stolberg in Bartholomees 2006:8) uses the acronym DIME to indicate the diplomatic, information, military and economic elements and recently, due to its fight against terrorism, expanded to MIDLIFE (military, information, diplomatic, law enforcement, intelligence, finance and economic). The Australian Department of Defence (Flaherty 2003: 4), on the other hand, lists only the political, economic, military, social and environmental elements of national power. The SANDF (Janssen 2006) currently uses the British system containing the political, economic, social, technological, military, physical (or environmental) and legal elements of national power. Elements of power are the contextual means of the state,

whereas, according to Lerche and Said (1979: 68) capabilities are tangible sources of power, for example the geographic location of the country or intangible sources, for example the national will and strategic purpose. Armoured regiments would, according to Jonston (2006) and consistent with this rationalisation, be capabilities of the military element of national power.

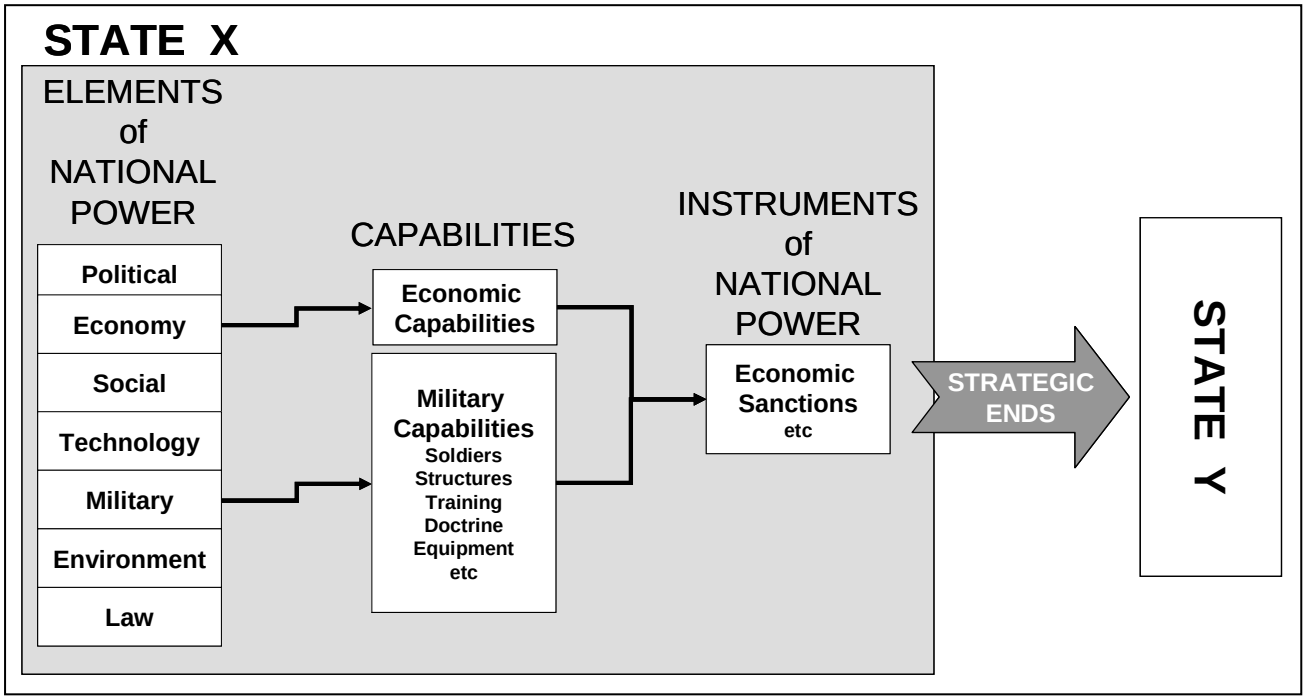
According to the US Army War College, elements of national power and instruments of national power are increasingly seen as synonymous. The College, however, differentiates between the two phrases and sees the instruments of power as subordinate to elements of power by defining the instruments of power as "policy options or tools that are derived from the elements of power and provide the ways the resources will be used." In keeping with this reasoning, economic sanctions can therefore be seen as an instrument of national power derived from the economic element of national power, and often, when military capabilities are used to enforce the sanctions, from the military element of national power.

In summary, therefore, national power can be defined as the elements of power of the state, applied through the instruments of power, to fulfil its strategic aims. The SANDF uses the political, economic, social, technological, military, environmental and legal elements of power. The elements belong to either the set of natural determinants or the set of social determinants. The state possesses capabilities, which can be allocated to the various elements, with which it can exert power. Instruments of power are the 'ways' in which the state applies the elements of power, or combinations thereof to fulfil its strategic ends. It can also be concluded that, given the level of aggregation, a model of elements and capabilities can represent national security (see Figure 2.2).

4. THE NATIONAL SECURITY PRACTITIONER

National security practitioners can be defined as persons employed in or practicing in the field of national security and include decision-makers, strategists, planners, officials, teachers, researchers and executors of national security. In the South African context, national security practitioners normally serve in government departments, education and training institutions, non-governmental research institutions and 'think tanks' where they hold executive, planning, teaching, research or operational positions. As the executors of national security, for example the members of the security forces, national security practitioners operate mostly, but nor exclusively, on the tactical level. However, since this

Figure 2.2. National power



(Adapted from Yarger and Barber 1997)

study is directed at strategic level national security, the term 'national security practitioner' will be used with reference to only those national security practitioners operating on the strategic level, specifically the national security planner, such as political office bearers, national security planners at the national intelligence agencies and strategists of Directorate Military Strategy of the SANDF. Wherever they are found and whatever they are doing, national security practitioners should possess specific skills or competencies, which need to be analysed before commenting on training and training methodologies.

4.1 Skills, knowledge and competencies of the national security practitioner

Before determining what a national security practitioner should be taught, the skills, knowledge and competencies of the practitioner should first be determined. According to Smith *et al.* (2001: 25) and based on their respective roles, a distinction is made between three types of security practitioners. These are the strategic theorist, a strategic leader and a strategic practitioner. The strategic theorist formulates and writes national security and related strategies; the strategic leader coordinates these strategies and the strategic practitioner applies these strategies. This implies that each of the three types of national security practitioners need specific skills and competencies and require specific knowledge to fulfil their particular roles.

In the South African context, all three types and corresponding roles are normally to be found to reside in a single individual, namely the national security practitioner. This implies that the national security practitioner requires the skills, competencies and knowledge needed to fulfil any or all three roles. Based on the views of Smith *et al.* (2001) and the US Defense Threat Reduction Agency (2005), analytic skills, negotiating skills, problem solving and decision-making skills, as well as small group leadership skills, are listed as necessary for an effective national security practitioner. National security practitioners are also expected to have a working knowledge of history, politics, economics, technology, sociology and decision-making techniques and even a foreign language. In terms of competencies, it is stated that a national strategic practitioner must have the ability to lead and manage amongst equals, to think clearly and comprehensively about problems and issues, to think creatively and critically, and to make things happen.

The SANDC expresses these skills and competencies in terms of 'exit level outcomes' (ELOs). These ELOs include the ability to think holistically, the ability to analyse and evaluate concepts and information associated with national security, the ability to identify and analyse regional security issues, as well as the ability to demonstrate research and communication skills (RSA DOD 2007a: 5 and 6).

4.2 Training the national security practitioner

Although the words 'training' and 'education' are often used as synonyms (Oxford s.v. 'education'), there is a fundamental difference between the two concepts. It is therefore necessary to explain training and education and to clarify the contribution of simulation and gaming to each of the concepts.

McCausland and Martin (2001) surmise that "training is … concerned with teaching *what* to think and what the *answers* ought to be", Training therefore has to do with specific tasks. Education, to them, is all about teaching *how* to think and what the *questions* ought to be. Education thus has to do with abstract ideas and knowledge. Simulation and gaming, on the tactical and even operational level, has to do with the enhancement of skills, whereas the more aggregated models of strategic level simulations and games lend themselves to skills development, as well as towards the development of strategic thought. Simulation and gaming therefore contributes to both training and education. In view of the fact that training is done on all levels, also considering the current trend to use 'training' as a collective noun to address both training and education, this study will accordingly follow suit.

It is generally argued by senior military officers that training of national security practitioners should primarily be done on advanved training courses, normally provided at senior training institutions, for example the SANDC. However, in most countries, training in national security (in its broader sense of education and training), is also provided at an undergraduate (and post-graduate) level at military academies and at non-military tertiary institutions such as universities The South African Military Academy at Saldanha and the US Military Academy at West Point are but two of many institutions where potential national security practitioners receive such training. In the case of the US, it is done as a deliberate attempt to enhance strategic thinking and awareness even at junior level. General (retired) John R. Galvin (in Smith *et al.* (2001: 5) confirmed this view by stating that the US military "need senior generals and admirals who can provide solid military advice to our political leadership … and young officers who can provide solid military advice to the generals and admirals." This approach led to the development of a comprehensive curriculum for teaching national security in the US military from an undergraduate level, through senior service colleges to professional schools at universities, for example the Elliot School of International Affairs of the George Washington University.

The same trend is also evident in South Africa, although not to the same extent. Strategy is taught at the South African Military Academy, while military strategy, as well as national security strategy, are lectured as part of the curriculum of the Joint Senior Command and Staff Programme at the South African National War College in Pretoria. National security is the focus of the ENSP at the SANDC, with short courses and post-graduate courses in national security and related subjects presented at several universities, for example the University of Pretoria, University of South Africa and the University of the Witwatersrand.

4.3 Planning and decision support for national security practitioners

In order to determine the planning and decision support needed by national security practitioners, national security decision-making must first be defined and its processes listed. Using the military orientated description of national security decision-making, as provided by the US Naval War College (US DoN 2007), and converting it into a generic definition, national security decision-making can be described as the effective selection and leadership of the capabilities of the state within the constraints of available national resources. In a report on national security decision-making structures and security sector reform (Bearne *et al.* 2005: v) several activities which are undertaken by national security decision-making structures, are listed. These activities are found in all structured planning

processes and include the assessment of the situation, making decisions on actions to be taken and their priorities, as well as resource allocation. Allen (1987: 2) in his description of what is called 'political-military games' used by the US National Security Council in dealing with the problems of national security, is of the opinion that very few national security decisions should be made without some kind of planning or decision support regarding the above process.

As regards simulation, special attention needs to be given to an emergent scientific discipline known by various names. During World War II a group of scientists from several disciplines gathered in the UK to discuss and solve specific military problems by means of scientific techniques (Crowther & Whiddington 1948: 96). The military problems these scientist – known as 'Blackett's circus' after the chairman of the group – encountered, ranged from tactical to strategic challenges. By combining and integrating these scientific techniques, including simulation, a new branch of mathematics was established, called 'Operations Research' (in the US and SA) or 'Operational Research (in the UK). Operations Research (OR) is defined as "(t)he analytic study of military problems, undertaken to provide responsible commanders and staff agencies with a scientific basis for improving military operations" (Dupuy, Johnson & Hayes 1986 s.v. 'operations research'). Clemen (1996: 8), referring to OR as 'decision analysis', states that apart from its military application, OR techniques (or decision analysis) are extensively used to provide support to decision makers in business, industry and government agencies. In the South African defence industry, it was decided to rather use the term 'decision support', as it entails a wider range of techniques than OR. (Du Toit 1995: 8). OR/decision analysis/decision support is therefore the 'scientific toolbox' which include models, simulations and games.

5. MODELS, SIMULATION AND GAMING

Since models are regarded as the building blocks of simulations and games, Brewer and Shubik (1979: 3) grouped the three concepts, namely models, simulations and games, together in the single abbreviation 'MSG', thereby acknowledging the interrelated and inseparable nature of these concepts. This section defines these concepts and discusses various categories and examples of each, followed by an assessment of the importance of realism and accuracy in simulation and a description of the architecture of a simulation.

5.1 Origins of simulation and gaming

Symbolic representations of soldiers and other artefacts, indicating wargaming in pre-recorded history, were unearthed in Greece, Egypt, Persia, China and India (Brewer & Shubik 1979: 46). A Hindu game, called 'Chaturanga', using pieces representing elephants, horses, chariots and foot soldiers, was played in the Middle East *circa* 500 AD. There are also indications that a similar game was played in 3000 BC in Iraq. These games were all played on boards, according to fixed rules (Wessels 1980: 48).

Modern non-chess like wargames originated in Prussia in 1811, through the efforts of Baron von Reisswitz. The game was used for recreation in Prussian high society, but not by the Prussian military. In 1824 Baron von Reisswitz's son, Prussian army officer, Lieutenant George von Reisswitz, added realism to the board game by using a topographical map, pieces representing troops and detailed rules (Brewer and Shubik 1979: 48). This game subsequently found its way into the British Army, where it was stated that (UK War Office 1872: i):

"Although, therefore, the game is no novelty, it is only recently that its importance has been fully recognized out of Germany: the increased importance which is now attached to it may be, in some measure, due to the feeling that the great tactical skill displayed by the Prussian officers in the late war had been, at least partially, acquired by means of the instruction which the game afford"

The use of wargames in the 19th and early 20th century are widely known and publicised. The Prussian Army (1870) under Helmuth von Moltke (The Elder) trained extensively in command and staff competencies using wargames (Bucholz 1991: 88). The Schlieffen Plan (1914) was planned with the use of wargaming, as were the attack on Pearl Harbour (1941) and Operation Desert Storm (1991) (Brewer & Schubik 1979: 49 and Schwarzkopf & Petre 1992:289). The British view on wargaming since 1872, and the British military culture instilled in the Union Defence Force, later the South African Defence Force (SADF) and recently the SANDF, contributed to the fact that simulation and gaming, using manual techniques such as sand tables (see Figure 2.3) and so-called 'telephone games' were utilised extensively in the defence forces of SA. The advent of computer technology greatly enhanced the potential and use of wargames. Rules could be hard-coded, decreasing the burden of umpires and increased memory capacity allowed for huge databases, thereby facilitating detailed simulation. Computation by the computer reduces subjective decisions to a minimum and virtual reality is enhanced by computer graphics

5.2 Definition of Concepts

In order to effectively simulate something as intricate as strategic level national security effectively, it is important to understand MSG. The following definitions and elucidation of models, simulations and games will foster this understanding.

Figure 2.3. A US Army officer busy with a sand table

(Brewster 2002:5)

5.2.1 Models

Models are the building blocks of both simulations and games. A model is defined as a representation of some or all of the properties of a device, system or object (US DoD 1999a: 1). Brewer and Shubik (1979: 10) added to this definition by describing a model as "a representation of an entity or situation by something else that has the relevant features or properties of the original". By integrating the two definitions, a model can thus be defined as a representation of some of the properties of a phenomenon. This phenomenon, be it an entity, a system or a process, is referred to as a referent (Hughes & Rolek 2003). A model and the referent therefore share some features, which might appear similar in nature, but is not generated or represented in a similar manner. The level of reality of these features, as represented by the model, depends on the complexity of and the ability to describe the referent.

Several classifications of models exist, but a three-type classification is generally used. The first type is the mathematical model, which makes use of algorithms and mathematical equations to describe the features of the referent. The famous Lanchester Square Law Equation (Huber 1984:577), which describes attrition in battle, is a good example of a mathematical model. In this model,

$$\frac{db}{dt} = -\mu r, r \geq 0$$
$$\frac{dr}{dt} = -\beta b, b \geq 0$$

b and *r* are the force strengths of 'Blue' and 'Red' forces at time *t* , with *ß* the kill rate of 'Blue' against 'Red' and μ the kill rate of 'Red' against 'Blue'.

The second type, the physical model, displays the same physical features as the referent, although mostly with a difference in scale, for example the models of airframes used in wind tunnels. The third type, namely the procedural model, not only represents a real entity or situation, but the dynamic relationships between several real entities or situations as well. In the military, the procedural models are referred to as simulations (US DoD 1999a: 2). Simulations are also the main focus of this study.

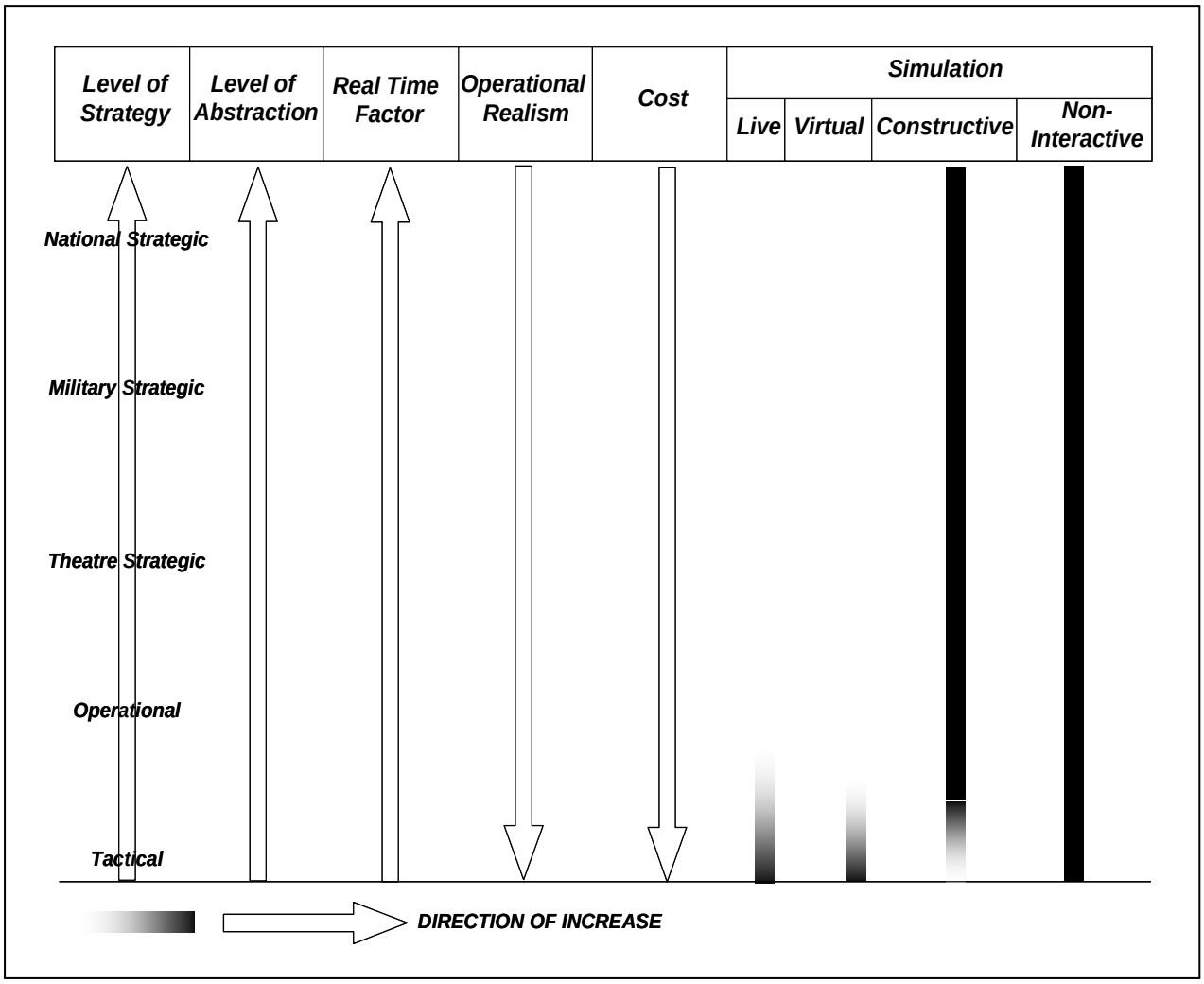
5.2.2 *Simulation*

A simulation is defined as a "method for implementing a model over time" (US DoD 1995: A-7), or "an operating model of central features or elements of a real or proposed system, process or environment" (Greenblatt 1988: 14). By integrating these definitions, a simulation can be defined as a dynamic model or combination of models of some of the features of a phenomenon. A simulation is therefore a model or set of models operating over a period of time. Depending on the category of simulation, the simulation time *versus* real time ratio, known as the real time factor (RTF), could be increased or decreased.

As is the case with models, simulations can be classified. Several methods of classification exist, for example that of the Independent Specialists Working Group 4 (ISWG.4) of the North Atlantic Treaty Organisation (NATO) (Hoogensteijn & Scott 1996: 22). According to this classification, there are three levels of simulation. The first level consists of simulations for individual and crew training, implying stand-alone systems like pilot simulators. The second level comprises of simulations for tactical training, including such diverse forms of simulation as field exercises and networked simulators. The third

level consists of so-called command and staff training and wargaming. This implies highly aggregated models interacting with a user interface of maps with icons representing military units. An alternative method of classification, which remains the most popular, is the US DoD Defense Modelling and Simulation Office (DMSO) classification, which uses three primary categories, based on the interaction between the real system and virtual systems (US DoD 1995: A-8). Accordingly, a distinction is made between live, virtual and constructive simulation. A common feature of this classification is the fact that these simulations are all interactive, which means that there exists a person, called a player, who interacts with the simulation in some way. However, cognisance have to be taken of the fact that there are simulations that do not allow interaction and once started, simulates a system without interference. This type of simulation, namely non-interactive simulation, will be added as a fourth category (see Figure 2.4).

Figure 2.4. The four simulation categories.



(Adapted from Allen 1987: 4)

(a) Live simulation. In live simulation, inputs from real people are made directly into real systems (US DoD 1998), sometimes instrumented with additional simulation equipment, in real terrain. An example of a live simulation is a live military exercise. Given the use of real people in a real environment, live simulation has a low level of abstraction, utilizing only simulation equipment to enhance the 'real' operational effect. It also implies an RTF of one. Since real systems are used, training or planning effectiveness is enhanced, but cost savings are minimal.

(b) Virtual simulation. Virtual simulations, also known as simulators, use real people to make inputs into simulated systems (US DoD 1998). A flight simulator is a good example of a virtual simulation. The real person therefore operates "simulated functions of the original equipment" (FRG MoD 1996). Operational realism in a simulator is less than that of the referent, but it still has a relative low level of abstraction. Using simulated systems and thereby being able to increase the RTF, reduce the costs of an event substantially.

(c) Constructive simulation. In this category real people provide inputs to simulated people who are operating simulated systems in a construction where soldiers, weapon systems and the environment are modeled mathematically, (US DoD 1998). The Battletek Tactical Level Wargame, developed in South Africa and used by the SANDF, as well as the GUPPIS Battle Exercise Simulation System of the *Bundeswehr* (FRG MoD 1996) are examples of constructive simulations. In a constructive simulation, for example, a computer operator, being a unit commander, will order a sub-unit commander to move from his present position to another by marking the relevant computer icon (representing the sub-unit in its present position), marking the next position and activating a 'move' button. Subsequent movement of the sub-unit will now occur as movement of the sub-unit icon to the next position on the computer screen. The speed of this movement, however, will be determined by mathematical models, which are elements of the total constructive simulation. Constructive simulation utilises a high level of abstraction and is able to increase the RTF dramatically, thereby effecting near-optimal cost saving.

(d) Non-interactive simulation. This simulation category uses integrated mathematical models and once data is submitted, runs without external intervention. This category is used where numerous repetitions of the same scenario are needed, for example the Force Requirement Model (FORM) of the SANDF. Being of a pure mathematical nature and without time-consuming interventions, non-interactive simulations

are fast in execution and accurate in the results it provides. The RTF of a non-interactive simulation is only restricted by its mathematical complexity and the capabilities of the computer that is used.

5.2.3 Games

The third component of the MSG triad is gaming, being the element which ensures that a simulation contains the dynamics of the system it represents, thereby making it useful for training and planning purposes. Two simulation related definitions of a 'game' provide further insight into this activity, namely "simulations that work wholly or partly on the basis of the players' decisions" (Greenblat 1988: 14); and a "physical or mental competition in which participants, called players, seek to achieve some objective within a given set of rules" (US DoD 1998). Although the first definition equates gaming to simulation, the second definition implies that a game need not be a simulated representation of reality. Board games, like 'snakes-and-ladders' and 'Ludo', do not portray real live situations and are therefore not simulations. A wind tunnel, on the other hand, is a simulation, but not a game. Greenblat (1988:15) distinguishes between games based on simulations and other games, by calling the former gaming-simulations. For the purpose of this study, however, a game will be defined as an interaction with and between players, governed by rules, procedures and regulations. Simulation could be an element of the game, but it is not a prerequisite – thus the phrase 'simulation and gaming'.

Prensky (2001: 05-11), calls games 'organized play' and contends that a game consists of six key structural elements. These structural elements are rules, goals and objectives, outcomes and feedback, conflict or competition, interaction, and a representation or story. In explanation of his six structural elements, Prensky states that a game should have a representation or referent, which provides the essence thereof. Rules set the boundaries within which the game is played. Rules also make games "both fair and exciting" (Prensky 2001:05-12). In order to manage the rules and the adherence to them, external third party members, referred to as 'umpires' or in military terms 'observers/controllers', are used. The rules ensure fair participation of all members, aiming for the attainment of the goals and objectives of the game. Outcomes and feedback provide the measure of progress against the goals and objectives. Interaction between players and with the game itself, allows for conflict and competition, which in turn provide or enhance the challenge or problem in the game that needs to be overcome.

Games can be classified according to the game control method and the temporal management method applied to it. Two game management methods are commonly used, namely in the form of script-driven and free-play games respectively.

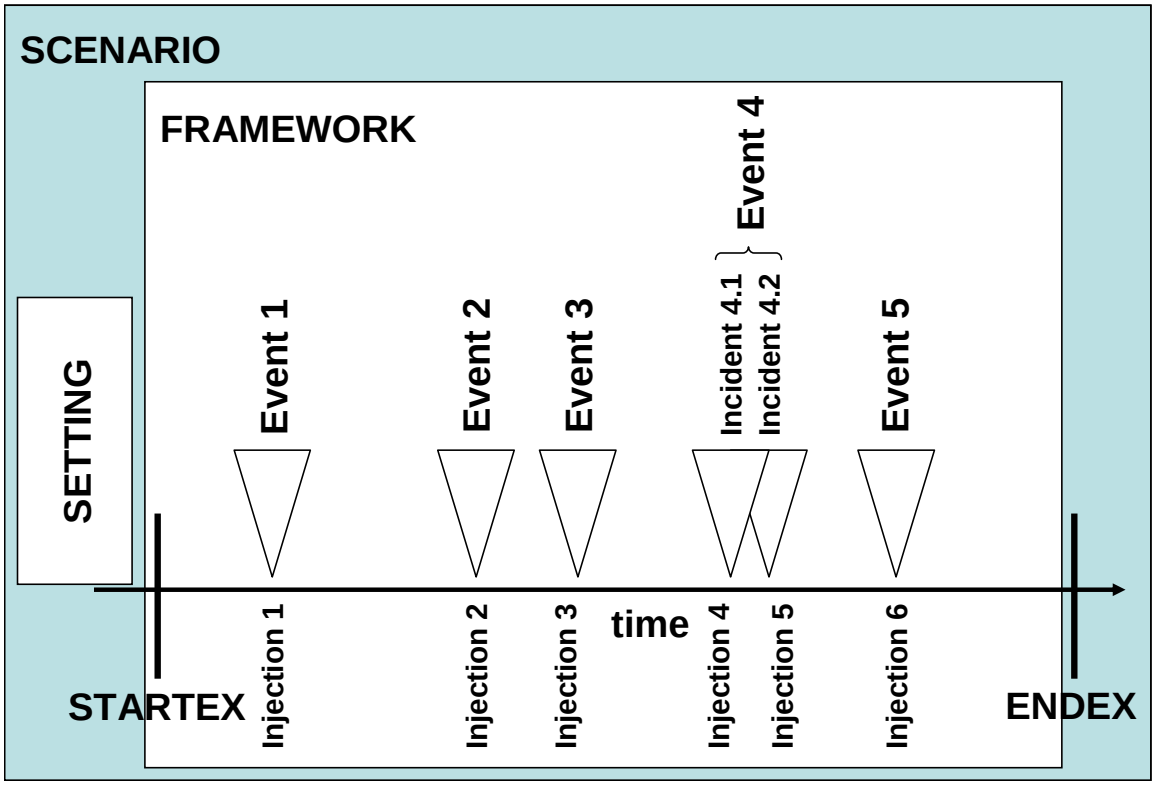
(a) Script-driven games. Script-driven games, also known as event-driven games, for example Exercise Viking 05 (Swedish Armed Forces 2005), a multinational NATO exercise, use pre-determined and pre-scheduled events and incidents to force the participants to react in a pre-determined manner, which would contribute to the achievement of exercise goals. In script-driven games, it is important to discern between the game scenario, game setting, game framework, events, incidents and injections. A NATO Glossary of terms and definitions (Swedish Armed Forces 2005) states that the game scenario is the background story of the game, initiating the crisis or conflict, whereas the game setting is a series of events that sets the final scene before the start date and time of the exercise (STARTEX). The game framework is the "skeleton around which the actual play … for an exercise is constructed." Gerner *et al.* (in Schrodt 2004: 50) provide a formal definition of events, namely:

An *event* is an interaction, associated with a specific point in time that can be described in a natural language sentence that has as its subject and object an element of a set of *actors* and as its verb an element of a set of *actions*, the contents of which are transitive verbs.

A more concise definition, provided in the NATO Glossary of terms and definitions (Swedish Armed Forces 2005) states that an event is a "sequence of incidents of a similar nature", while an incident is an "occurrence of an action or situation that provides greater clarification to an event." Events and incidents are often listed sequentially in a 'master event list' or 'master incident list, abbreviated as 'MEL/MIL'. Lastly, an injection is defined as **"**(t)he way of bringing an incident to the attention of the players for whom the incident was created and from whom a reaction is expected" (see Figure 2.5).

(b) Free-play games. In free-play games, there normally exist a friendly or own entity, for example a military force, a coalition force, a government, etc, and an opposition entity. The opposition entity could also be an opposition force (OPFOR), an opposing coalition or an opposing government. In a social game, the 'opposing entity' could be an epidemic, social strife, etc, while a fire, drought or a flood could constitute the opposing entity in a

Figure 2.5. The relation between the scenario, framework, setting, events, incidents and injections



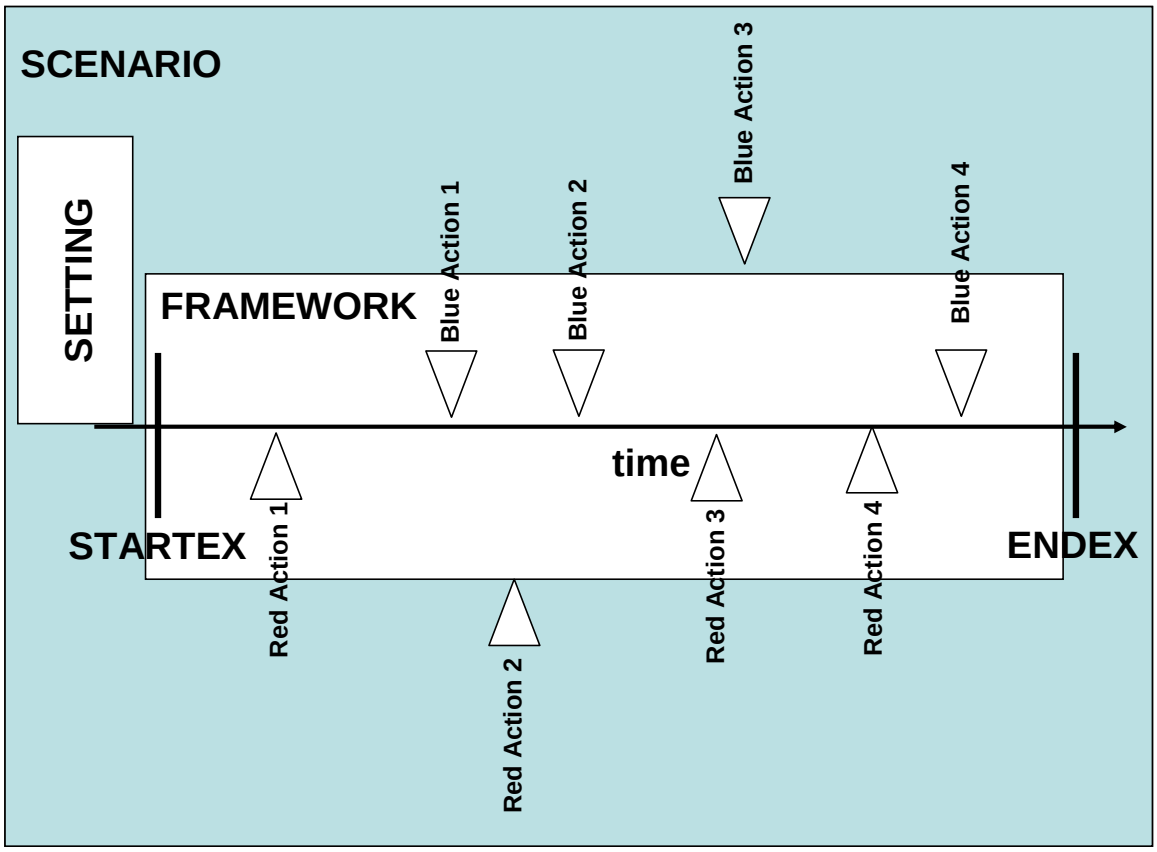
(Adapted from Swedish Armed Forces 2005)

disaster relief game. This management method requires that all participating entities are 'free-to-play' their respective roles without restrictions (USA DoD 1999a: 19). This could obviously lead to actions that fall outside the framework of the game. For example, a US national security game before 11 September 2001 might have considered a civilian airplane crashing into the Twin Towers in New York as being outside the game framework. Given the lack of restrictions on players, the challenge for the exercise director and his observer/controllers, is to ensure that the mission and objectives of the game are still attained (see Figure 2.6).

There exist three methods for temporal management in a game, namely continuous game-time, turn-based game-time and rapid-time management.

(a) Continuous game-time. The player/role-player continuously interacts with the simulation. This time management methodology is effective for games where real time reactions on real time stimuli are tested or practiced. This time management method is more suited for tactical games where, for example a 'Blue' entity can react to a 'Red' entity

Figure 2.6. A free-play game



(Adapted from Swedish Armed Forces 2005)

engagement by immediately executing a counter-engagement or by withdrawing out of the engagement range. Given distances, time, number of entities and level of aggregation, the planning for a counter-engagement might take several hours. This implies that although tactical actions might be taken immediately, theatre strategic level activities will not be immediate, potentially leading to periods of inactivity on that level. By applying a high RTF the problem of long periods of inactivity and unacceptable long games, could be alleviated. This, however, often produce temporal dissonance, leading to confusion and frustration amongst players, or even time distortion that could create a warped sense of temporal reality in terms of, for example, intensity of operations, decision-making time, etc[1].

(b) Turn-based time management. Interaction with the simulation is only done on set times or within set periods, known as turns (the preferred term), rounds or cycles (Greenblatt 1988: 55). Each turn will represent a certain period and will consist of a series of phases. These phases of the turn will typically be the planning phase, where the players formulate their plans; the input phase, where the plans are provided to the entity

[1] Based on the author's 13 years of experience in the field of tactical, operational and strategic simulation.

executing the simulation; the simulation phase during which the simulation of subsequent results takes place; and the output phase during which the results are provided to the player. As this is an unnatural methodology, it can also lead to time distortion and temporal dissonance. The ability to stop activities or to simulate at the maximum speed allowed by the simulation capability without waiting for player reactions nevertheless makes this the most effective method of simulating high-level long-term games. The theatre level game, for example, will operate in periods of 72 to 96 hours (Newell & Krause 1993: 49). Based on the previously mentioned features, turn-based games are more appropriate for the theatre strategic level, rather than a continuous game.

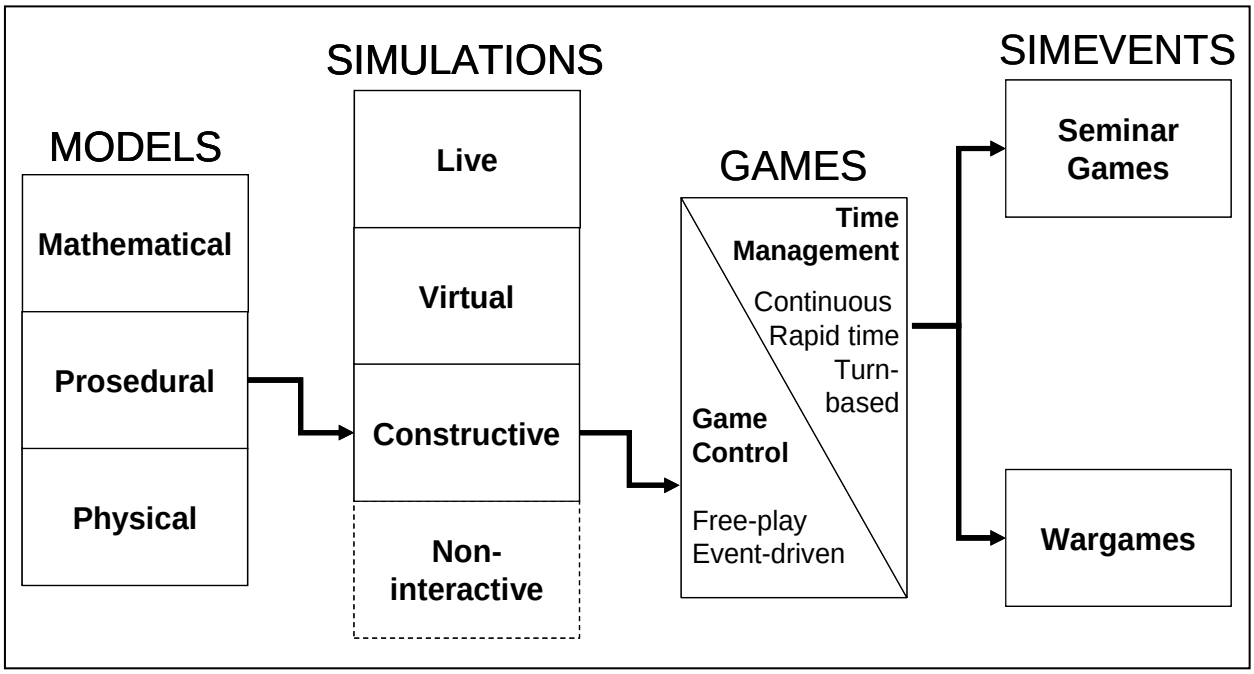
(c) Rapid time management. This method is a combination of the aforesaid two methodologies (FRG MoD 1996:5). Interaction with the simulation takes place at specific times, determined by 'jumps' in time. The control team will determine the events or situations which will be simulated and 'jump' to that event/situation. Reaction to the activity/situation can be either continuous or turn-based. Although focusing on the most important aspects of the scenario and a timesaving methodology, this method is prone to distortion, dissonance and even conflict as it may prevent players from reacting to their full potential. The use of this methodology for any simulation can only be advised if highly skilled and experienced simulation and exercise control personnel are available.

To summarise (see Figure 2.7), models, as representations of reality, provide the building blocks for simulations. One specific category of models, called procedural models, not only represents the entity or situation, but also the dynamic relationships between these entities or situations. These models are also known as simulations. Simulations, when given gaming characteristic, provide practical tools for training and planning support on all levels of strategy, including the national strategic level. The occasion where simulation, with or without the gaming component is used for training or to support planning, is called a simulation event. To distinguish between a simulation event and events occurring in a simulation, the former will be called SimEvents. Seminar games and conflict games are examples of such SimEvents.

5.3 Realism and accuracy in MSG

Two highly controversial subjects, when dealing with models and simulation, are realism and accuracy. Depending on several factors, mostly subjective and perceptual in nature, players will judge a SimEvent a failure or success, based on the perceived

Figure 2.7. Relationship between Models, Simulations, Games and SimEvents



(US DoD 1999b: 2)

accuracy or realism of the model or simulation. The judgment of the player, on the other hand, is based on the human ability to integrate and process experiences and knowledge.

Accuracy, pertaining to models and simulations, means that the model or simulation can be empirically verified and that it could be used to "solve real world problems" (US CG 1980: 8). Accuracy is therefore a quantifiable measurement of the ability of the model to represent the referent.

Realism is based on measurable or perceived judgment and is measured in terms of 'fidelity' (US DoD 1998). An observer will regard a model or simulation as realistic if it provides a result or action, which, according to the observer, is indistinguishable from the result or action of the referent. A combat model providing a certain number of casualties will be regarded as realistic if an observer perceives it to be similar to the results of a similar, but real battle. A soldier, however, used to low intensity battles with few casualties, will perceive a model that produces a high number of casualties as unrealistic, although it might be quite accurate. During an informal test of perception, done by the author on a sample of 200 military officers attending various warfare courses at the South African Army College during 1997, less than 5% graded a true scenario as realistic. Accuracy, or quantifiable realism, therefore, often does not correspond with perceived realism. In technical models, representing the functions of an entity, for example the

external ballistics of a projectile fired from a launcher, the accuracy, or ability to quantify is usually high. However, when modelling a political issue, for example the political attitude of one country towards another, the accuracy would be suspect. The higher the abstraction of the characteristics of a referent, the less reliable the quantifiable realism would become and the perceive realism would become the measure of fidelity. The same applies for simulations (see Figure 2.3).

A model or simulation could be developed with both high accuracy and high-perceived realism, for example a flight simulator. The aim of a model or simulation determines the type and level of realism. In games where specific skills are to be taught, 'tweakable' or adjustable models which are not necessarily accurate or realistic, could be used to force certain actions, which in turn result in the application and practicing of appropriate skills. For planning and decision support purposes, however, accuracy is vital.

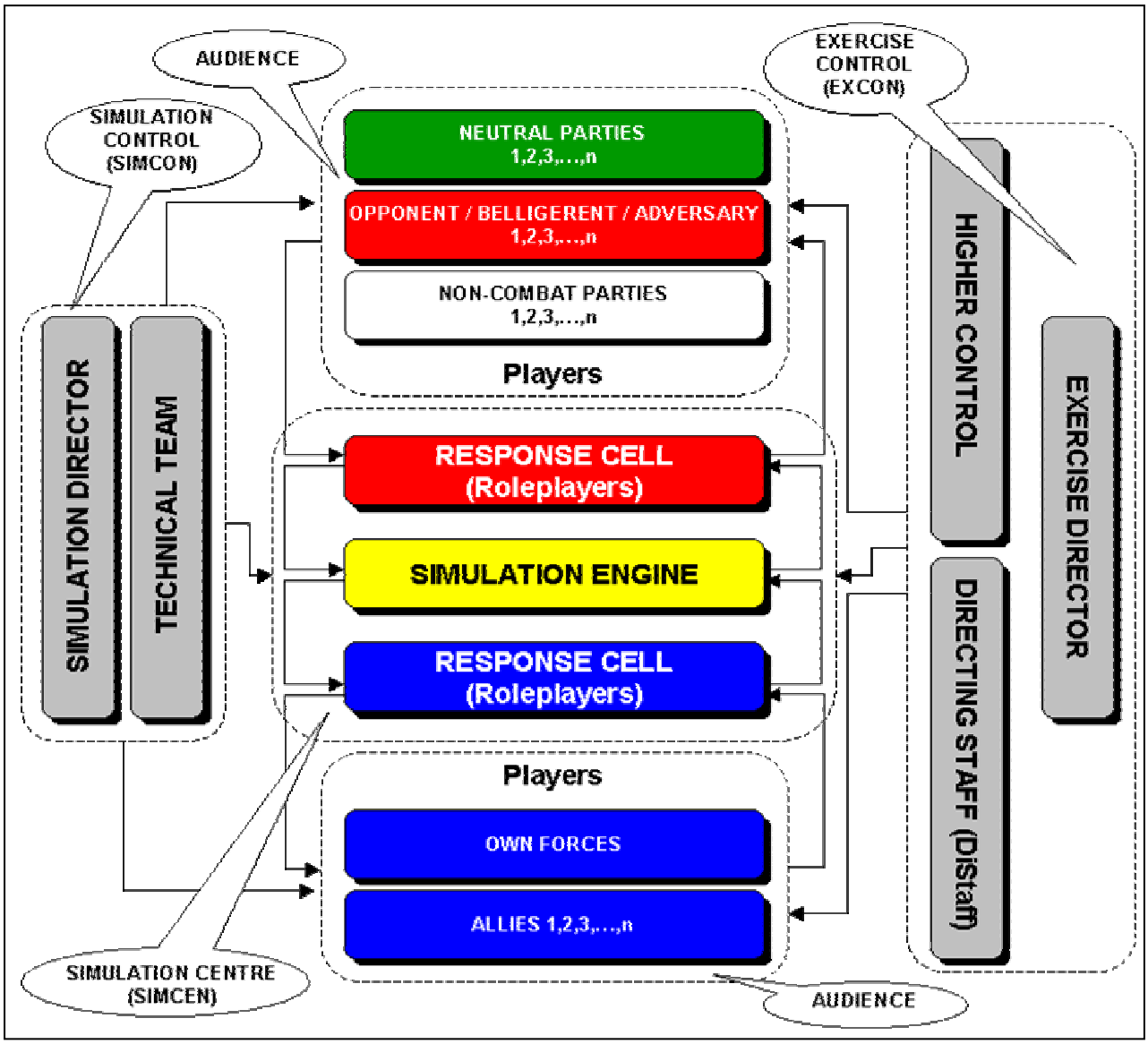
5.4 SimEvent architecture

The SimEvent architecture is the structure of the components, as well as the interactions that constitutes the SimEvent. A typical SimEvent normally have the following components, namely players, role-players, exercise control, simulation control and the simulation centre (derived from US DoD 1999a) (see Fig 2.8).

(a) Players. The player is a person who is being trained or who requires decision support during planning. The player interacts with the simulation engine either directly by means of a computer or indirectly through role-players. Players are also classified with a colour code, indicating the side they represent. A 'Blue' player represents own forces or own with a 'Red' player representing the opposition forces (OPFOR) or belligerents. All the players in a SimEvent are collectively known as the audience.

(b) Role-players. Role-players are members not being trained or not part of the planning process, but acting as a component of the simulation process by either direct interaction with the simulation, for example as computer operators, or as a response cell. There can also be several levels of role-players, with the player interacting with the first level of role-players, which interacts with the next level, up to the level that interacts with the simulation engine. Role-players that are grouped together to provide the audience with information or feedback from the simulation are called a response cell. The 'Blue' response cell, for example, acts as a subordinate entity to the own force players and provides information on own force positions and observations. The 'Red' response cell

Figure 2.8. SimEvent architecture



(US DoD 1999a: 142)

acts as the adversary, while the 'Green' response cell acts and reports as a neutral element and the members of the 'White' response cell act and report as non-combatants.

(c) Exercise Control (Excon). This grouping, known as Excon, firstly contains the Directing Staff (DiStaff), which consists of observer/controllers, also known as umpires. They supervise, direct and control the effect of the simulation by deleting, initiating and/or altering the inputs and outputs in order to achieve the predetermined objectives. Led by the exercise director, the observer/controllers also have an umpiring function by enforcing and applying the rules, procedures and regulations, as well as observing activities and conducting after action reviews (AAR). The AAR was executed according to the guidelines provided in US Field Manual, FM 7-0 (US DoA 2002: 6-4). An AAR allows for

open discussion on the learning experience during the game. Firstly, it concentrates on what was supposed to happen, as well as what actually happened; secondly, whether it was the right way of executing the task in the exercise; and lastly, how the task should be done differently. The second team in exercise control, known as Higher Control, aids the control process by simulating the higher command level(s). Members of this cell could also be regarded as role-players. In the case of a one-sided event, the opposing, or 'Red', audience could also be a part of Excon.

(d) Simulation Control (Simcon). The simulation director is the simulation and gaming expert in charge of Simcon. The simulation director provides simulation advice to the exercise director and ensures the integrity of the wargame. The technical team, consisting of computer specialists, programmers and simulation experts, provides technical support to ensure the effective execution of the SimEvent. In some cases, for example with a small training audience, members of the technical team can also act as role-players.

(e) The Simulation Centre (Simcen). Simcen consists of the simulation engine and the response cells. This grouping receives and processes the inputs from the players and produces results. The simulation engine, being the heart of the event, could be computer driven, manually driven or a combination of the two methods. A computer driven simulation engine contains several computers, which provide outputs, based on the execution of mathematical models. A manual simulation engine uses experts who analyse the inputs and supply resultant outputs, based on their knowledge and expertise.

In conclusion, a SimEvent needs a well-structured architecture to be able to provide effective support to training and planning. In such an event, several groupings co-operate and interact to provide the players, collectively called the audience, with a training opportunity or planning support. The intricacies of the architecture also confirm the complexity of the planning and presentation of SimEvents on all levels, including the national strategic level.

5.5. GAME THEORY

Gaming, in the context of simulation, cannot be discussed without discussing game theory. Game theory is defined by the US DoD (1998) as "(t)he study of situations involving competing interests, modelled in terms of strategies, probabilities, actions, gains, and losses of opposing players in a game". A shorter definition indicating the role of

mathematics is given by Brams (2001), namely that game theory is "a branch of mathematics concerned with decision-making in social interactions." Joseph Frankel 1973: 120), a political scientist, quotes Deutsch by stating the following:

"the approach of the theory of games is based on the existence of far-reaching similarities between certain conventionally standardized games and certain recurrent social situations. Where such similarities exist, it is held to be more profitable to analyze first the games rather than the far less sharply defined social situation"

According to game theory, a game has a set of players, strategies, outcomes and payoffs. The number of players can be from 1 to n, i.e. *i = 1, 2, …, n.* With two players opposing one another, it is called a two-person game. A game with one player opposing nature is often called a game of chance, but is excluded from this discussion (Kelly 2003: 6). With three players in a game, it is called a three-person game, etc. until *n* players participate in an *n*-player game. The players each have a set of options or alternative actions that are called *strategies.* *Pay-offs* are the utilities associated with the outcome for each player, based on the combination of preferred strategies. Pay-offs are normally described by means of a pay-off matrix (Taha 1976:339). Deutsch (1968: 115) and Thomas (1986: 19) also distinguish between zero-sum or fixed-sum games and non-zero-sum or variable-sum games. In a zero-sum game the sum of the pay-offs is zero, meaning that anything one player wins, is lost by the other player. Schelling (1966: 83) calls this "the strategy of pure conflict". A non-zero-sum game is a game of competition, but also of co-operation, as players not only individually win from one another, but can gain jointly from an additional player, for example the 'banker', 'nature, etc. Given competition, as well as co-operation in the same game, the latter is often called a mixed-motive game (Deutsch 1968: 117). The above description gives rise to a taxonomy that also explains the use of each type (see Figure 2.9).

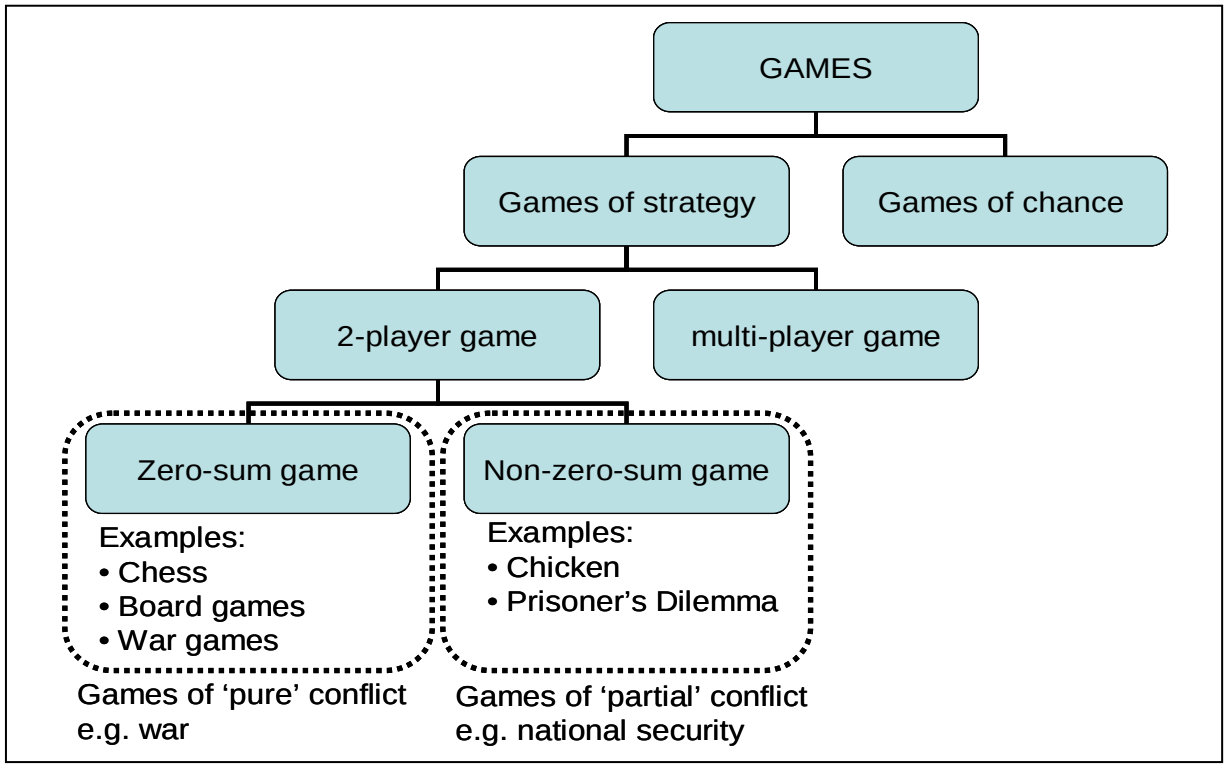
According to Brams and Kilgour (1988: 4), most national security level games can be explained by means of two well-known basic games, namely 'Prisoner's Dilemma' and 'Chicken'. The following (see table 2.2) provides a classification of a sample of national security games based on the above two games.

Table 2.2. National security games based on basic games.

Chicken	**Prisoner's Dilemma**
Deterrence Game	De-escalation Game
Winding Down Game	Arms Reduction Game
Star Wars Game	
Threat Game	

(Brams & Kilgour 1988: 4)

Figure 2.9. A taxonomy of games.



(Adapted from Kelly 2003:6, Brams & Kilgour 1988:4 and Dresher 1980:2)

To illustrate game theory and its usefulness in national strategy planning, Brams and Kilgour's (1988: 41) example of the Deterrence Game (a two-player variable-sum game), based on the generic game of Chicken, will be used. The following *pay-off matrix* explains the game:

		PlayerX	
		Cooperate	*Conflict*
PlayerZ	*Cooperate*	(3,3)	(2,4)
	Conflict	(4,2)	(1,1)

with *(z,x) = (outcome for z, outcome for x)*

4: best outcome

3: next best

2: next worst

1: worst outcome

According to this matrix, a conflict strategy with no cooperation for both players will lead to disaster (1,1). Should either Player X or Player Y co-operate, but the other player adopts a conflict strategy, the cooperative player will be worst off. A cooperative strategy for both players will lead to a compromise (3,3). In this game, which is also representative of a typical modern national security situation, the importance of a cooperative strategy in order to move from the mutually worst outcome (1,1) to a mutually beneficial outcome (3,3) is aptly demonstrated. The Threat Game, also based on Chicken, is similar to the Deterrence Game, but allows for retaliation. This game shows the benefits of cooperation, even in the presence of a threat of retaliation. In more advanced games, probabilities could be linked to the choice of a strategy (Brams & Kilgour 1988: 105 and 117), but the mathematical nature of these strategies falls outside the scope of this study.

Game theory was frequently used during the Cold War to simulate options, amongst others, with regard to deterrence and arms reduction. Shubik and Bracken (2001: 51), however, emphasize its biggest shortcoming in modern politics and conflict management, namely, that "(i)n the new game models there was no morale; leadership had no meaning; passion and anger could not be portrayed. The simplification of the individual to a mechanistic decision maker stripped these away." In view of the aim of this dissertation, namely to enhance planning and learning events, game theory will be regarded and used as a supplementary tool to explain and illustrate, but not as a simulation or gaming tool on its own.

6. CONCLUSION

The aim of this chapter was to clarify selected theoretical perspectives pertaining to simulation and gaming and the use thereof for national security training and planning, in the process providing a conceptual framework for analysis.

The first concept, strategy, refers to the art of distributing and applying the means necessary to fulfil the ends of policy. The aim of the discussion on strategy and its different levels is to create an understanding of the factors and threats that have to be

considered when simulating activities on the various levels and to aid the demarcation of the level of national security. For the purposes of this study, strategy has three hierarchical levels, namely national, military and theatre strategy. However, there is no definite division between the levels and determining the level should be based on the level of the effect of a plan or action rather than the plan or the action itself.

Various schools of thought on security and national security have evolved over time. The social and political conditions in Africa lead to the development of a unique view, according to which a broad spectrum of threats, both internal and external, influences the state as an entity and not only its vital interests or core values. These different views of security lead to two approaches to national security, namely the traditional approach and the human-centric approach. This study, however, contends that national security is the freedom of the state of all threats. National security was also related and linked to the elements of power, accepting the political, economic, social, technological, military, environmental and legal elements of power as both necessary and sufficient. A reflection on the capabilities of the elements of power, as well as the instruments of power, concluded this section.

In addressing the question of the education and training of national security practitioners, it was evident that the specialised skills and competencies of national security practitioners require innovative training methodologies. Similarly, given the impact of decisions and planning on national security, very few such decisions should be made without proven scientific planning and decision support.

In respect of the aforesaid and turning to the concept of simulation and gaming, it was shown that by linking models, as representations of reality, over time and adding the competitive element of gaming, simulations are constructed that are able to represent the tangible as well as the intangible characteristics of a real system. It was also indicated that, the realism or accuracy of a simulation depends on the aim and objectives of the simulation. Two specific types of SimEvents, namely seminar games and conflict games, each with its own unique architecture were identified. Both these variations of simulation are suited for simulating national security situations for training and planning purposes. A short overview of game theory, which also provided a methodology that is used for strategic simulation, concluded the deliberation on simulation and gaming.

This chapter provided the background to and understanding of several interrelated concepts, which are paramount to this study. National security, especially in the

integrative paradigm, provides a challenging environment where security practitioners need all the training they can get to instil and enhance the skills and competencies needed to operate effectively. The underlying premise is that simulation and gaming, specifically seminar gaming and conflict gaming, are tools well suited to provide in the security practitioner's need. By analysing the fundamentals and use of these techniques, the following chapters provide a detailed description of exactly how simulation and gaming is used for purposes of national security training and planning.

CHAPTER 3

THE FUNDAMENTALS OF SEMINAR AND CONFLICT GAMING

1. INTRODUCTION

When simulating events on the national strategic level, referring specifically to national security, several simulation methodologies can be used. These methodologies include, amongst others, the use of statistical frequency distributions and random numbers in a technique known as Monte Carlo simulation (Clemen 1996: 410), morphological analysis that structures multi-dimensional, non-quantifiable complexes (Ritchey 2004:1), game theory, serious gaming and 'rules and consequence' gaming. The latter two techniques will be reviewed in the latter part of this chapter. Adding gaming to simulation, however, produces two SimEvent types using the abovementioned techniques, which can be used for strategic level training and planning. The discussion of each op these two types, namely seminar games and conflict games, provides the background for the two case studies to be analysed in this dissertation.

This chapter covers the use of seminar gaming for teaching and planning on national strategic level by defining seminar gaming, and by discussing the components thereof in detail. Simulating national security through seminar gaming is addressed by describing examples of strategic level seminar games and by explaining the execution of these games. Wargaming is analysed in a similar manner. By examining conflict and integrating it with wargaming, conflict gaming is defined. Examples of conflict games are indicated to demonstrate the versatility of this SimEvent type.

2. SEMINAR GAMING

2.1 The seminar game

RAND Europe (RAND Corp 2002), an American-based research institute in a report emanating from its office in the Netherlands, defines seminar gaming as "een kwalitatieve onderzoeksmethode die gebruikt wordt voor het ontwikkelen van beleidsopsies en voor het onderzoeken van de mogelijke consequenties van de opties" [a qualitative research methodology for the development of policy options and for researching the possible consequences of the options]. In another RAND report (Kahan 2004:4) a further perspective on this activity is provided by describing it as "a method used to draw systematically on the expertise of a number of different people to understand a problem

that contains uncertainties … where not enough is understood to be able to rely on formal analytic modelling tools"

Whereas these two definitions describe seminar gaming in terms of problem solving, Ellis (2005: 1) contends that the seminar game can also be used as a training tool. Ellis bases this view on a seminar game held on 18 March 2005 on the Washington DC campus of the National Defense University (NDU) as a special session of the "Colleagues of the Americas" program. The seminar game was tool-supported and utilised role-playing. Participants included US military and government personnel, as well as academics involved in formulating US policy on Latin America. The objective of the event was to provide participants an opportunity to gain insight into the dynamics of the peace process and paramilitary demobilisation in Colombia. Integrating these views, a generic definition can be synthesised by describing seminar gaming as a qualitative process, using the expertise of a number of people for purposes of understanding or researching a problem or a situation.

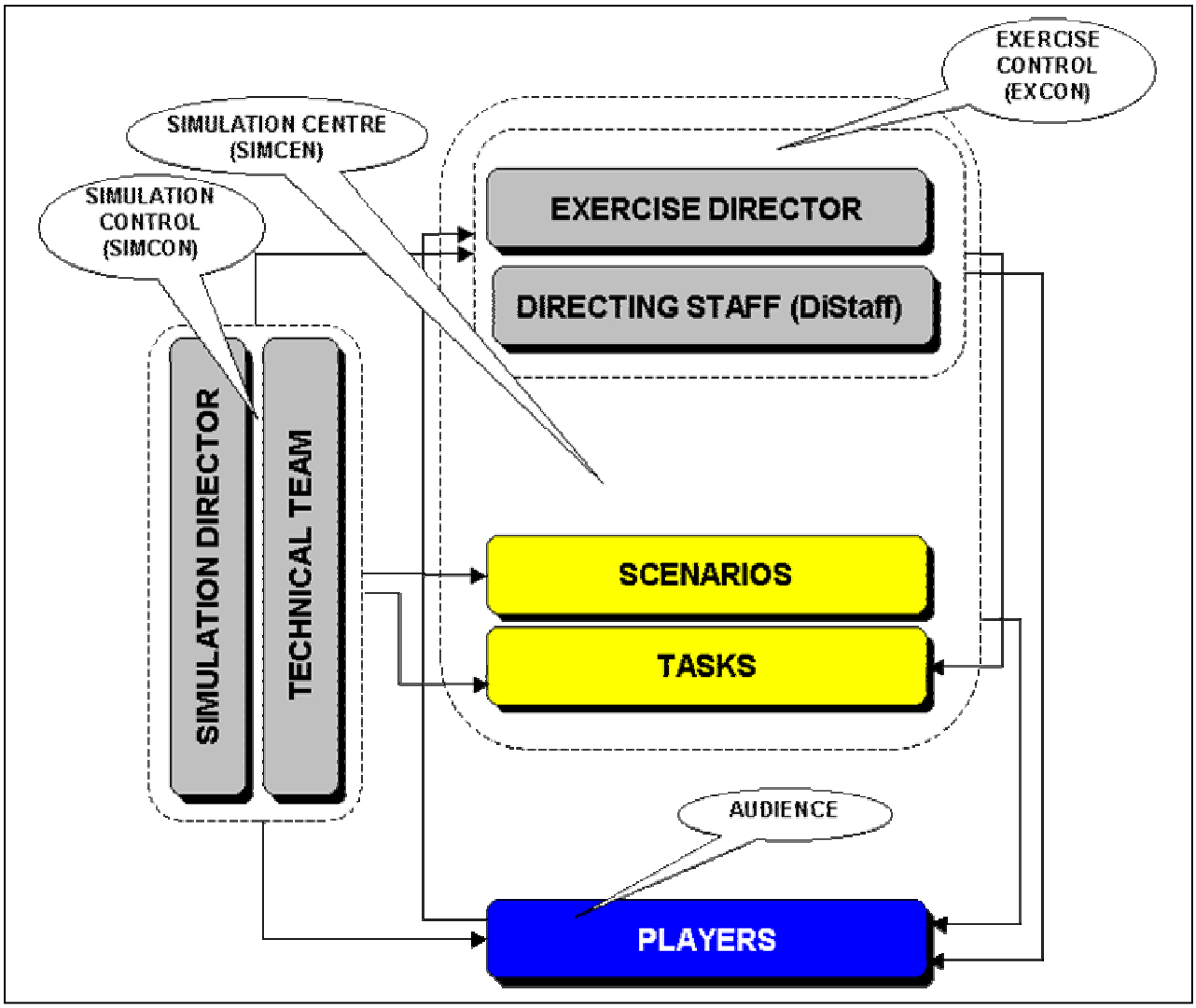
2.1.1 Seminar game structure

Given the definition of a seminar game, it is evident that the composition and execution of this game differ from that of a standard SimEvent. Based on Kahan's view (2004:5) that a seminar game consists of three major components, namely the players, scenarios and tasks for the players, as well as the architecture of a standard SimEvent (see Figure 2.8), the game structure for a seminar game (see Figure 3.1), can be described with reference to the following components:

(a) Players. In the case of the seminar game, the players are normally a chosen multi-disciplinary group. During a game, roles are assigned, which could be a natural role where the player acts as him/herself, or a crossed role, where the player is allotted a role relevant to the game, but not his/her own. The player could even be allotted a generic or specific role. A generic role represents a community, for example a business community, citizens, etc, whereas a specific role indicates a definite position, post or appointment (Kahan 2004: 8).

(b) Exercise Control (Excon). In a seminar game, the primary responsibility of the observers/controllers is to direct the output of the game by assessing the answers to the

Figure 3.1. Game Architecture of a Seminar Game



(Adapted from US DoD 1999a: 142)

questions put to the players and to adapt the ensuing questions accordingly. The observers/controllers also ensure that interaction takes place and they have an umpiring function by enforcing and applying rules, procedures and regulations.

(c) Simulation Control (Simcon). In the seminar game a specific scenario is provided, which serves as the framework for the answers on several sets of questions posed to the players. The simulation director provides this scenario, while the technical team will only be deployed when computer support, or other technical support, is needed.

(d) Simulation Centre (Simcen). Simcen consists of the exercise control, as well as a pre-determined scenario. The tasks, or questions for the players, direct the output of the game. This enhances the result of reflections upon issues, rather than actions, during the game. As the aim of this game is to understand the problem and not to solve it (RAND

Corp 1999), relevant tasking, implying asking the right questions, is therefore of the utmost importance.

2.1.2 The seminar game as a true game

The question can be asked whether a seminar game can truly be classified as a game. It could also be argued that there is little or no simulation involved in seminar gaming. The following argues the fact that seminar gaming is a true game and fits into the ambit of this study. According to Prensky (2001: 05-11) a game consists of six structural elements, namely rules, goals and objectives, outcomes and feedback, conflict, interaction and a representation. When measured against these elements, the following is found with regard to seminar gaming:

(a) Rules. All outputs are governed by rules, which are controlled by the control team to ensure the attainment of the goal and objectives. In a seminar game, rules, often in the form of questions, are also set to regulate the outcomes of discussions in order to achieve the goal and objectives.

(b) Goals and objectives. The goals and objectives are the *raison d'être* of the seminar game. In free-play games, for example, where two forces are committed in battle in a wargame, the goals and objectives are often not realised, as the dynamic interaction could lead to unforeseen or uncontrolled results. In a seminar game, with specific questions regulating the outcome, the realisation of the goals and objectives are certain.

(c) Outcomes and feedback. In seminar games, the outcomes are determined by the questions and tasking. On completion of the tasks, the feedback is analysed and further feedback directed by subsequent tasking. This process ensures that the outcomes and feedback loop is completed and that it remains intact.

(d) Conflict / competition / challenge / opposition. Direct conflict in the form of an opponent or a threat that needs to be 'conquered', is not part of a seminar game. However, more than sufficient challenge is provided in each turn in the form of the tasks or questions. This obviously places a huge responsibility on the observer/controllers, as they must ensure that all tasking are relevant and intellectually stimulating and challenging.

(e) Interaction. Interaction between players as direct opponents or allies does not form part of a seminar game. However, players do interact within the discussion group

and with the control team. The tasks or questions per turn, often predetermined, could also be adapted from turn-to-turn, based upon the player output of the previous turn. This leads to further interaction.

(f) Representation or story. The scenario is central to the Simcen. It is one of the strongest elements in ensuring the success of the game and drives the interaction between players and the tasking and questions.

Considering the aforesaid, it can be concluded that a seminar game is a true game. It is again stressed that this game can be supported by simulation, but simulation does not determine the existence of the game. It must be kept in mind that seminar gaming is future orientated and differs from wargaming in that there are no traditional 'Red' and 'Blue' opponents. It is also not a mechanical or computer driven game. There is no winning or procedural training taking place; it is a 'thinking exercise' (Canadian DoD 2003).

2.1.3 Scenarios in seminar games

As stated by Kahan (2004: 5), seminar games consist of three major components, namely the players, scenarios and tasks for the players, as well as the architecture of a standard SimEvent. Scenarios are central to the execution of a seminar game and part of the simulation centre (Simcen). It is therefore important to understand scenarios, the logic behind them and their construction.

According to Fahey and Randall (1998:6) scenarios are "descriptive narratives of plausible alternative projections of a specific part of the future", while Godet and Degenhardt (1994:60) describe a scenario as "(a) totality made up of the description of a future situation and the sequence of events which facilitates evolution from the original situation to the future situation" A scenario serves the following purposes (Fahey & Randall 1998:12; the Institute for Future Research in Roux 2001:1-29; and Godet *et al*. 1999):

(a) To create understanding of the future. Using scenarios, possible futures can be described which allow for insight and a shared vision that otherwise would not have been possible. It helps the user thereof to anticipate and cope with the future.

(b) To facilitate and improve the making of decisions affecting the future. Scenarios provide new insight and ideas that allow for new and innovative thinking and

result in better decisions, which would not be apparent if other forecasting methods were used.

(c) To stimulate strategic thinking and the identification of contingencies. By identifying certain possible events in scenarios, strategic planning and contingency planning can be done to react to the events, should they occur.

Perrottet (in Fahey & Randall 1998: 135) identifies specific uses for scenarios. Firstly, corporate scenarios are used to identify corporate strategies. Secondly, scenarios for scanning external change and scenarios to prioritise research activities are both used for purposes of decision support. Thirdly, scenarios for competitive gaming, also known as gaming scenarios, are used in wargaming. Although, as indicated, scenarios can serve various purposes, Wilson (in Fahey & Randall 1998: 91), the Institute for Future Research (in Roux 2001:1-29) and Van Heerden (2001), identify five generic criteria for useful scenarios. The first criterion is plausibility, which means a scenario should be relevant, possible and credible. A scenario used in a seminar game for planning purposes that is not plausible will obviously not lead to credible results. However, when using a scenario for training purposes, it does not necessarily have to be plausible, but might contain irrelevant, impossible and incredible elements with the aim of attaining training objectives.

The second criterion states that a scenario must clarify the future or future problems. In this case, the criterion certainly holds for seminar games for planning purposes, but as lessons can be learnt from the past, seminar games used for teaching could use any scenario, past, present or future. The final three criteria, namely that it should be creative, that it should provide insight and that it should be consistent and logical, apply to all scenarios. A scenario that is not creative will not challenge the user thereof and consequently will not provide insight in the situation or problem. However, creativity must not detract from consistency and logic, as it might render a scenario unsuitable for planning, or even training purposes. These criteria can also be used to evaluate the suitability of gaming scenarios. The assessment of scenarios is an important step in preparing for a seminar game, as a poorly constructed or senseless scenario will obviously not be effective or even conducive to good teaching. The actual construction of scenarios, however, falls outside the scope of this study and is not discussed.

2.2. Simulating national security through seminar gaming

Kahan (2004:4) states that seminar gaming is ideally suited for problems where "not enough is understood to be able to rely on formal analytic modelling tools." Given the diverse views on national security, as well as the unpredictable nature of most national security threats, the following examples of successful seminar games will show the applicability of this SimEvent type

2.2.1 Examples of seminar gaming

Seminar gaming has been used in numerous high profile strategic and other training and planning events, especially in Europe and the US. As far as Europe is concerned, in 1998 intra-state regionalisation was not only a political, but also an emotional issue in Portugal. The issue came to the fore in August 1991 with the passing of *Law 56/91*, which provided for new regional administrative structures. On the eve of a referendum on regionalisation, the *Fundação Luso-Americana para o Desenvolvimento* (Luso-American Foundation for Development – FLAD) tasked Rand Europe to conduct a series of seminar games throughout Portugal to explore various decentralisation options. Four of these games took place in June 1998, using participants from both large and smaller Portuguese cities in both the north and south of the country. Scenarios of various decentralization options were provided to the 21 participants per game who had to deliberate on them for one day. The participants – from universities and labour unions, as well as elected officials, entrepreneurs and civil servants – identified and raised several very important issues. These included the lack of clarity pertaining to the referendum, the importance of the regionalisation process and the financing of the process. The execution of the seminar game improved the outcome of this drawn-out debate and consequently made a huge contribution to the political process and therefore also to the national security of Portugal (RAND Corp 1999).

In 2001, a project investigating the future of scientific research was initiated by *De Ministeries van Onderwijs, Cultuur en Wetensshappen en van Economische Zaken* of the Netherlands. RAND Europe (RAND Corp 2002) was again involved in this project and provided support. The research question was '*Hoe zal het wetenschapsbeleid voor de komende jaren moeten worden ingevuld om zo goed mogelijk in te kunnen spleen op toekomstige ontwikkelingen en een goede kwaliteit en kwantiteit van het Nederlandse onderzoek te kunnen garanderen*? [What should the science policy look like to ensure good quality and quantity in future?] This seminar game, that considered a Dutch scenario in the year 2008, involved the participation of 79 members, representing universities,

government departments, research institutes and other organizations. The game consisted of three turns with turn one producing strengths, weaknesses, opportunity and threats (SWOT) on the scenario, as well as a comprehensive questionnaire. Turns two and three involved plenary sessions and two more work sessions, based on the previous outputs. The latter completed the game, which provided policy advice with regard to effective and focused future scientific research policy.

In 2003 (March), the Cyber Trust and Crime Prevention Project was launched by the UK department of Trade and Industry. This project also involved RAND Europe who provided support (Kahan 2004). Executed as a seminar game, the aim of the project was to explore the implications of future information technologies for effective interaction and trust between people and machines. Three scenarios were used to execute this task, while 60 participants from government, business, academic institutions and citizen communities were divided into six teams. The teams were required to execute a SWOT analysis and to decide what they would have done differently in order to seize the above opportunities and to eliminate the threats. The game lasted two days and provided new insight in the complex problem of cyber trust and crime prevention.

As far as the US is concerned, in 1999 the Sooner Spring seminar game was executed with the aim of enhancing the ability of the State of Oklahoma to prepare for and respond to acts of biological terrorism. The L-3 Communications Analytics Corporation provided the support (1999). The event was carried out in three turns and started off with the present situation as the base-line scenario. The participants were required to formulate courses of action and to identify supporting activities in case of the occurrence of biological terrorism. As the situation unfolded, control events were injected, requiring the participants to react. Because of this event, legislation was passed to allow officials to react effectively during an event of public health emergency.

In 2001, the US Army Technology Seminar game (ATSG) was presented by the RAND Arroyo Centre (Darilek 2001). What made this game unique, was that it combined seminar gaming and wargaming. This was done to attain three objectives, namely to look at the most promising technologies to satisfy ‘Army After Next’ requirements; to support the technology investment strategy; and to support 21st century force developments by looking at future technologies for the US Army. It was a seminar game in that there were no opposing forces. However, the use of 15 ‘vignettes’ or short scenarios, derived from recent wargames, provided a wargame element to the process. The game was facilitated

with the use of 'system cards'. These cards contained information about present and future army combat systems and the technologies that could be used to build these combat systems. It was required from the players to determine the appropriate combat systems and resultant technologies needed to achieve the mission in each vignette. By applying this technique in the seminar game, insight in operations, command and control, as well as logistics, was offered to the players.

The issue of paramilitary demobilisation in Colombia was regarded too complex for traditional gaming techniques. In March 2005, the National Defence University (NDU), supported by Booz Allen Hamilton Inc (Ellis 2005), facilitated a seminar game on this matter at the Washington DC campus of the NDU. Government officials and US military personnel participated in this event with the aim of acquiring insight into and to explore the dynamics of the peace process and the demobilization process in Colombia. The game was structured around three decision points with each decision point representing six months. At each decision point, which can be seen as moves or turns, it was required of each of the ten groups participating in the seminar game to make a series of decisions based on specific inputs. The decisions were fed into a software program, *Vensim*, which linked outcomes to inputs and thereby contributed to the success of the game.

2.2.2 Executing a seminar game

The successful execution of a seminar game requires meticulous planning, preparation, guidance and control. A seminar game is executed in three phases, namely the planning and preparation phase, the execution phase, and the post-exercise analysis phase. The following imaginary scenario is used to illustrate the three phases. The illustrative events are written in italics.

It is the year 2008. In view of numerous incidents where South African peacekeepers were shot, some soldiers charged with crimes against the population of the country they were deployed in and even incidents of fratricide, the Chief of the SANDF ordered an investigation into the training and discipline of members deployed in operations. The Inspector General, upon completion of his investigation, reported to the Defence Staff Council that the main reason for the apparent incompetence and ill-discipline of South African soldiers was a lack of competent leaders. South African officers and non-commissioned officers were simply not up to their task. The Chief of the SANDF immediately tasked the Chief Director Strategy and Planning (CDSP) to provide a strategy for the improvement of leadership in the SANDF. The CDSP consulted with the SANDF

Centre for Conflict Simulation (ConSim) and it was decided to use seminar gaming to provide insight into the problem and to determine strategic objectives for the improvement of leadership in the SANDF.

(a) Planning and Preparation Phase. As seminar gaming is about insight and understanding, it is important to start the preparation by determining the problem. *In this case, ConSim decided that insight and understanding of the leadership situation in the SANDF, specifically as it manifests in low intensity operations such as peacekeeping, is needed.* Given the problem, the concept of the game is decided upon and the scenarios to be used need to be drafted or acquired from existing sources. *ConSim chose to use a two turn game, using ten teams, each analysing a scenario in the first turn and then drafting the strategic objectives for a leadership improvement strategy in the second turn. The Institute for Security Studies at the University of Pretoria (ISSUP), together with several officers with operational experience were tasked to write the ten scenarios of future deployment.* Next, the players need to be selected to ensure that the relevant expertise, experience and knowledge are available for the game. *It was decided to use 100 soldiers of all rank levels and from operational units and training institutions, as well as civilian leadership and training experts to act as facilitators.* Lastly, the issues to be addressed in the first turn of the game must also be formalised in the form of questions or tasks and all logistic arrangements must be made. *Members of ConSim, ISSUP and the facilitators decided on the questions to be asked. A venue and other logistic needs, conducive to intellectual debate and interaction were also arranged.*

(b) Execution Phase. This phase entails the orientation and training of the audience, the execution of the game, and the conclusion by executing the AAR. As with all games, the effectiveness and efficiency of the game should be evaluated and all administration be completed. *On the first day of the game, which was also turn one, the participants were briefed on the problem, as well as on the process of the seminar game. The participants were then allocated to their respective teams. ConSim had two options with regard to the composition of the teams. The first option would be to distribute members of various rank levels amongst the teams in order to have ten equal and balanced teams. The second option was to use teams per equal rank level or homogenous teams according to mustering, for example only trainers, operational commanders, etc. Given the inclination of lower ranks to withhold comment in the presence of senior officers, it was decided to select teams according to rank levels. The teams were subsequently taken to team rooms where, facilitated by the appointed civilians, the participants studied the scenarios and*

answered the questions. That evening the members of ConSim, the facilitators and the advisors from ISSUP reviewed the results and decided on the process to determine the strategic objectives. On the second day, the above procedure was followed. The activities were completed with an open discussion on the problem and the approval thereof in a plenary session of all the participants.

(c) Post-exercise analysis phase. The aim of this phase is to compare the performance and results of the SimEvent with the client's expectations and requests. Based on the above feedback, improvements to the design and structure of the game can be made in order to enhance its effectiveness during the next event. *Upon completion of the game, members of ConSim, the facilitators and ISSUP once again reviewed the results and drew up a report, which was handed to the Chief of the SANDF.*

The above illustrative explanation of the execution of a seminar game for purposes of planning shows clearly the importance of preparation, the use of experts and control during execution.

3. WARGAMING AS CONFLICT GAMING

3.1 The wargame.

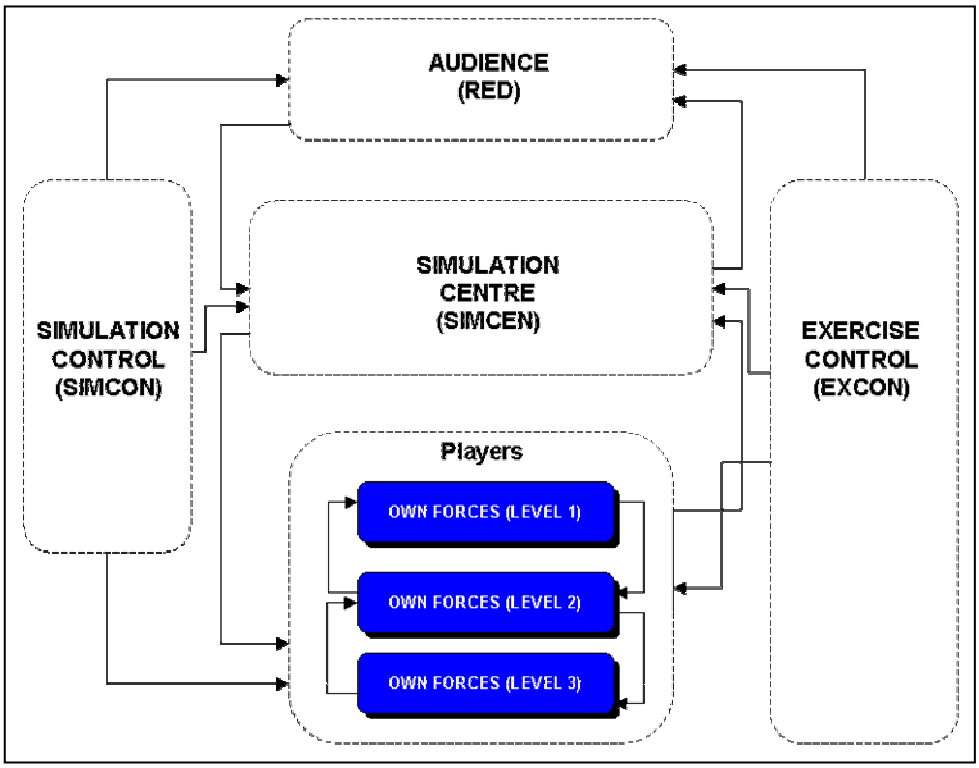
Numerous definitions and several variations on the spelling of 'wargame' exist. The SANDF officially defines a 'war game' (RSA DOD 1983) as a "simulation, by whatever means, of a military operation involving two or more opposing forces using rules, data and procedures designed to depict an actual or real life situation". The US DoD (1998) defines a wargame as a "simulation game in which participants seek to achieve a specified military objective given pre-established resources and constraints". Both definitions emphasise the simulation of military conflict and the existence of a structured process, executed by any relevant means. British literature on this subject (Grant, 1993: 38) refers to 'wargame' in the training environment as "a simulation to provide a realistic exercise framework for teaching, practicing or evaluating students". This definition provides a generic description, not even using the word 'military' and is suitable for use to describe any type of game. In spite of the SANDF Joint Military Dictionary spelling of 'war game', the widely accepted spelling of the word 'wargame' in the SANDF and South African defence industry will be used in this study. The stipulative definition of a wargame will also be a combination of the relevant elements of the aforesaid definitions, namely a wargame is a simulation, by whatever means, where participants seek to achieve a specified military objective given

pre-established rules, data and procedures. Wargames are also known as constructive simulations because “the pieces operating on the battlefield are not individual tanks and aircraft but a construction of many types of equipment into a single aggregated unit” (Smith 1995).

3.1.1 Wargame structure

The architecture of a generic wargame is similar to the structure of SimEvents previously discussed (see Figure 2.8). Variations, however, often do occur. One of the most common variations is the multi-player game with multiple levels of players (see Figure 3.2), applied in wargames where a unit with its sub-units are being trained or

Figure 3.2. Multi-level wargame

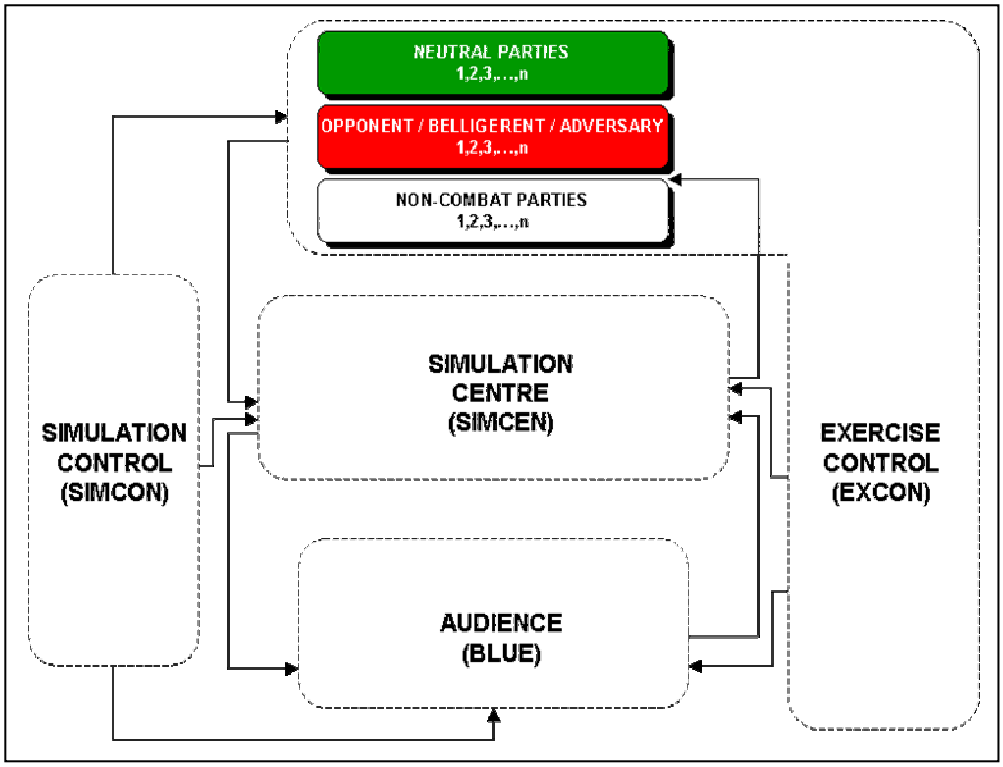


(Adapted from US DoD 1999a: 142)

tested. A second variation often used is the one-sided game (see Figure 3.3), utilising members of Excon, or even an artificial intelligence model, to act as the ‘Red’ force.

In view of the definition and architecture of a wargame, it can provide the structure for any form of game where a threat is present or where conflict exists. This implies that any game, which is a simulation, where participants seek to achieve a specified objective given pre-established rules, data and procedures, can be devised. Two modern types of

Figure 3.3. One-sided wargame



(Adapted from US DoD 1999a: 142)

wargames are also often used, namely serious games and 'rules and consequence' games:

(a) Serious games. Serious games can be defined as the use of high quality computer games software tools for training and planning support purposes. Serious games are currently used by the US Army for recruiting and training, by the British Army for procedural training as well as by several medical institutions for the transfer of manual dexterity skills in, amongst others, 'keyhole' surgery (Stone 2005).

(b) 'Rules and consequences' games. 'Rules and consequence' gaming is used to teach specific decision-making skills (CyberSim 2000: 14). This type of wargame is initiated by a scenario, which leads to a decision point, where it is required of the player to make a choice of one of *n* pre-programmed decisions. Consequently, based on pre-determined rules, each of these decisions will lead to a specific event in the scenario, which will require further decisions. By observing the consequences of each decision, as well as the result of the wargame, the appropriateness of certain decisions can be evaluated during a debriefing session.

3.1.2 The wargame as a true game

When measured against the six structural elements of a game (Prensky 2001: 05-11), the wargame also proves to be a true game. The following results are found:

(a) Rules. All wargame outputs are governed by rules, which are either taken up in computer models, for example the effective range of a gun, or controlled and enforced by the control team, for example the rules of engagement during a peacekeeping operation, to ensure the attainment of the goal and objectives.

(b) Goals and objectives. Although the control team can manipulate a wargame or the wargame results to ensure the attainment of the goal and objectives, it is possible that, in free-play games where two forces are, for example, committed in battle, the goals and objectives are often not realised, as the dynamic interaction could lead to unforeseen or uncontrolled results. This places an additional responsibility on the control team, ensuring timeous intervention in the game.

(c) Outcomes and feedback. In wargames, the outcomes are determined by the scenario and the tasking. On completion of the simulation of the ordered tasks, outcomes are analysed and further feedback directed by subsequent tasking. This process ensures that the outcomes and feedback remain in line with the goals and objectives.

(d) Conflict / competition / challenge / opposition. The existence of conflict, competition, a challenge or opposition between two or more opponents or belligerents is an inherent characteristic of a wargame, even when it is used to simulate non-violent activities, for example peacekeeping or disaster relief.

(e) Interaction. Interaction between players as direct opponents is also inherently part of wargaming. Interaction can take place by means of real time computer inputs or by means of manual inputs, for example written or verbal orders. By relating and integrating the opposing inputs, either by computer or by manual integration, outcomes are provided to the opponents.

(f) Representation or story. The scenario drives the wargame. Although the total scenario is not necessarily provided in the form of a narrative, elements thereof, for example the available ‘Blue’ and ‘Red’ forces, can be found in the simulation engine as

computer models. Elements of the scenario can also exist by default as, for example, published in existing doctrine.

In view of the abovementioned, it can be construed that a wargame is a true game. The use of opponents or belligerents, a simulation process and the existence of all the elements of the generic game structure confirm this conclusion.

3.1.3 Scenarios in wargames

Perrottet (in Fahey & Randall 1998: 135 and 137), identifies three specific types of scenarios, namely corporate scenarios to identify corporate strategies; scenarios used for purposes of decision support; and scenarios for competitive gaming, including wargaming. He also points out that there are subtle differences between scenarios for competitive gaming and the other scenarios. In competitive scenarios only information that would be visible or accessible to each respective opponent, are provided. The attainment of goals and objectives can also be manipulated by providing specific information in the scenario that would prompt the participants to follow a course of action that would complement the goals or objectives. Although the competitive scenario can be more complicated than the corporate scenario and the decision support scenario, it can be simpler to design as it does not require as much background information as the other scenarios.

3.2 The wargame as a conflict game

A typical wargame on the tactical or operational level uses, amongst others, terrain models and attrition models to represent the conflict between two, or more, opposing forces. The wargame is therefore a representation of military conflict, often enhanced by social or humanitarian issues. Most wargames are not designed to replicate non-military issues, for example natural disasters or economic activities. However, the simulation of national strategic level activities, for example national security, poses a need to simulate

more than just military conflict. Therefore, to conceptualise conflict gaming at a strategic level, it is firstly required to understand the concept of conflict and secondly, to be familiar with the simulation of the three levels of strategy.

3.2.1 Conflict

Roode (1974: 120) describes the difference between competition and conflict by stating “(w)aar kompetisie ’n wedywerende aktiwiteit binne ’n … kultureel-goedgekeurde raamwerk is, (is) konflik … wedywering waarin openlike vyandigheid en intense vorme van

stryd asook … 'n afwesigheid van … aanvaarde standaarde waarbinne die wedywering geskied, aangetref word" [whereas competition is an activity of rivalry within a culturally accepted framework, conflict constitutes open antagonism and intense struggle in the absence of accepted standards]. This view is shared by Blumberg (2006: 6) who portrays conflict as a state of opposition, disagreement or incompatibility between two or more people or groups of people. The aforementioned views of conflict show that the primary difference between competition and conflict is the existence of incompatibilities and hostility. Since a 'threat', in a physical sense, is defined as a hostile capability (Dupuy, Johnson and Hayes 1986), then conflict also implies the existence of a threat.

Previously it was stated that national security could be defined as the freedom of the state from all threats. Given the elements of national power, being political, economical, social, technological, military, environmental and legal (PESTMEL), a threat against any of the PESTMEL elements would constitute conflict in terms of these elements. A threat spectrum model (see Figure 3.4), illustrates different types of threats to the elements of national power. The threat spectrum model implies, therefore, that a state could face political, economic and military threats and thus be involved in political conflict, economic conflict and military conflict, to name but a few.

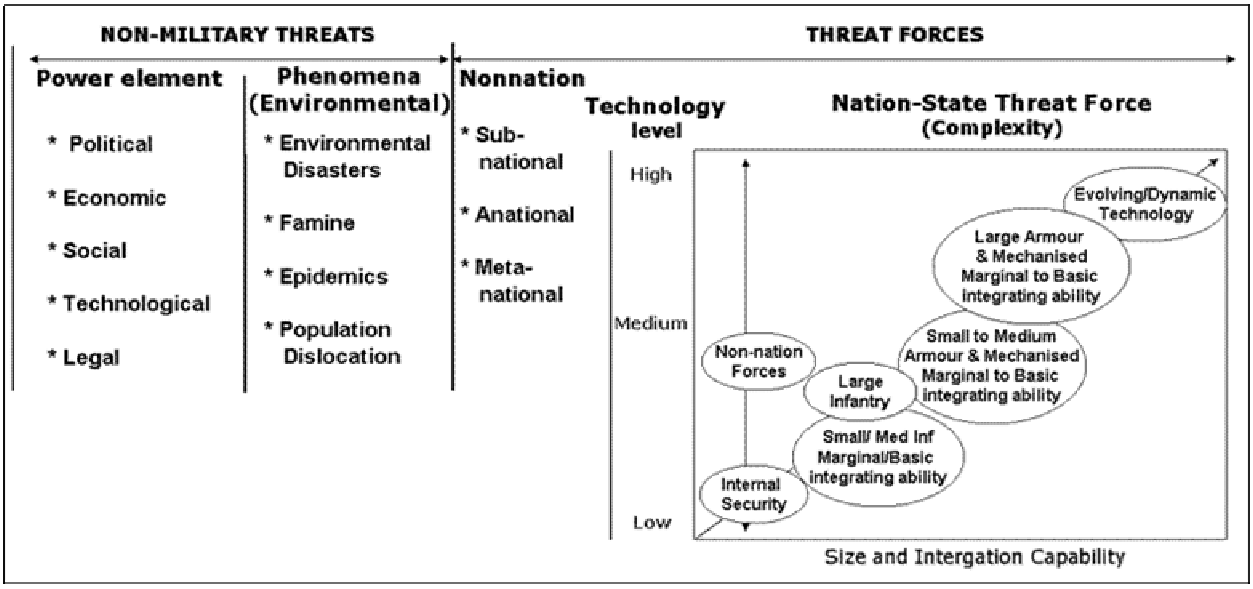
To conclude, simulating national security, as a strategic level concept executed in terms of the elements of national power, by means of a 'wargame', will be done by simulating and gaming all forms of PESTMEL conflict. Therefore, 'wargaming' on the national strategic level is known as conflict gaming.

3.2.2 Simulating the levels of strategy

The three levels of strategy, namely national strategy, military strategy and theatre strategy are significantly different with regard to the parameters, the intensity of activities, the degree of aggregation of data, as well as the methodology and techniques of simulation and gaming of the various types of conflict. In order to simulate national security in a conflict game effectively, these differences must be understood. For the purpose of this discussion, the levels of strategy are listed in ascending order.

(a) Theatre strategic level. The SA DOD does not acknowledge this level of strategy and maintains that the military strategic level follows the operational level (RSA DOD 2002b). In terms of US doctrine (Yarger 2002), however, theatre strategy has to do with

Figure 3.4 Threat spectrum model



(Adapted from US DoD 1994: 2-3)

concepts and courses of action, which would secure objectives by the use of force within a theatre, which is a geographically extensive area, using the military capability in or allocated to the theatre. Apart from military operations, 'interagency' – known in SA as 'interdepartmental' operations – can also be executed, necessitating close co-operation with other government agencies or departments (US DoA 1996a: 4-14). The theatre strategy is operationalised by means of campaign plans and operations plans. Developing a theatre strategic level game would subsequently entail the simulation of primarily military forces and activities. Given the extent of the theatre, modelling strategic movement will be important, while military activities, for example combat and logistics, will be utilising highly aggregated models. One such combat model is the Tactical Numerical Deterministic Model (TNDM), developed by Dupuy (1990b: 104 and 1992 and Dupuy *et al.* 1991: 184), used for casualty predictions during the Gulf War. Given future planning at the theatre strategic level in advance of up to 96 hours, time management is done using the turn-based technique (Newell & Krause 1994: 49).

(b) Military strategic level. The aim of military strategy in peacetime is to deploy and prepare military forces to deter war, as well as to provide guidance for the employment of forces in war (RSA DOD 2002b). The military strategic level, therefore, involves the preparation and employment of the armed forces of a country, including resource management, strategic movement, scheduling of activities and interdepartmental liaison. Simulating and gaming the military strategic level could be done in two ways. The first

method involves the use of a highly aggregated set of models, which simulate 'routine' activities, for example resource management, strategic movement, and even high-level military conflict. Secondly, lower level simulations, for example, theatre level or operational games can be used to provide operational results. Excon staff or role-players, in the case of training, are then used to interpret and integrate results. Military strategic level players will receive these synthesised results on the correct level of fidelity. Military models need to be supported by at least political and economic models. This implies a change from 'wargaming' to 'conflict gaming'. The preferred time management methodology at this level would be the same as for the theatre strategic level, namely turn-based, but with much longer time intervals of up to 30 days.

(c) National strategic level. Activities on the national strategic level have to do with the utilisation of national resources, which, for national security simulation, implies the use of all the elements of national power. The political, economic, social, technological, military, environmental and legal (PESTMEL) elements have previously been identified as those used by the SA DOD. When simulating the national strategic level, therefore, models need to be created for the realistic and/or accurate representation of the PESTMEL elements. These models could be embedded in the same program, for example the strategic game, 'High Command' (Moby Games 1992) or could consist of various programs, each simulating a particular element and manually integrated by Excon. Given the lengthy timeframes on this level that could be months or even years, the turn-based time management methodology is the only viable way of dealing with time in conflict games.

3.3 Simulating national security through conflict gaming

Strategic level games are usually used in circumstances where the content is classified and therefore not readily available. The ensuing examples are either from academic institutions or from commercial games and demonstrate a variety of conflict games.

3.3.1 Examples of conflict gaming

As far as conflict gaming is concerned, members of the Zagreb University, inspired and appalled by the ethnic conflict that characterised the disintegration of Yugoslavia – starting in 1991 and ending on 5 June 2006 with the declaration of independence by Serbia – initiated a project known as *Social Correlates of the Homeland War* (Srbljinovic *et al*. 2003). One of the aims of this project was to develop "formal models that could be

used as tools in discovering, investigating and explaining the social correlates of recent conflicts". In co-operation with the Croation DoD, the University aimed to build an ethnic mobilisation model, which could show some of the characteristics of ethnic mobilisation that took place in the former Yugoslavia. The model used national security issues such as ethno-nationalism, mass migration and crime and also took national resources, for example technology, into account in order to provide decision-makers with a better understanding of the interdependence of the issues in order to improve national security decisions.

The World Food Program's (WFP) game *Food Force* is a serious game available for training national security practitioners. The WFP of the UN uses the game to create awareness of the food crises that exist worldwide and to show the processes followed and resources utilised by the WFP in alleviating hunger. The game was specifically produced for the WFP and can be downloaded from the internet, free of charge. It consists of six missions (see Figure 3.4a), including airdrops, 'food run', nutrition planning and future farming projects. A narrated background of the activity, as well as additional information, supported by video clips (see Figure 3.4b), precede each mission. Although an educational game for the UN, it can be used to train national security practitioners in managing possible contingencies concerning food security (UN 2007).

War in the Pacific (WITP), distributed by Matrix Games (2004), is a commercial strategy game that can be used to enhance strategic thinking skills in the field of national security. WITP is a turn-based game simulating the US / Japan conflict during World War II. Although primarily a military game, issues of national security are constantly addressed. Economic decisions determine the availability of aircraft and also of nuclear weapons. Unfortunately this game needs approximately 1300 turns to finish (Peck 2006:47), which, with approximately two hours per turn, makes it too unwieldy for an effective teaching tool (see Figure 3.5).

The *Partnership for Peace* agreement is a NATO initiative to "increase stability, diminish threats to peace and build strengthened security relationships between individual Partner countries and NATO, as well as among Partner countries" (NATO 2006). This agreement between the participants forces them to make certain national security decisions and adjustments, for example with regard to border security, human rights, arms control, adherence to international law and the preservation of democracy. As part of the

Figure 3.5a. Screenshot from Mission 1, *Food Force*

Figure 3.5b. Screenshot from educational video footages, *Food Force*

(UN 2007)

Figure 3.6. Screenshot of *War in the Pacific*

(Matrix games, 2004)

agreement, NATO members and partners also commit to peacekeeping and participate in a biennial wargame, called *VIKING*. *VIKING 05* was an event-driven, distributed wargame focusing on peacekeeping operations. Eleven sites from whence 2000 members from 26 countries, led and directed by Sweden, participated, were used to play a fictitious scenario in which the participants took part in a coalition peacekeeping operation (Swedish Armed Forces, 2005). Although the exercise is conducted on the operational and tactical levels and predominantly in the military sector, it has a significant impact on the strategic level, in particular on the national security of participating countries. Therefore, the exercise provided an excellent opportunity to prepare national security practitioners as well.

3.3.2 Executing a conflict game.

As in the case of a seminar game, a conflict game requires careful planning, preparation, guidance and control. A conflict game is executed in the same three phases, namely the planning and preparation phase, the execution phase and the post-exercise analysis phase. Activities in each phase, however, differ from the activities executed in a seminar game. An imaginary scenario, using illustrative events written in italics, is used to describe the execution of a typical conflict game.

On 28 June 2000 the South African Cabinet released a statement regarding the establishment of a National Security Council (NSC), consisting of the ministers of Safety and Security, Defence, Intelligence, Foreign Affairs, Home Affairs, Finance and Justice, as well as, if and when necessary, the ministers of Trade and Industry, Welfare, Correctional Services and Provincial and Local Government. The aim of the NCS is to act as a co-ordination structure dealing with policy and strategic issues pertaining to national security. The council is chaired by the President and is intended "to ensure speedier responses to, and monitoring of, such matters as disaster relief, developments in the sub-continent, and fulfilment of international obligations by our country" (RSA Parliament, 2000). *In 2006, the President voiced his concern with the effective functioning of the NSC and ordered the Minister for Defence to organise a conflict game to provide training to the members of the NSC in the handling of national security crises. The Minister for Defence consulted with the Secretary for Defence and the Chief of the SANDF and it was decided that the SANDF Centre for Conflict Simulation (ConSim) would host the event.* In the execution of the task, the officer in charge (OIC) of ConSim will now affect the process of strategic gaming in the following phases.

(a) Planning and Preparation Phase. As the conflict game is about training, the process will start by determining the training needs or objectives of the client, that is, the President. *As the Minister for Defence was acting on behalf of the President, a meeting with him revealed three training objectives, namely to provide experience for the participants and their staffs in the management of national security and regional security crises; to test means of communication between the members of the NSC; and to train and provide experience to the participants in dealing with the press in matters of national security.* Given the objectives, the concept of the game, time management and software support are to be decided upon and an appropriate scenario, including the setting and framework, needs to be acquired. *ConSim chose to use a continuous, script-driven game. It was also decided to use a highly aggregated operational game belonging to the SA DOD to provide situational awareness and other military simulations, a commercial politico-economic game to simulate the economic effects on political decisions and a team of experts from the Institute for Security Studies at the University of Pretoria (ISSUP) to manually simulate the political, social, environmental and legal elements. The Centre for Military Studies (CEMIS) from the South African Military Academy was tasked to write the scenario and to draw up the MEL/MIL.* Normally, as in this case, the client nominates the players. *The President ordered all members of the NSC to participate. It was foreseen that several role-players would be required and a few retired generals and executives were*

subsequently requested to participate if needed. As communications had to be tested, it was decided to place Simcen in ConSim, Pretoria, and to communicate the simulation inputs and results by means of the actual communication means, being e-mail, fax, telephone and even video-conferencing with the players in the government offices in Cape Town. Members from ConSim were sent to Cape Town to train and assist the players and their staffs in the game procedure. The President also invited several prominent members from foreign and local universities, think tanks and non-governmental organisations to act as observer/controllers.

(b) Execution Phase. As with a seminar game, this phase entails the orientation and training of the audience, the execution of the game and the conclusion by executing the AAR. The effectiveness and efficiency of the game will be evaluated and all administration will be completed. *On the first day of the strategic game, the players and senior members of their staffs were gathered to be briefed by the President and the ConSim representatives on the aim, objectives and process of the game. The rest of the day was then spent preparing departmental operations rooms and a central NSC operations room, manned by members of the Presidency. The second day started with a telephone call from a role-player, acting as a premier of a province, requesting urgent support after a flash flood, caused by heavy rains, created havoc in the province. Shortly afterwards the NSC operations room received a fictitious e-mail from the African Union Southern African Development Community Standby Brigade (SADCBRIG) headquarters in Gaberone, requesting military support for intervention in a fictitious country, where a* coup d' état *was staged. As the president, as chairperson of the NSC, called a meeting of the NSC, the members of Simcon, at ConSim in Pretoria, ticked off the two events from the MEL/MIL and started preparing for the inputs to be received from the NSC. The inputs arrived two hours later in the form of a memorandum to the Premier, promising aid and two presidential directives to the DOD to support both the events. The directives were analysed by the panel of experts and military action fed into the operational game. As the next event was initiated, a ConSim representative in Cape Town, role-playing as a staff officer from the Chief of the SANDF's Joint Operations Division, prepared to provide a situation report to the NSC on the military deployments, using a situational awareness picture, generated by the operational game in Pretoria. The game continued in this manner as planned until the last day of the exercise. The NSC was then, for the last time, called to a meeting where the observer/controllers and the panel of experts conducted the AAR. The result of the exercise was another presidential directive, ordering changes in the structure and processes of the NSC.*

(c) Post-exercise analysis phase. The aim of this phase is to compare the performance and results of the game with the user's expectations and requests. Based on the above feedback, improvements to the design and structure of the game can be made in order to enhance its effectiveness during the next event. *Members of ConSim, the panel of experts and the role-players conferred shortly after the completion of the game, debating the weaknesses and challenges experienced during the execution of the game. On completion of the conference a report, containing recommendations for the next national security game, was compiled and handed to the Minister for Defence.*

The above illustration shows the intricacies of conflict gaming and the importance of thorough preparation. It also shows that national security issues can be simulated in a conflict game, but not necessarily by computer models. The use of experts, as in the case of seminar gaming, is unavoidable. Modern technology is vital in order to ensure the effective communication of information, the processing of complex calculations such as combat modeling, and to create situational awareness.

4. CONCLUSION

The aim of this chapter was to define and explain the fundamentals of seminar gaming and wargaming, in the process providing a conceptual framework for the analysis of selected case studies.

The discussion of seminar gaming indicated that, based on its structure, it is a variation of the generic game. Furthermore, the analysis and evaluation of seminar gaming in accordance with Prensky's six structural elements also showed that a seminar game is a true game. When using a seminar game, it must, however, be kept in mind that this game type is a 'thinking exercise' which is future orientated and that it does not always require simulation support or competition/conflict between opponents. Based on the importance of scenarios for the effective application of a seminar game, five criteria for scenarios were provided and evaluated. These criteria included plausibility, future orientation, creativity, the provision of insight, as well as consistency and logic. The discussion of several examples demonstrated the value of seminar gaming for planning and, potentially, also for training purposes. These examples included those on Portuguese intra-state regionalisation, the Dutch science policy, and the UK Cyber Trust and Crime Prevention Project – all supported by RAND Europe. US based seminar games included the Sooner Spring biological terrorism game, the US Army Technology seminar game and the Colombian demobilisation seminar game. The analysis and examination of seminar

gaming as a national security simulation capability were concluded with a demonstration of the generic features of the gaming process, using an imaginary SA national security scenario.

Conflict gaming was similarly dealt with by analysing and assessing the wargame structure. Although the wargame has a generic game structure, two variations, namely the multi-level wargame and the one-sided wargame exist. In addition, two modern wargame types were indicated and described, namely serious games and 'rules and consequence' games. The application of Prensky's six structural elements of a game to the wargame confirmed that it is a true game. The importance of the use of scenarios in wargaming, specifically competitive scenarios, was confirmed. The reference to and analysis of conflict confirmed that the existence of a threat against any, or all, of the elements of national power denotes the existence of conflict in terms of the respective elements of power. Since this conflict is on the national strategic level, its inclusion in wargaming is known as conflict gaming. Conflict gaming on three strategic levels, namely the theatre strategic level, the military strategic level and the national strategic level was subsequently investigated and it was concluded that the turn-based time management methodology is the most viable way of dealing with time in strategic level conflict games.

The various examples of conflict games confirmed the utility and versatility of conflict gaming. The project to investigate and explain social correlates, undertaken the Zagreb University and using a non-interactive model and the use of serious gaming by the UN World Food Program, provided two examples of the non-military use of conflict gaming. The commercially available *War in the Pacific* game and the NATO *VIKING* distributed multi-national exercise illustrated the military use of conflict gaming on the national strategic level. Similarly to seminar gaming, an imaginary scenario was used to demonstrate the suitability and the use of conflict gaming in a SA national security context.

This chapter provides the required insight into and the framework to analyse and appraise the selected case studies to follow. In this respect the structure and execution process of seminar games and conflict games serve a dual purpose. Firstly, awareness is created of the possible application of the simulation and gaming methodology for purposes of national security training and planning. Secondly, a framework is provided for the subsequent analysis of the structure and processes of the South African and US case studies.

CHAPTER 4

SELECTED SOUTH AFRICAN AND UNITED STATES CASE STUDIES

1. INTRODUCTION

This chapter provides an overview of the history of simulation and gaming in the SANDF, leading to the use of seminar gaming for the training of national security practitioners at the South African National Defence College (SANDC); gives an account of seminar gaming at the SANDC with the inclusion of the process followed during the execution of the seminar game; and assesses the effectiveness of the seminar game as a training event in the ENSP (Executive National Security Programme) at the SANDC.

Similarly, in respect of conflict gaming, this chapter also provides an overview of the history of conflict gaming at the US Army War College (USAWC); describes the SCE (*Strategic Crisis Exercise*) and the execution thereof with the inclusion of an account of the computer support to the SCE; and assesses the effectiveness of the SCE as a training event at the USAWC.

The two case studies were specifically chosen for illustrative purposes. As will be pointed out, particular circumstances contributed to the failure of the SANDC game, the opposite occurred with the USAWC game. The two disparate case studies thus supplement conclusions drawn from previous examples.

2 SEMINAR GAMING AND THE SOUTH AFRICAN NATIONAL DEFENCE COLLEGE

2.1 Simulation and gaming in the SANDF

Given the growing need for simulation and gaming in the SADF, as well as the technological advances made in the field of information technology, the then Chief of the SA Army, Lieutenant General A.J. (Kat) Liebenberg, promulgated a wargames philosophy and plan in 1987 and ordered the use of wargames for training, analysis of plans, as well as research and development. The philosophy and plan confirmed the need for jointness and centralised control for activities on higher levels. The plan also ordered the launch of a project to develop a wargaming centre, as well as computer software, to support wargaming in the SA Army (RSA DOD 1987: 22). A subsequent SA Army staff requirement, dated 14 March 1989, led to the inauguration of the SA Army Wargaming Centre as a branch of the SA Army College on 23 November 1989. At the time (*circa* May

1989) a project aimed at developing a strategic wargame, simulating the operational and theatre strategic level, was also initiated (RSA DOD 1989).

The change of government in 1994 and the transformation process in the SANDF brought about changes to the command and control structure of the SANDF. In 1999 the White Paper on Defence Related Industries (RSA DOD 1999) declared "simulation systems and war gaming" to be one of the strategically essential defence technologies and capabilities. In 2000 the SANDF Military Strategy (RSA DOD 2000b) also confirmed the importance of simulation in all training activities of the SANDF. In response, the Chief of the SANDF, General S. Nyanda, ordered the SA Army Wargaming Centre to be renamed the SANDF War Simulation Centre and to be placed under command of the Joint Training Division (RSA DOD 2000). In 2000, due to the changing environment previously referred to and the resultant change in strategic level simulation requirements, the strategic level wargame project was revisited by the Directorate Military Strategy (CyberSim 2000). The initial requirement for a strategic level wargame was changed to a requirement for a set of strategic planning and simulation tools. To accommodate the ability to present constructive simulations of al forms of conflict, including military conflict, the name of SANDF War Simulation Centre was again changed in 2006 to the SANDF Centre for Conflict Simulation (ConSim) (RSA DOD 2006).

The ConSim currently presents SimEvents to the Joint Operations Division, the Military Academy and the SANWC, as well as to units of the SA Army. The latter is currently the biggest user of the ConSim capability. The strategic level wargame project was also handed over to ConSim. To enable the provision of the simulation service, the ConSim has a complement of 16 SANDF officers and non-commissioned officers, operating in three simulation teams, administrative staff and research staff. A software development and maintenance company, CyberSim (Pty) Ltd, provides technical support for the 20 to 30 SimEvents per year, ranging from the tactical to the strategic level, from war fighting to peacekeeping events and from seminar games to conflict games (RSA DOD 2007b).

2.2 Gaming at the SANDC

The SANDC currently presents two ENSPs *per annum*, each consisting of 36 program members. The aim of the ENSP, before 1999 known as the 'Joint Staff Course' (JSC), is "(t)o qualify … members to function at the strategic level individually or as part of a multi-disciplinary team, to be able to critically assess national security matters and to recommend or direct appropriate actions that contribute to national security" (RSA DOD

2007a: 5). The delegates to the ENSP are directors and senior deputy directors, invited from all government departments, but primarily from the DOD and parastatal organisations. Except for members of the SANDF and the Defence Secretariat, members from the Department of Foreign Affairs, the South African Police Service, Armscor and the State Information Technology Agency (SITA) normally attend the ENSP. Military delegates attending the ENSP are nominated for the programme based on their seniority or the fast-tracking of previously disadvantaged members, or service requirements. Most of the members return to their units and are not deployed in strategic level posts. Some members, however, have the opportunity to work in strategic level posts, for example at the Directorate Military Strategy. Members from foreign countries, primarily from the Southern African Development Community (SADC), also attend the programme.

The ENSP is the highest level programme in the RSA DOD that can be attended by senior officers and other delegates and is the only programme dedicated to the teaching of national strategic level processes. The focus of the programme, however, is on national security as a national strategic process. While attending this programme, delegates are exposed to numerous views on all aspects of national security. Visits to installations of key importance to national security, for example military installations, installations in the national electrical power supply network and several key industries, support and expand the theoretical background already provided. An overseas visit is also undertaken, with the aim to observe and explore the national security policy and processes of the host country. In an attempt to enhance the strategic thinking skills of the delegates, the SANDC, in cooperation with relevant directorates in the RSA DOD, for example the Directorate Military Strategy, also endeavours to present a strategic level SimEvent to the delegates of the ENSP. In order to develop a suitable SimEvent, three games, namely *High Command, Embrace Peace* and *Write Strat* were used.

2.2.1 High Command

In the mid 1990s a commercial computer game, known as *High Command* was introduced to the JSC, in an attempt to enhance strategic thinking skills. *High Command* (see Figure 4.1) simulated the situation in Germany prior to and during World War II and entailed the allocation of funds and the scheduling of activities on the national strategic level. In this game, which was a conflict game and not a seminar game, funds allocated to industry in time, would ensure that warships, units, etc were manufactured when needed. Although *High Command* dealt with several of the elements of national power, notably the

military and the economical, the current national security debate, as well as the present aim of the ENSP, made this game obsolete.

Figure 4.1. A typical *High Command* scene

(Moby Games n.d.)

2.2.2 Embrace Peace

In 2001, an attempt was made from outside the SANDC to revive strategic level gaming. The initiative came from the Chief Director Strategy and Planning (CDSP) at Defence Headquarters, who endeavoured to improve the strategic thinking skills of future military and national security strategists. The Director Military Strategy[1] was tasked to execute a SimEvent in collaboration with the Commandant of the SANDC. The first SimEvent, known as *Exercise Embrace Peace*, took place in November 2001. It was supported by the software of the strategic level game called *uKhozi,* developed by CyberSim Pty (Ltd) (2000). The aim of the SimEvent was to enhance strategic thinking skills, to experience the use of strategic decision support tools and to gain experience in the writing of a strategic directive. It was a seminar game involving a scenario set in 2009, which was prepared by Prof. M.J. Hough from ISSUP (in RSA DOD 2001a). The scenario

[1] The author of this study is currently the Officer in Charge of ConSim. Before he occupied this post, he was the Chief of Staff of the Directorate Military Strategy. In this post he was responsible for the development of the *uKhozi* software, as well as the establishment of seminar gaming at the SANDC. Official letters, as well as unpublished and undocumented working papers, covering this period, have been used for the purposes of this discussion

contained relevant Southern African issues that could potentially lead to national security threats to the Southern African states. Examples of these issues included, amongst others, the Namibian territorial claim in respect of the Orange River international border with the associated mineral and water rights; political unrest and insurgent activities to depose of the Swazi monarch; and the destabilising effect of the Zimbabwean situation on contiguous countries. Considering that the programme was attended by international delegates who might have been offended by the scenario content, the CDSP regarded the scenario to be too politically sensitive and insisted that the current political and socio-political situation in SA be used as an alternative.

The players were divided into four groups, resembling a national security council. In the first turn they were required to determine and prioritise possible national security objectives, by using the prioritising tool and the decision tree tool of the *uKhozi* Strategic Planning and Simulation Tool (a component of the suite of strategic planning and simulation programs – see section 2.3). In the ensuing turns, the players had to plan the implementation of one of the national strategic objectives and had to write a strategic directive in this regard.

With regard to the first SimEvent, feedback from the ENSP members and staff members of the SANDC indicated several shortcomings. Amongst others these included the negative attitude of the members towards gaming and simulation; the lack of time during the hectic program of the ENSP; as well as ignorance about strategic planning and decision support methodologies and tools, for example the decision tree tool. The major problem, indicated through the feedback, was the lack of integration of seminar gaming with the ENSP curriculum (RSA DOD 2001b).

Several actions were taken by Director Military Strategy to improve the subsequent SimEvents. Amongst others, these included lectures on the writing of strategic directives; training in the use of the planning and decision support tools; the use of an imaginary scenario; as well as the addition of a ‘Rules and Consequence’ game to provide insight into the consequences of strategic decisions. Unfortunately, despite these supplementary measures, the feedback on two further events in 2002 and one event in 2003, remained negative. As a result the Commandant of the SANDC terminated *Exercise Embrace Peace.*

2.2.3 Write Strat

Based on the failure of the four *Exercise Embrace Peace* events, CDSP ordered Director Military Strategy to re-plan the exercise. In April 2004, after extensive research into the presentation and facilitation of a seminar game, strategic level gaming at the SANDC resumed as a seminar game (RSA DOD 2004). The first of the 'new' games were still called *Embrace Peace*, but the subsequent exercises went under the new name of Exercise *Write Strat*. The ENSP seminar game followed the same three phases as previously indicated, namely the planning and preparation phase, the execution phase and the post-exercise analysis phase. However, there were certain deviations from a typical seminar game. Firstly, there was still no future scenario. Based on the fear that foreign programme members on the ENSP might be offended by the scenario content and that future SANDF planning, regarded as classified, might be revealed, the current SA situation was still the scenario used. Secondly, the exercise questions that formalised the issues to be addressed, were not only directed by the attempt to understand the uncertain situation, but were also circumscribed by programme constraints. The latter included the lack of time allowed for Exercise *Write Strat* and the lack of integration of the objectives of the exercise with the rest of the ENSP programme. These deficiencies contributed to the termination of the exercise after three *Write Strat* SimEvents.

2.2.4 Executing Exercise Write Strat

Members from Excon and Simcon planned the execution of Exercise *Write Strat* according to the execution process of a generic seminar game. This included the following:

(a) Planning and preparation phase. Several months before the execution of the seminar game, the SANDC staff, simulation consultants and the simulation director (a staff officer from Directorate Military Strategy) coordinated and confirmed the objectives of the game, the scenario to be used, the computer support and the game program. In addition, several days before the game started, the theory of seminar gaming was presented to the programme members. The participants were organised into six groups of six members each. The game consisted of two to three turns, depending on the learning progress of the participants. The first turn was initiated by a tasking document that described the (current) scenario and the tasks to be performed in the first turn (see Fig 4.2).

Figure 4.2. A copy of the document to initiate *Exercise Embrace Peace*.

ENSP EX EMBRACE PEACE: 2004

MISSION

1. Identify four of the main national security threats currently facing South Africa, and how to respond to this in a national security strategy.

EXECUTION

2. Specifically refer to the following issues:

   a. Priority of threats.

   b. Motivation for each threat being seen as a national security threat.

   c. Causes of each of the threats.

   d. Political/strategic response plan or contigencies (shorter and longer term) for each threat in broad terms. Indicate the strategic framework, including resources required in each case.

   e. Indicate which strategies represent new alternatives and which represent improved efficiency of current strategies.

3. Total length of document: maximum 2 page, 12pt Arial, single spacing. Diagrams, graphs etc to be placed on separate pages, maximum 2 additional pages.

4. Presentations: Presentations will be made on the answers to above questions. Maximum 10 min and maximum 5 slides are to be used.

5. Dates and time for preparation and presentation: See Timeline

(from RSA DOD 2004)

(b) Execution phase. Each turn was executed by discussing the questions that formalised the issues to be addressed, using brainstorming and other group planning. techniques. The responses to the questions were collated on a presentation tool, for example Microsoft PowerPoint, and presented to the Excon staff. The Excon staff considered the responses per group and prepared questions for the next turn. At the start of the next turn, participants received the questions to be considered and the process repeated itself. The execution phase was concluded with an AAR.

(c) Post-exercise analysis phase. Based on the outputs of the AAR and on the comments and feedback from the participants, the game concept, inputs and support were reviewed and adapted for implementation during the next exercise.

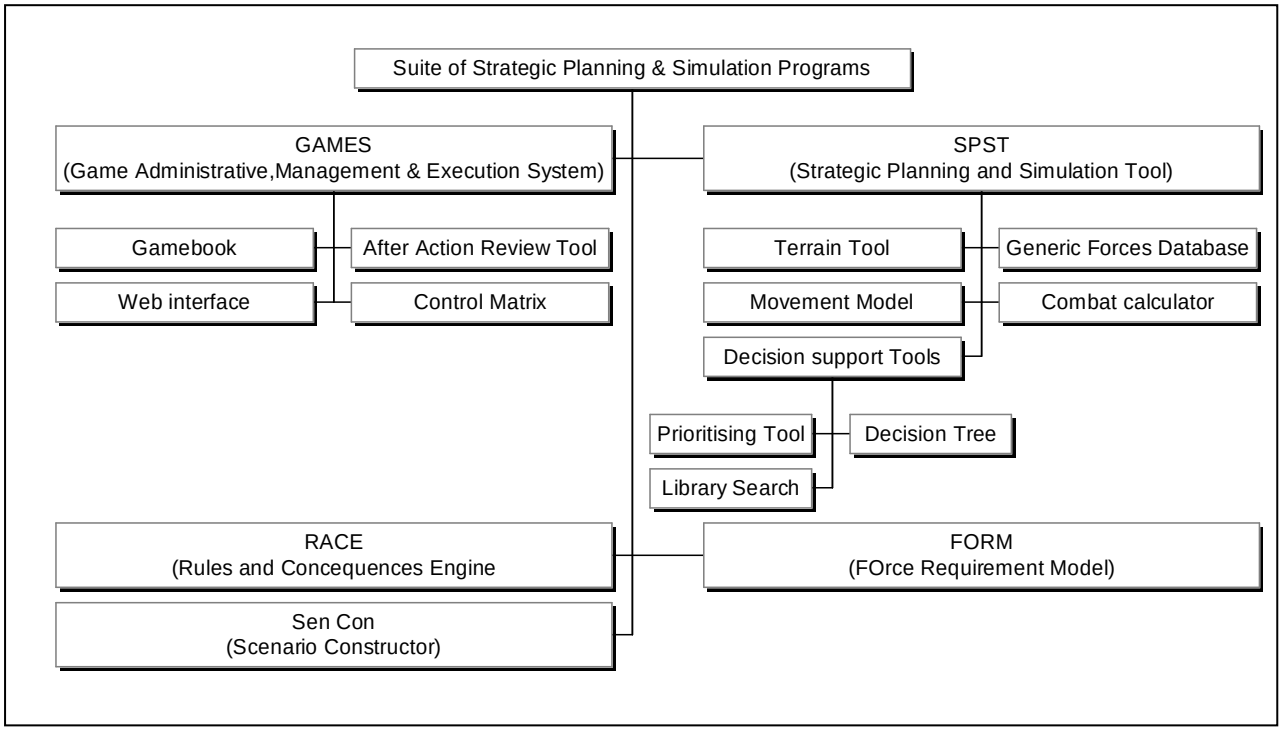
2.3 Computer support for seminar games at the SANDC

In an attempt to improve strategic level gaming at the SANDC, as well as planning activities at the Directorate Military Strategy, the need for computerised support for planning was recognised and accordingly provided. The suite of strategic planning and simulation programs, known as *uKhozi*, was consequently developed *in lieu* of the strategic level wargame (CyberSim 2000). The suite consists of the following five capabilities (See figure 4.3):

(a) Game Administration, Management and Execution System (GAMES). GAMES is a computer front page that allows easy access to all the tools and reference material needed to execute a seminar game or wargame. It has the ability to provide a printed game book, which contains all the rules, timings, logistics and other game related information. It also contains a web interface as well as a control matrix, which can be used to disseminate information to various workstations on specified times, and an AAR tool.

(b) Strategic Planning and Simulation Tool (SPST). The SPST is a military orientated tool that provides the ability to construct and manipulate geographic data (the Terrain Tool) and to maintain a force in a comprehensive database (Generic Forces Database). It can also simulate strategic movement (Movement Model) and calculate the outcome of conflict (Combat Calculator), and it contains three decision support tools for use in strategic planning, namely the Prioritising tool, the Decision Tree tool and the Library Search tool.

Figure 4.3. The suite of strategic planning and simulation programs



(Adapted from CyberSim 2000)

(c) Rules and Consequences Engine (RACE). RACE is a training tool and a 'what if' or contingency evaluator. It uses pre-programmed responses to situations where decisions are needed to show the result of specific decisions.

(d) Force Requirement Model (FORM). FORM is used to determine military strategic capabilities, based on military strategic inputs. It can also be adapted to determine national capabilities, based on national strategic inputs.

(e) Scenario Constructor (SenCon). SenCon uses a systematic process to construct scenarios. It is particularly useful to construct scenarios for seminar gaming.

2.4 Assessment of seminar gaming at the SANDC

As demonstrated by the examples of successful non-South African seminar games, the simplicity of this technique and the powerful results from the interaction of experts in a 'safe' environment make seminar gaming a highly suitable and useful tool for the training of national security practitioners and the planning for national security issues and contingencies. Seminar gaming was, however, not effective as a training tool at the SANDC. This can be ascribed to various reasons. Amongst others, since it was ordered from outside the College, there was a lack of commitment to seminar gaming and the

seminar game was not effectively integrated into the curriculum of the ENSP. In addition, the lack of a gaming culture in the SANDF and the SANDC, as well as the lack of seminar gaming expertise, compromised the effective use of this training tool. However, the lack of a specific scenario, directed by the training objectives, was the most important factor that contributed to the lack of success and the eventual demise of gaming as a training tool at the SANDC. This limitation was reinforced by the lack of specific information, of a stimulating story, of effective and credible role-playing and of specific objectives. Collectively, these factors contributed to a lack of interest and participation. Therefore, in order to present an effective seminar game at the SANDC, the following must be assured:

(a) Confidence in the advantages of an experiential training event such as seminar gaming. The present ELOs of the ENSP should focus on the ability to think holistically and to analyse national strategic issues. As the programme consists primarily of the transfer of information by means of lectures, enhanced by group discussions and assignments, seminar games is an excellent tool to inculcate strategic thinking skills and to improve on the current method of instruction. Seminar gaming also provides the opportunity to practice interdepartmental cooperation, to hone negotiation skills and to improve knowledge of the processes and role-players in the national security environment. Having foreign members present on the programme grants the opportunity to learn from other countries and national security experiences while engaging in the seminar game.

(b) Sufficient time. Confidence in the advantages of seminar gaming will also ensure the allocation of sufficient time for the efficient and effective execution of a seminar game.

(c) A well-defined aim. A seminar game should be directed by a central issue or situation, somewhere in the future. This ensures that the participants detach themselves from current issues. The situation should also be relevant to the members on the ENSP, as well as to the curriculum themes dealt with in the programme itself in order to ensure continued interest and a willingness to participate.

(d) A well-researched and complete scenario. Kahan (2004: 6) contends that future scenarios must be logical, consistent as well as plausible and must contain sufficient detail so that players can imagine themselves in it. Therefore, since they are exposed to a myriad of information and related assignments on the ENSP, the members could lose interest in seminar games based on incomplete and implausible scenarios. Success is

dependent on a well-researched and complete scenario that will sustain interest and participation.

3. CONFLICT GAMING AND THE US ARMY WAR COLLEGE

3.1 Simulation and gaming in the US Army

To appreciate the USAWC and its SCE, the "nation's preeminent simulation" (US DoD 1996b), it is important to determine the position of the US DoD, specifically the US Army, with regard to simulation and gaming. The history of wargaming in the US Army, which lead to the present position, started in 1879, a mere 55 years after the first Reisswitz wargame, when Army Major James Livermore added logistics and the quantification of fatigue to the wargame. By 1887, it was firmly established as part of the curriculum at the US Naval War College. The advent of computers, although they were initially large and cumbersome, led to two major developments, namely an increase in computational speed and the ability to join computers in a network which benefited simulation and gaming (Little 2006 1-1). Since the 1990s, being able to integrate live, virtual and constructive simulations, simulation has become an indispensable training methodology. Accordingly, the US Army wrote a modeling and simulation master plan, proclaiming that modeling and simulation must be used to enhance readiness, joint training, training for the complete spectrum of military operations and the assessment of war fighting situations, as well as for the development and evaluation of operational plans, doctrines and tactics (US DoD 1995: 2-3). Compliance with this master plan and the present importance attached to modeling and simulation in the US Army were confirmed by members of the RSA DOD, based on their experiences at the Interservice/Industry Training, Simulation and Education Conference in Orlando, Florida (Thompson & Van Schalkwyk 2006).

3.2 Conflict gaming at the USAWC

The USAWC was established in 1951 in Carlisle Barracks, Pennsylvania. Its current mission is to prepare selected military, civilian and international leaders to assume strategic leadership responsibilities; to educate leaders on the deployment of land power in a joint and combined environment; and to do research and publish on national security and military strategy (US DoA, 2006a). To achieve this mission, the USAWC presents, amongst others, a resident education programme (US DoA 2006b). This programme is presented over a period of 190 academic days and includes six core courses, a strategic research project, the National Strategic Seminar and the SCE (*Strategic Crisis Exercise).* National security strategy and policy, as well as military strategy, are taught in the core

courses. As adherence to requirements set by the USAWC results in the awarding of a Master's degree, the academic content and standard of the program is exemplary.

With conflict gaming being an integral part of all USAWC curricula, a Department of War Gaming (DWG) was established in 1981. In 1983, due to the expansion of its wargaming activities, the DWG reorganised and became the Center for Land Warfare (CLW). Because of further expansion of the wargaming capability and to indicate the core business of the CLW more prominently, the CLW was renamed the Center for Strategic Wargaming (CSW). The year 1991 saw a further review of the activities of the CSW and, based on the US Army's requirement for "the high-level study of land power", the mandate of the CSW was expanded. This new role was assumed in 1992 under the name of the Center for Strategic Leadership (CSL). The CSL, as a department of the USAWC and situated in a facility known as Collins Hall, provides SimEvents, seminars, workshops and conferences on strategic issues to the USAWC, to the Department of the Army, to the Commanders in Chief and to national and international areas where support is required. In terms of the SimEvents, the CSL uses information-age technology and provides strategic level political-military simulations for USAWC students, Army staff exercises, strategic research, as well as joint and theatre level exercises.

3.2.1 The Strategic Crisis Exercise

This general description of the SCE comprises a summary of information (based on various sources) from 10 exercises. The general aim of the SCE is to enhance strategic thinking skills by allowing the student to integrate and apply acquired knowledge by means of "an experiential learning event" (US DoD 2006). However, although it is a teaching game, there are several issues that, for research purposes, are entered into the SCE, for example homeland security (Pasquarett 2002). The Strategic Experiential Education Group (SEEG) makes it clear that such an event is not a command post exercise where the participants are being trained to operate as a commander, but rather an opportunity "to think and make decisions as strategic leaders" (US DOD 2006). Students of the resident education program participate in the SCE, executed at the CSL, Collins Hall, by engaging in crisis planning and execution on the national and theatre strategic levels, as well as on the operational level. The SCE is a turn-based, script-driven and computer-aided exercise, utilising a number of exercise tools and simulations, to execute the prescribed strategic processes and to produce directives and plans.

The SCE was executed for the first time in 1995 as a politico-military exercise, of ten days duration. The planning and execution of two major regional contingencies and approximately eight lesser simultaneous contingencies are done according to the framework set by the Joint Crisis Planning Process (Chilcoat & Magee 1996). Approximately 350 students are the players, acting as the US NSC, Departments of State, Defence, etc, as well as commanders and staff in departmental and theatre level positions. They are supported by 200 to 300 faculty members and outside participants, mostly subject matter experts. Role-players act as the UN, NATO and the US Congress. Since 2002, homeland security scenarios became an integral part of the SCE with players representing the Office of Homeland Security and related structures. In SCE 2006 a combination of live, virtual and constructive technologies were used. Live simulation was by means of 'live' negotiations, press briefings and AARs; virtual simulation entailed, amongst others, congressional testimonies and mapping; while constructive simulation included several software applications that provided simulated reactions.

3.2.2 Conducting the SCE

As with the seminar game, the SCE is also conducted in a process containing the same three phases as previously discussed, namely the planning and preparation phase, the execution phase and the post-exercise analysis phase. The players are divided into three different groups. They all start with the same scenario and develop their own 'world'. Playing for ten days and simulating 230 virtual days, each 'world' reacts to results and a developing scenario, unique unto itself. The SCE is normally conducted as follow:

(a) Planning and preparation phase. The exercise entails, amongst others, eleven different scenarios, based on a 'World Summary' describing the global situation ten years into the future. The summary is a plausible depiction of a possible future, but contains deliberate distortions to enhance the attainment of training objectives. The first chapter of the 'World Summary' contains global trends from the present up to ten years in the future, followed by a detailed description of a possible future per region. The regions include the US, North, Central and South America, Asia Pacific, Southeast, South and Central Asia, Oceania, Eurasia North and Sub-Sahara Africa (US DoD 1999b).

Another document, also prepared during this phase, is the 'Exercise Directives'. This document contains all administrative and game arrangements necessary for an effective game, including the gaming objectives, student roles and responsibilities, memoranda to direct the exercise, the Crisis Action Planning Process, a description of available software and security arrangements. Collins Hall is also equipped for the coming event by the

preparation of the computer network and related capabilities, the video conferencing facility, hospitality services and the security system. Although not reported as such, the preparation of these documents and facilities require prior research, preparation, reconnaissance and dedication several months in advance of the exercise.

(b) Execution phase. As previously indicated, the SCE is executed over a period of ten days. Before the start of each SimEvent, the participants are issued with access cards and allocated their 'offices' based on the 'world' they serve in and their appointments, as indicated in the 'Exercise Directives'. The ensuing days are spent executing the turns of the SimEvent. Each day starts by receiving the simulated results of the activities of the previous turn, as well as additional events by means of a scenario, captured in a Master Scenario List (MSEL).

The rest of the day is spent reacting to the events in keeping with the Joint Crisis Planning Process. During the planning phases, additional activities are also initiated by means of injections from Excon. These injections sets off events, for example press conferences and testimonies before 'congressional committees'. Role-players, acting as, amongst others, the President of the US, enhance the realism of the experiential learning event. On each day, at 15:00, the results of planning are submitted in the form of a directive. A daily AAR concludes the planning phase of the turn. Members of Excon, observer/controllers and role-players conclude the turn by executing the simulation phase of the event. Upon the conclusion of the last turn, all members participate in an AAR, executed in accordance with the prescribes of US Field Manual, FM 7-0 (US DoD 2002: 6-4).

(c) Post-exercise analysis phase. Given the feedback and inputs from participants and additional and/or redundant requirements from the programme, the SCE is adapted for the next SimEvent.

3.3 Computer support for conflict games at the USAWC

The success of the SCE can be partially attributed to the computer support provided by the CSL. Apart from the complete computer network, which is available throughout the centre, and the Microsoft Office suite including the Outlook e-mailing program, several utility programs are also provided. These software programs have been developed by the Operations Research Group of the CSL and include an Integrated Database (IDB); as well as a force manager and force viewer, which provide information on US and selected foreign military forces; the Mover tool that allows Excon to manipulate information on

military forces; and the Joint Integrated Contingency Model (JICM) link, which is used to read JICM results. JICM is the 'wargame' that provides the combat results. The Strategic Wargaming Automated MSEL Injector (SWAMI) is used to develop, edit and inject scenarios into strategic level games, for example the SCE (US DoD 2007).

3.4 Assessment of conflict gaming at the USAWC

The resolve of the US DoD, USAWC and the CSL, to train and plan with simulations, such as the SCE, clearly shows how serious the US DoD is about training with simulation. The SCE is but one of numerous wargames executed by the US Army and other arms of service of the US defence network. In this context, the constant reminders from the USAWC and specifically the CSL, that the SCE is a 'capstone' event, is a clear indication of the pride that is taken in and effort that is made to ensure the success thereof.

The layout and the management of the SCE show that the exercise is a classic strategic level turn-based wargame, which could easily become monotonous. However, the specially developed planning tools and the injections, which require live simulation, prevent the players from merely methodically executing a strategic planning process. The advantages of the SCE as an important part of the resident education programme are the following:

Although the primary objectives of the SCE are training, adding research elements to the exercise not only guarantees the optimal use of resources, knowledge and expertise during the event, but also contributes to the high profile of the exercise. Evaluating and commenting on the recommendations made on these research issues and the implementation of some of the proposals contribute even more to the esteem of this exercise.

4. CONCLUSION

In this chapter the concepts of seminar gaming and conflict gaming were discussed at length.

With regard to the seminar game, the participants, the scenario and the tasking of players were described and demonstrated by means of the seminar game conducted at the SANDC. Computer support tools, which aid the process of seminar gaming were also indicated and explained. Throughout the discussion, based on several examples of

successful seminar games, it is clear that the simplicity of a seminar game and the powerful results from the interaction of experts in a 'safe' environment makes seminar gaming a highly suitable and useful tool for the planning of national security issues and the training of national security practitioners in strategic planning, policy formulation and decision-making. It was, however, not particularly successful as a training tool at the SANDC. As indicated above, several factors, for example the lack of commitment and incomplete scenarios contributed to the lack of success. Seminar gaming, nevertheless, remains a proven and well-suited experiential training methodology for a sub-discipline and field of specialisation as complicated and diverse as national security.

Conflict gaming, as executed in the form of the internationally known Strategic Crisis Exercise (SCE) was subsequently analysed. The analysis of the use of simulation in the US DoD and specifically the USAWC, indicated a remarkable determination in the US military to utilise simulation on all levels and for various purposes. Contrary to the seminar game at the SANDC, this SCE is an integrated part of the curriculum of the resident education program of the SANWC and presented as a text book example of a conflict game. The venue, well-prepared arrangements and publicity afforded to the SCE provide clear indication of the commitment of the CSL to make the SCE truly the 'capstone' of all exercises.

After analysing and evaluating the two exercises, it can be concluded that the success of exercises of this nature lies in commitment, the integration of the exercise in the curriculum of the relevant programme or course, simulation and gaming expertise, a well-researched and prepared scenario and an organisational culture that favours the use of simulation and gaming. If these prerequisites are met, simulation and gaming not only becomes a viable, but essential national security training and planning tool.

CHAPTER 5

EVALUATION

It was the aim of this study to provide a critical analysis of the use of simulation and gaming for the training of national security practitioners and the application thereof as a planning and decision support tool in respect of national security. The aim of the study generated the research question, namely: *Can strategic level simulation and gaming be used to improve the quality of national security training and planning?* In view of the complexity of the strategic level pertaining to the simulation and gaming of the parameters on that level, as well as the diverse approaches to national security, two sub-questions were formulated. The first sub-question was: *Which simulation and gaming practices are used on the national strategic level?* The second sub-question pertains to the case study evaluation, namely: *How effective is the use of simulation and gaming practices on the national strategic level for training, as well as planning and decision support?* These questions were all conceptually demarcated with reference to the concepts of models, simulations and games, strategy and national security, as well as the concept of training and the concept of planning and decision support. The study was restricted to the national strategic level and dealt with examples from a variety of countries, although the illustrative case studies were confined to the US and SA.

As a point of departure, selective theoretical perspectives with regard to strategy, national security and simulation and gaming were provided. Strategy was the first concept to be defined and, in terms of national security, was described as the ways of distributing and applying the national means necessary to fulfill the ends of security policy. Given the strategic levels of the case studies, three levels of strategy, namely the theatre strategic level, military strategic level and national strategic level were explained. Although the SANDF does not acknowledge the theatre strategic level, it was included to provide the background for US examples and case studies. By understanding the levels of strategy, the national strategic level was set as the frame of reference in terms of level for the next concept that was discussed, namely national security. A discussion on the different schools of thought on security, namely the classical school, the modern Western school, the Third World school and the African school provided the background to the reflection on national security and the elements of national power. Following the analysis of the traditional approach and the human-centric approach to national security, the concept of national security was defined as the freedom of the state from all threats. Within the ends-

ways-means strategic paradigm, the elements of power were seen as the conceptual means of the state to ensure its national security. Within the instruments of national power, there exist capabilities, which are applied to implement the instruments of power. The elements of power constitute the national strategic 'ways' applied by the state to ensure its national security and also provide the parameters of models which are used to simulate national security on the national strategic level. In preparation for the assessment of simulation, the needs of the national security practitioner, as well as the planning and decision support requirements for national security planners were considered. Given the three roles of the national security practitioner, namely that of a strategic theorist who formulates national security strategies, the strategic leader who coordinates the strategies and the strategic practitioner who applies these strategies, it is evident that national security practitioners need specific skills and competencies. Several examples of training programmes for national security practitioners indicated that the training of these practitioners in the aforesaid skills are normally done in a series of courses and programmes throughout the practitioner's career. The complexity of the national strategic planning and decision-making process, consisting of the assessment of the situation, making decisions on actions to be taken and their priorities, as well as resource allocation, also emphasised the need for scientific support to improve the quality of these national security plans and decisions. OR/decision analysis/decision support, the 'scientific toolbox' which include models, simulations and games, were subsequently discussed.

The analysis and evaluation of the concepts of models, simulations and games provided insight into a methodology that can be utilised to train national security practitioners and to provide planning and decision support. It was found that the relationship between models, simulations and games leads to the existence of SimEvents, which can be applied for strategic level training as well as planning and decision support. This relationship involves, firstly, the interaction of procedural models, representing not only the characteristics of the referents, but also the dynamic relationships between these models. Secondly, when these interactive models, also known as simulations, are given gaming characteristics, a Simevent is created that serves as a practical tool that can be utilised for training, as well as for planning and decision support on all levels of strategy, including the national strategic level.

Two specific SimEvents, namely seminar games and conflict games were identified as specific tools that can be used for the training of national security practitioners and the

support of strategic level national security planning and decision-making activities. The theoretical insight into the fundamentals of these two SimEvents provided a background for the analysis and evaluation of the case studies. Seminar gaming was defined as a qualitative process, using the expertise of a number of people for purposes of understanding or researching a (policy or security) problem or a situation. The seminar game was also shown to adhere to the generic game architecture, although it primarily consists of three components, namely the players, exercise and simulation control, and the simulation engine. Using Prensky's six structural elements, namely the rules, goals and objectives, outcomes and feedback, conflict and competition, interaction and a representation, it was also indicated that a seminar game is a true game. Scenarios were also found to form an integral part of a seminar game. Scenarios create an understanding of the future, facilitate decision-making and stimulate strategic thinking, provided that they are plausible, future orientated, creative, insightful, and consistent and logical. Various examples of seminar games offered further insight into their utility and proving the usefulness of seminar games for training, as well as for planning and decision support. The examples included an investigation into intra-state regionalisation in Portugal, research into Dutch science policy, an exploration of the implications of new information technologies in the UK, studying the effects of biological terrorism in the US, exploring new military technologies for the US Army and solving the problem of Colombian paramilitary demobilisation. Finally, the execution of a seminar game was illustrated, using an imaginary South African scenario.

The fundamentals of conflict gaming, as a form of wargaming, were similarly analysed. As a point of departure, wargaming was defined as a simulation to provide a realistic exercise framework for teaching, practicing and evaluating learners. An examination of the structure thereof indicated that a wargame is merely an adaptation of the generic game. However, two variations exist, namely the multi-level wargame and the one-sided wargame. The wargame, utilising competitive scenarios, was also proven a true game. The analysis of conflict and the simulation of the three levels of strategy provided a definition of conflict gaming, namely wargaming on the national strategic level. Examples of conflict gaming, including a conflict model on social correlates, a serious game on food security, a distributed game between NATO members and a commercial strategy game, provided further insight into this form of gaming and indicated how effective this gaming methodology can be applied for training, planning and decision support. A second imaginary South African scenario provided the background for an illustrative conflict game.

In respect of the case studies, the first case study involved seminar gaming at the SANDC. This case study was introduced by presenting a brief history of simulation and gaming in the SANDF, showing that a commitment to the discipline of simulation and gaming exist, although still immature and frequently changing. Seminar gaming at the SANDC followed the same route; starting with a commercial game, *High Command*, followed by *Embrace Peace* and ending with *Write Strat.* An evaluation of a suite of strategic planning and simulation tools, developed specifically to support strategic level simulation activities, concluded the case study. The analysis and assessment of this case study revealed the reasons for the apparent ineffectiveness of seminar gaming at the SANDC. These reasons included a lack of commitment and of a gaming culture, the lack of time and expertise and the absence of a specific future scenario. Contrary to the SA case study, the US case study, SCE (*Strategic Crisis Exercise)* provided an effective and well-structured SimEvent. A brief history of simulation and gaming in the US Army, showing total commitment thereto, expressed in a modelling and simulation master plan, introduced this case study. The analysis and evaluation of the SCE demonstrated a resolve to present a capstone exercise. The planning and preparation is well executed and done in detail, while the execution of the exercise is done according to a daily schedule, which includes a daily AAR. Computer support for the SCE is developed and produced by the Operations Research team of the CSL. The SCE is executed as a typical turn-based conflict game, kept dynamic in its execution using live simulation to provide some of the injections. The analysis and assessment of this case study indicated the resolve and seriousness of the US DoA with regard to simulation and gaming. Given the aim of the exercise, namely to allow participants to make strategic decisions, it showed that this exercise also addresses the holistic thinking skills, research skills and analytic skills, previously indicated as the skills needed by national security practitioners.

Several issues emanate from the case studies that influence the effective use of strategic level simulation and gaming. In respect of organisational culture and associated commitment, it is obvious that the exposure to simulation influences the approach towards and the use of simulation and gaming. The organisational culture of the US Army has included simulation and gaming since 1887. In the 1990s, the commitment to simulation was re-affirmed by the issuing of several directives, verifying the necessity for simulation in the modern US Army. Despite large ‘combat training centres’ that exist in the US, providing ample opportunity for live training and live simulation, constructive simulation is seen in the US DoD as a cost-effective and supplementary instrument with which to enhance skills and to improve the outcome of live training. The SANDF, on the other

hand, only became involved in simulation twenty years ago during the 1980s. It also drafted directives to ensure the use of simulation and gaming in a national security context for training and planning purposes. Unfortunately, these directives have not been properly resourced, resulting in non-adherence to the prescribes of the directives. The fact that the CDSP had to order the SANDC to host a seminar game, was further proof of the general reluctance to use simulation and gaming as a training tool. Therefore, a departmental policy is urgently needed in the SANDF to instill a simulation and gaming culture. The policy should then be followed by a simulation and gaming strategy and a master plan.

The official status of SimEvents in exercises and programme curricula also influences the simulation and gaming practices of an organisation. For example, both the ENSP, presented at the SANDC and the residential education program (REP) at the USAWC aim to train national security practitioners. In both cases, there are well-defined accredited *curricula*. The difference is, however, that the SCE is an integral part of the REP, whereas the exercise objectives of the ENSP are not completely integrated into the curriculum of this programme. Distinct differences with regard to the execution of the two case studies are consequently noticed. SCE is executed over a period of two weeks. During this period, all participants are dedicated to the execution of the exercise. Unfortunately, that was not the case with ENSP exercises. Given time constraints and other parallel activities, exercise *Embrace Peace*, and later *Write Strat*, were executed over three consecutive afternoons. In view of the low priority of the exercise in the SANDF, it was also a challenge to find suitable role-players. This, unfortunately, contributed to the termination of *Exercise Write Strat*. Total integration of and a commitment to simulation and gaming as an indispensable element of an exercise, training programme, or planning process are essential for the provision of effective SimEvents.

Pertaining to the simulation and gaming expertise, the US DoD has established capabilities and experts of which the CSL, with its own inherent Operations Research capability, is but one example. The ConSim is the only simulation capability in the SANDF that is able to present seminar gaming and conflict gaming, supported by the only company in SA that develops constructive simulation. With a capability and industry so small, expertise is also limited. With a handful of officers and non-commissioned officers involved in simulation and gaming, there is little incentive for other members of the RSA DOD or the industry to develop and to become proficient in this field. However, in order to provide an improved simulation and gaming service to the RSA DOD, funds and

opportunity will have to be provided to develop and maintain expertise both inside and outside the RSA DOD.

In respect of the use of proper scenarios, it was found that the use of the present real situation, as with the SANDC exercises, caused a lack of information and the absence of a credible story. The necessity of adhering to the requirements of a scenario, namely plausibility, future orientation, creativity, the provision of insight, logic and consistency, was aptly demonstrated by the success of the SCE and the lack or limited success of the SANDC exercises. The advantages of an interesting and inspiring future scenario would outweigh any sensitivity that might exist in this scenario. Furthermore, should training objectives necessitate, events could be written into an imaginary future scenario, which would not be the case with a real-time current scenario.

It was the aim of this study to provide a critical analysis of the use of simulation and gaming for the training of national security practitioners and the application thereof as a planning and decision support tool in respect of national security. The research question subsequently generated, was: *How successful is the use of simulation and gaming practices on the national strategic level for training, as well as planning and decision support?* This required the analysis and assessment of selective theoretical perspectives with regard to strategy and national security and the evaluation of the concepts of models, simulations and games. This was done to obtain insight into a methodology that could potentially be utilised for training, as well as for planning and decision support; and to acquiring insight into the fundamentals of seminar gaming and conflict gaming. Having obtained the above background, numerous examples and two case studies were analysed, assessed and critically evaluated. This analysis, based on the question, whether or not simulation and gaming can effectively be used for training and planning support, proved that it could indeed be done. However, the determinants of success for the use of simulation and gaming are a simulation-orientated organisational culture, commitment, an integrative approach to simulation and gaming, the availability of expertise and the use of proper future scenarios.

For any organisation to present effective SimEvents on the national strategic level, it is proposed that, based on the above deliberations, further research into the content of simulation and gaming policy, strategy and master plan be undertaken. It is also suggested that simulation and gaming experts, particularly in the field of seminar gaming and conflict gaming, should be trained and given the opportunity to attend successful

SimEvents, such as the SCE. Regarding the presentation of new SimEvents to the ENSP at the SANDC, it is recommended, firstly, that the goals and objectives of such an event are fully integrated into the curriculum of the ENSP, that a total commitment from the SANDC is obtained, and that sufficient time is provided for the presentation of the event. Simultaneously, much needed national security processes and structures should also be drafted and developed.

In conclusion, the study addressed the main research problem, as to whether strategic level simulation and gaming can be used to improve the quality of national security training and planning through a literature study and a case study analysis. The study pointed out that the simulation and gaming practices that are used on the national strategic level entail, primarily, seminar and conflict games. It also concluded that these games are highly effective for training, as well as for planning and decision support on the national strategic level, provided that simulation and gaming is conducted in an organisation where a simulation-orientated organisational culture prevails. In addition, commitment, an integrative approach to simulation and gaming and the availability of expertise further contribute to effective strategic level national security simulation and gaming. Hence, it is concluded that simulation and gaming can effectively and efficiently be used for national security training and planning.

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