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SYSTEMIC OPERATIONAL DESIGN: A VIABLE ALTERNATIVE TO THE CANADIAN FORCES OPERATIONAL PLANNING PROCESS

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ABSTRACT

This paper demonstrates that the theoretical and doctrinal frameworks of CF OPP render it unsuitable as a design and planning tool to address the complexities inherent to those of today's operating environment and that SOD is a viable alternative that merits further research. CF OPP, an analytical decision-model designed to solve linear problems of limited complexity, was conceived to address the linear conventional threat of the Cold War operating environment. CF OPP in its current form, however, is not ideally suited for operational level problems that possess the properties of complexity and adaptivity. SOD, on the other hand, was purposely conceived to address complex problems inherent to the operating environment of the 21st Century. Globalization and technology, international intervention into failed states, and the impending threat of non-state actors are three realities that define the 21st Century operating environment complex. SOD is founded upon the naturalistic decision-making approach, capitalizing on the decision-maker's experience, breadth and depth of knowledge and intuition in the face of complex problems or external pressures. As such, SOD is theoretically well suited to address the complexities inherent in today's operating environment and deserves further attention with a view to improving CF operational design and planning doctrine.

CHAPTER 1 - INTRODUCTION

The Canadian Forces Operational Planning Process manual describes conflict as "a human manifestation conducted under conditions of imperfect knowledge by multiple participants who act concurrently and react specifically against perceptions of the adversary's actions and reactions".[1] In other words, conflict is complex and unpredictable. Despite these complexities, militaries must be prepared to execute its nation's strategic and political goals. However, strategic goals can sometimes be ambiguous and broad, and therefore must somehow be translated into a military campaign design whereby the actions of every soldier are linked to the accomplishment of the nation's goals.[2] The Canadian Forces Operational Planning Process (CF OPP) is the doctrinal planning and operational design process currently employed by the CF to translate strategic political intent into campaign plans in this complex environment.

CF OPP is similar to the operational planning processes of most Western countries. The doctrinal roots of CF OPP stem from Industrial Age analytical decision making models as well as the practical lessons of great military minds, such as Napoleon and Clausewitz, dating back to the 1700s[3]. The current CF OPP was developed during

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[1]Department of National Defence. B-GJ-005-500/FP-000 *Canadian Forces Operational Planning Process* (Ottawa: Department of National Defence, 2008), 1-3.

[2]John Shy, "*Jomini.*" in *Makers of Modern Strategy: From Machiavelli to the Nuclear Age*, ed. Peter Paret, 143-185 (Princeton: Princeton University Press, 1986), 146.

the Cold War era to cope with an operating environment characterized by an adversary's conventional military.[4] Today's complex environment raises the question regarding the suitability of the Cold War based planning process. Recently, a variety of militaries including those of the United States and Israel have acknowledged that this current planning process does not meet the exigencies of the current operating environment. In particular, the impact of 21st Century globalization and technology, the emergence of non-state threats such as al Qaeda, and the security risks imposed on the West by failed nations such as Afghanistan, have created an environment posing challenges to the military commander which are unparalleled in history.

The nature of 21st Century conflict has been a topic of debate across militaries and academic institutions. Is there a requirement to evolve doctrine, specifically the process by which operations are planned, to address the 21st Century operating environment? Equally important, is there a requirement for a paradigm shift regarding the way in which military practitioners think and solve problems? On one hand, Dr. Milan Vego, a professor at the United States Naval War College, argues that the nature of war has not actually changed and that the Western method of campaign planning is still relevant.[5]

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[3]Howard G. Coombs, "Perspectives on Operational Thought", in *The Operational Art: Canadian Perspectives Context and Concepts*, ed. Allan English, 75-95 (Kingston: Canadian Defence Academy Press, 2005), 77.

[4]Stephan Lefebvre and Michel Frontman, "'The Revolution in Military Affairs': Its Implications for Doctrine and Force Development Within the U.S. Army", in *The Operational Art: Developments in the Theories of War*, ed. B.J.C McKercher and Michael A. Hennessy, 173-192 (Westport: Praeger, 1996), 180.

Likewise, former Canadian Forces College student LCol Lessard also supports the notion that CF OPP is an effective tool as long as those using it actually understand the terminology and adhere to the steps as they were intended.[6]

On the other hand, the findings of the *Evaluation of the Maintenance and Currency of CF Doctrine* determined that:

> doctrine development above the tactical level has not kept pace with recent changes to CF command and control architecture and new capabilities introduced through CF Transformation. Coherently communicated and readily accessible military-strategic and joint operational doctrine is a necessary key enabler for interoperability and to achieve integrated operational effects. Remedial action is urgently required to ensure that current deficiencies do not negatively influence the achievement of military objectives.[7]

Likewise, referring to the challenges faced by commanders during both Operation Enduring Freedom in Afghanistan and Operation Iraqi Freedom prior to 2006, Colonel James Greer, former director of the U.S. Army School of Military Studies, argues that "the current operational design construct is often incapable of providing planners and

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[5]Dr. Milan Vego, "Systems versus Classical Approach to Warfare", *Joint Force Quarterly* 52 (1st quarter 2009): 46.

[6]Lieutenant-Colonel Pierre Lessard, "Reuniting Operational Art With Strategy and Policy: A New Model Of Campaign Design for the 21st Century", in *The Operational Art: Canadian Perspectives Context and Concepts*, ed. Allan English, 331-364 (Kingston: Canadian Defence Academy Press, 2005), 335-337.

[7]Department of National Defence, 1258-153 *Evaluation of the Maintenance and Currency of CF Doctrine* (Ottawa: Chief Review Services, 2007); http://www.crs-csex.forces.gc.ca/reports-rapports/2007/115P0738-eng.asp#_Toc166992434; Internet; accessed 22 January 2010.

commanders the means of designing campaigns and major operations full spectrum operations require."[8] Allan English adds that "the current doctrine needs to be refined such that [the current linear method of] operational lines, decisive points and centres of gravity to reflect a systems approach."[9] If CF OPP exhibits deficiencies that restrain commanders from achieving their strategic goals, what is the alternative?

In 2000, the Israeli Defence Force formerly adopted a new operational design tool: Systemic Operational Design (SOD). After a review of its campaigns dating back to the 1973 Arab-Israeli War, the Israeli Defence Force (IDF) acknowledged "an inability to link tactical level achievements with strategic goals" and began to question the utility of their operational planning process.[10] SOD addressed these deficiencies and also addressed the emerging complex environment faced by Israeli commanders in Lebanon and the Israeli occupied territories. Unlike CF OPP, which is considered a linear and reductionist model, SOD in its military application applies general systems theory and complexity theory to operational design.

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[8]Colonel James Greer, "Operational Art for the Objective Force", *Military Review Vol 82 Issue 5* (Sep/Oct 2002): 26.

[9]Allan English, "Operational Art in the Canadian Forces" in *The Operational Art: Canadian Perspectives Context and Concepts*, ed. Allan English, 1-74 (Kingston: Canadian Defence Academy Press, 2005), 29.

[10]Lieutenant-Colonel William T. Sorrells et al, "Systemic Operational Design: An Introduction" (Fort Leavenworth: School of Advanced Military Studies. United States Army Command and General Staff College, 2005), 9.

The emergence of SOD does not sideline CF OPP. Likewise, many of the characteristics of 21st Century warfare as Clausewitz viewed it are also not new: "Violence and political impact were two of the permanent characteristics of war. Another was the free play of human intelligence, will and emotions. These were the forces that dominated the chaos of warfare."[11] What is new, however, is the emerging body of complexity theory and its formal application to military operations.[12] Also new is the requirement for a paradigm shift regarding the way in which military practitioners think and solve problems. SOD provides the commander and planners an alternative method of perceiving a complex military problem.

This paper will demonstrate that the theoretical and doctrinal frameworks of CF OPP render it unsuitable as a planning tool to addresses the complexities inherent to those of today's operating environment and that SOD is a viable alternative for operational level commanders. In order to foster a credible debate, the theoretical framework and the practical elements of CF OPP and SOD will be introduced. CF OPP and SOD will then be analyzed individually followed by a comparative analysis that will make recommendations for further avenues of study.

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[11]Carl von Clausewitz. *On* War, ed. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1989), 11.

[12]Edward Allen Smith, *Complexity, Networking & Effects-Based Approaches to Operations* (Washington, DC: CCRP Publications, 2006), 2.

First, Chapter 2 will introduce the notion of complexity and the evolution of general systems theory to understand how humans frame and characterize challenging problems. Next, the two theoretical decision making models that form the basis of CF OPP (normative) and SOD (naturalistic) will demonstrate how these challenging problems can be addressed. This chapter will demonstrate that military practitioners are not required to master this theory or the mathematics that support it. Rather, they "need to explore the fundamental nature of complexity, understand its potential impact and how military forces operate, and figure out how best to bound it so as to exploit it."[13]

Having an understanding of general systems theory and the two decision-making models, Chapter 3 will demonstrate that the 21st Century operating environment facing the CF possesses the properties and characteristics of a complex adaptive system. First, to fully appreciate the unique responsibilities and challenges faced by commanders at the operational level, it is necessary to summarize the roles of all three hierarchical doctrinal levels of conflict: strategic, operational and tactical. Next, this chapter will examine how globalization and technology, the emergence of non-state threats, and the security risks inherent to failed nations have created a complex operating environment for military commanders. This synopsis will conclude that operational level commanders are faced with an operating environment that is indeed a complex adaptive system. This notion will frame the analysis of CF OPP and SOD in the subsequent chapters.

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[13]Smith, *Complexity…*, 4.

Chapter 4 will examine the operational planning process currently employed by the CF to address the operational level complexities introduced in the previous chapter. The first section will examine the genesis of operational design and the role of CF OPP. The iterative steps will then be introduced in sequence. Last, this chapter will draw from the theoretical model and practical examples to demonstrate three deficiencies of CF OPP at the operational level: the notion of the centre of gravity, linearity and inefficiency.

Once CF OPP has been analyzed within the context of the current operating environment, Chapter 5 will introduce SOD. Using the same methodology as the previous chapter, the genesis of SOD will be introduced first. The iterative steps will then be examined to highlight SOD's flexibility and its ability to capitalize on commander's intuition. Last, this chapter will draw from the theoretical models and, in this case, limited practical examples to demonstrate how SOD actually addresses the deficiencies of CF OPP in today's operating environment.

Finally, Chapter 6 will provide a comparative analysis of CF OPP and SOD. Understanding that SOD is relatively new outside of Israel, Western nations have very little first-hand experiences from which to draw.[14] Therefore, this chapter will make specific recommendations on the employment of SOD in conjunction with CF OPP. Last, this chapter will conclude by providing recommendations on further areas of study beyond the scope of this paper with the aim of improving CF operational planning.

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[14]Matthew Lauder, "Systemic Operational Design: Freeing Operational Planning from the Shackles of Linearity", *Canadian Military Journal* Vol 9, no. 4, (2009): 41.

CHAPTER 2 – THEORETICAL FRAMEWORK

Introduction

Doctrine is defined as the "fundamental principles by which military forces guide their actions in support of objectives. It is authoritative but requires judgment in application."[15] CF OPP is a product of CF doctrine. Although deeply rooted in the theoretical framework of operational art tracing back to Clausewitz and Jomini, the CF, like most NATO countries, developed their current war fighting doctrine and organizations during the Cold War.[16] These developments were legitimate efforts to address the complex problems of a unique type of conflict: conventional militaries of enemy nations.[17] Ironically, war between nations has been the rarest form of conflict in which NATO engaged since its conception.[18] As such, the rapid pace of change of the conduct of military operations to address failed states, insurgencies and non-state threats

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[15]Department of National Defence, A-AE-025-000/FP-001 *Canadian Forces Doctrine Development* (Ottawa: Department of National Defence, 2003), 1-3.

[16]William MacAndrew, "Operational Art and the Canadian Army's Way of War", in *The Operational Art: Developments in the Theories of War*, ed. B.J.C McKercher and Michael A. Hennessy, 87-102 (Westport: Praeger, 1996), 97-98.

[17]Lieutenant-Colonel C.L. Dalton, "Systemic Operational Design: Epistemological Bumpf or the Way Ahead for Operational Design?" (Fort Leavenworth: United States Army Command and General Staff College, 2006), 7.

[18]United States, Department of Defence, TRADOC Pamphlet 525-5-500, Version 1.0, *Commander's Appreciation and Campaign Design* (Washington: Department of the Army, 2008), 6.

have challenged existing planning doctrine.[19] However, before discussing the impact of the current operating environment on the CF OPP, the theoretical framework of military decision making will be explored. What then are the theoretical foundations on which the CF OPP was based?

In order to foster a credible debate on the benefits and limitations of the CF OPP and the SOD in the following chapters, the theoretical framework of both must be established. Military practitioners are not required to master this theory or the mathematics that support it. Rather, they "need to explore the fundamental nature of complexity, understand its potential impact and how military forces operate, and figure out how best to bound it so as to exploit it."[20]

This chapter will provide that theoretical framework. First, general systems theory will be introduced. An understanding of general systems theory will permit further detailed exploration into the theory of complex adaptive systems. The theory of complex adaptive systems is the conceptual model to which this paper will refer in order to rationalize the complexities of the 21st century operations environment in the following chapters. Next, the two different theoretical decision-making approaches that are deeply rooted in CF OPP and SOD will be examined; specifically the normative and naturalist approaches.

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[19]Department of Defence, *Evaluation of the Maintenance…*, n.d.

[20]Smith, *Complexity…*, 4.

General Systems Theory

> "If we are to figure out how to plan, execute, and assess… operations and how to exploit their non-linearity, we must start by understanding what complexity and non-linearity are and what role they must play in military operations.[21]

Modern science evolved out of the developments of 19th Century classical physics. This era was characterized by Newtonian mechanistic efficiency and the scientific view that everything in the world, animate or inanimate, could be understood by viewing the individual components in isolation.[22] In other words, a structure's properties were merely the sum of the individual components. Concurrent across all fields of science, yet in isolation of each other, there was skepticism surrounding the ability of this prevailing analytical scientific approach to address the complexities of modern society and technology.[23] For example, classical physics did not address notions like those of "wholeness, growth, differentiation, hierarchical order, dominance, control and competition."[24] Furthermore, the Newtonian analytical approach did not address the relationships between the individual components of a structure.

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[21]Smith, *Complexity*..., 1.

[22]John F. Schmitt, "Command and (Out of) Control: The Military Implications of Complexity Theory", in *Complexity, Global Politics and National Security*, ed. David S. Alberts and Thomas J. Czerwinski, 219-248 (Washington, DC: National Defence University 1997), 223.

[23]Shimon Naveh, *In Pursuit of Military Excellence, The Evolution of Operational Theory* (London: Frank Cass, 1997), 4.

[24]Ludwig von Bertalanffy, *General Systems Theory: Foundations, Developments, Applications* (New York: George Braziller, 1980), 37.

These notions are all characteristics of organization, be they of a living organism or a society.[25] Given the reality of the complexities inherent to such structures, the Newtonian approach was not effective in identifying and addressing them. A new approach was required and the theory of systems began to influence contemporary thinking. General systems theory was developed by Hungarian scientist Ludwig von Bertalanffy in the 1940s after recognizing the need to analyze "wholeness", or the behaviour of organizations.

> It is necessary to study not only parts and processes in isolation, but also to solve the decisive problems found in the organization and order unifying them, resulting from dynamic interaction of parts, and making the behaviour of parts different when studied in isolation or within the whole.[26]

By identifying the laws and rationale that govern a system, Bertalanffy's theory provides a universal framework for understanding systems, and the perceptual tools for their definition.[27] Before any further analysis of general systems theory can occur, it is important to understand the key characteristics that define a system.

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[25]Bertalanffy, *General Systems Theory*, 47.

[26]Ibid., 31.

[27]Naveh, *In Pursuit of Military Excellence,* 3.

Defining a System

A system is defined as "a functionally related group of elements forming a complex whole".[28] The level of complexity is measured in two different ways in order to frame the system: its structural complexity and its interactive complexity. A system's structural complexity is based on the number of components within the system[29]. The more individual components within the system, the greater the structural complexity. However, a more structurally complex system is not necessarily more challenging or unpredictable. A system's interactive complexity measures this level of predictability by referring to the amount of interaction of the individual components[30]. The more freedom of interaction between these individual components, the greater the interactive complexity. For example, a watch is a complex system of numerous intricate moving parts. However, a watch is not an interactively complex system because the behaviour of the individual parts, and the watch as a whole system, is predictable. In this case, the watch demonstrates properties of linearity.

What are the attributes that make a system linear? A system is considered linear if it meets three criteria. First, similar inputs produce similar proportionate outputs. Second, the cause and effect linkages are replicable under different conditions and with

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[28]Bertalanffy, *General Systems Theory*, 47.

[29]Schmitt, "Command…", 234.

[30]Ibid., 234.

different actors.[31] For example, pushing the watch's lamp button will always turn on the watch lamp. Furthermore, no matter how often the lamp button is pushed, and regardless of who is pushing the button, there is no chance that another function, like the watch alarm for example, will be engaged. The last attribute that characterizes a system as linear is that the effects of the individual parts combine such that the whole simply equals the sum of the parts.[32] Based on these three attributes, the behaviour of a linear system can be understood by simply taking it apart, isolating and studying the individual components.

A structure that is both structurally and interactively complex does not behave linearly and therefore, the outcomes are more unpredictable. If the same watch behaved as a complex interactive structure, the following characteristics would be observed. First, similar inputs would not produce similar outputs. Pushing the lamp button may result in bright illumination in one instance but poor illumination in another. Second, pressing a particular button may not have the same result each time. In this case, the lamp button may cause the alarm to signal. Press the lamp button again and the stop watch may start. Unlike the linear system, an interactively complex structure must be looked at from a systemic approach because analysis of its components in isolation does not take into to account the dynamics between the components.[33] Having acknowledged the fundamental

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[31]United States, Department of Defence, *Commander's Appreciation and Campaign Design,* 8.

[32]Ibid., 8.

differences between linear and complex systems, the next section will now build on the principle of complexity and introduce the theory of complex adaptive systems.

Complex Adaptive Systems (CAS)

Suitably named, a CAS is one whose component parts interact with sufficient intricacy that they cannot be predicted by standard linear equations: "so many variables are at work in the system that its overall behaviour can only be understood as an emergent consequence of the holistic sum of all the myriad behaviours embedded within".[34] A CAS not only possesses all of the properties of a complex interactive system, it also learns and adapts to its surrounding environment in unpredictable ways. This Darwinian characteristic is prominent in social or biological systems; for any system to survive, it must be able to deal with the changing physical environment in which it finds itself.[35] Living systems epitomize CAS and scientists, not to mention military practitioners, are coming to recognize that the world is not orderly or linear.[36]

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[33]Schmitt, "Command…", 235.

[34]Russ Marion. *The Edge of Organization* (Thousand Oakes, CA: Sage Publications, 1999), 26.

[35]Smith, "Complexity: The Promise and the Problems", 9.

[36]Schmitt, "Command…", 228.

Marion refers to Chris Langston's concept of complexity, depicted in Figure 2.1. According to Langston, the large structure at the top of the figure emerges as a result of the interactions of the smaller individual units, depicted in this diagram as small circles.[37]

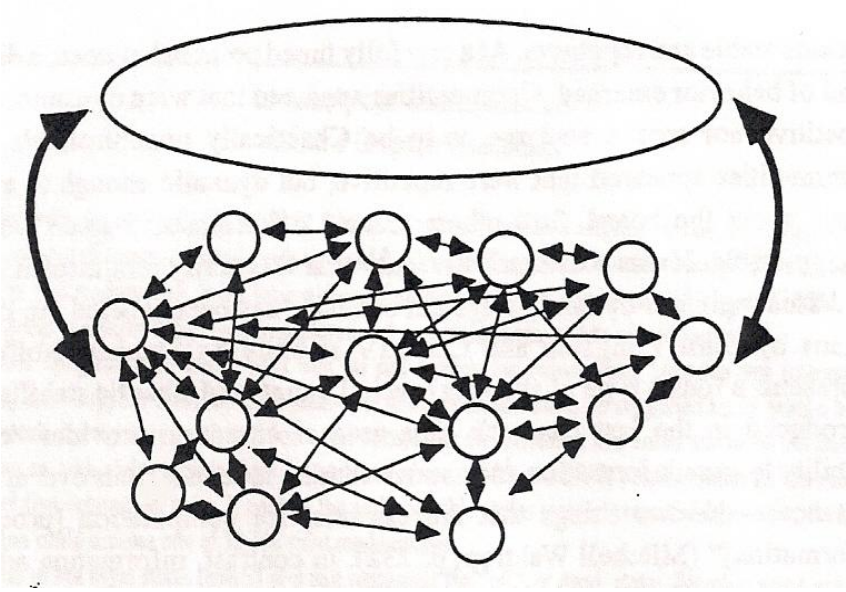

Figure 2.1: Concept of Complexity
Source: Marion. *The Edge of Organization*, 28.

These individual units do not necessarily have an understanding of the large structure above them; they are merely driven by local rules and reactive to local influences around them. Control is dispersed throughout the individual parts but not necessarily equally distributed. Some actors are more important than others, but none are fully in control of the outcome. As such, Langston notes that their behaviour is based on "projections (however imperfect or primitive) of future outcome, thus they are adaptive in a teleological sense. They interact in some fashion, be it through language, hormones or

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[37]Marion, *The Edge of Organization*, 26.

simple reaction to the presence of another."[38] Based on Bertalanffy's principles, a CAS emerges.

This system does not necessarily emerge out of necessity. The system may simply emerge as a result of the dynamics of the individual components and the relationships with their surroundings. These components do not know that they are supposed to behave in a manner that facilitates the creation of the system.[39] As Marion summarizes, "it may, and very often does, just happen."[40] What is clear though is that the whole system is larger than the sum of the parts. Referring back to Figure 2.1, the whole system at the top has that understanding of the big picture that is lacking within the individual components. Furthermore, the system has a feed back loop mechanism which permits learning and adaptation; this notion further complicates one's ability to understand the system let alone predict future behaviours or outcomes. Bertalanffy believes that this emergent system "violates the second law of thermodynamics by growing and becoming stronger rather than dissipating… it can maintain its integrity in the face of perturbation."[41] Langston uses the arrows from the system back to the individual units to depict how the system exerts this influence on the individual components in order to ensure its survival.

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[38]Marion, *The Edge of Organization*, 26.

[39]Schmitt, "Command…", 223.

[40]Marion, *The Edge of Organization*, 26.

[41]Bertalanffy, *General Systems Theory*, 35.

Living Systems Model and The System of Complex Adaptive Systems

Langston's model depicts a single complex adaptive system in isolation. James Grier Miller builds on this basic notion by explaining how complex adaptive systems interact, by considering a CAS as a system of systems. Miller developed this model and it consists of the eight levels of living systems depicted in Figure 2.2.

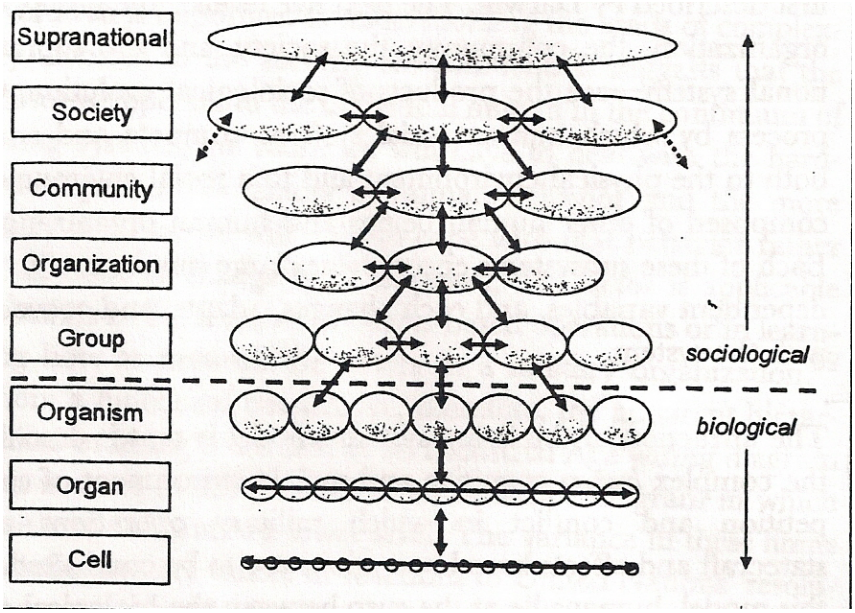

Figure 2.2: Living Systems Model
Source: Smith, *Complexity…,* 47.

Despite the layout of the model, it is not meant to depict hierarchical control from one level to another. Each of the levels possesses interdependent variables and deals with varying degrees of interaction. As such, each of the sub-systems at various levels adapts and changes through continual interaction within its environment. An increasingly complex system emerges out of the systems from the lower level. One level does not

exert any form of control over the lower level. Miller points out that "it is a hierarchy of complexity with each successive level representing an aggregation of the complexity of all of the lower levels plus the additional complexity at that level."[42] Human beings, the interaction between human beings and the organizations which are created by human beings possess the properties of a complex adaptive system. In no way do they display the properties of a linear model.

This paper has already determined that systems emerge out of the dynamic interactions of its sub-components and the surrounding environment. Referring back to the lowest sociological level in Figure 1.2, it is important to understand how and why humans form groups. This may seem far from the issue of operational design or CF OPP but this phenomenon is the lynch pin to understanding the significance of complexity and how it would apply to the military planning process.

First, people are socialized to behave a certain way.[43] For example, students are taught communication skills at a very young age to sit at their desks and be quiet when the teacher enters the classroom. A student must first raise his or her hand in order to communicate with the class in an orderly fashion. Any behaviour contradictory to this would receive corrective action by the teacher. Socialization occurs in all cultures and

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[42]Smith, *Complexity…*, 9.

[43]Discussion with Dr. Eric Ouellet, Canadian Forces College, 23 March 2010.

what may be considered acceptable behaviour in one culture may not be acceptable in another.

As such, human social behaviour is catalyzed by ideas, beliefs and symbols. Humans assign meaning to things that have no physical substance. Russ provides a variety of examples: humans establish families out of love, tribes may form out of similar cultures, a shared belief may foster group action or drive a group into mass hysteria, militaries are created due to perceived threats to the nation's security, and humans join academic groups to share ideas. These mental constructs catalyze humans to create complex webs, alliances or social structures.[44]

Regardless of the motivations that catalyze humans to create these webs or groups, it is important to understand that these interactions are localized, or independent of each other. Referring back to Figure 1.2, these localized interactions then create groups of complex adaptive systems. Organizations emerge from the interactions between groups, each more complex than the levels below them. Smith summarizes the importance of such a model:

> It suggests that the closer we operate to the individual human in the continuum of living systems, the more we will have to deal with the hardwired primordial factors in human behaviour rather than hope to change it… From a functioning perspective, therefore, the apparent hierarchical ordering is not that of an

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[44]Marion, *The Edge of Organization,* 33.

> industrial age wiring diagram but is more in the manner of an influence diagram in which one level influences another.[45]

Based on the characteristics and the inherent unpredictability of such a complex adaptive system, it would appear impossible to solve a system's problems at first glance. However, a system's problems, according to Bertalanffy, are problems of interrelation of a great number of variables, which occur in the fields of politics, economics, industry, commerce and the military art.[46] In fact, through a combination of intuition and learned behaviour, humans already know how to deal with complexities simply by being inhabitants of a social environment.[47] For example, humans know how to deal with the complexities of small groups, such as one's sports team or family. Humans know how to function as part of an organization and as citizens of their country. Therefore, there is no linear mechanistic procedure to turn to for such a problem, nor is there a need. General systems theory implies that understanding human characteristics and human organizations is the key to defining and solving problems within society. Having introduced the two differing theoretical models used to frame problems, the next section will introduce the decision-making models designed to address them.

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[45]Smith, "Complexity: The Promise and the Problems", 17.

[46]Naveh, *In Pursuit of Military Excellence*, 4.

[47]Smith, "Complexity: The Promise and the Problems", 17.

Decision-Making Approaches

Normative Decision-Making Process

According to Matthew Lauder of Defence Research and Development Canada, there are two main approaches to decision-making: the normative approach and the naturalistic approach.[48] Both approaches are currently employed in all facets of CF operations and a fault line between the more suitable approach to military operations already exists.[49] This notion will be addressed in subsequent chapters once the two decision-making approaches have been introduced.

First, the normative is a formalized linear process, known otherwise as a rational or an analytical approach. This approach is a direct reflection of the Western world's Newtonian desire to reduce a linear system down into its primary components in order to understand it. Janis and Mann developed a popular model for rational decision-making using the normative approach:

> -canvass a wide range of options.
> -survey a full range of objectives.
> -carefully weigh the costs, risks and benefits of each option.
> -assimilate new information.
> -reexamine the positive and negative consequences of each option.
> -carefully plan to include contingencies if various risks occur.[50]

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[48]Lauder, "Systemic Operational Design…", 42.

[49]Discussion with Dr. Eric Ouellet, Canadian Forces College, 23 March 2010.

CF OPP was modeled after this method. Although the concept and detailed steps of CF OPP will be introduced and analyzed in Chapter 3, it is important to note its theoretical roots. CF OPP possesses the same normative approach found in the steps developed by Janus and Mann. Such a method can be very effective when dealing with structural complexity and when sufficient time is available to conduct such a process. It is thorough and will likely result in a reliable decision. It is interesting to note that Klein insists that "this process is more helpful for beginners than for experienced decision-makers." [51]

However, rational thinking has its limits in the social sciences and the human domain. By imposing rational thinking methodology onto an overtly complex problem, there is a risk of devising a solution to a problem that was never properly defined in the first place. Second, there is also a risk that the decision-maker will sub-consciously distort the problem to make it fit into the rational decision-making template.

Naturalistic Decision-Making Process

The other approach to decision–making is the naturalistic approach. The Recognition-Primed Decision (RPD) model is an example of the naturalistic approach. RDP focuses on the way the decision-maker assesses the situation and judges it familiar,

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[50]Gary A. Klein, *Sources of Power: How People Make Decisions* (Cambridge: The MIT Press, 1998), 28.

[51]Klein, *Sources of Power*, 28.

not on comparing options[52]. RPD capitalizes on the decision-maker's experience, breadth and depth of knowledge and intuition in the face of complex problems or external pressures such as time constraints. With experienced decision-makers, courses of action need only be thought out informally until the first workable course of action is found. There's no need to continue developing additional courses of action. "By imaging the option being carried out, they can spot weaknesses and find ways to avoid these, thereby making the option stronger."[53] As such, the experienced decision-maker avoids paralysis by analysis.

However, the RPD has limits. First, it is not a model that is suitable for inexperienced decision makers. Again, the model capitalizes on the inherent experience and knowledge of the decision maker. Someone with little knowledge or experience forced to make a critical decision is not able to draw from a repertoire of anecdotes or memories. Therefore, one's ability to spot weaknesses or make the option stronger as it is being played out in one's mind is limited. Sometimes one does not know what one does not know. Second, the tenets of the naturalistic approach make it vulnerable to the same problems inherent to the normative approach.[54] For example, intuitive decision-making is susceptible to individual biases. Also, group-thinking fosters a deeper

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[52]Klein, *Sources of Power*, 28.

[53]Ibid., 28.

[54]Dr. Jack D. Kem, *Design: Tools of the Trade* (Fort Leavenworth: U.S. Army Command and General Staff College, 2009), 32.

understanding of the problem but, by its very design, could create non-intuitive solutions.[55]

Summary

This chapter provided a theoretical framework from which to begin a credible analysis of CF OPP and SOD models. The theoretical tenets of general systems theory were introduced progressively in order to highlight the differences between linear systems and complex adaptive systems. The problem solving methodologies required to solve these systems are very different.

A linear system is best understood by reducing it to its individual components because the system is equal to the sum of its parts. As such, a normative decision-making approach is well suited for linear problems of minimal complexity. A naturalistic decision-making approach, on the other hand, is well suited for complex problems because it capitalizes on the decision-maker's experience, breadth and depth of knowledge and intuition. Although Miller's model in Figure 2.2 addresses generic CAS, profound similarities can already be drawn between the model and that of 21st Century society as a complex adaptive system.

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[55]Kem, *Design: Tools of the Trade*, 32.

However, it is important to note that this theoretical framework is just that: a theory. They are models to which one may rationalize, evaluate or predict events in real life. Bertalanffy warns that general systems theory is not intend to create meaningless analogies where "nations are to be considered organisms on an inordinate level… within which the human individual appears like an insignificant cell in an organism"[56]. Likewise, it is important to acknowledge that both decision-making approaches have inherent flaws, which reinforces the notion of complexity as an invariant.

General systems theory has its opponents. There are those, such as Dr. Vego, who dismiss the notion of applying systems theory to social sciences and, in particular the military operational art. Systems theory, one could argue, is better suited for examining micro-cultures in a petri-dish in a laboratory rather than in a military operational level headquarters. The next chapter will disprove this notion. In fact, the next chapter will demonstrate how 21st Century society and military operating environments possess the same attributes inherent to complex adaptive systems.

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[56]Bertalanffy, *General Systems Theory*, 35.

CHAPTER 3 – COMPLEX OPERATING ENVIRONMENT

> The mission of the CF has remained relatively unchanged since the 1990s: to defend Canada and Canadian interests at home and abroad while contributing to international peace and security. The Canadian government is committed to providing combat-capable maritime, land, and air forces to respond, at short notice, to fulfill a wide range of missions and tasks. What has changed is the evolving nature of operations to which the CF has been committed since the first Gulf War in 1991.[57]

Introduction

The nature of 21st Century conflict has been a topic of debate across militaries and academic institutions. What are the characteristics of the 21st Century that make it different or more complex than that of the twentieth century? More importantly, is there a requirement to evolve doctrine and current ways of thinking at the operational level in order to address these complexities? On one hand, Dr. Vego, United States Naval War College, argues that the nature of war as Clausewitz defined it has not actually changed and that the Western method of campaign planning is still relevant[58]. On the other hand, Dr. Shimon Naveh believes that the nature of warfare has changed and that commanders at all levels today are faced with complexities that either did not exist or were not considered relevant in the twentieth century. As such, Naveh argues that these complexities cannot be solved by the linear rational processes common in Western

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[57]Department of Defence, *Evaluation of the Maintenance*…., n.d.

[58]Dr. Milan Vego, "Systems versus Classical Approach to Warfare", *Joint Force Quarterly* 52 (1st quarter 2009), 46.

doctrine[59]. Rather, militaries must engage in a systems approach to solving complex problems.

This chapter will demonstrate that the twenty-first century operating environment facing the CF possesses the key characteristics of a complex adaptive system. This chapter will examine the roots of CF OPP and demonstrate that it is a product of the doctrine development cycle; a cycle that should be ever-evolving to meet the challenges of the ever evolving operating environment. Second, the three doctrinal levels of conflict will be introduced such that the roles and challenges faced at the operational level are framed for future discussion. Last, the key characteristics of the current operating environment will be examined to highlight the inherent properties of CAS in Chapter 2. Specifically over the past decade, the impact of globalization and technology, the emergence of non-state threats, and the security risks imposed on the West by failed nations have created an environment that offers challenges to the military commander that are unparalleled in history. Demonstrating that the operating environment possesses properties inherent to those of CAS will frame the analysis of CF OPP and SOD in the subsequent chapters.

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[59]Naveh, *In Pursuit of Military Excellence,* 3.

CF Operational Design Doctrine Development

"The role of doctrine within the conceptual component of military power is to provide a framework within which operations are planned, executed, and evaluated." [60] CF doctrine was neither conceived in isolation nor is it considered an immovable object. Doctrine is complementary to conceptual thinking and one of the major departure points of the force development process.[61] Although deeply rooted in the theoretical framework of Clausewitz and Jomini, the CF developed its current war fighting doctrine and organizations during the Cold War. It shares similarities with the United States joint doctrine and that of NATO. How then does doctrine evolve and what are the major influences that spark the need for change?

Figure 3.1 shows how such factors influence doctrine and, in turn, how doctrine influences the military institution. Looking back to the First World War as an example, the genesis of three-dimensional warfare brought on by technological breakthroughs in artillery and air planes demonstrates the impact that technology, strategy and campaign concepts can have on doctrine development.[62]

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[60]Department of National Defence. Canadian Forces Joint Publication 01 *Canadian Military Doctrine* (Ottawa: Canadian Forces Experimentation Centre, 2009), 2-6.

[61]Major-General Irving Brinton Holley Jr, *The Role of Doctrine: Essays on a Challenging Relationship* (Maxwell AFB: Air University Press, 2004), 2.

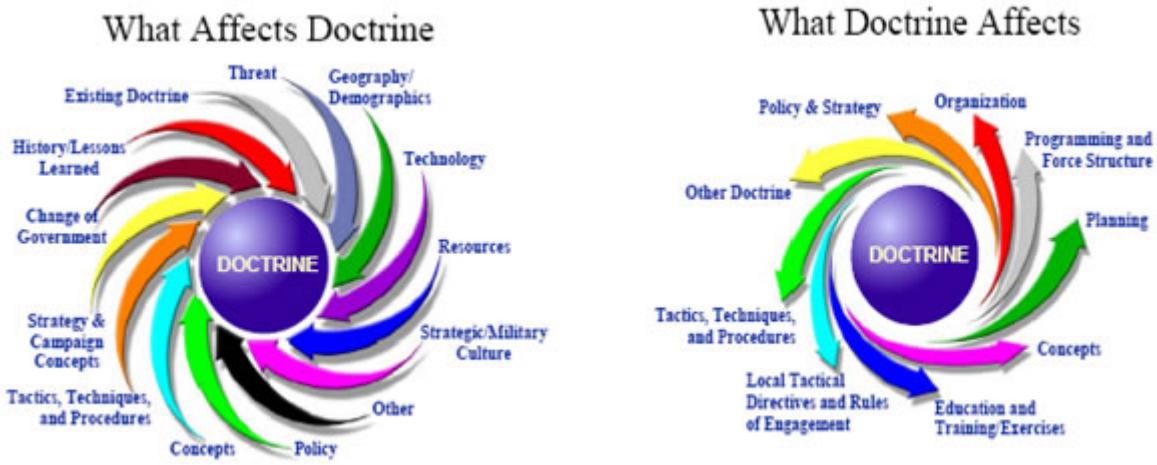

Figure 3.1: Doctrine Development Cycle.
Source: Department of Defence, *Doctrine Development*, 1-5.

Likewise, relevant and credible CF Counter-Insurgency (COIN) doctrine has been recently published as a result of lessons learned, emerging concepts and the ever-evolving tactics, techniques and procedures from CF operations and those of its allies in contemporary theatres such as Afghanistan and Iraq.

Subsequently, doctrine is the focal point for developing new concepts and procedures. Since the Cold War, operational commanders have been provided new tools to deal with these complexities. For example, the Canadian Joint Task Force Commander in Afghanistan commands organizations that include the Royal Canadian

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[62]Jonathan Bailey, "The First World War and the Birth of Modern Warfare" in *The Dynamics of Military Revolution 1300-2050,* ed. Macgregor Knox and Williamson Murray, 132-153 (New York: Cambridge University Press, 2001), 132.

Mounted Police and the Department of Foreign Affairs. He now has weapons and sensors at his disposal that were once doctrinally held at the strategic level.

Figure 3.1 depicts that planning is also a product of doctrine. If doctrine provides the framework in which operations are planned and executed, certainly the planning doctrine required to execute such complex operations should also have kept pace with current twenty-first century trends. However, it has not. Colonel Bernd Horn provides an explanation for this deficiency: "Often we do not know what we do not know, and we assume our perception of the state of affairs is accurate and mutual, when in fact ground truth may be an entirely different reality"[63]. In other words, the CF may not even be aware that it is using planning doctrine designed for an operating environment that has been overtaken by time.

What then are the characteristics of the current operating environment that have rendered CF operational planning doctrine unsuitable? More importantly, is there a requirement to evolve doctrine, specifically the process by which operations are planned, to address these complexities? These questions will be answered through the following overview of the levels of conflict and the characteristics of today's complex operating environment.

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[63]Colonel Bernd Horn, *In Harm's Way. The Buck Stops Here: Commanders on Operations* (Kingston: Canadian Defence Academy Press, 2007), 203.

Levels of Conflict

The military operates across a spectrum of conflict. As such, the military must possess the flexibility and mental agility to plan, execute and sustain missions across this spectrum while fully inculcating the environmental complexities outlined in Figure 3.2.

Figure 3.2: Spectrum of Conflict
Source: Department of National Defence, *Canadian Forces Operations,* 1-4.

The left side of the spectrum relates to military operations that do not require the use of force to achieve the mission. Support to domestic operations, such as the Red River floods in 1997, is example of a non-combat operation. International peacekeeping missions, such as UNPROFOR in the Former Republic of Yugoslavia in 1992-1995, and peace enforcement missions, such the NATO Stabilization Force in Bosnia in 1996-2004, are two types of missions central to the spectrum. Due to the very nature of maintaining or imposing peace amongst hostile forces, militaries must acknowledge that these types of missions are potentially volatile and can escalate along the spectrum of conflict very quickly.[64] The right side of the spectrum relates to military operations that require the

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[64]Department of National Defence. B-GJ-005-307/FP-030 *Peace Support Operations* (Ottawa: Department of National Defence, n.d.) http://www.cfd-cdf.forces.gc.ca/websites/Resources/dgfda/Pubs/CF%20Joint%20Doctrine%20Publications/CF%20Joint%20Doctrine%20-%20B-GJ-005-307%20FP-030%20-

use of force to accomplish the mission, such as the Russian incursion into Georgia in 2008. Operation ATHENA, Canada's contribution to ISAF, and Operation IRAQI FREEDOM are two examples of operations that may at any time involve tactical activities that span the spectrum.

Regardless of the nature of conflict, CF operations must be consistent with the national political aims. In order to align military actions at all levels, from the Chief of Defence Staff to a section commander tactically deployed in a theatre of operations, towards the same national aim, CF doctrine delineates military activities into three levels of conflict "to allow commanders to visualize a logical flow of operations, allocate resources, and assign tasks"[65]. They are the strategic, operational and tactical levels. These levels are distinguished neither by the number of formations nor the ranges of the weapons systems. These levels are distinguished by the intended outcome and will now be introduced in hierarchical order.

Strategic Level

The strategic level of conflict is that level at which the nation determines its security objectives and employs the nation's resources to achieve those objectives. Here, the government assesses the national interest and develops a range of options to address a

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%20Peace%20Sp%20Ops%20-%20EN%20(06%20Nov%2002).pdf; Internet; accessed 23 February 2010, n.d.

[65]Department of National Defence, *Canadian Forces Operations*, 1-4.

crisis across the spectrum of national power.[66] Options could include, but are not limited to, diplomatic, economic, information and military action. Roles for the military will be defined at this level, along with employment limitations and any inherent risks associated with employing the military. Although the overriding criteria for the conduct of military operations are the strategic objectives, this strategic direction may not always be clear, tangible or completely achievable through the military alone. It is the role of the next level of conflict to synthesize this strategic direction and translate it into concrete objectives for the tactical commanders.

Operational Level

The operational level of conflict is "the level at which campaigns and major operations are planned, conducted and sustained to accomplish the strategic objectives within theatres or areas of operations."[67] This is the level that links strategy to tactical actions on the ground. Accomplishment of a strategic or operational objective requires sequenced and synchronized employment of military and non-military sources of power. To achieve these objectives, the commander's intuition and experience required to wade through the ambiguities and challenges faced at this level of conflict are aptly named operational art.[68] The CF OPP publication formally defines operational art as "the skill

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[66]Department of National Defence, *Canadian Forces Operational Planning Process*, 1-8.

[67]Department of Defence, *Canadian Forces Operations*, 2-6.

of employing military forces to attain strategic objectives in a theatre of war or theatre of operations through the design, organization and conduct of campaigns and major operations"[69]. It also ensures that the focus of effort is on the objectives to be accomplished not tasks to be achieved or targets to be destroyed or neutralized[70].

Tactical Level

The tactical level of command is the level that directs the use of military forces in battles or engagements. Each of these engagements, be they combat or non-combat activities, should be designed to contribute to the operational level objectives.[71] This chapter will demonstrate that the lines between the different levels of conflict are not as clear as the definition portrays. A division or brigade headquarters have traditionally been considered to be at the tactical level. However both could actually be working at the operational level depending on the joint resources at their disposal and the objectives they must achieve. Although it fits the definition of a tactical level headquarters, one could argue that Canada's Joint Task Force Afghanistan Headquarters is an operational

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[68]Dr. Milan Vego, *Joint Operational Warfare* (Newport, R.I.: Naval War College, 2000), I-3.

[69]Department of National Defence, *Canadian Forces Operational Planning Process,* 1-3.

[70]Vego, *Joint Operational Warfare,* II6-7.

[71]Department of National Defence, *Canadian Military Doctrine*, 5-3.

level headquarters due to the inherent joint resources at its disposal and the strategic objectives it has been mandated to achieve.[72]

The 21st Century Operating Environment

> Their complexity is not the more familiar kind, the complexity of "detail" or structure such as those encountered in such complicated operations such as D-Day or Operation Desert Storm but of a more difficult variety, the complexity that arises out of the interactions between cause and effect. It would be a mistake to suggest that this kind of complexity is only a property of irregular warfare or insurgency. This is a general condition and there is no returning to "traditional" warfare.
>
> Brigadier-General Huba Waas de Czerga

This chapter has introduced two notions thus far. First, CF operational planning doctrine roots stem from the mechanistic influences of industrial age warfare and it has not evolved since the Cold War. Second, CF doctrine identifies the operational level as the link between strategic goals and tactical actions. This section will now introduce three complexities of the 21st Century that affect the operational level with a view to debating the suitability of CF OPP and SOD in subsequent chapters.

The 21st Century offers challenges for the military commander. No doubt these challenges are difficult. The question to ask, however, is if these difficult challenges possess the same properties of complex adaptive systems. Clearly, the Army has

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[72]Department of National Defence, "CEFCOM. Our Mission in Afghanistan: Why Are We There?" http://www.comfec-cefcom.forces.gc.ca/pa-ap/ops/fs-fr/afg-eng.asp. Internet; accessed 21 February 2010, n.d.

recognized this based on the words and terms used to frame the current operating environment in *Land Operations 2021: Adaptive and Dispersed Operations*:

> Conflict within this environment reflects the relationships between the underlying actions, structures, and beliefs resident within the conflict. Each dimension must be understood both individually and as part of the larger whole, i.e in terms of how they affect and are affected by the others. Land operations undertaken to resolve the root causes of conflict in the future security environment must therefore address the multi-threat, multidimensional, multi-national, joint and interagency aspects of the operating environment.[73]

This section will examine three realms of the complex operating environment from which complex adaptive systems emerge: globalization and technology, failed states and non-state actors. These notions are not new to the world per se because technology and the phenomenon of failed states, for example, can be found throughout history. However, all three are interdependent and their synergistic effect on the environment in which the military operates is indeed reflective of that of a complex adaptive system. Ignoring these interdependencies may permit a nation to win tactical battles but it will deny campaign success.

Globalization and Technology

In *The Utility of Force: The Art of War in the Modern World*, Rupert Smith argues that future conflict will not pin nation versus nation. Rather, future conflict will

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[73]Department of National Defence, *Land Operations 2021 Adaptive and Dispersed Operations: The Force Employment Concept for Canada's Army of Tomorrow* (Kingston: Directorate of Land Concepts and Design, 2007),16.

be characterized as "wars amongst the people."[74] Demographic trends indicate that population growth will be in the cities of Third World countries; the same area in which continuing state weakness in prevalent.[75]

For Canada, with a history of conducting expeditionary operations in troubled nations, the implications of this operating environment are significant. Adversaries will be fighting for specific social and political conditions rather than the absolute objectives over which political leaders traditionally went to war; and subsequently resolved through treaties.[76] Fighting will take place amongst the people in cities and built up areas. Conflicts involving tribal cultures may not necessarily be constrained by national borders and could spill into other neighbouring countries.

Certain technological advances in the past decade have also rendered national borders and social structures transparent. Internet and cell phone cameras "shape the perception of a global audience in near real time. Every action conveys a message, and the interpretation of that message often varies from one audience to another in unintended and unpredictable ways."[77] Free flowing information in the form of blogs and websites

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[74]Rupert Smith, *The Utility of Force: The Art of War in the Modern World* (London: Penguin Books Ltd, 2005), 267.

[75]Department of National Defence, *Land Operations 2021*…, 4-5.

[76]Smith, *The Utility of Force*…, 270-271.

offering opinions and stories are now considered sources of information in the same way one would consider a national news programme such as CNN or CTV. As absurd or as credible as this notion may appear, the fact remains that presently there is no way to control its acceptance or refusal.

Globalization and technology have created a complex system that is difficult to predict. State and non-state actors can adapt and exploit technology to leverage both their regional and international influence. One small action, such as the abuse case at the U.S. prison in Abu Garib, can have synergistic global impact almost instantaneously. The United States Joint Force Command (JFCOM) recognized in 2007 that "an environment influenced by global communications well beyond those controlled by state institutions will only lead to 'complex' outcomes."[78] JFCOM ceased all joint developments in planning doctrine that did not apply the tenets of general systems theory.

Failed States

The origins of a state crisis often lie in failures to govern one or more key constituents in a manner which benefits the population. Figure 3.3 illustrates both the interdependencies and the complex adaptive system that emerges.

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[77]United States, Department of Defence, *Commander's Appreciation and Campaign Design,* 6.

[78]Canadian Forces College, "Into the Future: Emerging Operational Concepts" (Joint Command and Staff Programme 36 activity package C/DS-543/WAS/LD-06, 2010), n.d.

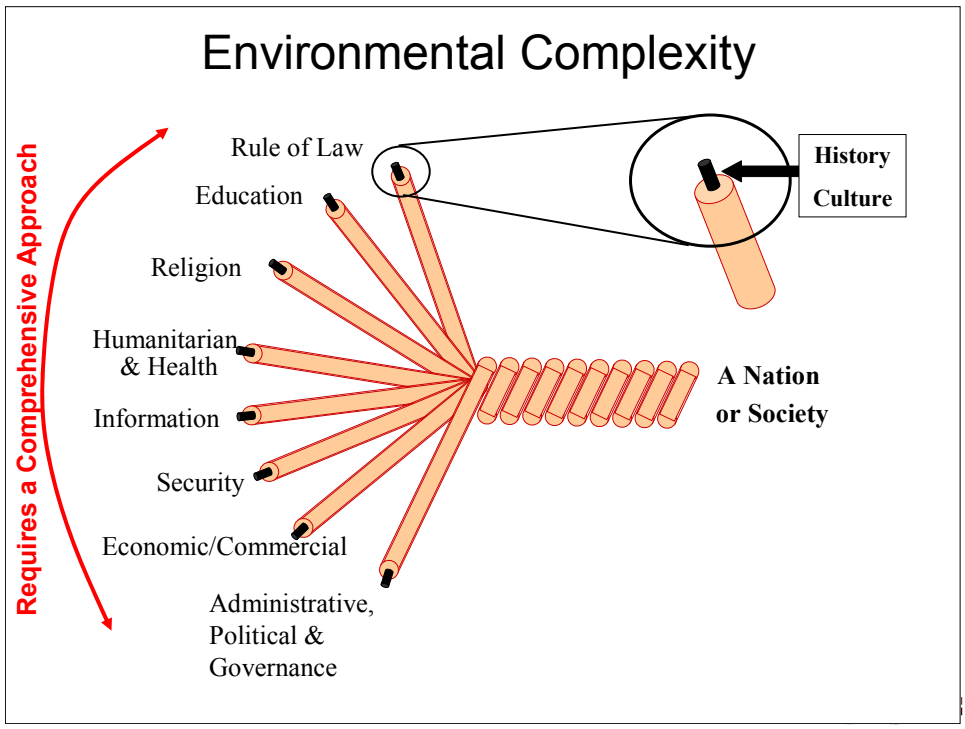

Figure 3.3 – Environmental Complexity
Source: Department of National Defence, B-GL-300-001/FP-001 *Land Operations* (Ottawa: Department of National Defence, 2008), 5-42.

The constituent parts of a society include but are not limited to rule of law, education, religion, commerce, health, information, security, diplomacy and governance. These constituent parts are interdependent and foundations such as culture and history are present in each constituent. In each constituent, there may be issues of perception, inequality, ethnicity, class, gender or religion. It may only take one of these issues, depending on its significance, to act as the catalyst that throws the state into failure However, solving this conflict is not simply a matter of providing the missing constituent. Every state is subtly different and that they will have developed differing strengths, priorities and interdependencies based on core values provided by their culture and

history. These conflicts will involve carefully coordinated and synchronized political and military action.

These tenets, coupled with the influences of globalization, are all currently having an impact in Afghanistan and Iraq. Prior to 9/11 and Operation IRAQI FREEDOM, Robert Leonhard warned that U.S. army doctrine only focussed on the first thirty days of the European theatre and that, despite the requirement to conduct intensive battles, the U.S. Army could not afford to overlook other contingencies and realties of an ensuing campaign.[79]

Only three years after Leonhard's warning, Operation IRAQI FREEDOM demonstrated that although 21st Century military operations could start out as state versus state conflicts, they can quickly turn into a war amongst the people when the goals involve the establishment of those missing constituent parts in Figure 3.3.

Although Operation IRAQI FREEDOM met the objective of ousting Saddam Hussein's regime in less than one month, the United States continues its struggle to rebuild the failed nation of Iraq seven years later. This scenario depicts a key property of general systems design – adaptivity. Removing Saddam Hussein created a power

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[79]Robert Leonhard, *The Art of Maneuver, Maneuver-Warfare Theory and Air Land Battle* (Novato: Presidio, 1991), 238.

vacuum in the system. Iraq struggles today as the various elements within and external to the system attempt to fill that void.

Solving such conflicts requires capabilities and resources beyond the realm of a traditional military operation. After a significant number of US air strikes into Afghanistan in November 2001, intended to cripple al Qaeda and Taliban command centres, Milton Beardon, a retired senior US intelligence officer, warned:

> As a rule…getting into Afghan cities , particularly for foreign armies, has always been pretty easy; it took the Soviets less than two-weeks to take most of the cities… The hard part always has been what comes next… so to call the Taliban down for the count because a string of urban centres has fallen, while possibly true, would be needlessly pushing our luck.[80]

Lieutenant-Colonel Lavoie, Commanding Officer 1RCR Battle Group in Kandahar in 2006, argued that the "contemporary operating environment itself, specifically working in an insurgency, poses another whole range of challenges… such as the difficulty of gaining the necessary intelligence, as well as working in an environment where it is so difficult to differentiate friend from foe"[81]. In failed states, the foe may consist of locals or it may also consist of non-state actors.

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[80]Michael Scheuer, *Through Our Enemies' Eyes: Osama bin Laden, Radical Islam, and the Future of America* (Washington: Potomac Books, Inc., 2006), 277.

[81]Horn, *In Harm's Way…*, 231.

Non-State Actors

> While it is useful to hate the enemy you must kill, it is counterproductive to sail into a war armed with hatred but no understanding of your foe's worthiness, skill, or appeal. In bin Laden's case, hate and our unwillingness to talk frankly about Islam have blinded many Americans to the fact that bin Laden has been, in the words of Thomas L. Friedman "a brilliant and dedicated foe"[82].

How does a nation's government address a threat that does not have a place of residence? Globalization has facilitated the emergence of non-state actors who may be funded through international enterprises while harbouring within the borders of failed or failing states. These entities have the ability through technology to command subordinate cells and garner influence across the globe. Such a threat does not possess the properties of a linear system. It is unpredictable, extremely adaptable and relies on synergistic effects to achieve notoriety. The destruction of two U.S. embassies in Africa, the crippling of the U.S. destroyer Cole in Yemen, the attacks on the World Trade Centre and the Pentagon are indicators of a non-state actor's range of military, political, economic, and propaganda successes between 1996-2005.[83] Unnamed US officials offered this summary of military operations up to January 2002.

> They [bin Laden and al Qaeda] can no longer conceive a new operation in Afghanistan… we have basically eviscerated their capacity to project power outside Afghanistan. They are now in a survival only mode… unable to

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[82]Scheuer, *Through Our Enemies' Eyes*…, 281.

[83]Ibid., 230.

> communicate with their global cells… About all they can do is hide out and not get caught. They are not in a position to conduct operations.[84]

Normative thinking is preventing military practitioners, and arguably political leaders, from viewing the problem with an open mind and first defining the actual problem before taking action to solve it. "Tragically, many American experts have displayed simple laziness in their research and have fallen back on… analysis by assertion. They have not for example read what bin Laden has written"[85]. As such, the West takes action to solve an ill-defined problem.

Impact on Operational Commanders

There is a common theme throughout the three tenets of the 21st Century operating environment: complexity. The military practitioner's quest for full understanding of the operating environment at the start of an operational planning process is becoming increasingly illusive. The operating environment indeed displays the adaptive nature inherent to Bertalanffy's theory. As such, militaries have struggled with operations such as counter-insurgencies, non-state actors and the war of public opinion because of the inability to accurately frame the problem. When a military problem is not properly framed, tactical actions do not align with the strategic intent. A design and

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[84]Scheuer, *Through Our Enemies' Eyes*…, 273.

[85]Ibid., 280.

planning tool is required to bridge that fault line. Equally important is a paradigm shift in the way military practitioners think about the operational problem.

Summary

This chapter has demonstrated that the current operating environment possesses the characteristics inherent to that of Bertalanffy's complex adaptive system model. CF doctrine also acknowledges that the operational environment is indeed a complex problem. Although the CF has provided new capabilities and technology to address the challenges, one critical doctrinal tool remains absent: a cognitive planning tool. The quest for full understanding of the operating environment at the start of an operational planning process is becoming increasingly illusive. Therefore, such a cognitive planning tool must acknowledge this fact in order to permit the commander to conduct relevant operations within the operating environment.

The next chapter will examine CF OPP, the current planning tool employed at the operational level to address the complexities inherent to 21st century conflict. The basic steps will be addressed to understand the interaction between the staff and commander and the products that will emerge. Finally, the benefits and deficiencies of the CF OPP will be analyzed within the frame of this complex operating environment.

CHAPTER 4 – CF OPERATIONAL PLANNING PROCESS

Introduction

> The essence of operational design is to apply joint effects in a manner in which friendly strengths are brought to bear on enemy weaknesses, friendly weaknesses are shielded and the enemy is outmaneuvered in time, space, and legitimacy, forcing him into a position from which the only option is capitulation.[86]

The essence of operational design as articulated above is a legitimate comment but it is not necessarily complete for today's operating environment. For example, it refers to only two contenders in the battle space: the friendly force and the enemy opponent in isolation. This chapter will draw upon the foundations of Bertalanffy's general systems theory and the normative decision making model to examine the CF OPP currently employed to address the operational level complexities introduced in the previous chapters. The first section will examine the genesis of operational design and the role of CF OPP. The five steps of CF OPP will then be introduced in sequence. Last, this chapter will expose three specific limitations of the CF OPP at the operational level: the ambiguous notion of the centre of gravity, linearity, and the stifling of commander and staff creativity.

It should be noted that terminology varies both throughout the different references used in the Chapter. 'Operational design" and 'campaign design' are used synonymously

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[86]Department of National Defence, *Canadian Forces Operational Planning Process*, 2-8.

throughout the CF OPP manual for example. The nouns "plan" and "design" also appear to be interchangeable. This section will maintain standard CF definitions and terms where possible, with the understanding that terminology and the definitions of specific terms may vary between nations and publications. The confusion caused by these ambiguities will be addressed as a topic of the analysis section.

The Genesis of Canadian Forces Operational Planning Process

This paper has already identified that CF OPP is employed by operational level headquarters to translate strategic political intent into conventional campaign plans. How does CF OPP actually facilitate this process? The CF OPP manual attests that it is deliberately "designed to optimize logical, analytical steps of decision making in conditions of uncertainty and ambiguity".[87] LCol Dalton contends that it "emerged out of efforts to solve a particular military problem; namely, how to overcome the challenges initially manifested during the 'epoch of imperialism' – large-scale, state on state, mechanized warfare."[88] CF OPP has since evolved into its latest form during the Cold-War. Its current form is a linear analytical process that incorporates both design and planning. Before the actual steps of this process are exposed, it is important to conceptualize the expected result of the CF OPP- the campaign plan.

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[87]Department of National Defence, *Canadian Forces Operational Planning Process*, 3-1.

[88]Dalton, "Systemic Operational Design…", 45.

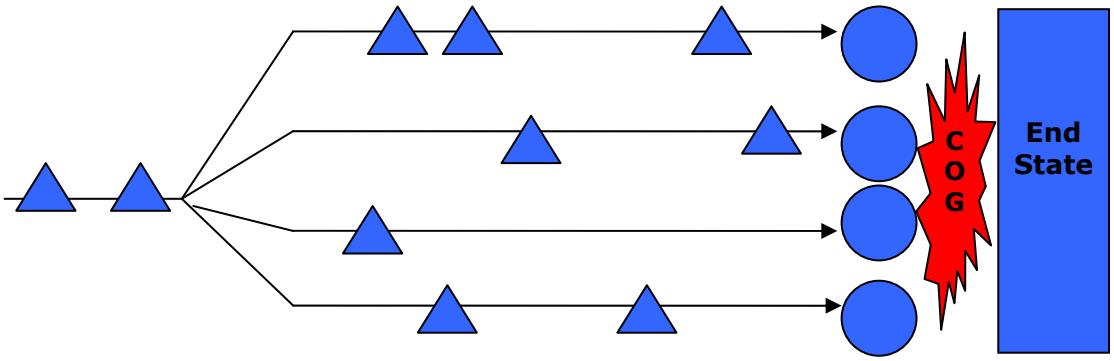

Figure 4.1 Graphical Representation of a Campaign Design
Source: Department of National Defence. *Canadian Forces College Guide to CF Operational Planning Process*. Toronto: Department of Exercises and Simulation, 2010, G-4/17.

Operational design, or campaign design, is a product that is created within the steps of CF OPP. Figure 4.1 is the graphical representation of an operational design taught by the Canadian Forces College. The design depicts a number of triangular decisive points (DP) representing critical events synchronized in time along horizontal lines of operation that will pave the way to the commander's end-state. Lines of operation help visualize the different types of operations that are taking place simultaneously, as shown in Figure 4.1.[89] The different lines of operation allow the commander to coordinate efforts and resources in time and space in order to achieve the objectives mandated by the strategic level, depicted in Figure 4.1 as circles. The centre of gravity (COG) is a notion established by Clausewitz referring to "dynamic and powerful physical or moral agents of action or influence that possess certain

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[89]Dr. Jack Kem, *Campaign Planning: Tools of the Trade, 2nd edition* (Fort Leavenworth: U.S. Army Command and General Staff College, 2006), 31.

characteristics and capabilities, and benefit from a given location or terrain."[90] By defeating the enemy center of gravity, the model insists that the enemy will capitulate and the end-state will be achieved.[91] The terminology and the linear framework of the operational design are indeed reflective of CF OPP's Napoleonic roots. Before further analysis takes place, the steps of CF OPP should be established.

The Steps of CF OPP

This section will now expose the steps of CF OPP: Initiation, Orientation, COA Development, Plan Development, and Plan Review. Each of these five steps contains several sub-functions. The process is commander-led, in that he provides his overall intent to the staff and the staff then conduct the analysis and produce the different options, or courses of action, for the commander's choosing.[92] Each step will be introduced in sequence:

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[90]Dr. Joe Strange and Colonel Richard Iron, "What Clausewitz (Really) Meant by Center of Gravity. Understanding Centers of Gravity and Critical Vulnerabilities", *Joint Force Quarterly* (June, 2003): 15; http://www.thefreelibrary.com/Center+of+gravity%3a+what+Clausewitz+really+meant.-a0125914001; Internet; accessed 20 February 2010.

[91]Department of National Defence, *Canadian Forces Operational Planning Process*, 2-1.

[92]Lauder, "Systemic Operational Design…", 42.

The first step is Initiation. During this stage, the commander will receive strategic guidance and, in turn, issue initial planning guidance to his staff in order to focus their preliminary study of the situation and strategic level intent.

Orientation is the next and most critical step of CF OPP in terms of operational design. As such, more emphasis will be placed on this step than the others. Orientation has two objectives: it determines the nature of the problem and it also confirms the results to be achieved.[93] Two deliverables or products emerge out of the Orientation step: the Mission Analysis briefing and the Commander's Planning Guidance to his subordinate command elements. This essay will not examine the latter because the details within that planning guidance are simply the results of the mission analysis process.

The mission analysis briefing is prepared and then articulated to the higher level headquarters. The briefing itself, although important, is not the focus. The mission analysis is the focus. It represents the culmination of staff work to ensure that the commander's operational design, a product of this step, meets the strategic level intent and end-state. The CF OPP manual and the CFC Handbook provide the following description of the mission analysis:

The commander and staff review the situation in order to frame the problem. This involves "a first look at environmental, political, and geographic factors…, a review of

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[93]Department of National Defence, *Canadian Forces Operational Planning Process*, 4-4.

enemy and friendly forces, administrative, logistic and command and control factors."[94] Next, the commander and staff review the strategic level intent and envisioned end-state, focusing on: critical facts and assumptions, any limitations imposed by the higher headquarters that may limit the commander's freedom of action, an analysis of the strengths and weaknesses of friendly and enemy forces, the commander's tasks assigned to him by the higher headquarters and those implied tasks that are required to achieve the assigned tasks, the stated objectives and end-state that describe the accomplishment of strategic level goals and the level of risk the commander is willing to accept in order to achieve them.[95] It is critical that these factors be understood by the commander and his staff for they will become the foundation on which the operational design is constructed.

Having determined the nature of the problem in step two, step three focuses on Course of Action (COA) Development to solve the problem. A comparison of these COAs takes place such that the commander can select the best COA to further develop into a plan. This selection process is carried out by comparing the viability of the COAs against specific selection criteria devised by the commander in his planning guidance from the Orientation step.

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[94]Department of National Defence, *Canadian Forces Operational Planning Process*, 4-5.

[95]Department of National Defence, *CFC Guide…*, II-9/17.

Step four, Plan Development, is dedicated to the development of the selected course of action. The staff prepares the plan and the products such as orders, annexes and any other supporting information that is required.

Last, step five is the plan review. Here, the staff conducts a review of the campaign design and the detailed plan. This may include an exercise or a war game. If required, the commander and staff may reinitiate CF OPP or make amendments or changes to the plan to guide the plan towards the intended end-state.

Analysis of OPP

These five steps of the operational planning processes are similar to those across the majority of western militaries. CF OPP is a product of practical experience and theory and it does have strengths. First, CF OPP was deliberately designed to be a simple process, a hangover from the massed militaries of the post-industrial age where the headquarters was seen as a number of interchangeable parts. This notion makes sense because replacements, new staff or new commanders can take over with minimal loss of corporate knowledge. This particular strength of CF OPP will be further examined in comparison to SOD in Chapter 7. As well, CF OPP forces the military planners to analyze a problem in detail. One could also argue that having the staff develop a number of COAs, three being the accepted norm, serves to validate the commander's original intuition for his campaign design. However, by importing the planning process from the

U.S., the CF has also imported the problems and the deficiencies associated with it.[96] This section will simply expose three specific shortfalls of CF OPP with a view to recommending solutions in subsequent chapters.

Centre of Gravity

There are two challenges that emerge from the notion of the centre of gravity. First, after three hundred years of translation and interpretation, the quest to understand what Clausewitz actually meant by the notion of the centre of gravity has turned into analysis by assertion. The CF OPP manual defines the centre of gravity as follows:

> The Center of Gravity is defined as characteristics, capabilities or localities from which a nation, an alliance, a military force or other grouping derives its freedom of action, physical strength or will to fight… Centres of gravity can be considered at the strategic, operational and tactical levels of conflict.[97]

In contrast, Dr. Joe Strange, the originator of the Strange Analysis used by the Canadian Forces Joint Command and Staff Programme to analyze enemy and friendly force strengths and weaknesses in the Orientation step, argues that Clausewitzian centers of gravity "are not characteristics, capabilities or locations ... They are dynamic and

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[96]English, *Operational Art…*, 31.

[97]Department of National Defence, *Canadian Forces Operational Planning Process*, 2-1.

powerful physical or moral agents of action or influence that possess certain characteristics and capabilities, and benefit from a given location or terrain."[98]

Despite the fundamental differences of opinion on the three hundred year-old notion, CF OPP dogmatically relies on the selection of the correct enemy centre of gravity in order to build an operational design that is focused on destroying it. This reliance is further complicated by the fact that the enemy did not provide their centre of gravity to the friendly force commander. Rather, the friendly force staff, through a filtered lens of Western values, customs and experiences, must decide upon the enemy's centre of gravity using the linear analytical process in step two of CF OPP. This raises the question of the validity of the centre of gravity and the magnitude of effort that is focused towards its destruction.

To further complicate the notion of the centre of gravity, counter-insurgency and peace support operations require further identification of centre of gravity for each of the key parties in the conflict. The doctrinal ambiguity surrounding the centre of gravity becomes more apparent.

> There may be more than two centres of gravity in a [Peace Support Operation] PSO as there will be one for each political entity in the mission area. Centre of gravity analysis in complex PSO should not merely focus on the application of military force. While used to seek lines of operations that will provide leverage in ensuring continuing compliance with the mandate, those selected must have a direct relation to the political entities structural characteristics.[99]

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[98]Strange and Iron, "What Clausewitz (Really) Meant… ", 15.

How does the linear operational design in Figure 4.1 address multiple parties with multiple centres of gravity? In Figure 4.1, all friendly force activities and objectives are designed to destroy one enemy's centre of gravity. Therefore, once the centre of gravity has been destroyed, the operational design implies that the end-state will be achieved. This is a dangerous notion when applied to operations other than a conventional conflict. Lieutenant-Colonel Echevarria addresses this notion in his *Naval War College Review* article:

> The industrial-age paradigm of warfare, in which the distinction between the strategic, operational, and tactical levels is inviolate, needs to be replaced with one that regards all activities of war as interdependent. Clausewitz did not distinguish between tactical, operational, or strategic centers of gravity; he defined the center of gravity holistically--that is, by the entire system (or structure) of the enemy--not in terms of level of war.[100]

Echevarria recognizes the danger in viewing the centre of gravity as a Newtonian element in a linear system that can be isolated and subsequently removed. This Newtonian view also assumes that the enemy centre of gravity remains constant throughout the entire campaign and it is not affected by external influences. In other words, it is not considered part of a complex adaptive system. However, similar to the friendly force, the enemy force is likely doing everything possible to protect its centre of gravity. Referring

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[99]Department of National Defence, *Peace Support Operations*, 6-9.

[100]Lieutenant-Colonel Antulio Echevarria, "Clausewitz's Center of Gravity: It's Not What We Thought," *Naval War College Review* (January 1, 2003): n.d.; http://www.thefreelibrary.com/Clausewitz's+center+of+gravity%3a+it's+not+what+we+thought.-a098143823**;** Internet; accessed 20 February 2010.

back to the theory of complex adaptive systems, if the enemy force centre of gravity is truly the source of its freedom of action and will to fight, then the centre of gravity will adapt and change over the course of the campaign in order for the enemy force to survive. This creates a challenge for the commander conducting a campaign whose actions are not focused on the emergent enemy centre of gravity, but on the original perceived centre of gravity. As such, Echevarria's statement also includes the recommendation to adopt a holistic systemic approach when considering enemy strengths and weaknesses vice the reductionist approach inherent in CF OPP.

Linearity

> The idea of 'organized chaos' reflects the constant contradiction between the random nature of such operations and the traditional trend to institutionalize their study in scientific patterns.[101]

The CF OPP follows the same essential steps inherent to the Janus and Mann model introduced in Chapter 2; a reductionist decision-making model established to solve problems of limited complexity and when sufficient time is available to conduct such a process. For instance, the problem is identified, a range of options are created, these options are weighed against each other and a suitable option is selected. It is thorough and will likely result in a reliable decision given sufficient time to conduct the thorough analysis it is designed to achieve.[102] As such, the argument that CF OPP is not linear,

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[101]Naveh, *In Pursuit of Military Excellence*, 8.

because the staff can always return to a previous step, is irrelevant. The term 'linearity' should not be confused with term 'sequential' or 'iterative'.

Klein also insists that "this process is more helpful for beginners than for experienced decision-makers" because this process forces the inexperienced decision maker to conduct a detailed analysis of all of the facts prior to making a decision.[103] If this tool is more beneficial for the inexperienced decision-maker as Klein argues, would not an experienced commander and his staff at the operational level be burdened by such a rigid planning tool in a complex operating environment?

Lauder confirms this notion. The number of formal rigid sub-steps within the five main stages of CF OPP "encourages planners to view each step of the process as independent and sequential, which implies that each step should be treated as discrete and not used to inform subsequent steps."[104] Lieutenant-Colonel Hoskin, an Australian army officer, also supports this notion:

> the process is biased towards analysis and determinate judgments, which is unrealistic in terms of the likelihood of complete and accurate information being available, and also in terms of the intuitive decision-making processes actually used in practice.[105]

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[102]Klein, *Sources of Power*, 26.

[103]Ibid., 6.

[104]Lauder, "Systemic Operational Design…", 43.

The burden caused by the inherent rigidity and formality explains why commanders and staffs "tend to deviate from the formal OPP (as it is written doctrine) in an operational setting, often modifying the process or, in some cases, completely abandoning the OPP in favour of naturalistic approaches."[106]

From an operational design perspective, the graphical representation in Figure 4.1 reflects the same rigidity inherent to the planning process. The notion that key events can be forecasted and synchronized sequentially along distinct lines of operation, with a view to destroying the enemy's centre of gravity, contradicts the very characteristics that define conflict in the first place: complex and unpredictable. It can be concluded therefore that, although the CF acknowledges the inherent systemic complexities of conflict, it only offers the commander and his staff a normative and linear planning tool rather than a cognitive tool to deal with these complexities.

CF OPP - Enabler or Anchor?

The complex nature of the current operating environment creates problems of command that are not necessarily present or relevant in a conflict that pins one nation's

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[105]Lieutenant-Colonel Rupert Hoskin, "The Ghost in the Machine: Better Application of Human Factors to Enhance the Military Appreciation Process" (Canberra; Land Warfare Studies Centre, 2009), 12.

[106]Lauder, "Systemic Operational Design…", 43.

military against that of another. Despite two decades separating the end of the Cold War and today, the CF OPP manual still attests that the principles that design a campaign should remain the same across the entire spectrum of conflict, highlighted earlier in Figure 3.2, and therefore CF OPP in its current form also applies.[107] Despite changes in the operating environment, doctrine continues to force the proverbial square peg into a round hole. That is to say, current doctrine attempts to use a linear planning process to solve complex problems.

This dilemma becomes apparent during step three of the CF OPP. If the headquarters fails to properly frame the problem, the headquarters will continually be forced to return to the mission analysis in step two throughout the entire process. One may argue that this is a positive characteristic of CF OPP's iterative process. However, it is not efficient. Specifically, the key factors are analyzed in isolation during step two but they are not actually synchronized and studied holistically until step three during the COA development. This dilemma can be mitigated by very thorough liaison and coordination between the different staff. Ironically, the process preaches constant coordination between branches but the planning process is designed to have the different branches working on concurrent pieces of the puzzle in isolation.

Furthermore, the CF OPP framework puts the commander and key staff in a precarious position. On one hand, the commander is required to provide guidance and a

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[107]Department of National Defence, *Canadian Forces Operational Planning Process*, Chapter 2.

vision of the campaign plan well before the detailed framing of the problem has even occurred. Does the commander's vision of the design, around which the staff will construct the operational design, come first? Or does the operational design emerge as a result of the detailed analysis after step 2? Dalton identifies this particular deficiency: "one could argue that no distinct design process exists. From a theoretical perspective this is interesting because it suggests that design emerges as a result of planning, a teleological process that is linear, deterministic and reductionist."[108]

On the other hand, CF OPP is also designed to allow the commander to be absent. Having provided initial guidance in step one, the commander relies upon the breadth and depth of experience of his key staff. Staff updates to the commander will obviously occur throughout the planning process but again, the process is neither efficient nor does it facilitate the exercise of operational art. "While theoretically an efficient process, in practice the commander's ability to personally influence the process is less than ideal… [and] planning time is wasted. It also fails to prepare the commander for subsequent intuitive decision-making."[109]

Finally, what aspect of CF OPP permits the commander and his staff to deal with an environment where the lines between the strategic, operational and tactical levels are blurred? For instance, the CF Joint Task Force Headquarters currently serving under the

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[108]Dalton, "Systemic Operational Design…", 22.

[109]Hoskin, "The Ghost in the Machine…", 12.

ISAF mission in Afghanistan is responsible for providing traditional military security, facilitating governance through a 300-person Provincial Reconstruction Team consisting of Department of Foreign Affairs and Canadian International Aid representatives, provision of training and mentoring to both the Afghan National Army and Afghan National Police services.[110] The CF Peace Support Operations manual clearly identifies this challenge:

> The conduct of PSO is likely to be politically highly charged, and strategic and operational level considerations may have a considerable and disproportionate effect, even at the lowest tactical level. There could be a tendency for the operational and tactical levels of command to overlap as individual incidents assume a high profile in political terms. Each national contingent is likely to have separate national command arrangements which could affect many aspects of the operation, particularly if sudden and unexpected escalations of violence occur which place new demands upon the military force.[111]

Unfortunately, the only advice provided to commanders by CF doctrine is to conduct more frequent plan reviews and a wider range of branches and sequels during the campaign plan.[112] This advice is inefficient and could potentially overwhelm the operational planning process as it was intended.

> Despite the concept of logical, in place of physical, lines of operation in the 2001 version of FM 3-0, planners of the ongoing counterterrorism campaign face the same challenges as planners of peace-support operations in the Balkans. Today's doctrinal concepts hamstring

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[110]Department of National Defence, "Our Mission in Afghanistan: Why Are We There?", n.d.

[111]Department of National Defence, *Peace Support Operations*, 6-10.

[112]Ibid., 6-9.

> planners' and commanders' abilities to design and conduct effective, coherent campaigns for operations across the spectrum of conflict in today's security environment.[113]

Summary

Although CF OPP has its strengths as a thorough analytical tool, today's operating environment highlights its critical deficiencies. Specifically, the ambiguity surrounding the centre of gravity poses a risk to the planning process. Despite the varying definitions of the centre of gravity, doctrine still dogmatically forces the commander to identify that of the enemy and orient a campaign plan around its destruction. Second, this chapter demonstrated that the CF OPP is very much a linear analytical tool that is ideally suited for complicated, not complex, problems that require detailed reductionist analysis. It is not suited, however for commanders and staff, all of whom have inherent decision making experience based on the ranks they have achieved, in situations that are not defined as linear. The last deficiency of CF OPP relates to the process itself. Today's operating environment requires a tool that goes beyond simply identifying and analyzing factors in isolation.

A tool that enables the commander to understand the operating environment holistically, including the acknowledgement of relationships between the groups in the operating environment, will not only better frame the problem, but will facilitate an achievable solution. The next chapter will introduce and analyze SOD, an alternative planning tool designed to address the complexities of the operating environment.

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[113]Greer, "Operational Art for the Objective Force…", 23-24.

CHAPTER 5 – SYSTEMIC OPERATIONAL DESIGN

Introduction

> The creative, nonlinear and idiosyncratic but vital cognitive work of senior commanders is generally called military art, strategic thinking or operational art. Generals who possess the experience and genius for this art do it well. Sometimes their genius is finding the right people to help them with it - an informal command team. What they do is not really planning. It is creating an abstract framework of ideas that summarize the essential elements of a situation, describes what is to be achieved and outline the approach so that planning can begin. It is strategic and operational design. There is no linear process for this essential creative contribution.
>
> Brigadier-General Waas de Czerga

Systemic Operational Design emerged out of necessity. The IDF fell victim to operational level planning doctrine that did not keep pace with the operating environment in which Israel had been operating. As such, the IDF experienced difficulties over the past three decades linking its tactical operations to strategic political aims.[114] A complete overhaul of its operational level planning doctrine was undertaken to inculcate cognitive planning tools designed specifically to address the complexities inherent to the 21st Century environment.[115]

Drawing upon the foundations of Bertalanffy's general systems theory and the naturalistic decision-making model from Chapter 2, this chapter will introduce the elements of SOD and demonstrate how it addresses those complexities faced by

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[114]Dr. Milan Vego, "A Case Against Systemic Operational Design", *Joint Force Quarterly* 53 (2nd quarter 2009), 70.

[115]Sorrells, "Systemic Operational Design…", 5.

operational level commanders. The first section will examine the genesis of SOD in Israel and the momentum it has recently gained at the U.S. Army Command and General Staff College. SOD's characteristics and its different levels of discourse will then be introduced in sequence. Finally, this chapter will demonstrate how SOD addresses the same three operational level deficiencies inherent to CF OPP: the ambiguous notion of the centre of gravity, linearity, and the stifling of commander and staff creativity.

Genesis of Systemic Operational Design

> If I were given one hour to save the planet, I would spend 59 minutes defining the problem and one minute resolving it.
>
> Albert Einstein

Chapter 2 highlighted the emergence of general systems theory as a means of addressing complex problems not readily explainable by previous scientific analytical models. Although Bertalanffy is credited with establishing the body of general systems theory, retired IDF Brigadier General Shimon Naveh is credited with establishing its military application in the form of SOD. Naveh's interest in systems theory began out of frustration with how operational level analysis and campaign design were understood and taught to Israeli officers. "His examination of the role cognition plays with the conceptualizing of operational art led both him and the… IDF to realize in 1992 that they had let their knowledge of the concept of operational art drift."[116]

Operational failures in Lebanon, the West Bank and the Gaza Strip supported his argument. In fact, Naveh's argument was so convincing the IDF established the Operational Theory Research Institute, as well as the School of Operational Command, in order to educate the IDF in the lost notion of operational art. [117] SOD was officially adopted by the IDF in 2000 and is still considered in its infancy. Due to the classification level and lack of English documents, very little Israeli doctrine is available for detailed analysis. As such, the concept and tenets of SOD will serve as the launch point to debate its usefulness as an alternate or reinforcing tool to CF OPP. Prior to examining the seven discourses that form the process of SOD, it is important to understand the underlying principles by which SOD is guided.

Elements of SOD

First and foremost, Chapter 2 indicated that a system continually seeks to adapt to its environment in order to survive. Therefore, any system can be destroyed if it cannot adapt to its environment. Destruction can occur in one of two ways. First, a system can be forced into equilibrium, or a steady-state, such that it will no longer react to change and become irrelevant. Second, the system can be thrown into chaos when it can no longer adapt quickly enough to the changes occurring in and around it. Figure 5.1 depicts

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[116]Sorrels, "Systemic Operational Design…", 42.

[117]Major Jelte R. Groen, "Systemic Operational Design: Improving Operational Planning for the Netherlands Armed Forces" (Fort Leavenworth; United States Army Command and General Staff College, 2006), 21.

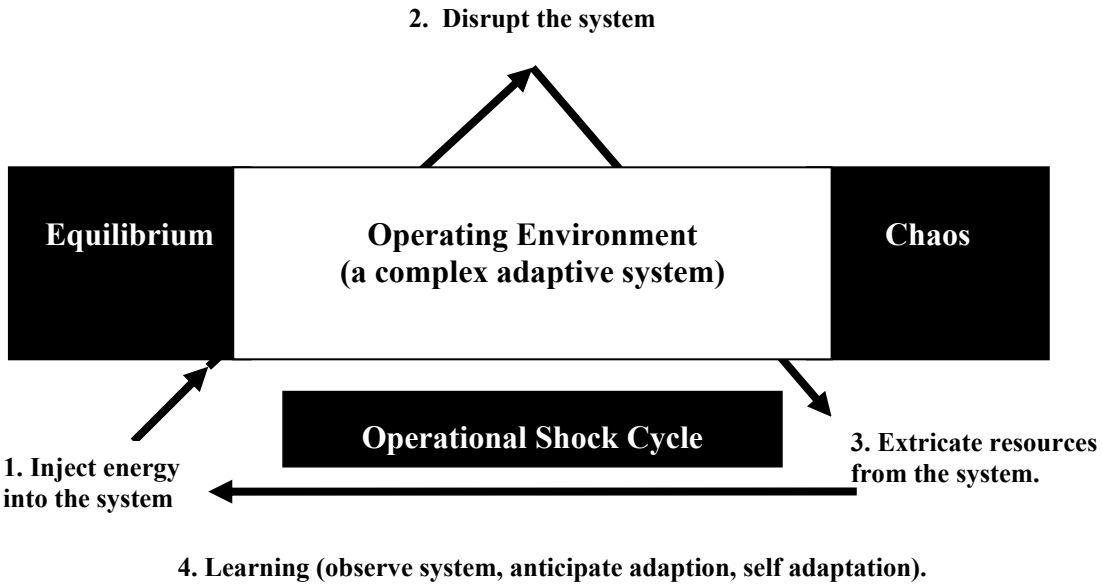

Figure 5.1: Achieving systemic disruption through Operational Shock.
Source: United States, Department of Defence, *Systemic Operational Design: Designing Campaigns and Operations To Disrupt a Rival System* (Fort Monroe, Virginia), 13.

how SOD seeks to achieve disruption of the enemy by injecting energy into the system, by learning from the reactions of the system, and by then adapting to the reactions. Energy refers to the conduct of military actions in the operating environment, be they kinetic or non-kinetic. Operational shock is the term Naveh uses to describe the enemy's paralysis as a result of this cycle.[118] In this case, 'operational maneuver' may be viewed as a means of learning about the enemy's system by making him react, rather than for a deterministic operational effect in the classical sense of the term.

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[118]Naveh, *In Pursuit of Military Excellence,* 17-18.

Second, in order to achieve the operational shock and the inherent operational objectives laid out by the strategic guidance, SOD focuses on problem framing rather than problem solving. Although subsequent sections will examine the differences between operational design and operational planning in detail, at this stage it is must be understood that problem solving is a subsequent and subordinate step to problem framing and design. As such, the complex operating environment must be viewed as an abstraction rather than a Newtonian mechanism that can be reduced down to its individual components and analyzed in isolation. By breaking down the operating environment, there is an inherent risk of losing sight of the dynamic relationships that exist between such elements as the enemy's forces, the friendly forces, the population, international agencies and the economy and stability.[119]

Third, SOD is reflective of Bertalanffy's theory in that it acknowledges that it is impossible to fully understand the operating environment and players within. SOD also acknowledges that characterizing an operating environment and its parts is in itself subjective; it is affected by the military practitioner's political, social, cultural and economic views. The military practitioner must also acknowledge that he is actually immersed in the operating environment and he influences it by his very actions. Therefore, SOD relies upon a flexible and broad operational design, deliberately avoiding predictions or deterministic sequenced events. Designing permits flexibility for the commander to learn about the operating environment and to make the necessary changes

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[119]Sorrels, "Systemic Operational Design…", 15.

to the design as the system emerges and as his level of understanding increases.[120] Dalton supports this notion: "design is a process that enables the development of a hypothesis – an operational design – that bridges the strategic and tactical levels of thought and provides planners with a temporary determinate space within which to plan, execute and learn."[121]

Finally, SOD is command centric. The commander is involved intimately with his staff throughout the design process to ensure that his knowledge, experience and intuition are imparted on the staff and the design. He is also intimately involved because he plays an important role in the learning process. Through discourse, learning occurs. The discourse sessions must facilitate open and critical discussion amongst the key staff and commander. Rank and seniority are not constructive tools in the discourse and the staff must be permitted the candour that critical discourse deserves. The commander will also be in constant discussion with the strategic level headquarters to ensure that problem definition continues. Throughout the process, the discourses are recorded for future reference.

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[120]Groen, "Systemic Operational Design…", 40.

[121]Dalton, "Systemic Operational Design…", 35.

Discourses of SOD

There are seven discourses or steps of SOD. The first four discourses serve to gain an understanding of the system. The remaining steps focus on the actual designing and planning the operation. Every step consists of several sets of questions to guide the discourse. These questions are not intended to be followed and answered one by one, but are meant to facilitate a discourse. Each discourse has a particular role and expected output that serves to influence the operational design. Each discourse is analogous to formal brainstorming as opposed to a linear or sequential step in a larger process. Because SOD is guided by continual learning and adaptation, it is expected that the commander and staff will revisit particular discourses based on the emergence of new information and better understanding. Figure 5.2 depicts Naveh's SOD as a process. Each step will be introduced individually.

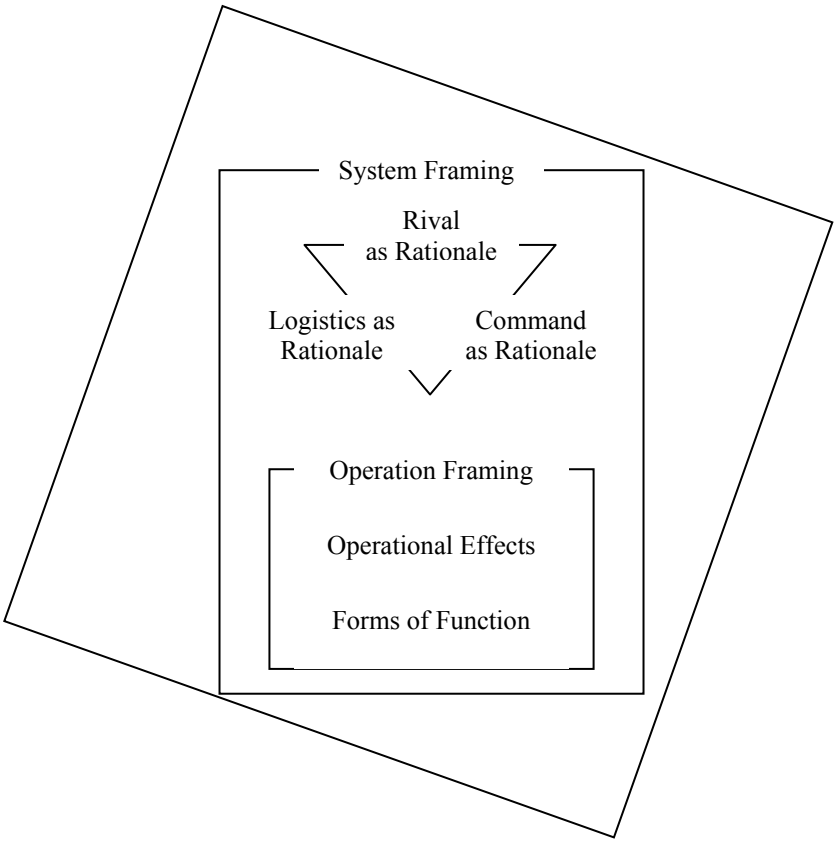

Figure 5.2: Discourses of Systemic Operational Design
Source: Naveh, Shimon. *In Pursuit of Military Excellence, The Evolution of Operational Theory.* London: Frank Cass, 1997.

System Framing

Problem definition and subsequent planning cannot occur until the problem has been framed to a scope that is manageable for the operational commander. TRADOC views the art of system framing as "the art of seeing the essential and relevant among the trivial and irrelevant; penetrating the logic of the broad received mission and its messy contextual situation; and reshaping it into a well-enough structured working

hypothesis."[122] The purpose of system framing, therefore, is to put the strategic guidance and the nature of the operating environment, represented by the outer frame in Figure 5.2, into context. By framing the conceptual system the commander and his staff then have a common starting point for mutual understanding.[123]

The design team, which includes the commander, should strive to answer the following question: What in the system has changed to merit the issuing of strategic guidance? To do this, the design team needs to frame the problem by putting a hypothetical boundary around all of the elements that have an impact or influence on the problem. Elements should include, but are not limited to, the strategic guidance and objectives, the cognitive connections and relationships of the friendly force, enemy force, any other actors and the environment. As depicted in Figure 5.2, the hypothetical boundary is likely going to be a smaller, more manageable system including only those elements which have a bearing on the strategic intent.[124]

There are two outcomes of this discourse. First, discourse amongst the design team and also with the strategic headquarters will facilitate better understanding of the problem and provide common frame of reference for further development. Second, the discourse is recorded to capture the thought process and logic of the discourse. It can be

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[122]United States, Department of Defence, *Commander's Appreciation...*, 23.

[123]Sorrells, "Systemic Operational Design…", 20.

[124]United States, Department of Defence, *Systemic Operational Design…,* 15.

captured as a combination of narrative and diagrams. It will be used to inform the next discourse.

Rival as Rationale

The role of rival as rationale is to examine the conceptual framework of the rival's system.[125] The rival is not merely the enemy force in the classic sense. SOD deliberately views the rival to be any condition or element that must be disrupted or influenced in order to achieve the operational objectives.[126] Therefore, the design team must understand the rival's operational intent and reason for its behaviour within the system. The team must also examine the significance of different capabilities, values, goals, and practices between the rival and the friendly force in order to build the cognitive relationships and tensions within the system.[127] In stability operations, for example, discourse must include all of the organizations and conditions that could pose threats to friendly force activities. The discourse must investigate the tensions internal to the organizations and between the organizations such that a holistic systemic picture may be drawn. The product of this discourse is a running narrative, again a combination of narrative and rival organization graphics.

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[125]United States, Department of Defence, *Systemic Operational Design…,* 16.

[126]Lauder, "Systemic Operational Design…", 46.

[127]Major Patrick E. McGlade, "Effects-Based Operations Versus Systemic Operational Design: Is There a Difference"(Ohio: Air Force Institute of Technology, 2006), 23.

Command as Rationale

The role of command as rationale is to determine the tensions between the existing command structure and the system in order to determine a suitable command structure for the operation.[128] Here, the design team must critically analyze the assumptions and objectives provided by the strategic headquarters in order to ensure that the conceptual command structure meets the demands of the strategic guidance. Likewise, rigourous assessment of the rival's capabilities should be compared against the conceptual command combinations in order to highlight any deficiencies or omissions.[129] The products of this discourse should include the running narrative and graphical command and control organization graphics.

Logistics as Rationale

The role of logistics as rationale is to examine the tension between the existing logistical structures and that required to meet the challenges of the design.[130] The aim of this step is to identify the means to sustain the structure of the design within the limits or restraints of the logistics capabilities.[131] Lauder identifies three specific areas to which

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[128]United States, Department of Defence, *Systemic Operational Design…,* 17.

[129]Groen, "Systemic Operational Design…", 33.

[130]Ibid., 33.

[131]McGlade, "Effects-Based Operations…", 23.

the design team must focus: strategic mobilization, strategic-operational deployability and operational sustainment.[132] The design team must determine that the logistics system can provide the adequate resources, troop levels and delivery mechanisms in order to support the developing COA. The end result of this discourse is to identify and adapt existing procedures and sustainment methods which will provide the means to execute sustainment of the friendly force in the structure of the design.

Operation Framing

In the first discourse, System Framing, the scope of the problem was narrowed down into the operational framework. Operation Framing narrows the problem further in order to focus on the design of the operation itself and to provide the key ideas of how to conduct the operation. Friendly components are arranged in time and space to give structure for the movement of forces in relationship to the rival. Because the operation is not deterministic in the classic sense, the operation is viewed as the first of many operations that will eventually force the system in a state desired by the strategic level headquarters. Therefore this step has a short term focus. SOD is not concerned with a clearly defined end state because a system will continually adapt to change. Therefore, after each operation, a re-evaluation of the situation must take place to reassess if the system is changing and moving in the direction desired by the commander.[133]

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[132]Lauder, "Systemic Operational Design…", 47.

[133]Groen, "Systemic Operational Design…", 34.

Operational Effects

The purpose of operational effects is to enable the achievement of the strategic goal. This discourse converges even more on the actual operation. The interrelated elements of the rival and the friendly force will be the point of initiation for learning through military action. The design team must understand the components of the rival so they can judge the form and the procedures to break apart the rival into an easily understood structure.

Forms of Function

This last discourse permits the commander to provide the design team the specifics of the COA. This last discourse also permits the design team to commence the actual planning process with the planning team in order to develop the COA into a plan. The design products, the collection of staff data and the COA are presented to the planners through discourse. As Groen highlights: "the discourse with the planners is in fact a test of the design. If the planners have a clear understanding of what is required of them, they start translating the design into an executable plan."[134]

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[134]Groen, "Systemic Operational Design…", 37.

Analysis

As with any emerging concept, SOD can be easily met with scepticism simply because of its fundamental differences with classical operational design. First and foremost, the vocabulary of SOD is foreign to Western military practitioners and could be cause for immediate mistrust or scepticism. This is certainly the view of Dr. Vego, a proponent of the classic operational planning methods. He affirms that the vocabulary used by SOD advocates is essentially "unintelligible" and that doctrine with unintelligible vocabulary is dangerous.[135] Dr. Vego's concern is indeed credible. For 300 years, Western militaries have had the luxury of maintaining the same vocabulary developed by Jomini and Napoleon.

The second challenge facing western militaries is their limited exposure to, if not complete absence of, any education in GST. Although the concept of systems theory is relatively easy to grasp, the military application of GST demands that designers and planners have a deeper understanding of the scientific and philosophical roots. Naveh and Vego both attribute Israel's 2006 failures in Lebanon to this issue. Israeli senior officers applied SOD without the adequate level of understanding of GST, resulting in operational level plans and orders that were ambiguous and tactically unsound.[136] Bearing these two shortfalls in mind, this section will now demonstrate how SOD

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[135]Vego, "A Case Against Systemic Operational Design", 75.

[136]Ibid., 73.

addresses the three specific shortfalls of CF OPP: ambiguity of the notion of the centre of gravity, linearity, and its effectiveness as a process.

Centre of Gravity

SOD does not paint the commander into a corner by forcing him to choose the enemy centre of gravity before he has a developed understanding of the enemy force and the operating environment. Rather, SOD views the centre of gravity as a moment in time and space during the operation where the enemy is unknowingly exposed. The commander can achieve operational shock and then subsequently neutralize the enemy by striking at that location at the right moment in time and space.[137]

This is not actually a new concept, but one that evolved from the Soviet deep battle concept during the inter war years of the 1930s.[138] The roots of GST are evident in this concept because it acknowledges two important notions up front. First, the friendly force does not have complete understanding of the enemy force. Second, not only is there a lack of understanding, the enemy force continually adapts to protect itself and to exploit the weaknesses of the friendly force. The notion of "complexity arises somewhat

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[137]Naveh, *In Pursuit of Military Excellence,* 19.

[138]Jacob Kipp, "Two Views of Warsaw: The Russian Civil War and Soviet Operational Art, 1920-1932", in *The Operational Art: Developments in the Theories of War*, ed. B.J.C. McKercher and Michael A. Hennessy, 51-86 (Westport: Praeger, 1996), 63-64.

paradoxically from the same conditions because it is exactly this non-linearity that presents the possibility of obtaining a disproportionate leverage from a given action."[139]

Therefore the centre of gravity cannot be viewed as a predetermined inanimate object. Rather, it is a moment in time and space identified through commander's intuition where the conditions favour the friendly force to exert the devastating blow to the unknowing enemy. The application of commander's intuition, deception and maneuver in this case encapsulates the spirit of operational art even in the classical sense.[140]

Linearity

SOD addresses the dogma of linearity simply by the nature of its design. SOD, assumes uncertainty and therefore the operating environment and strategic guidance require constant reframing. Therefore, the centre of gravity is not used in the Jominian sense because a complex system involving human interaction renders such an entity impossible to identify. SOD also views the end-state in the same way. A system does not have an end state, it will transform to a new, altered system due to influxes of energy.[141]

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[139]Smith, *Complexity…*, 8.

[140]Naveh, *In Pursuit of Military Excellence,* 19.

[141]Groen, "Systemic Operational Design…", 45.

To highlight the notion that a system has no end-state but continues to transform, military practitioners need only look to the 2002 Operation Enduring Freedom (OEF) mission in Afghanistan. OEF successfully neutralized the Taliban and al Qaeda forces operating in Afghanistan, a conventional joint operation. However, in doing so they failed to understand the relationships and tensions that existed within the system. As such, the system eventually adapted and transformed into a new one due to the power vacuum created.

> The situation on the ground in Afghanistan also bodes well for a resurgence of the Taliban and their al Qaeda associates. Since the fall of Kandahar [in 2002], multiple warlords – many of whom served as anti-Taliban proxies for the U.S. – led coalition – have established control over personal fiefdoms across the country, creating a land so perilous it can boggle the mind of anyone who has lived in peace.[142]

To avoid such deterministic ways of thinking, the commander and staff focus on achieving the operational objectives and the strategic vision. "Although the IDF use the [Hebrew] term end state…, a better term in this context would be 'waypoint' to explain the nature of the operations on the path to an acceptable state of the Rival system."[143]

Although the seven discourses are structured, from system framing down to forms of function, this structure highlights operational art and cognitive reasoning rather than deterministic procedures or steps. The running narrative and the graphical products are

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[142]Scheuer, *Through Our Enemies' Eyes*..., 278.

[143]Groen, "Systemic Operational Design…", 44.

not created in isolation nor are they meant to be products in their own right. It is expected that the designers will continually revisit any discourse as new information presents itself and as learning occurs. For example, the final rival as rationale graphic depicting all of the elements posing threats to the friendly force mission will invariably differ significantly from the initial graphic and be much more thorough as learning process evolves through each discourse.

SOD - Enabler or Anchor?

One defining characteristic of SOD as an enabler is its emphasis on understanding the operational problem rather than analyzing the mission. This characteristic is the root of the larger debate between CF OPP and SOD and will be addressed further in Chapter 6. Before any design can take place in a complex environment, the commander must first understand the operational problem. Also, the collaborative and egalitarian nature of the discourses forces the commander and staff to cast aside biases and promotes the intuition and creativity intended from the group-think concept.[144]

The other defining factor of SOD as an enabler is the distinct separation of design from planning. Although the two activities are related, Naveh makes these distinct differences between the two:

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[144]Dee Ann Kline, *How Professionals Make Decisions*, ed. Henry Montgomery, Raanan Lipshitz and Berndt Brehmer (Mahwah: Lawrence Erlbaum Associates, 2005), 4-5.

> Design deals with learning, while planning is about action. Design is a referential framework for redesign, while planning is a framework for action. Design addresses problem setting, while planning deals with problem solving. Design creates new patterns, while planning uses existing templates. Design is holistic but incomplete and not detailed, while planning is complete but partial. Design is an open construct, while planning is a closed one.[145]

Design acknowledges that, although problems may be similar, no problem is exactly the same as another. Therefore, understanding each unique problem requires a unique approach, and may not have a solution in the conventional sense. The design team translates the strategic concepts and frames the problem; a creative process that includes the commander throughout. The design is then handed to the planning team, who then applies the military structured processes of building the plan, assigning specific tasks to subordinate formations and coordinating the standard activities; a more mechanistic process. Throughout, discourse continues between the planners and designers in order to adapt and adjust the plan as learning continues. This separation of design and planning process is very much common practice in many civilian professions.

Consider a simplistic civilian anecdote to highlight the differences between design and planning: a customer requires a new kitchen in his house. The customer must engage in discourse with the designer who will then define the customer's specific requirements. Vague requirements could be ample storage space and natural light. Specific customer requirements may call for certain appliances to be located next to each other. At this stage, it is too early to start planning to build such a kitchen. It is important for the

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[145]Groen, "Systemic Operational Design…", 26-27.

designer and the customer to acknowledge that each unique problem requires a unique approach. At this stage, the designer's work is more creative or artistic. The designer cannot gain an appreciation for the problem by implementing a check list. As discourse continues, both the customer and the designer learn more about the situation. For example, it may be impossible to place the appliances in the original manner stated by the customer because of electrical codes or because of functionality. As such, the design will change and develop as knowledge is gained. Once the designer has a design concept that meets the customers' requirements, he will pass the design to the planners who will use specific trade skills and a more mechanistic process to put the plan together to actually construct the kitchen. Although this example is a simple scenario, it highlights the difference between design and planning. More importantly, it highlights the fact that planning cannot occur without a design.

Finally, SOD enables the commander to be involved from receipt of the strategic direction to the transfer of the operational design to the planning staff. SOD is command centric. The commander is involved intimately with his staff throughout the design process to ensure that his knowledge, experience and intuition are imparted on the staff and the design. He is also intimately involved because he plays an important role in the learning process. Discourse facilitates better understanding of the problem. Discourse is intended to inform the operational level headquarters as much as it is meant to inform the strategic level. As in any scenario, the more critical discussion that takes place, the more each level will learn about the problem and further develop a thorough course of action. Sorrells confirms this notion based on experimentation at Fort Leavenworth: "it is

apparent to the design team that this method produces a very rich level of understanding of the situation amongst the designers, whilst it avoids producing lock-step, numerous courses of action."[146]

Summary

Although SOD is still in its infancy in the West, SOD's deep roots in GST and the normative decision making model make it well suited as a design tool to address the complexities of 21st Century operations. SOD acknowledges that the military practitioner will never gain complete understanding of the operating environment and therefore requires the commander to first frame the actual problem into a manageable operating environment. It is also based on the tenets of open and unhindered discussion and learning throughout the seven discourses. Last, SOD clearly separates the design process from the planning process. As such, it is a tool that enables the commander to understand the operating environment holistically, including the acknowledgement of relationships between the groups in the operating environment. SOD will not only better frame the problem, but will facilitate an achievable solution.

The next chapter will further analyze SOD with respect to CF OPP to foster debate on the usefulness of both tools. It is clear that SOD and CF OPP are very different beasts. In the case of SOD, there is little doctrinal or historical data from which to draw.

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[146]Sorrells , "Systemic Operational Design…", 27.

However, this paper will select three key requirements of any military practitioner in an operational level headquarters to provide a framework for the comparative analysis. First, how effectively does the tool address operational design? Second, how effectively does the tool address operational planning? Last, is the tool efficient for an operational level headquarters?

CHAPTER 6 – COMPARATIVE ANALYSIS

Introduction

Chapter 6 will provide a comparative analysis of CF OPP and SOD with a view to fostering debate on the usefulness of each. It is clear now that SOD and CF OPP are fundamentally different tools stemming from different theoretical models and established in different eras to address different operating environments. However, they do have one common characteristic: they are both intended to act as the medium through which strategic objectives are translated into tactical actions through a campaign plan. Therefore, the framework for the comparative analysis must centre on the ability of the operational headquarters to employ the tools.

This chapter will pose three questions that the author considers to be critical requirements of an operational level headquarters. First, how effectively does the tool address operational design? Second, how effectively does the tool address operational planning? Third, is the tool efficient for an operational level headquarters? Finally, this chapter will conclude by providing recommendations on further areas of study beyond the scope of this paper with the aim of improving CF operational planning.

Effectiveness as a Design Tool

The question of the operational commander beginning by analyzing the mission or by first gaining an understanding of the operational problem is the root of the debate between CF OPP and SOD. From the perspective of SOD, it requires the commander to first gain an understanding of the operational problem. SOD assumes that the strategic headquarters does not have complete knowledge and understanding of the operating environment, the elements and the relationships therein. CF OPP, on the other hand, puts the commander's mission analysis at the forefront of the process because CF OPP assumes that the strategic headquarters has sufficiently framed the problem. Referring back to the kitchen design analogy in Chapter 5, this notion would be akin to the customer, the strategic headquarters, completely defining the problem for the kitchen designer, or the operational level designers, in such detail that the mechanistic planning could commence immediately.

Therefore, the answer to the question depends on the type of mission the operational level commander has been given. If the problem is one of little complexity and the strategic headquarters has properly framed it in the strategic guidance, then the commander should be able to commence with mission analysis. SOD emphasizes problem definition because it assumes that complexity compels the commander to first understand the operational problem and then based upon that understanding design a broad approach to problem solving.[147] "When we talk about analytic versus intuitive

decision making, neither is good or bad. What is bad is if you use either of them in an inappropriate circumstance".[148] How then does one compare or measure the usefulness of either tool if they were meant for different situations?

The current operating environment must serve as the litmus test to provide this measure of effectiveness. In 2005, Chairman of the Joint Chiefs, General Myers, stated that militaries now "operate on nonmilitary and cross-border fronts, involving law enforcement, diplomacy, and finance".[149] This phenomenon is rooted in the mission of the Canadian Joint Task Force Afghanistan Headquarters. Not only does the headquarters direct subordinate forces into combat to achieve its strategic objectives, it must also contend with diplomacy and civil-military cooperation.

> Twenty-five PRTs throughout Afghanistan help the democratically-elected government of Afghanistan extend its authority and ability to govern, rebuild the nation, and provide services to its citizens. The PRT combines the expertise of diplomats, corrections experts, development specialists, the Canadian police, including the RCMP, and the military. It supports key initiatives in the province and carries out a broad range of enabling roles such as police training and strengthening local governance capacity, in line with Canada's priorities in Afghanistan.[150]

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[147]United States, Department of Defence, *Commander's Appreciation*..., 14.

[148]Malcolm Gladwell, *Blink: The Power of Thinking Without Thinking* (New York: Back Bay Books / Little, Brown and Company, 2005), 143-144.

[149]Richard Downie, "Defining Integrated Operations". *Joint Force Quarterly*, No 38 (3rd Quarter 2005): 10.

[150]Government of Canada, "Canada's Engagement in Afghanistan. Kandahar Provincial Reconstruction Team," http://www.afghanistan.gc.ca/canada-

This level of complexity is not simply inherent to that of counter-insurgency operations. Referring back to Chapter 3, globalization and technology will not permit a return to operations of limited complexity. Therefore, the relevance of CF OPP as an appropriate design tool is questionable for the current and future environments. As one analyst in the United States Joint Forces Command quipped:

> The next war is not just going to be military on military. The deciding factor is not going to be how many tanks you destroy… The deciding factor is how you take apart your adversary's system. Instead of going after war-fighting capability, we have to go after war-making capability. The military is connected to the economic system, which is connected to their cultural system, to their personal relationships. We have to understand the links between all those systems.[151]

Operational level experimentation conducted by the Future Warfare Studies Division of the U.S. Army Doctrine and Training Command serves to reinforce this notion. On one hand, experimentation determined that the classical approach to operational art worked well for conventional conflict.[152] The tenets of current campaign design, which include the end state, centre of gravity, lines of operation and decisive points, worked well because the problem was readily defined and framed by the strategic level headquarters. As such, the operational level headquarters was not responsible for defining the problem, it was able to readily accept the strategic level guidance and focused on designing a campaign to achieve very specific and tangible objectives.

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afghanistan/kandahar/kprt-eprk.aspx?menu_id=41&menu=L; Internet; accessed 21 February 2010.

[151]Gladwell, *Blink*..., 104.

[152]United States, Department of Defence, *Systemic Operational Design*…, 1.

On the other hand, the same experimentation observed that the classic approach was not suitable for irregular or unconventional warfare, concluding that operational art in its current form constrains how military practitioners think.[153] The study identified three problems with the classical approach in today's environment. First, it does not address the influences of other government departments or multi-national action. Second, conventional thinking hinders a comprehensive understanding of an adaptable and flexible enemy. The classic approach was designed to study massed conventional enemies. Finally, "the classical elements of operational design [are] based on history, theory, and practice from a different context"[154] Operational art in its current form addressed issues of mass, space, time and linearity, not the asymmetries such as enemy motivation, morality, and the impact of globalization.

Effectiveness as a Planning Tool

Chapter 5 highlighted the distinction between design and planning. Both activities are critical requirements in the process of translating strategic guidance into tactical actions in the operating environment. The fundamentals of CF OPP make it a useful planning tool in theory. Its roots stem from the Newtonian analytical way of thinking and the normative decision-making model, forcing the military practitioner down the analytical path of detailed problem solving. The lock-step procedure permits

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[153]United States, Department of Defence, *Systemic Operational Design…*, 5.

[154]Ibid., 6.

detailed options, or COAs, that serve to validate the commander's initial planning guidance.

However, in reality this is not the case. No distinct design process actually exists in CF OPP. Design emerges as a result of the planning steps inherent to the process. Therefore, without a distinct design process, the planning process will be inherently flawed. With little commander interaction throughout the process, except for the initial mission analysis and subsequent planning guidance, the creativity in the operational design and the subsequent COA development must come from the staff. Hoskin supports the notion that OPP lacks depth as a planning tool because of its own mechanistic structure. He argues that, because the focus of the staff is on mechanistic planning and COA development in steps two and three, "the creative aspect of the process tends to be left to chance, with no consideration of the best way to harness the full creative abilities of the people involved."[155] Lauder observes that Canadian military planners often deviate from the doctrinal CF OPP steps in order to avoid wasting staff effort on adherence to a process.[156] The conclusion that is drawn from Lauder's observation is that CF OPP, in its current form, is not ideally suited for planning. CF military practitioners must veer from the actual steps of CF OPP in order to harness the staff effort and creativity required to understand the operating environment and develop COAs that

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[155]Hoskin, "The Ghost in the Machine…", 12.

[156]Lauder, "Systemic Operational Design…", 43.

address implied tasks, deception, a workable command and control framework and a workable logistics framework.

SOD is structured, on the other hand, to harness staff effort on operational design separate from the planning function. In theory, the systemic approach to framing the problem and creating an operational design using the naturalistic approach to decision-making is better suited to a complex operating environment. The final two discourses are purposely intended to facilitate the transition of the operational design into one plan.

Efficiency

Efficiency is a comparison of the output of the design tool to the effort that must go into the process.[157] The measure of efficiency goes beyond simply employing the tool at the operational level. The realities of an operational headquarters must also be considered when determining a tool's efficiency. Some of these realities include a headquarters that may not be fully manned due to casualties of war or higher priorities that require personnel elsewhere. Another reality of a headquarters is the limited inherent experience or cohesion of the staff due to casualty replacement, promotions or postings over the course of a campaign. Therefore, this section will attempt to apply the realities of a campaign to each tool with a view to validating their overall efficiency.

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[157]Merriam Webster On-line Dictionary and Thesaurus, http://www.merriam-webster.com/; Internet; accessed 28 March 2010.

At first glance, CF OPP does not appear to be efficient. There is a significant amount of staff effort dedicated to questionable activities. First, the production of multiple COAs could be considered an inefficient activity simply to validate the commander's original intuition. Each of the COAs must be developed and detailed to the point where the staff can actually war game each against the perceived enemy COAs. Only one of these many COAs will actually be selected and developed into a detailed plan. Lauder refers to Swedish scientist Peter Thunholm's observation that the production of multiple COAs does not yield a better solution than that of a process that is dedicated the production of a single COA.[158] Second, the absence of the commander throughout the OPP creates the requirement to provide him very deliberate and detailed staff presentations at pre-determined steps in the process. Specifically, there is a deliberate information brief designed to update the commander with the progress of the staff during step two of CF OPP. The CFC package provides a standard information brief that includes a Powerpoint slide deck comprising of close to one hundred slides. Second, the commander will receive a very detailed decision briefing during step three of CF OPP in order to select the COA that will be further developed into the plan. This briefing includes the results of the COA war game and the recommendation to the commander to select a particular COA based on pre-determined comparison criteria. Again, the CFC standard briefing includes approximately sixty Powerpoint slides. If the commander were more involved in the process, would it be necessary to provide such staff intensive briefings? Is the staff work required to produce multiple COAs and briefings, simply to

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[158]Lauder, "Systemic Operational Design…", 43.

have two discarded in the end, an efficient process? The answer to both of these questions is no.

SOD, on the other hand, has been developed to address these inefficiencies. By now it is clear that SOD was deliberately developed by the IDF based on their strategic failures to re-establish its understanding of operational art. Therefore, from a theoretical perspective, it is difficult to argue the fundamentals and the intentions of the process itself. The staff is less apt to second guess the commander's intent because the commmander is actually present and key to the discourse. Involving the commander in the discourses diminishes the need to validate the commander's intuition by extensive COA development. SOD certainly addresses the complexities inherent to the current operating environment. After all, Israel is a nation founded in conflict and one that has struggled to maintain its sovereignty since its conception.

However, Israel's operating environment is a complex system whose components and tensions have ironically remained relatively constant for decades. Israel's neighbours have and always will be the same Arab countries. Those countries will not physically move. Hezbollah, Syria, Hamas and Iran are constant threats to Israel's sovereignty. Therefore, the complexity of the Israeli operating environment is actually reduced. The corporate knowledge of the system already exists amongst the IDF. Thus, system framing is not an arduous process, it is a matter of routine. The IDF can afford to invest in their officer corps to create expertise and specialized staffs to deal specifically with

particular aspects of their system because the IDF is actually immersed in the system.[159] SOD is therefore an efficient tool for the IDF.

SOD may be more efficient for the IDF than the classic OPP, but a tool that requires specialization and very rich knowledge of a particular rival system is also more fragile. As such, SOD presents a significant challenge to western militaries that normally conduct campaigns in other parts of the world rather than on their own soil, and arguably for short periods of time.[160] The IDF has the luxury of apprenticeship in the operational art in the same system for the very reasons highlighted earlier. The west does not have this luxury.

For example, the CF has developed an understanding of the system that exists in southern Afghanistan for only six years. When the ISAF mission terminates in the near future, that inherent expertise in Afghan culture, diplomacy, economics and the elusive centre of gravity will no longer be required. The relationships built between the CF and other governmental departments as a result of the mission in Afghanistan will cease to exist. The entire process must occur for the next campaign the CF finds itself supporting. The future expertise to acquire is not known yet.[161] Therefore, SOD is not necessarily an efficient tool for western militaries who will not be immersed in a system long enough to

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[159]Discussion with Dr. Eric Ouellet, Canadian Forces College, 26 March 2010.

[160]Groen, "Systemic Operational Design…", 40.

[161]Discussion with Dr. Eric Ouellet, Canadian Forces College, 26 March 2010.

understand it. Likewise, western militaries will not establish staffs and specialized skills to address a particular operating environment knowing that the mission duration, and public appetite for extended campaigns, is short.

Finally, although the CF establishment changes that would be required to incorporate SOD are beyond the scope of this paper, it should be noted that systems theory is not found in any CF curriculum. The CF would require a significant overhaul to educate and train its officer corps. Such an overhaul raises the question of how SOD and "operational art" could be taught. For example, are SOD and the operational art concepts that should be learned through apprenticeship vice the current classroom methodology of teaching CF OPP? Although CF OPP has its flaws, the military must face a tough question: is the need for new operational design and planning mindset greater the than the effort it will take to inculcate it into the CF?

Recommendations

CF OPP has its strengths and its weakness and, until SOD is further developed such that headquarters structures and procedures are in place to seamlessly accept SOD, CF OPP will remain the doctrinal planning tool for the CF. In the mean time, there is a requirement to include think tanks, such as defence research and social scientists, in the professional debate regarding the application of systems theory to ensure it meets the comprehensive approach to operational design. Furthermore, elements of SOD can be inculcated into CF OPP immediately to improve operational design and planning.

The first, and arguably the most important, element will require a fundamental shift in the way western military practitioners think. The commander and staff must accept that they will never gain complete understanding of the situation and that the enemy, the operating environment and their own friendly forces are not immovable objects; they will adapt over time and space. Acknowledgement of this reality will facilitate the development of more realistic and tenable operational design.

Second, the commander and senior planning staff can focus on problem definition and design rather than jumping into mission analysis in step two CF OPP. To achive this, SOD can be employed immediately during steps one and two of CF OPP to produce a more thorough and richer mission analysis and operational design and the end of step two. Although this particualr recommendation does not address the critical shortfalls of CF OPP, specifically linearity and the deterministic Jominian operational design construct, it does narrow the current fault line between design and planning.

Finally, the concept of open discourse can be embraced in each step in order to enhance the collective understanding of the problem both within the operational and strategic level headquarters. This notion also requires a shift in the current way of thinking. That western commanders and politicians are too busy to be present for continuous discourses highlights a serious flaw in current western political-military strategy but it is also a well beyond the scope of this paper. Suffice it to conclude that discourse between all military levels and the government is a fundamnetal requirement if SOD is to succeed.

Summary

SOD and CF OPP are fundamentally different tools stemming from different theoretical models and established in different eras to address different operating environments. However, they do have one common characteristic: they are both intended to act as the medium through which strategic objectives are translated into tactical actions through a campaign plan. This chapter provided a comparative analysis of CF OPP and SOD, focusing on the ability of the operational headquarters to employ the tools.

Three critical requirements of an operational level headquarters were used as the framework to compare the usefulness of both models. CF OPP is not an effective design tool because the design process is actually subordinate to the planning process. SOD on the other hand is deliberately structured to be an effective design tool. CF OPP, although effective, is not necessarily an efficient planning tool due to the questionable and often redundant activities that take place within the inherent steps. SOD is an effective planning tool because effort is focused on the creation of one well developed COA. CF OPP is an efficient tool over the course of a complete campaign because the terminology and doctrine is simple and familiar for western militaries. In contrast, SOD is not efficient for rotating staffs because it relies on a combination of unstructured group think processes and commander's intuition. However, until SOD is further developed by western militaries, elements of SOD can be incorporated into CF OPP to improve its effectiveness.

CHAPTER 7 - CONCLUSION

Everything has changed except our way of thinking.

Albert Einstein

This paper has demonstrated that the theoretical and doctrinal frameworks of CF OPP render it unsuitable as a planning tool to address the complexities inherent to those of today's operating environment and that SOD is a viable alternative that merits further research for operational level commanders. The consequences of error in the military profession are so catastrophic that relevant doctrine is not an option, it is an expectation. Therefore, professional militaries must continue the process of challenging their doctrine in order to maintain its relevancy. If doctrine is not open to professional debate or challenged by new concepts, it runs the risk of becoming dogma.[162] In the case of operational design, the aim of this paper was to foster debate over the effectiveness of CF OPP by comparing it to the emerging SOD in order to improve the CF operational design capability.

CF OPP was conceived during the Cold War to address conventional warfare. As challenging and arduous as conventional warfare may be, the operational level problems faced in conventional warfare are by definition linear and of limited complexity. The steps and processes of CF OPP are similar to those of the Janus and Mann decision-making model, a normative model designed to solve linear problems of limited

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[162]Sorrels, "Systemic Operational Design…", 7.

complexity. Therefore, CF OPP is an appropriate problem solving tool for conventional operational level problems. CF OPP in its current form, however, is not ideally suited for operational level problems that possess the properties of complexity and adaptivity.

SOD, on the other hand, was purposely conceived to address complex problems inherent to the operating environment of the 21st Century. Globalization and technology, international intervention into failed states, and the impending threat of non-state actors are three realities that define the 21st Century operating environment as complex. SOD is founded upon the naturalistic decision-making approach, capitalizing on the decision-maker's experience, breadth and depth of knowledge and intuition in the face of complex problems or external pressures. As such, SOD is theoretically well suited to address the complexities inherent in today's operating environment.

SOD is still in its infancy. Although conceptually well suited as design and a planning tool, there is not yet enough practical experience and unclassified lessons learned to merit complete acceptance of SOD and a departure from CF OPP. CF OPP has its strengths and its weakness and, until SOD is further developed such that headquarters structures and procedures are in place to seamlessly accept SOD as doctrine, CF OPP will remain the doctrinal planning tool for the CF. In the mean time, elements of SOD can be incorporated into CF OPP to immediately improve operational design and planning. The commander and senior planning staff can focus on problem definition and design rather than jumping into mission analysis in stage 2 of CF OPP. Discourse can be embraced in each step in order to enhance the collective understanding of the problem

both within the operational and strategic level headquarters. Most important, the commander and staff must accept that they will never gain complete understanding of the situation and that the enemy, the operating environment and their own friendly forces are not immovable objects; they will adapt over time and space. Acknowledgement of this reality will facilitate the development of a richer campaign plan.

With a view to improving the CF's ability to design operational campaigns that better achieve the strategic goals of the nation, it is recommended that further research be conducted in three fields. First, Western nations have very little first-hand experiences from which to draw[163]. As such, how could the discourses of SOD be best conducted and recorded based on current CF headquarters structure? Second, based on the significant theoretical and philosophical foundations of SOD, how and when should it be taught to CF officers within the professional development stream? Finally, does SOD require significant changes to headquarters structure in order for it to work and, if so, what are the most significant changes that would be required? The essentials of SOD, as McAndrew atests for any emerging model, "will only be revealed through sustained thought and open discussion."[164]

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[163]Lauder, "Systemic Operational Design…", 41.

[164]MacAndrew, "Operational Art and the Canadian Army's Way of War", 98.

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