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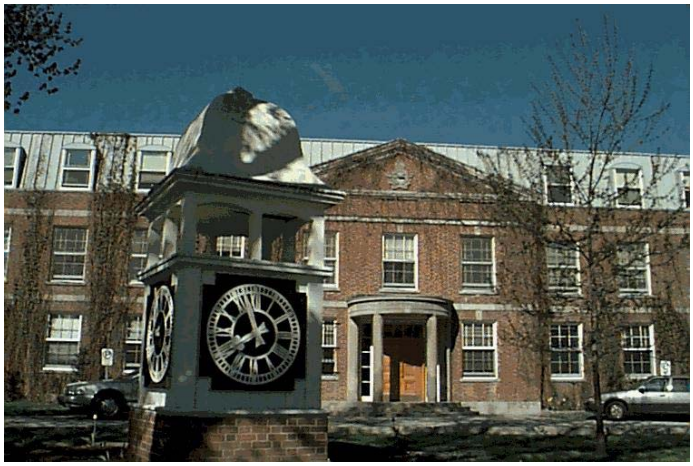

FORECASTING FOR CANADIAN NATIONAL SECURITY

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FORECASTING FOR CANADIAN NATIONAL SECURITY

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ABSTRACT

Eliminating uncertainty is a strong human desire which is challenged by an increasingly uncertain world. The changing security environment of the post-Cold War and post-9/11 period has been characterized by a rise in national security concerns and the absence of a definable enemy. This paper will explore the complexity of the modern security environment and in the process demonstrate why the future cannot be *predicted* but it can be *forecast*. The discussion of the nature of the security environment will show potential benefits from forecasting particularly for national security activities like capability development. By exploring the history of Canadian national security it will show that Canada's articulation of national security concerns has grown significantly, particularly in the post-9/11 period. It will explore Canada's nascent forecasting community in the Department of National Defence, the Canadian Security Intelligence Service and Policy Horizons Canada, showing how these efforts have been used in positive and negative ways for Canadian national security. This paper will conclude with proposals to improve Canada's forecasting capability. It will recommend that Canada complete a National Threat Assessment, develop a foreign intelligence service, and establish co-ordination of the forecasting community in order to move its forecasting capability into the future.

> *So make it Canada, 8 games to 0. If the Russians win one game, I will eat this column shredded at high noon in a bowl of borscht on the front steps of the Russian Embassy.*
>
> *- Dick Beddoes, The Globe and Mail, 1972*

CHAPTER 1 - INTRODUCTION

Predictions are all around us. From predicting the Stanley Cup winner[1] to election result projections,[2] there are a plethora of sources purporting to predict, forecast, or project the future. In the United States (US), the Psychic Services industry, encompassing activities such as palm reading, fortune-telling, and astrology, is a $2 billion a year industry.[3]

At first glance this appears to be an attractive notion. If we could predict the future we could win the office hockey pool, make big profits by picking the right stocks or avoid bad decisions by seeing the outcome in advance. For a country, it would greatly enhance national security by knowing where the next threat was coming from.

But is this really possible? Can we predict the future or will attempting predictions leave us like Beddoes eating borscht covered newsprint on the steps of the Soviet Consulate?[4] If we cannot predict the future should we even bother to try? Is there any way to think about the future to enable decision makers to make better choices? In the absence of a clearly defined enemy,

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[1] NHL.com, "2015 Stanley Cup Playoffs picks," last accessed to 25 April 2015, http://www.nhl.com/ice/news.htm?id=763063.

[2] Laurier Institute for the Study of Opinion and Public Policy, "Seat Projections: Converting poll results into party seat standings," last accessed 25 April 2015, http://www.lispop.ca/seatprojections.html.

[3] IBIS*World*, "Psychic Services in the US: Market Research Report," last accessed 25 April 2015, http://www.ibisworld.com/industry/psychic-services.html.

[4] Joe Pelletier, "Beddoes Makes His Prediction Into Tasty Borscht," last accessed 27 April 2015, http://www.1972summitseries.com/beddoes.html. The Soviets won game 1 of the 1972 Summit Series 7-3.

would forecasting future possibilities enhance national security by guiding decision makers in developing policy for real and emerging threats?

By forecasting the future to gain a greater appreciation of national security threats and emerging crises, it is proposed that national security can be enhanced. In applying this premise to Canada it will be suggested that Canada's national security could benefit from further development of its nascent forecasting capability.

Chapter 2 will look at the problem of the future. It will discuss why, for national security purposes, a prediction of the future is desirable. It will examine the problems of predicting the future and investigate whether or not it is possible to predict it. In doing so it will discuss the complexity of the modern world and the challenges that complexity presents to prediction. It will make a distinction between *prediction* and *forecasting* and argue that *prediction* is impossible but that several *forecasting* techniques can offer some insight into the future useful for national security.

A survey of the history of the articulation of national security threats and concerns in Canada will be completed in Chapter 3 with a view to understanding the implications of changes in that articulation over time. The survey will look at four eras in Canadian history: the interwar period from 1919 to 1939, the Cold War from 1945 to the fall of the Soviet Union in 1991, the post-Cold War period from 1991 to 2001, and the post-9/11 period from 2001 to the present day. It will trace the evolution of threats from clearly defined nation-state actors to the present day where a there are a multitude of national security threats and concerns that range from state to non-state actors and from countries to individuals. Further this chapter will note the emergence of forecasting in Canadian national security in the post-Cold War era.

Chapter 4 will delve further into Canadian forecasting attempts in the Department of National Defence (DND) and the Canadian Security Intelligence Service (CSIS). It will look at the Force Development product the Future Security Environment (FSE), discuss why this product was developed, and how it compares to similar products published by the United States (US) and the United Kingdom (UK). Further, it will investigate how the FSE is used within the three elements of the Canadian Armed Forces (CAF): the Canadian Army (CA), the Royal Canadian Navy (RCN) and the Royal Canadian Air Force (RCAF). Chapter 4 will finish by looking at another nascent Canadian forecasting capability in CSIS and its development of the Academic Outreach Program (AOP).

Measures intended to improve Canada's forecast of the future will be proposed in Chapter 5. Several steps to organize and focus the emerging forecasting capability to enhance Canadian national security will be offered. Following the intelligence cycle, this chapter will suggest improvements at each step: direction, collection, analysis, and dissemination. It will recommend several improvements. It will argue that Canada should complete a National Threat Assessment to better articulate the national security problem by prioritizing the known known and known unknown threats. Canada will be encouraged to develop a foreign intelligence service primarily to disrupt emerging threats and, thereby, reduce part of the national security problem. Finally Chapter 5 will argue that the nascent forecasting community in DND, CSIS, and Policy Horizons Canada (PHC) is lacking central direction and that by establishing a central authority, and co-ordination, of the forecasting community, Canada's forecasting capability would be enhanced as we move into the future.

> *By looking towards the far horizon, even if we cannot see it very clearly, we may, perhaps, be able to perceive the present in somewhat clearer perspective*.
>
> - R.J. Sutherland, 1962

CHAPTER 2 - PROSPECTS FOR FORECASTING FOR NATIONAL SECURITY

Implicit in Sutherland's 1962 comment is the notion that one cannot predict the future.[5] But is this really true? This chapter will explore the future by making a distinction between *prediction* and *forecasting* before examining the scope of national security for modern states in the post-Cold War era. By outlining the scope of the national security problems that states face it will conclude that the contemporary environment has too many variables to make reliable prediction possible. It will present *forecasting* as an alternative tool and explore what methods of *forecasting* the future are available. These methods: trends analysis, Alternative Futures, computer modelling and Bayesian analysis offer valuable insights that can be used to enhance national security.

Before commencing this study, some *forecasting* terminology must be defined as these terms have specific meanings in this paper. First it is necessary to distinguish between a *prediction* and a *forecast*. In general a *prediction* is precise and a *forecast* is a possibility. The Government of Canada, however, conflates these two terms, defining a prediction as a forecast and a forecast as "an estimate of future events or conditions."[6] To distinguish between the two

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[5] R.J. Sutherland, "Canada's Long Term Strategic Solution," *International Journal* 17, no.3 (Summer 1962), 200.

[6] "Terminum Plus® The Government of Canada terminology and linguistic database," last accessed 26 April 2015, http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=&index=ent&srchtxt=PREDICTION. http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=&index=ent&__index=ent&srchtxt=forecast&comencsrch.x=10&comencsrch.y=4.

words in this paper, the definition offered by Silver will be used. Silver's distinction, borrowed from seismology, is as follows. A *prediction* is "a definitive statement about when and where" an event will occur while "a forecast is a probabilistic statement, usually over a longer time scale."[7]

Forecasting can be broken down still further into different aspects: *insight, trends, foresight,* and *farsight* based on how far one is peering into the future. *Insight* is one to two years, *trends* are three to five years, *foresight* is five to ten years, and *farsight* is ten to thirty years into the future.[8] In Canadian literature the terms most often used are trends and foresight but they are not defined by timeframes in most publications.[9] *Trends* are *followed* in the Department of National Defence's (DND) *Future Security Environment 2013-2040* out to 27 years,[10] but, for the purpose of this paper, *trends* will not be defined by a specific number of years due to the variety in meaning between organizations. CSIS and PHC both use the term

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[7] Nate Silver, *The Signal and the Noise: Why So Many Predictions Fail – but Some Don't* (New York: The Penguin Press, 2012), 149.

[8] Her Majesty's Government, *Strategic Trends Programme: Global Strategic Trends – Out to 2045* (London: Ministry of Defence, 2014), xxv.

[9] The government of Canada terminology and linguistic database has a number of entries on "insight,""trend" and "foresight" none of which have a time frame. See "Terminum Plus® The Government of Canada terminology and linguistic database," last accessed 26 April 2015, http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=&index=ent&__index=ent&srchtxt=insight&comencsrch.x=0&comencsrch.y=0. See also: http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=&index=ent&__index=ent&srchtxt=foresight&comencsrch.x=0&comencsrch.y=0 and http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=&index=ent&__index=ent&srchtxt=TREND&comencsrch.x=10&comencsrch.y=11. Trend forecasting has a single definition but with respect to economics. See "Terminum Plus®…," last accessed 26 April 2015, http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=&index=ent&srchtxt=TREND%20FORECASTING. There is no entry for "farsight." "Terminum Plus®…," last accessed 26 April 2015, http://www.btb.termiumplus.gc.ca/tpv2alpha/alpha-eng.html?lang=eng&i=&index=ent&__index=ent&srchtxt=farsight&comencsrch.x=5&comencsrch.y=11.

[10] Department of National Defence, *The Future Security Environment 2013-2040* (Ottawa: Chief of Force Development, 2014) xv.

foresight without defining it.[11] PHC does note, however, that its reports look out between ten to fifteen years.[12] For the purposes of this paper, then, *foresight* will be defined as five to fifteen years into the future.

As this exploration of *forecasting* begins, it will first consider why a government might want to *forecast* the future for its national security. There are two aspects of national security considered in this chapter: capability development and intelligence support to decision makers. Capability development, particularly in the area of procurement, will be shown to have a real requirement to *forecast* the future given the length of time the contemporary acquisition processes take and the requirement of new equipment to operate well into the future. Intelligence will be shown to have two roles: dealing with surprise and providing advice to decision makers in an increasingly complex security environment.

Capability development and defence procurement is often a lengthy and a costly process. It may not be possible to get it exactly right, but to make sound decisions on equipment acquisitions, it is necessary to envision the likely future methods and theatres of conflict to ensure that the right kinds and numbers of systems are procured to build a force capable of facing the challenges it is likely to encounter.[13] The acquisition of a new weapons platform: be it a ship, aircraft, or land fighting vehicle takes a number of years, sometimes decades, to complete. Consider the example of the F-35 fighter. In 1997 Lockheed Martin entered the Joint Strike

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[11] CSIS publishes a number of "foresight" monographs that do not actually include a definition of foresight. See, for example, Canadian Security Intelligence Service, *Of Threats and Opportunities: Exploring Canada's National Security Interests in 2025 Results of a Foresight Project* (Ottawa: Her Majesty the Queen in Right of Canada, 2014), 5.

[12] Policy Horizons Canada, "What We Do," last modified 25 April 2013, http://www.horizons.gc.ca/eng/content/what-we-do.

[13] Department of National Defence, *Capability-Based Planning Handbook* (Ottawa: Chief of Force Development, 2014), 20.

Fighter competition with the X-35 which was selected in 2001.[14] As of September 2014 the program was still at least 5 years from completion.[15] In the *Capability-Based Planning Handbook*, five to ten years is used to develop future scenarios and is derived from "both the length of time required to procure military equipment and the length of time that equipment tends to remain in service."[16] Depending on the nature of the acquisition it may be necessary to be able to visualize what the world will look like well beyond ten years as the effective life of the platform must also be considered. For example Vice-Admiral Paul Maddison stated in 2011,

> the next class of warships we build in Canada are likely to still be in service in 2050. In fact, building a navy is a series of fifty-year decisions, any one of which is among the most substantial a government will ever make, not only for the size of the investment involved, but also because it will determine for decades to come the options future Prime Ministers will have at their disposal to respond to events.[17]

The possibilities offered by the future then, are important to national capability development. If there is no attempt to sketch out the likely future, then plans which will affect future governments' flexibility in responding to strategic challenges, as in the case of naval planning, *or* plans themselves that will require decades to be realized as in the case of the F-35, will be made in a condition of extreme uncertainty.

In looking at the future, it is natural to consider the role intelligence plays in supporting decision makers. This is articulated in the *Canadian Forces Joint Publication 2-0 Intelligence*

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[14] Lockheed Martin, "F-35 Timeline," last accessed 8 April 2015, https://www.f35.com/about/history.

[15] Aaron Mehta, "The Current Status of the F-35, in Three Charts," *Defense News*, last accessed 8 April 2015, http://intercepts.defensenews.com/2014/09/the-current-status-of-the-f-35-in-three-charts/.

[16] DND, *Capability-Based Planning*…, 11 note 3.

[17] Vice-Admiral Paul Maddison, What the Admiral Said: The Business of the Royal Canadian Navy, (speech 2011 Supply Chain and Logistics Association Conference, 2011). http://www.cfc.forces.gc.ca/JCSPDL/Readings/wtas-maddison-eng.pdf

(CFJP 2.0), where the term 'intelligence' is defined as "the product resulting from processing information concerning foreign nations, hostile (or potentially hostile) forces or elements, or areas of actual or potential operations."[18] This is echoed by Colonel (Ret'd) John Hughes-Wilson who describes intelligence as "nothing more or less than information that has been systematically and professional processed and analyzed."[19] Hughes-Wilson further notes that surprise is a key principle of war and that commanders rely on their intelligence capability to avoid surprise.[20] CFJP 2.0 makes no mention of surprise but does note that "provision of timely warning is the most critical Intelligence responsibility."[21] Intelligence, then, can be viewed as an aid to decision making that enhances understanding and aids in avoidance of surprise. At its heart, intelligence is a futures oriented discipline.

It is incumbent upon intelligence, in supporting national security, to try to minimize the effects of, or avoid, strategic surprise. If decision makers are going to make proactive, vice reactive, decisions they must have some idea of what developments *might occur.* If they are to make good decisions, then the ideas must be based on logical analysis of the threats or crises most likely to occur. Even if the actual contingency never arises, going through the planning process will leave the decision maker better situated to deal with unanticipated developments. Further, even if the *specific* crisis cannot be anticipated, an analysis of the types of crises that

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[18] Department of National Defence, *Canadian Forces Joint Publication 2-0 Intelligence* (Canada : Chief of Defence Intelligence, 2011), 1-1.

[19] Colonel John Hughes-Wilson, *Military Intelligence Blunders and Cover-Ups* (London: Constable and Robinson Ltd., 2004), 4-5.

[20] *Ibid*…, 1.

[21] DND, *CFJP 2-0…*, 2-4.

may emerge can enable better reactions by decision makers.[22]

CFJP 2-0 and Hughes-Wilson's definitions are primarily at the operational and tactical levels of conflict and therefore represent only a narrow slice within the larger national security problem. These definitions do not clearly enough articulate the role of intelligence in a national context. For example, Cynthia Grabo defines the scope of American warning intelligence in the post-World War II period much more broadly and concerned with four things:

> (a) direct action by hostile states against the U.S. or its allies, involving the commitment of their regular or irregular armed forces; (b) other developments particularly conflicts affecting U.S. security interests in which such hostile states are or might become involved; (c) significant military action between other nations not allied with the U.S., and (d) the threat of terrorist action.[23]

While the scope encompassed by Grabo's definition is a good start, this definition still falls short of the scope of national security challenges today. In the paragraphs below it will be demonstrated that what constitutes a threat to national security has gone from nation state actors to a host of vectors that were not traditionally considered national security problems. In order to understand the full scope of national security it is necessary, therefore, to examine the post-Cold War expansion of security, the rise of non-state actors, and the emergence of "wicked problems."

The shift in the scope of national security began with the end of the Cold War and resulted in a situation where virtually everything now has a national security dimension. During the Cold War, there was a clearly defined enemy and it was possible to bring sharp focus on the

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[22] Thomas Quiggin, *Seeing the Invisible: National Security Intelligence in an Uncertain Age* (Singapore: World Scientific Publishing, 2007), 42-43.

[23] Cynthia M. Grabo, *Anticipating Surprise: Analysis for Strategic Warning* (Washington: National Intelligence Press, 2002), 2. Grabo's handbook was developed in the 1970s and drew from her long experience producing Strategic intelligence warning for the US government. It was useful as very few analytical handbooks exist. Following 9/11 it was updated and declassified.

limited number of potentially belligerent states.[24] Fingar observes that since the Cold War, the scope and scale of the intelligence problem has expanded enormously and gone from a need to track distinct targets like intercontinental ballistic missile sites to having to be able to locate individual terrorists.[25] Instead of focusing on a few countries, an analyst must track threats all over the globe. Rather than safeguarding the state, now the public expectation is that the government will safeguard individual citizens who have placed themselves in harm's way such as the recent case of Kayla Jean Mueller in the US.[26] To exacerbate the issue, rather than what might be considered purely military threats, Fingar asserts national security now includes "the effects of global climate change, infectious disease, cybersecurity, trafficking in persons, counterfeit pharmaceuticals, and international criminal networks"[27] This is reflected in Canada's "*Securing an Open Society: Canada's National Security Policy* (NSP) which includes a similar mix in its list of threats.[28] Put another way, everything now may potentially have a national security nexus.

To further complicate matters, the number of actors in the security environment has dramatically expanded beyond traditional state based threats. Since the end of the Cold War,

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[24] Thomas Fingar, *Reducing Uncertainty: Intelligence Analysis and National Security* (Stanford: Stanford University Press, 2011), 8.

[25] *Ibid*., 9.

[26] *Ibid.* and Catherine E. Shoichet, Jason Hanna and Pamela Brown, "American ISIS hostage Kayla Mueller dead, family says," *Cable News Network*, 11 February 2015, last accessed 10 March 2015, http://edition.cnn.com/2015/02/10/world/isis-hostage-mueller/. Mueller was abducted in Aleppo, Syria while conducting humanitarian relief work in 2013. President Obama noted, ""We devoted enormous resources, always devote enormous resources to freeing captives or hostages anywhere in the world. And I deployed an entire operation -- at significant risk -- to rescue not only her but the other individuals who had been held, and probably missed them by a day or two, precisely because we had that commitment,"

[27] Fingar, *Reducing Uncertainty*… 9.

[28] Canada Privy Council Office, *Securing an Open Society: Canada's National Security Policy* (Ottawa: Her Majesty the Queen in Right of Canada, 2004), 7-8. Threats are further elaborated in the *Canada First Defence Strategy* which also includes changing weather patterns [that] are altering the environment. See Department of National Defence, *Canada First Defence Strategy* (Ottawa: Department of National Defence, 2008), 6.

non-state actors have a growing ability to affect states and their actions cannot be ignored in the calculation of national security.[29] A recent example of this phenomenon is the rise of the Islamic State of Iraq and al-Sham (ISIS). ISIS began as an off-shoot of al-Qaeda in Iraq but is now a non-state sectarian actor in control of territory in Syria and Iraq approximately the size of the United Kingdom.[30] Such a non-state actor which has actively inspired attacks in France, Australia, Canada, and elsewhere, is a security threat that cannot be ignored.[31]

Further, many of the national security problems facing states today fit the definition of a "wicked problem" which by definition makes them intractable. These problems are also referred to as "interactively complex" or "ill-structured" problems and these names provide some clues to their nature.[32] Rittel and Webber identified "wicked problems" as having ten characteristics that defined them.[33] Chief among these characteristics is the difficulty in defining the problem and the level of significant disagreement among stake holders as to possible solutions.[34] A "wicked

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[29] Quiggin, *Seeing the Invisible*…, 12-13.

[30] Fawaz A. Gerges, "ISIS and the Third Wave of Jihadism," *Current History: A Journal of Contemporary World Affairs* Vol 113 Issue 767 (December 2014), 339-340, 343.

[31] Stephen Collinson, "Paris Attack: The New Terror," *CNN News: International Edition,* 9 January 2015, last accessed 14 April 2015, http://edition.cnn.com/2015/01/08/politics/paris-new-terror/.

[32] T.C. Greenwood, "War planning for wicked problems," *Armed Forces Journal* 1 December 2009, last accessed 8 April 2015, http://www.armedforcesjournal.com/war-planning-for-wicked-problems/

[33] Horst W.J. Rittel and Melvin M. Webber, "Dilemmas in a General Theory of Planning," *Policy Sciences* 4 (1973), 161-167. The characteristics outlined in these pages are: 1) "There is no definitive formulation of a wicked problem." 2) "Wicked problems have no stopping rule." 3) "Solutions to wicked problems are not true-or-false, but good-or-bad." 4) "There is no immediate and no ultimate test of a solution to a wicked problem." 5) "Every solution to a wicked problem is a 'one-shot operation;' because there is no opportunity to learn by trial-and-error, every attempt counts significantly." 6) "Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan." 7) "Every wicked problem is essentially unique." 8) "Every wicked problem can be considered to be a symptom of another problem." 9) "The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution." 10) "The planner has no right to be wrong."

[34] Nancy Roberts, "Wicked Problems and Network Approaches to Resolution," *International Public Management Review* 1, no.1 (2000), 1.

problem" is one that cannot be defined until all the possible solutions have been identified.[35] Because the definition of a "wicked problem" is dependent on identifying potential solutions, the understanding of a specific "wicked problem" depends on the perspective of the observer and will vary from observer to observer.[36] All wicked problems are unique which means there are no historical examples to provide solutions.[37] Due to their interconnected nature as part of a system, "wicked problems" cannot be "solved." Any attempted solution of a "wicked problem," even a small input in the system, will have an impact and thereby change the problem, sometimes massively.[38] Finally, for a "wicked problem" there is no definitive solution and it can only be temporarily addressed, or abated, but it will recur over time.[39]

An example of a wicked problem is graphically displayed in Figure 1 below. This diagram graphically depicts the national level counter-insurgency and governance problem faced by General Stanley McChrystal in Afghanistan in 2010. Critics did not understand that it was a representation of the "wicked problem" and readily lampooned it. One commentator noted, "Richard Engel says this chart was made for the Joint Chiefs of Staff. I prefer to think that it was drawn for a new magazine called Popular Chaos Illustrated and that the White House is a charter subscriber."[40]

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[35] Rittel and Webber, "Dilemmas…," 161.

[36] *Ibid.,* 166 and Daniel R. Green, "Design and Joint Operation Planning," *Canadian Military Journal* 12, no.1 (Winter 2011), 32.

[37] Rittel and Webber, "Dilemmas…," 163-164.

[38] *Ibid.*, 163, and Greenwood, "War planning…"

[39] Green, "Design and Joint …," 32 and Greenwood, "War planning…"

[40] Editor, "Afghanistan Stability / COIN Dynamics Chart," *The Defense Strategy Review Page from the project on defense alternatives,* last accessed 30 April 2015, http://www.comw.org/wordpress/dsr/afghanistan-stability-coin-dynamics-chart-pa-consulting.

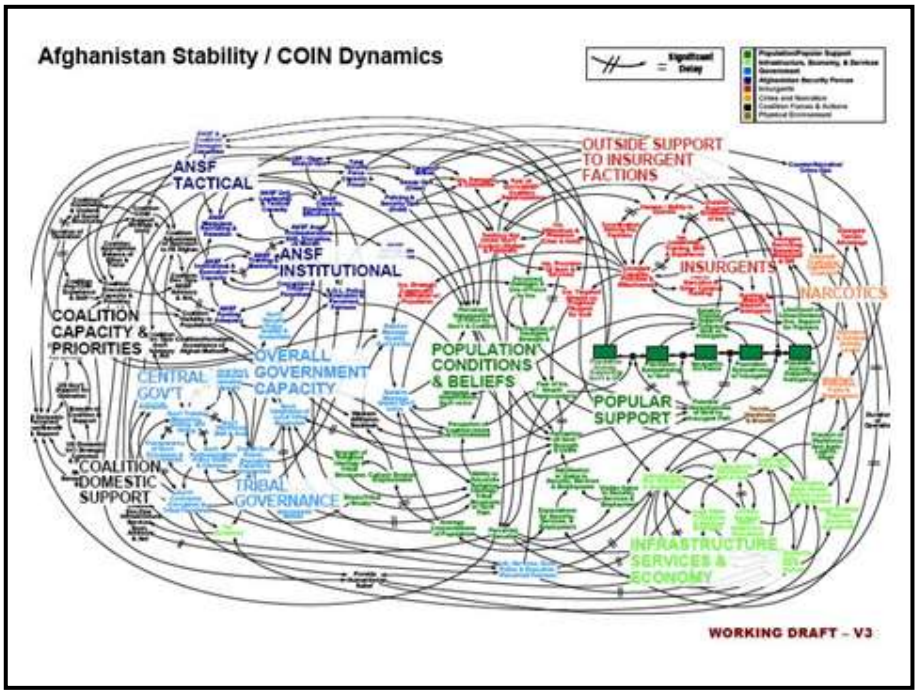

Figure 1- Afghanistan Stability/Coin Dynamics
Source: Afghanistan Stability / COIN Dynamics Chart," *The Defense Strategy Review Page from the project on defense alternatives,* last accessed 30 April 2015, http://www.comw.org/wordpress/dsr/afghanistan-stability-coin-dynamics-chart-pa-consulting.

The critics, however, are missing the point and attack the slide thinking that it is the plan to solve the Afghanistan problem. What the slide really represents is the problem. McChrystal stated, "When we *understand* that slide, we'll have won the war."[41] Looking at the complexity of the graphic, however, illustrates that a "wicked problem" can never be fully understood but, by attempting to define it, it can be better bounded and approached.[42]

National security problems have become quite complex since the Cold War and as the scope of national security broadened there was a growing demand for intelligence products from

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[41] Brad Norington, "Pentagon uses its noodle to win war," *The Australian*, April 29, 2010, last accessed 30 April 2015, http://www.theaustralian.com.au/news/world/pentagon-uses-its-noodle-to-win-war/story-e6frg6so-1225859597904.

[42] A breakdown of the construction of the graphic is here: PA Consulting Group, "Afghanistan Stability / COIN Dynamics," PA Knowledge Limited, 2009, http://www.oss.net/dynamaster/file_archive/091222/9649ad18a0d538dc213e13af676e3aa8/Afghanistan_Dynamic_Planning.pdf

decision makers and their staffs which raised an unanticipated problem.[43] As part of the response to the increased demand, and a result of the advent of new technological capabilities, there was been an increase in collection capabilities, but without a proportional increase in analytic capability. Analysts now face an incredibly broad set of problems, spanning the globe, with collection assets providing more data than they can possibly process.[44] This has the net effect of analysts spending most of their time scanning through multiple reports looking for nuggets of information and very little time actually thinking and analyzing.[45] For example, it is estimated that it would take 24 years in order to exploit all of the data captured by drones in Afghanistan in 2009 with the current number of analysts.[46]

Further, while new technology has many benefits for intelligence, there is a paradox in that the new technology and innovation often offers opportunities for potential threat actors. It is not sufficient to track new technological developments. Attention must also be paid to the possibility of new technology being employed in unanticipated ways, perhaps in combination with other new technology, creating effects or capabilities not anticipated by the innovator. This can give rise to entirely new and unanticipated threats.[47] One example of this kind of development is the use of social media by ISIS to spread its message, recruit followers, and

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[43] Wayne Michael Hall and Gary Citrenbaum, *Intelligence Analysis: How to Think in Complex Environments* (Santa Barbara: Praeger Security International, 2010), 25.

[44] Fingar, *Reducing Uncertainty…* 10. James Sheptycki calls this "intelligence overload." See James Sheptycki, "To go beyond the cycle of intelligence-led policing," in *Understanding the Intelligence Cycle*, ed. Mark Phythian, 99-118 (London: Routledge Taylor and Francis Group, 2013), 107.

[45] Sandra I. Irwin, "Too Much Information, Not Enough Intelligence," *National Defense Magazine* (May 2012), last accessed 14 April 2015, http://www.nationaldefensemagazine.org/archive/2012/May/Pages/TooMuchInformation,NotEnoughIntelligence.aspx

[46] Joseph Fitsanakis, "Too much intelligence collection overwhelms US agencies," *IntelNews* 12 January 2010, last accessed 15 April 2015, http://intelnews.org/2010/01/12/01-361/.

[47] Quiggin, *Seeing the Invisible…,*36.

gather information to target Western military personnel.[48] Such use of this technology was inconceivable when the internet was created and social media websites like Facebook and Twitter were developed. Further, while it is clear that Steve Jobs recognized the revolution that he had unleashed on the world by combining a cell phone, an iPod, and a web browser in a single device,[49] as visionary as he was, it is doubtful that he anticipated how an organization like ISIS could incorporate Apple technology for their information operations.

As the scope of national security has expanded, the understanding of the nature of surprise has grown. This was famously articulated by Donald Rumsfeld in his articulation of known and unknown information. Rumsfeld spoke of known knowns, known unknowns, and unknown unknowns.[50] In terms of national security a known known is a threat that has been identified. An unknown known is a potential problem that is known but for which there is no clear definition of the scale, scope, or severity of the threat making it dangerous or unpredictable.[51] Silver defines an unknown unknown as "a contingency that *we have not even considered.* We have some kind of mental block against it, or our experience is inadequate to imagine it; it's as though it doesn't even exist."[52]

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[48] Sabrina Toppa, "ISIS Uses Social Media to Lure British Muslim Girls,Think Tank Says," *Time* 24 February 2015, last accessed 14 April 2015, http://time.com/3719895/isis-social-media-uk-british-muslim-girls/, and Philip Ross, "US Airstrikes ISIS: Troops Told To Limit Social Media Use After Islamic State Threatens Families Online," *International Business Times* 14 April 2015, last accessed 13 April 2015, http://www.ibtimes.com/us-airstrikes-isis-troops-told-limit-social-media-use-after-islamic-state-threatens-1880292. For further insight on ISIS use of social media see J.M. Berger and Jonathon Morgan, *The ISIS Twitter Census: Defining and describing the population of ISIS supporters on Twitter*, *The Brookings Project on U.S. Relations with the Islamic World Analysis Paper No. 20*, (Washington: Brookings Institute 2015), last accessed 14 April 2015, http://www.brookings.edu/research/papers/2015/03/isis-twitter-census-berger-morgan.

[49] Walter Isaacson, *Steve Jobs* (New York: Simon and Schuster, 2011), 474.

[50] Department of Defense, "DoD News Briefing - Secretary Rumsfeld and Gen. Myers," February 12, 2002, last accessed 30 April 2015, http://www.defense.gov/transcripts/transcript.aspx?transcriptid=2636.

[51] Silver, *The Signal*…, 420-421.

[52] *Ibid.*, 421.

Unknown unknowns are the realm from which strategic surprise often emerges. The effect of unknown unknowns becomes further enhanced considering the normal human response to new information. Often the unfamiliar is regarded automatically as improbable. Silver, quoting Schelling, notes "the contingency we have not considered seriously looks strange; what looks strange is thought improbable; what is improbable need not be considered seriously."[53] An example of this is 9/11. Dahl argues,

> senior policymakers did not truly believe that terrorists might use commercial airliners as aerial bombs. The possibility had been imagined, and numerous government officials had been warned. But because no such attack had ever occurred before, these warnings were seen as little more than imaginative scenarios, and little action was taken against the threat.[54]

To avoid strategic surprise the ideal situation is to accurately predict the future but this is not possible. Quiggan asserts that prediction is only possible in a system that has a small number of known and controlled variables. As an example he cites predicting how long it will take to boil water in a laboratory. All the variables including the ambient temperature in the lab, the amount and purity of the water, the amount of heat applied, the composition of the boiling vessel, the atmospheric pressure, and purity of the water can be known, or measured, and controlled. As a result the time when the water will boil can be predicted. [55] With more variables, such as in national security problems, prediction is not possible, even for experts.

At first glance, Clark appears to dispute Quiggan arguing that "convergent phenomena

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[53] *Ibid.*, 419.

[54] Erik J. Dahl, *Intelligence and Surprise Attack: Failure and Success from Pearl Harbor to 9/11 and Beyond* (Washington: Georgetown University Press, 2013), 159.

[55] Quiggin, *Seeing the Invisible…,* 180-181.

make prediction possible."[56] Clark defines convergent phenomena as occurring when two pieces of evidence support the same conclusion.[57] His examples of prediction include Kennan's prediction that the Soviet Union would eventually collapse under the policy of containment.[58] Clark is not however, defining prediction as "a definitive statement about when and where." As defined by this paper, Kennan's *prediction* was actually a *forecast* and Clark is, in these terms, arguing that convergent phenomena make a *forecast* possible.

Nassim Taleb, in his book *Black Swan: The Impact of the Highly Improbable*, notes, "in spite of our progress and growth in knowledge, or perhaps *because* of such progress and growth, the future will be increasingly less predictable."[59] As Nate Silver puts it, "there is no reason to conclude that the affairs of men are becoming more predictable. The opposite may well be true. The same sciences that uncover the laws of nature are making the organization of society more complex."[60] Consider for example, the difficulty of choosing your diet in the contemporary world. There is a deluge of literature, backed by science, which advocates what to eat, and what not to eat, for optimum health. The problem is that there is too much information and much of the information is conflicting. We are left with bewildering choices, none of which seems quite right. One commentator noted, "they say knowledge is power, but in our complicated food

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[56] Robert M. Clark, *Intelligence Analysis: A Target-Centric Approach Second Edition* (Washington: CQ Press, 2007), 173.
[57] *Ibid.*, 129.
[58] *Ibid.*, 174.
[59] Nassim Nicholas Taleb, *Black Swan: The Impact of the Highly Improbable* (New York: Random House Inc., 2010), xxxii.
[60] Silver, *The Signal…*, 447-448.

marketplace, what you know often can inspire a feeling of powerlessness."[61] For a more difficult problem like national security, the implications of the growth of knowledge are clear. Decision makers are faced with a complex torrent of data and must make choices from often conflicting information.

Human nature, however, does not like uncertainty, and occasionally there is an individual touted for the accuracy of their predictions of the future such as "Ray Kurzweil's Mind-Boggling Predictions for the Next 25 Years."[62] Such work is thought provoking but immediately suspect because it only lists the items Kurzweil got right and not what he predicted incorrectly. Such is the nature of modern day prophets, who are praised when they are correct and their mistakes are conveniently ignored.[63] Philip Tetlock examines a similar theme in depth in *Expert Political Judgement: How Good Is It? How Can We Know?* Tetlock's research indicates that, paradoxically, experts that ardently purport to be able to accurately predict outcomes are actually less accurate in foretelling the future than those experts who make more tentative future forecasts.[64]

Just because we can't *predict* the future that does not mean that attempting to *forecast* the future is pointless. We can never remove the uncertainty surrounding the future but research indicates that some methods work better than others at bounding it. These can be taught and

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[61] Sarah Elton, "Wheat, meat, now milk – what's safe to eat in the 21st century?" *The Globe and Mail,* April 26, 2015, last accessed 30 April 2015, http://www.theglobeandmail.com/life/health-and-fitness/health/wheat-meat-now-milk-whats-safe-to-eat-in-the-21st-century/article24110276/.

[62] Peter Diamandis, "Ray Kurzweil's Mind-Boggling Predictions for the Next 25 Years," *Singularity Hub,* last accessed 10 March 2015, http://singularityhub.com/2015/01/26/ray-kurzweils-mind-boggling-predictions-for-the-next-25-years/

[63] Dan Gardner, *Future Babble: Why Expert Predictions Fail – and Why We Believe Them Anyway* (Toronto: McClelland and Stewart, 2010), 177.

[64] Philip E. Tetlock, *Expert Political Judgement: How Good Is It? How Can We Know?* (Princeton: Princeton University Press, 2005), 77-81. Much of Gardner's work is an outgrowth of Tetlock's ongoing research.

applied with favourable, if imperfect, results.[65] By making the distinction between a *prediction* and a *forecast* it is possible to pursue this line of investigation.

A review of Clark's argument that Kennan *predicted* that containment would lead to the fall of the Soviet Union is actually a demonstration of the potential of *forecasting*. Containment came out of an article in *Foreign Affairs* written under the pseudonym "X" in 1947.[66] In his article Kennan did not make a *prediction* providing a timeline and a recipe for the dissolution of the Soviet Union. Instead, Kennan reviewed the history of the Soviet Union and its conditions in 1947 noting "Soviet society may well contain deficiencies which will eventually weaken its own total potential."[67] Kennan's *forecast* was that

> the United States has it in its power to increase enormously the strains under which Soviet policy must operate, to force upon the Kremlin a far greater degree of moderation and circumspection than it has had to observe in recent years, and in this way to promote tendencies which must eventually find their outlet in either the break-up or the gradual mellowing of Soviet power.[68]

Kennan's *forecast* was the basis of the US foreign policy of containment until the dissolution of the Soviet Union.[69] If similar *forecasts* can be produced, they offer a valuable tool for national decision makers.

Forecasting is a relatively new field and there is not yet a consensus on how to do it. For example, George and Wirtz observe that,

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[65] Gardner, *Future Babble*…, 16.

[66] John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy* (Oxford: Oxford University Press, 1982), 26.

[67] X, "The Sources of Soviet Conduct," *Foreign Affairs* 25 (July 1947), 581.

[68] *Ibid.*, 582.

[69] Department of State Office of the Historian, "Milestones: 1945-1952, Kennan and Containment 1947," last accessed 30 April 2015, https://history.state.gov/milestones/1945-1952/kennan.

> the director of national intelligence has a small interagency "tiger team" focused on how it can best develop "anticipatory intelligence," which identifies emerging trends that might have significant implications for US interests. In part it is a recognition that some new transnational issues – global health, global climate change, humanitarian issues, and financial crises – do not lend themselves to traditional indicators and warning analysis. Determining how one can monitor these more novel issues remains a work in progress. Some have suggested the use of "horizon-scanning" techniques for monitoring a long list of basic economic, demographic, social, political trends from which one can determine some potentially significant discontinuities, but these techniques remain relatively untried in the United States.[70]

While these methods are relatively untried in the US, there has been work elsewhere. Four methods that are commonly used are: trend analysis, Alternative Futures, computer assisted modeling, and Bayesian analysis which will be reviewed in turn.

Trend analysis is a very attractive approach as it proceeds from the known to the unknown. The CSIS publication, *Of Threats and Opportunities*, argues that by analyzing and extrapolating current trends it is possible to sketch out the key features of the future security threats including allowances for unplanned events.[71] This practice appears to be a popular today,[72] perhaps encouraged in national security efforts by the US *Global Trends* series of products. *Global Trends*, first produced in the mid-1990s was intended to "identify trends and

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[70] Roger Z. George and James J. Wirtz, "Warning in an Age of Uncertainty," in *Analyzing Intelligence: National Security Practitioner's Perspectives Second Edition*, ed. by Roger Z. George and James B. Bruce, 215-228 (Washington: Georgetown University Press, 2014), 226.

[71] CSIS, *Of Threats and Opportunities*…, 20.

[72] Frank Spencer and Yvette Montero Salvatico, "Why Predicting Trends Doesn't Help Prepare For The Future," last accessed 10 March 2015, http://www.fastcoexist.com/3021148/futurist-forum/why-predicting-trends-doesnt-help-prepare-for-the-future. This article notes that if you "do a search for 'trends' on Amazon, and you will find that there is a book written on the subject every 15 minutes. This mountain of books is due to the fact that many people believe trends to be the beating heart of futures thinking."

drivers that appear likely to constrain and challenge decision makers around the world."[73]

Trend analysis, extrapolation, and projection, however, can only do so much. This approach is often too simplistic because it requires the current trend to continue indefinitely and as Nate Silver notes, "some of the best-known failures of prediction have resulted from applying this assumption too liberally."[74] Taleb explains the limits of trend analysis by recounting Betrand Russell's parable of the turkey. Up until the last day of its life, the turkey's interaction with humans has been positive. They have fed and watered it and all trends point to a continued positive relationship with humans. Then the axe falls and the turkey becomes supper.[75] While in retrospect, it would be possible, if the sudden absence was noticed, for the other turkeys to "connect the dots" often such changes are not noticed and the sudden end of the trend appears without warning to the turkey. The parable illustrates the key problem with trend projections: the implicit assumption that trends continue in a linear fashion.

Linear systems are systems in which the behavior of the system is the sum total of its parts. All the parts of the system are added together in a consistent cause and effect way. Linear systems by their nature are predictable. If you add or subtract from the system, predictable results will occur. The operation of the solar system is linear. The movements of the planets can be accurately projected. Non-linear systems are those in which the components are not additive, rather, they are synergistic. The cause and effect relationships are not certain and they feature

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[73] Fingar, *Reducing Uncertainty*…, 58.
[74] Silver, *The Signal*…, 212.
[75] Taleb, *Black Swan*…, 40. Taleb notes that Russell's example used a chicken but he changed it to reflect his American audience.

side-effects and unintended consequences. All nation-states are non-linear systems.[76] Further most systems that are of national security interest are non-linear.[77]

The synergy of non-linear systems presents even more problems for *forecasting* due to the impact of feedback on the system. For example, Lorenz's "Butterfly Effect" describes how even small changes can have big impacts on a system.[78] One classic example was the assassination of Archduke Ferdinand in 1914. While academic debate continues over the cause of the war, the trigger for the catastrophic unravelling the complex interstate system was the murder.[79] Given the complexity of the modern world, where a small change can affect the entire system, accurate trend projection is problematic. As Spencer and Salvatico note, "trends tend to keep us connected to what is immediate and surrounding us, but fail to stretch us to see what is changing, what is emerging, and what is possible."[80] In 1903, for example, the Michigan Savings Bank president advised against investing in Ford noting that "the horse is here to stay but the automobile is only a novelty—a fad."[81] The bank president's prediction was perfectly reasonable given the trend of reliance on horses for land transportation for hundreds of years. Grounded in the present, his failing was in his inability to imagine the enormous possibilities coming with the advent of motor vehicles. Steve Jobs viewed the limitations of trends analysis from a different

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[76] Josh Kerbel, "Thinking Straight: Cognitive Bias in the US Debate about China, Rethinking Thinking," *CIA Library*, 14 April 2007, last updated 26 July 2008, https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/csi-studies/studies/vol48no3/article03.html.

[77] Gardner, *Future Babble*…, 39.

[78] *Ibid.*, 38.

[79] Hew Strachan, *The Outbreak of the First World War* (Oxford: Oxford University Press, 2004), 82. Recent scholarship has challenged this but that only highlights the complexity of the international system and the difficulty it presents to an analyst or historian. See William Mulligan, "The Trial Continues: New Directions in the Study of the Origins of the First World War," *The English Historical Review* 129, no. 538 (June 2014) for additional discussion of the root causes.

[80] Spencer and Salvatico, "Why Predicting Trends…"

[81] Ashley Lutz, "20 Predictions From Smart People That Were Completely Wrong," *Business Insider* 2 May 2012, last accessed 15 April 2015, http://www.businessinsider.com/false-predictons-2012-5?op=1.

perspective. Jobs eschewed market research noting, "customers don't know what they want until we've shown them."[82] His point was that no amount of trend research and analysis will *forecast* an innovation.

Finally, trend analysis relies on an accurate understanding of the situation and systems as they exist today. If that understanding is incorrect, any errors will likely be magnified as they are projected forward.[83] Given the complexity of the modern world, trend analysis faces a significant challenge.

Alternative Futures, sometimes called scenario planning, is another approach.[84] In Alternative Futures, rather than trying to forecast the future precisely, a number of different future scenarios are created which may be seen to be accurate or may include possibilities that seem fanciful or implausible. The scenarios are then examined and the implications are considered. From this reflection, decisions for actions can be made. This is a useful brainstorming or thinking exercise but it is unclear how valuable the outcomes are, or indeed how to measure the validity of the outcome.[85] Indeed, the outcome is often of less importance than the experience of going through the process. For many participants the free-thinking brainstorming process of constructing the scenarios themselves is as useful as the outputs of the exercise.[86]

One example of an Alternative Futures project was completed by the Rand Corporation to support US Army development. For this study they considered five factors: demographics,

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[82] Isaacson, *Steve Jobs*…, 143.
[83] Clark, *Intelligence Analysis*…, 169.
[84] United States, *A Tradecraft Primer: Structured Analytic Techniques for Improving Intelligence Analysis*, 2009, 34. Last accessed 27 April 2015, https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/Tradecraft%20Primer-apr09.pdf.
[85] Gardner, *Future Babble*…, 110-111.
[86] US, *A Tradecraft Primer*…, 34.

geopolitics, economics, environment, and technology. The study charted the factors versus possible developments being good, medium, or bad for each as shown below in Figure 2. This gave a potential 243 different combinations which were reduced to two best case worlds, two worst case worlds, and two medium scenarios. Using these six possibilities as a framework, required US Army force capabilities for each were derived.

	Good	Medium	Bad
Demographics	Population stability	Regional overpopulation	Systemic demographic pressure
Geopolitics	Hegemonic stability or benign multipolarity	Peer competition or multipolarity	Nation-state collapse
Economics	Steady growth/ low inflation	Slowdown	Stagnation
Environment	Resource management	Water scarcity, soil erosion	Climate change, famines
Technology	Information technology boom, biotech growth	Information technology slowdown	Destructive applications

Figure 2: Rand Alternative Futures Matrix
Source: Nichiporuk, *Alternate Futures*, 7.

There were two limitations to the RAND study, both of which it acknowledged. First it did not consider a mix of good and bad outcomes.[87] This made for a simpler process but it does not necessarily reflect the complexity and unpredictability of the modern world. More significantly it did not consider the rise of a new ideology and specifically the rise of "militant Islamic fundamentalism" arguing that this omission while significant would not invalidate their

[87] Brian Nichiporuk, *Alternate Futures and Army Force Planning: Implications for the Future Force Era* (Santa Monica: RAND Corporation, 2005), 8.

findings.[88] With the rise of ISIS it is clear they got their start point wrong and thus all of their findings should be reconsidered. In essence, Alternative Futures can be a useful tool but there are risks of significant error in its execution.

With the advances in computer technology it is logical to conclude that some of the problem of overwhelming data might be addressed through an automated solution. The scope of the problem of mass data is immense with an estimated increase in raw information of 2.5 quintillion bytes per day. The problem is that most of this data is not useful information. Hidden in this mass is a small amount of useful information and the rest is clutter. But the amount of clutter is increasing faster than the amount of useful data.[89] Further, technology tends to be most useful supporting the intelligence functions that already work well such as collection and collation. To date automation has yet to offer significant support or improvement to analysis which is the area where intelligence is most strained.[90] In the case of the failure to pre-empt the Christmas Day bomber in 2009, the problem was not the collection or collation of information but rather the inability to sift through the data. As one intelligence source noted, "it's not that information wasn't passed around, it's that so much information is being passed."[91] With respect to drone video and other data, automated electronic image recognition can complete preliminary analysis but final judgment of information still requires a human analyst.[92]

Nevertheless, there is some promise in taking an automated, or semi-automated, approach. The National Weather Service in the US uses computers for weather forecasting.

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[88] *Ibid.,* 6.
[89] Silver, *The Signal…*, 13.
[90] Quiggin, *Seeing the Invisible*…, 180, 184.
[91] Karen DeYoung, "Obama to get report on intelligence failures in Abdulmutallab case," *Washington Post* 31 December 2009, last accessed 15 April 2015, http://www.washingtonpost.com/wp-dyn/content/article/2009/12/30/AR2009123003229.html?hpid=topnews&sid=ST2009123002832.
[92] Fitsanakis, "Too much intelligence…"

When comparing the accuracy of weather forecasting by a computer alone versus a computer whose forecast is reviewed, analyzed and updated by a human forecaster the results are interesting. The forecasts of a computer that have been amended by a human forecaster are 25% more accurate for precipitation and 10% more accurate for temperature. Computers can be useful tools that can enhance the accuracy of the human analyst.[93] The National Weather Service experience with automating analysis suggests that further efforts at automation may bring dividends.

There is significant interest in automating the horizon scanning process. Horizon scanning, the "systematic examination of information to identify potential threats, risk, emerging issues and opportunities" has utility for both policy development and improving security.[94] Examples include the Risk Assessment Horizon Scanning methodology used in Singapore, Metafore used at the Hague Centre for Strategic Studies, iKnow, the Innovation, Foresight and Horizon Scanning Community funded by the European Union, and Sigma Scan in the United Kingdom.[95] Automated methodology is still being developed but computers can perform a number of tasks to identify patterns including text-mining and can also be used to aid in visualization. As of 2013, social media, such as Twitter, were not fully exploited.[96] Again,

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[93] Silver, *The Signal*…, 125.

[94] UK Government, "Horizon Scanning Programme: a new approach for policy making," 12 July 2013, last accessed 15 April 2015, https://www.gov.uk/government/news/horizon-scanning-programme-a-new-approach-for-policy-making.

[95] SAMI Consulting, "Alternative Approaches to Horizon Scanning – Public Sector," 27 June 2013, last accessed 15 April 2015, https://samiconsulting.wordpress.com/2013/06/27/alternative-approaches-to-horizon-scanning-public-sector/. See also Quiggin, *Seeing the Invisible*…, 200-208..

[96] *Ibid*. There is no clear explanation for the incomplete exploitation of social media. In the SAMI Consulting article it was noted that the Australians are talking about exploiting Twitter and data mining but had not made any significant moves in that direction. In the UK, "Wiki and Twitter scanning are surprisingly currently under-developed." This may be a reflection of the analyst community recognizing that it has a new source of data at its disposal but it has not yet established a clear methodology to exploit it. This area may expand considerably as new techniques are developed and shared

automation offers some promise in improving the quality of analysis but still serves only as an enabler rather than a stand-alone capability.

Turning to Bayesian analysis, Silver argues that it is particularly appropriate for decision making in the modern complex world. Bayesian analysis considers multiple hypotheses simultaneously, updates them continually and analyses them probabilistically.[97] There are advantages to Bayesian analysis. First, it forces an analyst to make explicit their estimate of probability for a particular hypothesis. Analysts almost inevitably do this implicitly but a Bayesian approach makes them aware of their position and may help them reduce bias.[98] Second, the analyst passes judgment on the evidence or factors but not the overall assessment. The overall assessment is done by a formula which prevents analysts from, consciously or unconsciously, skewing the results if they are too wedded to their own assessment.[99] Finally, the analyst does not have to choose one hypothesis over another, rather the analyst only makes a judgment about the likelihood of each hypothesis and the formula calculates the outcome.[100]

In a complex decision making environment with a high degree of uncertainty this is arguably a good approach.[101] In the business world, big companies such as Google can afford a trial and error approach essentially testing their hypotheses on customers and seeing what works.[102] There may be some perception that this sort of approach is not appropriate to national security where the stakes are not measured in dollars but rather in human lives.

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[97] Silver, *The Signal*…, 444.
[98] Jack Zlotnick, *Bayes' Theorem for Intelligence Analysis*, 1970, 44. Last accessed 27 April 2015, https://www.cia.gov/library/center-for-the-study-of-intelligence/kent-csi/vol16no2/pdf/v16i2a03p.pdf.
[99] *Ibid.*, 45.
[100] *Ibid.*, 44-45.
[101] Silver, *The Signal*…, 444.
[102] *Ibid.*, 452.

The national security problems of today, however, are complex and any action will be a form of trial and error. At the moment, the possibilities of exploiting "Big Data," that is the vast amount of information that is available, through Bayesian analysis are exciting and it is being investigated by both CSIS and the Central Intelligence Agency (CIA).[103] The problem is that as the amount of data available expands, so too do the number of hypotheses that need to be tested.[104] To date, the promise of "Big Data" has yet to be fulfilled but it is an area of increasing promise and investigation.[105]

None of these forecasting approaches is entirely satisfactory. Some or all of them can be used to provide a forecast but ultimately that forecast is likely to be wrong. Further none of these is designed to complete a comprehensive National Threat Assessment, that is, an assessment of all known known and known unknown threats to national security. They can be used to anticipate individual emerging threats, however, and they are already aiding human forecasting in national security.

The difficulty of forecasting the future is graphically depicted below in Figure 3. Overall Figure 3 shows the spectrum of intelligence assessment from prediction through *forecasting* to speculation. In Figure 3 the left hand posits looking through a lens towards the future on the right. At the focal point prediction is possible but this applies only to questions that fall into closed systems with few variables. As the vision extends to the right towards the future the field

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[103] *Ibid.*, 9. As Director of the CIA, David Petraeus noted, "the CIA and our Intelligence Community partners must be able to swim in the ocean of 'Big Data.' Indeed, we must be world class swimmers – the best, in fact." David H. Petraeus, "Remarks by Director David H. Petraeus at In-Q-Tel CEO Summit," *CIA News and Information*, 1 March 2012, last accessed 27 April 2015, https://www.cia.gov/news-information/speeches-testimony/2012-speeches-testimony/in-q-tel-summit-remarks.html. See also CSIS, *Of Threats…*, 59-60.

[104] Silver, *The Signal...*, 250.

[105] *Ibid.*, 249.

of view is bounded by variables that increase and interact. As these variables increase and interact synergistically the produce unanticipated outcomes.

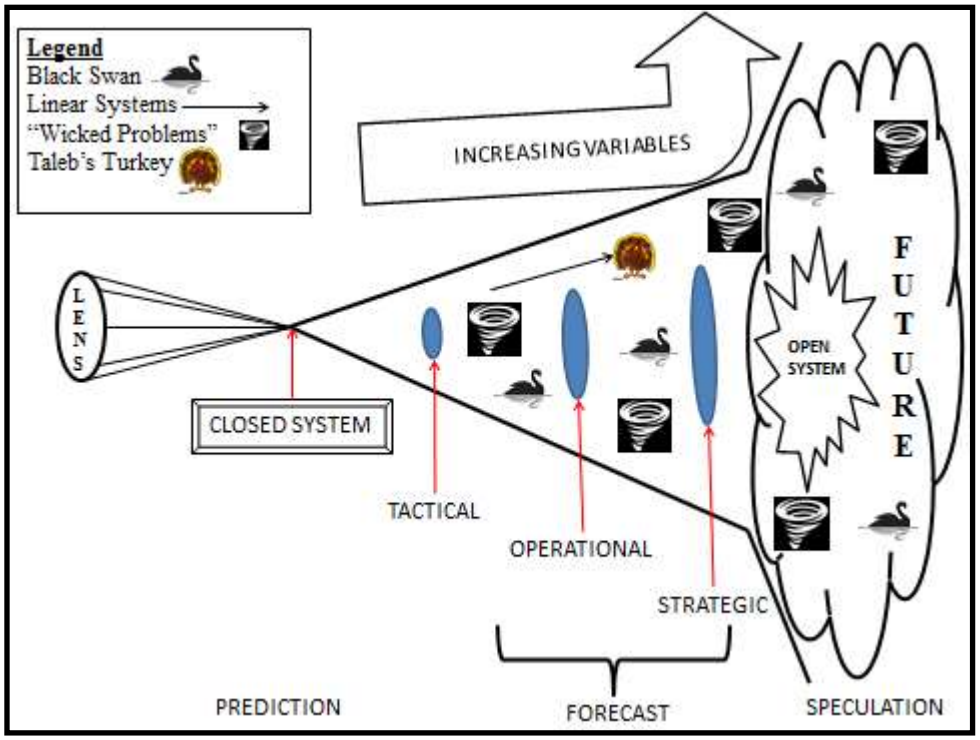

Figure 3: The Prediction Problem

The three ovals indicate the intelligence problem at the tactical, operational, and strategic levels. The ovals increase in size reflecting the greater size and scope of the problem as the level rises from tactical to strategic. Trends are shown by the arrow that leads to a turkey indicating that trends may be traced and forecast but that they may also abruptly end for unforeseen reasons. "Wicked Problems" and non-linear trends alike are depicted as a cyclone. While "Wicked Problems" present unique intractable analytical challenges, from a forecasting standpoint a "Wicked Problem" should be as visible, or indeed, as invisible, as any other future challenge. On the right, in the cloud of the Future, Open Systems reside.

Note that even at the tactical level there are too many variables for the intelligence analyst to accurate assess everything. Desired information will always be missing or incomplete.

For example, the raid that killed Osama Bin Laden launched without answers to all the relevant questions. Despite a national level effort in support of a tactical problem, it was not certain if Bin Laden was actually on the objective.[106] This is normal and no matter how accurate intelligence is at *forecasting* there will always be gaps.

Throughout the field of view the possibility of a Black Swan event exists. It should be noted that, while they will be in the field of view, by definition they will not be visible until they occur. Beyond the strategic level, the field of view, unlike light through a lens, actually bends and expands exponentially as the variables increase.

In considering national security and the problem of the future, this chapter has shown that in the post-Cold War era national security has become much more complex. While prediction is impossible, *forecasting* the future is important to be able to mitigate and avoid surprise, guide decision makers, and to procure new equipment. There are many techniques for *forecasting* the future, none of which seems to provide a perfect solution but they can provide insight into the future. Before investigating these ideas further, the next chapter will look more closely at the evolution of the Canadian definition of national security.

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[106] Mark Owen with Kevin Maurer, *No Easy Day: The Firsthand Account of the Mission That Killed Osama Bin Laden*, (New York: Dutton, 2012), 183 and 191. One analyst was 100% certain Bin Laden was in the compound but most other analysts placed the chance at 60%. Dahl notes, "The intelligence in this case was very precise – a particular house where Bin Laden was suspected to live – but it could not be confirmed. The critical variable was that President Obama was ultimately receptive, and that he ordered the raid despite a fairly high degree of uncertainty among his senior advisers." Erik Dahl, *Intelligence and Surprise Attack: Failure and Success from Pearl Harbor to 9/11 and Beyond* (Washington: Georgetown University Press, 2013), 179.

Canada is a fire-proof house, far from the source of any conflagration.

- Raoul Dandurand[107]

CHAPTER 3 – THE EVOLUTION OF NATIONAL SECURITY IN CANADA

In Chapter 1 the importance of forecasting the future was outlined. A logical question, however, is whether a small power like Canada has a requirement to forecast the future. In Chapter 3 the evolution of the articulation of national security in Canadian policy will be traced. It will review Canadian policy in four distinct periods in this evolution: the interwar period, the Cold War, the post-Cold War period, and the post-9/11 period and demonstrate two things. It will show that Canada went from a short list of national security threats and concerns in the interwar period and expanded thereafter to the present where the list of national security threats and concerns is quite extensive. Second it will trace the use of forecasting through the same eras and show that forecasting has begun to be used in response to the national security problem.

The Interwar Period

Following World War I, Canada began to feel its way on the international stage having achieved some level of national maturity during the conflict. During this period the geographical determinants of Canada's unique strategic context began to be articulated. Because of its location in the world, Canada did not need a robust military capability. As historian C.P. Stacey noted in *The Military Problems of Canada: A Survey of Defence Policies and Strategic Conditions Past*

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[107] Desmond Morton, *A Short History of Canada, Fifth Edition* (Toronto: McClelland and Stewart Ltd., 2001), 200.

and Present Canada possessed "the priceless boon of geographical isolation."[108] This was articulated rather more eloquently by Raoul Dandurand who noted that Canadians lived in "a fireproof house, far from the sources of conflagration."[109]

When the Statute of Westminster gave Canada sovereignty in 1931, Canada had already established some independence in its foreign policy and it was primarily concerned about international relations for economic reasons.[110] As Harris noted by the end of the 1920s, "the country was in no danger of attack… the greatest threat to peace was in Europe and Asia, where both the League and the empire's community of interests were being challenged."[111]

Canada was slow to mature in its approach to national security. Despite independence and in addition to geographic isolation and the inherent continental protection offered by the Monroe Doctrine, Canada retained strong ties to the British Empire and could not ignore developments in the Commonwealth. If Britain declared war, Canada would not automatically follow but there would be strong internal pressure to do so.[112]

Still, Canada was slow to shoulder its security responsibilities. It was suggested at the Imperial Conferences in 1923 and 1926 that Canada should form its own Defence Committee but

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[108] C.P. Stacey, *The Military Problems of Canada: A Survey of Defence Policies and Strategic Conditions Past and Present* (Toronto: The Ryerson Press, 1940), 48.

[109] Desmond Morton, *A Military History of Canada* (Toronto: McClelland and Stewart, 2009), 176.

[110] D.W. Middlemiss and J.J. Sokolsky, *Canadian Defence: Decisions and Determinants* (Toronto: Harcourt Brace Jovanovich Canada Inc., 1989), 10.

[111] Stephen J. Harris, *Canadian Brass: The Making of a Professional Army, 1860-1939* (Toronto: University of Toronto Press, 1988), 162.

[112] George F. G. Stanley, *Canada's Soldiers: The Military History of an Unmilitary People Revised Edition* (Toronto: The Macmillan Company of Canada Limited, 1960), 345.

it was not until 1936 that one was established.[113] Canadian foreign policy in the 1930s was semi-isolationist[114]and the Canadian government was reluctant to make expenditures on defence from 1919 to 1939.[115] Canada ignored a request by Britain to send troops to Turkey in 1922 but could not entirely avoid larger issues and there was some recognition that participation in a war supporting either the League of Nations or Britain might be required.[116] Further, competition between Japan and United States meant some forces were required to protect the West Coast in order to preserve Canadian neutrality should those nations go to war. The West Coast was the main priority from 1936 to 1939 at which point priority shifted to the coming crisis in Europe.[117]

When Mackenzie King returned as Prime Minister in 1935, the emphasis of Canadian foreign policy was maintenance of relations with the US and UK and not the League of Nations. Canada would not engage in war if at least one of these two countries was not involved.[118]

In short, Canada initially relied on Britain for its security, spending little on defence and supporting increasingly good relations between the US and Britain.[119] By 1919, the Royal Navy thought the chance of war with the US was so remote that they no longer planned for it.[120] There

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[113] Stanley, *Canada's Soldiers*…, 347.
[114] Middlemiss and Sokolsky, *Canadian Defence*…, 16.
[115] Harris, *Canadian Brass*…, 190
[116] Stanley, *Canada's Soldiers*…, 351.
[117] *Ibid.,* 351-353. Canada actually had four contingency plans in this period. Defence Scheme No.1 through No.4 were in order: invasion of the US in response to war with the US, defense against Japan in the event of US-Japanese conflict, mobilizing a 7 division force for expeditionary operations, and raising a minor expeditionary force. See Harris, Canadian Brass…, 168, 179-180.
[118] Escott Reid, "Canada and the Threat of War," in *Canadian Foreign Policy: Historical Readings* ed. J.L. Granatstein, 118-124 (Toronto: Copp Clark Pitman Ltd., 1986), 118-119.
[119] Middlemiss and Sokolsky, *Canadian Defence*…, 10-11.
[120] Harris, *Canadian Brass*…, 169.

was no appetite among the Canadian population for military expenditure in the 1920's and early 1930's and to a large extent Canada had no domestic armaments industry into the mid-1930s.[121]

As Sutherland noted, "the salient fact during most of the first century of Canada's existence was the insulating effect of our geography backed up by friendly naval power."[122] Canada's geographic isolation meant that national security was given little thought and focused on defence of national borders and planning to support allies. There was little need for foresight and few national security concerns articulated. This geographic isolation would end with World War II, but, as will be shown below, it took a long evolution before Canada understood its' national security as a problem whose boundaries span the globe.

The Cold War

The Cold War era was characterized by clearly defined threats. Canada began to clearly articulate its national security concerns which will be seen through a review of the defence White Papers of 1964, 1970, 1987, and 1989. Reviewing the White Papers make it clear that the future was believed to be unpredictable, but the enemy was sufficiently obvious that it could be prepared against. Canada's security response will be seen to have been largely through close co-operation with the US, alliances, supporting peacekeeping and disarmament, and planning defence against the defined threat. During this period it will be seen that the scope of national security began to expand and that there is some evidence Canada began to use forecasting to support national security.

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[121] Stanley, *Canada's Soldiers…*, 348.
[122] Sutherland, "Canada's Long Term …," 209.

The consistent theme throughout this period was a definable enemy, the Soviet Union, and the persistent threat of nuclear attack. While the perception of the nuclear threat changed somewhat, waxing and waning over time, the only military threat to Canada during the Cold War came from the Soviets.[123]

In this environment, Canada turned to the U.S. to ensure its national security building on the relationship created in World War Two. The Permanent Joint Board on Defence (PJBD) was established with the United States in 1940 initially planning for defence of Canada and the US in the event that Britain was defeated or lost naval superiority in the North Atlantic.[124] In forming the PJBD, both countries were equal partners and this "ushered in an unprecedented integration of the strategic efforts of the two nations."[125] This integration grew in the Cold War. As Sutherland noted, "Canada can never, consistent with her own interests, ignore the requirements of American security; because, in the final analysis, the security of the United States is the security of Canada."[126]

With the advent of nuclear weapons, the luxury of geographic isolation was gone. In effect North America would likely be a single target set in the event of a nuclear conflict.[127] Canada, lying between the two superpowers could do little independently to defend itself and

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[123] Department of National Defence, *White Paper on Defence* (Ottawa: Queen's Printer, 1964), 11, 13, 25-26, Department of National Defence, *Defence in the 70s:White Paper on Defence* (Ottawa: Information Canada, 1971), 6, Department of National Defence, *Challenge and Commitment: A Defence Policy for Canada* (Ottawa: Department of National Defence, 1987), 10, and Department of National Defence, *Defence Update 1988-89: Presented to the House of Commons Standing Committee on National Defence* (Ottawa: Minister of Supply and Services Canada, 1988), 5.

[124] Stanley, *Canada's Soldiers*…, 408.

[125] Middlemiss and Sokolsky, *Canadian Defence*…, 15.

[126] Sutherland, "Canada's Long Term…," 203.

[127] *Ibid.,* 204.

was directly at risk.[128] With the establishment of a series of three radar lines in cooperation with the US in the early 1950's Canada effectively accepted the "American policy of nuclear deterrent as its own."[129] North American Air Defence Command (NORAD) was established in 1958 between Canada and the US.[130] Canada had moved closer to the US for its own security at risk of its own independence.

To balance the US, Canada engaged in the international arena. In the 1950s, "for the first time the country joined military alliances while at peace; defence spending increased substantially; and the number of men in uniform grew to well over one hundred thousand."[131] This was a logical outgrowth of changes in technology and weapons capabilities. It was recognized that in the event of a major war, there would no longer be time to mobilize. As Sutherland noted in 1962,

> the culprit is technology. As a result of the revolutionary changes which have taken place in the technique of warfare, the tempo and scale of military operations have enormously accelerated. Forces weapons, headquarters, radar systems, communications, and logistic installations must exist in peace-time. There is little likelihood that they could be created after the outbreak of war.[132]

Canada joined NATO to enhance its own security by helping to maintain the balance of power in Europe. By linking Western European defence to North America any potential aggressor would be more likely to be dissuaded from attacking.[133] It helped to counter the

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[128] Harris, *Canadian Brass*…, 213.
[129] Stanley, *Canada's Soldiers*…, 413-414.
[130] Middlemiss and Sokolsky, *Canadian Defence*…, 21.
[131] Harris, *Canadian Brass*…, 213.
[132] Sutherland, "Canada's Long Term…," 220.
[133] Middlemiss and Sokolsky, *Canadian Defence*…, 18.

American influence and pressure for closer integration of defence and it was hoped by encouraging greater cooperation between Western states to indirectly promote trade.[134]

Peacekeeping came to the fore in this era as another counter-balance to the relationship with the US. Initially, Canada sought security by taking an active role in diplomacy and had international stability and order as objectives.[135] Through greater participation in multi-lateral arrangements including the UN Canada hoped to enhance its security.[136] For the United Nations mission in Korea, Canada's contribution was one of the largest per capita of any of the contributing nations.[137] Canada began active involvement in other UN missions as observers in Indo-China and Kashmir, and in 1956 sent a peacekeeping contingent to Egypt as part of the UN Emergency Force.[138]

Peacekeeping was in part about managing conflict to avoid nuclear war.[139] "If contributions of Canadian personnel and expertise could help the UN and other peace-keeping efforts to function more effectively, international conflict might be avoided or at least postponed to allow for peacemaking."[140] Peacekeeping also offered an opportunity to demonstrate a Canadian foreign policy distinct from that of the US.[141]

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[134] *Ibid*., 18-19 and Michael J. Lawless, "Canada and NATO: A Starving Fish in an Expanding Pond," *Canadian Military Journal* 7 no.2 (Summer 2006), 9.
[135] Middlemiss and Sokolsky, *Canadian Defence*..., 16.
[136] *Ibid*.
[137] Stanley, *Canada's Soldiers*…, 404.
[138] *Ibid.*, 404-405.
[139] Howard G. Coombs and General Rick Hillier, "Planning for Success: The Challenge of Applying Operational Art in Post-Conflict Afghanistan, *Canadian Military Journal* 6 no. 3 (Autumn 2005), 6.
[140] Middlemiss and Sokolsky, *Canadian Defence*…, 24.
[141] J.L. Granatstein, "Canada and Peacekeeping: Image and Reality," in *Canadian Foreign Policy: Historical Readings,* ed. J.L. Granatstein, 232-240 (Toronto: Copp Clark Pitman Ltd., 1986), 232.

While Canada engaged internationally and maintain a distinct independent foreign policy, there were two key national security developments: Canada began to develop strategic thinking including trend analysis and the span of national security expanded.

Writing in 1962, R.J. Sutherland noted, "Canada has no particular tradition of strategic calculation."[142] Unlike the US, "in Canada, which generally lacked a non-governmental defence community during this period, it was up to government officials to identify strategic interests."[143] Yet, a defence community was emerging and in 1951 the Defence Review Board report "'a preliminary assessment of future trends in offensive-defensive balance' began with a review of how offensive and defensive forces traditionally approached conflict."[144] This was one of several Canadian strategic studies whose impact is still impossible to assess. Richter notes that in the 1950s "the classified nature of the Canadian studies ensured that they could not be cited even if they were used by American observers."[145] There was, however, some independent Canadian strategic thinking emerging.

This kind of strategic thinking appeared in the 1964 White Paper which quite appropriately notes, "despite the evident hazards of prediction, some attempt to estimate the future evolution of world power relationships is an essential prerequisite of defence planning" but further notes that "assumptions concerning the probable political developments over the next decade or so cannot be made with any certainty."[146] In addition to the Soviet Union, the 1964

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[142] Sutherland, "Canada's Long Term…," 199.
[143] Andrew Richter, "'Strategic theoretical parasitism' reconsidered," *International Journal* 55, no.3 (Summer 2000), 404.
[144] *Ibid.*, 405.
[145] *Ibid.*, 423.
[146] DND, *White Paper…1964…*, 10.

White Paper was concerned with the rise of Communist China and the Communist threat in general.[147] Interestingly it makes an estimate of the likelihood of conflict on the spectrum of conflict**,** assessing nuclear war and major combat operations as unlikely due to the effect of deterrence.[148]

In addition to the emergence of some Canadian strategic analysis, there was an expansion of the scope of national security as a by-product of the threat of nuclear war. Due to the nuclear threat the role of the Canadian Army expanded its role from *assistance* to civil defence to taking the *lead* on some of the tasks required to survive a nuclear attack.[149]In addition to nuclear war survival, the 1964 White Paper articulated search and rescue, communications and aid to the civil power on the national security agenda.[150]

The 1970 White Paper showed a further increase in the diversity of threats being considered under national defence. External challenges such as foreign interest in Canadian natural resources, including in the Arctic are noted.[151] National internal security and domestic threats like floods and forest fires are also included.[152] "Even though the White Paper did not specifically give priority to any of these roles and stressed Canada's continued adherence to its alliances, the emphasis was clearly on sovereignty protection."[153]

Throughout the Cold War period, the principal threat to Canada was perceived to be the Soviet Union. This gave a defined, quantifiable threat to enable national security planning. At

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[147] *Ibid.*
[148] *Ibid.,* 11.
[149] Stanley, *Canada's Soldiers*…, 416.
[150] DND, *White Paper…1964…,* 13, 25-26.
[151] DND, *Defence in the 70s*…, 8-9, 11.
[152] *Ibid.*, 11, 14.
[153] Middlemiss and Sokolsky, *Canadian Defence*…, 33.

the same time, the concept of what constituted national security issues expanded. While the 1964 White Paper acknowledged the difficulty of predicting the future, there is evidence of some forecasting to support national security.

The Post-Cold War

The Cold War featured a clearly defined enemy in a bipolar world but it will be shown that, after 1991, very quickly there was no longer enemy and, as a result, policy struggled to articulate what threats needed to be defended against. There were four main policy documents in this period: *Defence Policy 1992*, the *1994 White Paper on Defence*, *1995 Canada and the World* and *Shaping the Future of the Canadian Forces: A Strategy for 2020* (*Strategy 2020*). The first three documents are fairly similar in their attempt to make sense of the security implications of the new world. The fourth document was, as it noted, "a significant milestone" and reflected a significant change in approach.[154] Through the review of these documents the definition of national security will be seen to expand further and *Strategy 2020* reveals concrete evidence of the use of trend analysis and Alternative Futures in DND to support national security.

In 1992, with the end of the Cold War a new defence statement was issued, *Canadian Defence Policy 1992*, which attempted to address the changing situation in the world. The stated purpose of it was to provide direction in an environment where "the number of certainties is far outweighed by the number of uncertainties," and was envisioned to be the first of a series of

[154] Department of National Defence, *Shaping the Future of the Canadian Forces: A Strategy for 2020* (Ottawa: Department of National Defence, 1999), foreword.

annual statements to allow for ongoing changes as the situation changed.[155] The international environment still considered the former Soviet Union but now with respect to the political and economic instability that its collapse had created rather than in terms of a likely aggressor. The statement noted the rise of nationalism in some parts of the world and widened the security concerns to include the environment, demographics, religion, and the potential shortage of critical resources.[156] While there was still "no external threat unique to Canada," the national security problem was now recognized to be much more broad and complex than previously articulated.[157] This, in part, was a reflection of the increased globalized nature of the world and recognition, articulated in *1995 Canada and the World* that Canada and Canadians had global interests and wanted to actively participate in the world.[158]

The national security agenda further expanded adding to the growth that occurred in the Cold War. *Canadian Defence Policy 1992* lists "drug smuggling, a decaying environment and costly clean-ups, declining fish stocks, illegal immigration and terrorism" as needing "national action." This national action included DND supporting other departments.[159] The *1994 White Paper on Defence* further articulated the expanded scope of national security. In addition to traditional military roles such as conventional defence as part of NATO, the Canadian Forces now had a significant support role domestically. These responsibilities included border and

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[155] Department of National Defence, *Canadian Defence Policy 1992* (Ottawa: Department of National Defene,1992), 1.

[156] *Ibid.*, 2-3.

[157] *Ibid.*, 5.

[158] Foreign Affairs and International Trade, *1995 Canada and the World* (Ottawa: Government of Canada, 1995), Chapter 1, last accessed March 28, 2015, https://web.archive.org/web/20100402180537/http://www.dfait-maeci.gc.ca/foreign_policy/cnd-world/menu-en.asp.

[159] DND, *Canadian Defence…1992*, 5-6.

environmental surveillance, fisheries protection, and domestic disaster relief.[160] By 1995 this had expanded even further with the addition of the international security challenges of "social inequity, lack of economic opportunity and overpopulation."[161] In these three documents the articulation of the definition of national security included emerging global and non-traditional security issues.[162]

There is little specific articulation in the three documents on threats and little direction on how to prepare for threats in the absence of a clear enemy. The 1992 policy does include an interesting section on the future where trend analysis appears in an embryonic form. "Present trends make it highly unlikely that global war could break out as a result of a direct East-West confrontation."[163] This appears to be an early use of the word trend in published government defence policy. It would not be the last.

The section on the future in the *1994 White Paper*, however, is not based on trends but instead is focused on outer space and the possibility of participating in missile defence with the United States.[164] The whole document itself was intended to give Canadian national security policy direction in a period of drift.[165] It very much reaffirms traditional roles, including NATO, and places an emphasis on a multilateral security.[166] Canada was to maintain a multi-purpose combat capable force in order to give the government flexibility in responding on the

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[160] Minister of National Defence, *1994 White Paper on Defence* (Ottawa: Minister of Supply and Services Canada,1994), chapter 4.
[161] Foreign Affairs, *1995 Canada…,* summary
[162] Traditional in this sense refers to Grabo's definition of national warning intelligence contained in Chapter 2.
[163] DND, *Canadian Defence Policy 1992*, 33.
[164] DND, *1994 White Paper…*, chapter 5.
[165] *Ibid.*, chapter 7.
[166] *Ibid.*, chapter 6.

international stage.[167] Rather than predicting the future, Canada was arguably electing to maintain flexibility, or resiliency, in its capabilities in order to be able to deal with unanticipated crises.

During this period Canada shifted its military operations from traditional peacekeeping to operations closer to, and including, warfighting. Canada contributed to the Persian Gulf War in 1990-91, Haiti 1993, supported efforts against Iraq from 1991-2002, and the NATO air campaign in Kosovo in 1999.[168] At the same time the 1992-93 Somalia mission was regarded as a failure, peacekeepers were incapable of stopping the Rwanda massacre in 1993, Canadian soldiers were unable to stop ethnic cleansing in the Medak Pocket in the former Yugoslavia, and a Canadian officer was held hostage in Bosnia in 1995 by Serbian forces.[169] By action, if not policy, peacekeeping was beginning to decline in favour of peacemaking and supporting warfighting.

Further, with the fall of the Soviet Union, Canada's balance to the US, alliance participation, was in doubt. The rationale for NATO was collective defence against the Soviet Union and Warsaw Pact. With the collapse of the Soviet Union there was some debate about whether or not NATO would continue.[170] In the end NATO survived largely due to the relationships and collective capabilities that were established in NATO during the Cold War that gave member nations an international institution capable of dealing with the new security

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[167] *Ibid.*, chapter 3.

[168] Sean. M. Maloney, *Are We Really Just: Peacekeepers? The Perception Versus the Reality of Canadian Military Involvement in the Iraq War, Institute for Research on Public Policy Working Paper Series* no. 2003-02 (Montreal: Institute for Research on Public Policy, 2003), 6-12.

[169] Walter Dorn, "Canadian Peacekeeping: Proud Tradition, Strong Future?" *Canadian Foreign Policy* 12 no.2 (Fall 2005), 13-14.

[170] Lawless, "Canada and NATO…," 11.

environment after the Soviet threat disappeared.[171]

Still, Canada was drifting during this period. NATO's future, if not in doubt, was unclear: peacekeeping was on the wane and Canada was actively involved, albeit in a limited way, in warfighting operations. The definition of Canadian national security was expanding but not in a coherent way. As Macnamara and Fitz-Gerald observed in 2002,

> Canada lacks any process even remotely comparable [to the US and UK]in analytical rigour, multi-department involvement, coherence and consistency. The absence of a clear process is possibly a major factor in the irregularity of foreign and defence policy reviews: the methodology is not clear and has to be reinvented each time.[172]

It is not surprising then, that at the end of this era, some attempt was taken by the Department of National Defence to address this drift. There was a sudden and significant change with the publication of a 17 page document entitled *Shaping the Future of the Canadian Forces: A Strategy for 2020*. It notes in the section entitled the "Emerging Security Environment" that it is impossible to predict the future but it is possible to make a *forecast*.[173] In the section "Toward a Strategy" it details how the vision of the future was conceived using both trend analysis and three Alternative Futures. As the document notes,

> Even the best analyses won't tell us with certainty whether the world will be safer, kinder and gentler, or more brutal, unstable and dangerous. Neither will they tell us to what extent emerging potential threats like cyber-terrorism and information operations will become realities in the new international order. It is for this reason that defence planners did not rely solely on an extrapolation

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[171] Celeste A. Wallander, "Institutional Assets and Adaptability: NATO After the Cold War," *International Organization* 54 no.4 (Autumn 2000), 731.

[172] W.D. Macnamara and Ann Fitz-Gerald, "A National Security Framework for Canada," *Institute for Research on Public Policy* 3, no.10 (October 2002), 20.

[173] DND, *Shaping the Future*…, 7.

> of trends in building Strategy 2020. Indeed, a key part of the analysis was to evaluate strategic options for the future through a matrix of future scenarios providing Defence with a robust and dynamic roadmap for the future.[174]

The trends considered for the analysis were: geopolitical, military, socio-economic and organizational. The trends included "current and emerging trends as well as observable patterns of behaviour."[175] The methodology included engaging "military and civilian defence experts through a series of symposia and conferences that examined emerging defence issues, challenges and opportunities."[176]

The three Alternative Futures considered included a world more stable than the one at the time of writing, one that mirrored the current world, and one that featured greater instability.[177] The resulting strategy included proactivity, defined as using trend analysis and Alternative Futures, as one of the eleven critical attributes of the strategy.[178] While not yet incorporated in a national security policy, Canada had begun to try to *forecast* the future for national security purposes.

The post-Cold War period saw Canada struggle with national security policy in the absence of a clearly defined enemy. In a globalized world Canada wanted to be an active player but there was no clearly articulation of how to identify threats and its traditional venues of peacekeeping and alliances were somewhat in question. The scope of national security concerns

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[174] *Ibid.*
[175] *Ibid.*, 6.
[176] *Ibid.*, 3.
[177] *Ibid.*, 7.
[178] *Ibid.*, 10.

had expanded significantly, however, both domestically and internationally. As the era came to a close, the DND began to use trend analysis and Alternative Futures to guide its strategy.

Post 9/11

The terrorist attack on September 11, 2001, initiated a new period in Canada's understanding of national security that continues to evolve up to the present day. With the 9/11 attacks Canadians suddenly found themselves vulnerable.[179] In response, policy was articulated in two main documents: *Securing an Open Society: Canada's National Security Policy* (2004) and the *Canada First Defence Strategy* (2008) and is further expanded in ten other documents covering international policy, cybersecurity, counter-terrorism and critical infrastructure. The implementation of this policy will be shown to have improved the national security intelligence structure which will be shown to have created a fusion capability but not a forecasting capability. Finally, the plethora of national security policy documents will be shown to have further increased the articulated scope of the Canadian national security to an unprecedented level.

The 2004 *Securing an Open Society: Canada's National Security Policy* (NSP) had eight chapters which included non-traditional national security topics like public health emergencies, transportation security, border security, in addition to traditional topics international security.[180] While the NSP was domestically focused, the spectrum of security spread all the way from the individual to the international community (as displayed in this Figure 4):

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[179] Greg Fyffe, "The Canadian Intelligence Community After 9/11," *Journal of Military and Strategic Studies* 13 no. 3 (Spring 2011), 2. http://jmss.synergiesprairies.ca/jmss/index.php/jmss/article/view/407.

[180] Privy Council Office, *Securing an Open* Societ…, v.

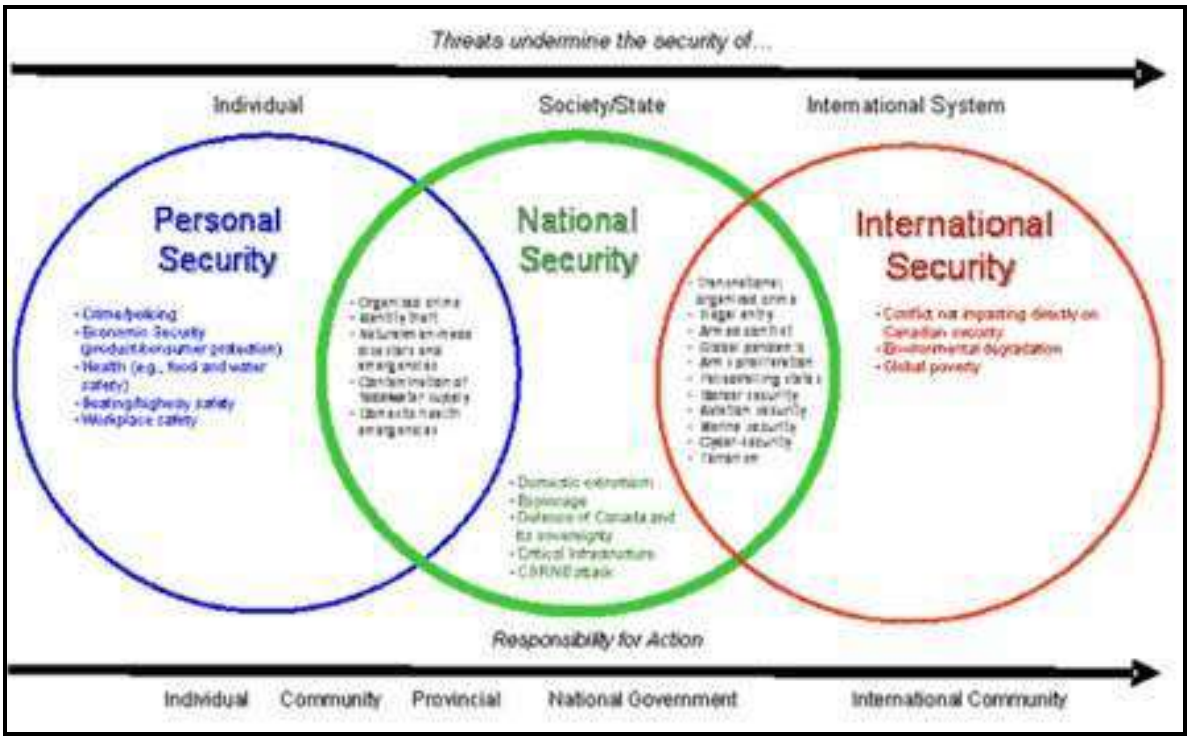

Figure 4: The Scope of Canadian National Security in 2004
Source: Privy Council Office, *Securing an Open Society: Canada's National Security Policy*, 4.

The NSP made significant changes to the national security intelligence architecture which created the structure depicted in Figure 5.

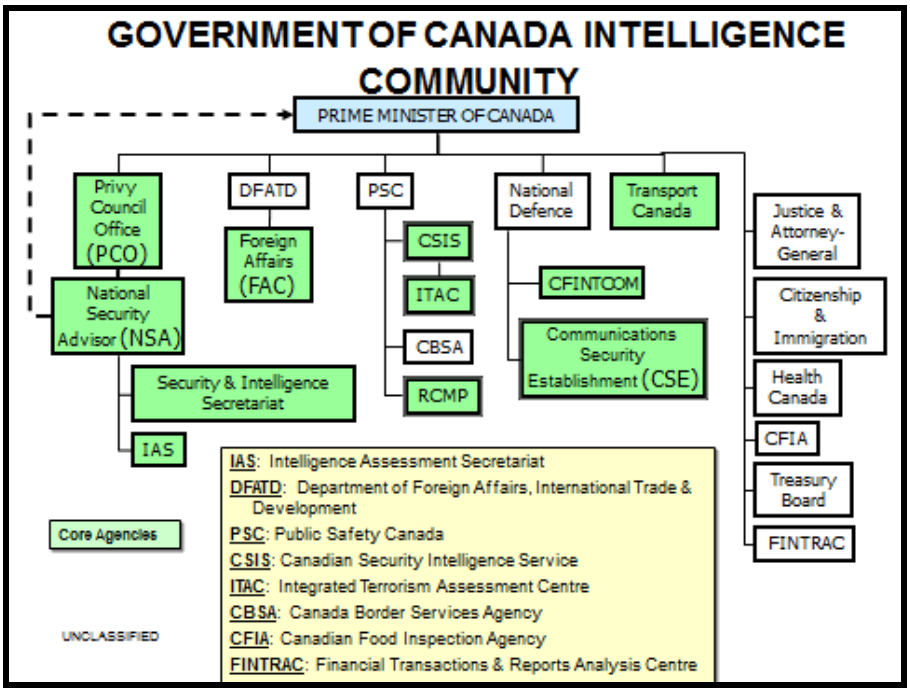

Figure 5: The Government of Canada Intelligence Community
Source: Canadian Forces Intelligence Group Briefing in Halifax 8 December 2014

The position of National Security Advisor (NSA) and the Integrated Threat Assessment Centre (ITAC) were created.[181] The weakness in intelligence management including prioritization, co-ordination and information sharing was reported by the Auditor General in 2003 and 2004.[182] Created in 2003 and reporting directly to the Prime Minister, the role of the NSA was to improve inter-departmental integration and co-ordination.[183] Held by a senior deputy minister, the NSA can coordinate the work of all deputy ministers in the security and intelligence nexus.[184] This was an important improvement and Fyffe notes that "before 9/11 coordination and cooperation across the community was much weaker than it is now."[185]

The ITAC was created with a mandate to "produce comprehensive, integrated assessments of threats to Canada's national security and distribute[s] them as required."[186] The ITAC was to facilitate co-ordination and integration using intelligence and trend analysis.[187] While the NSP notes that "there has been no comprehensive and timely central government assessment that brings together intelligence about potential threats from a wide range of sources

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[181] Privy Council Office, *Securing an Open Society…*, 9, 11.

[182] Office of the Auditor General of Canada, *2009 Status Report of the Auditor General of Canada to the House of Commons* (Ottawa: Office of the Auditor General of Canada, 2009), 1. It was also noted in the Major Commission into the Air India Flight 182 bombing but it is not clear when this information was available. The Auditor General was aware of some of the Major Commission's findings a year before it was published. It is unclear how readily this information was available within the government. See Major Commission, "Key Findings of the Commission of Inquiry into the Investigation of the Bombing of Air India Flight 182, 1, last accessed 23 April 2015, http://epe.lac-bac.gc.ca/100/206/301/pco-bcp/commissions/air_india/2010-07-23/www.majorcomm.ca/en/reports/finalreport/key-findings.pdf for the issue of information sharing. The Major Commission findings are alluded to in the Auditor General's 2009 Report on page 7.

[183] Privy Council Office, *Securing an Open Society…*, 9.

[184] Fyffe, "The Canadian Intelligence…," 7-8.

[185] *Ibid.*, 7.

[186] Commission of Inquiry into the Actions of Canadian Officials in Relation to Maher Arar, *A New Review Mechanism for the RCMP's National Security Activities* (Ottawa: Her Majesty the Queen in Right of Canada, 2006), 141.

[187] Privy Council Office, *Securing an Open Society…*, 11.

to allow better and more integrated decision-making"[188] the ITAC was intended to address this deficiency but very quickly focussed on terrorism.

> The Integrated Threat Assessment Centre, styled on the UK's Joint Terrorism Assessment Sector, has not thrived as well as its inspiration because the Canadian context is much different, but it has given the Canadian community valuable experience with the 'fusion centre' model now used in some way by all allied communities. It has helped provide a flow of information to Canadian police services, and draws on terrorist expertise from across federal government agencies, making an important contribution to the pool of community assessments on terrorism and radicalization. It is the conduit for products from allied fusion centres.[189]

The NSP mandated the ITAC to include the following organisations:

- Public Safety and Emergency Preparedness
- CSIS
- RCMP
- Communications Security Establishment
- Department of National Defence
- Department of Foreign Affairs
- Privy Council Office
- Transport Canada
- Canadian Border Services Agency (CBSA)

The ITAC can draw on the following agencies when required:

- Health Canada
- Agriculture and Agri-Food Canada
- Environment Canada[190]

The other key player in this community is the Privy Council Office of International Assessment Staff (PCO IAS) which has a key role as the lead in co-ordinating the Canadian

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[188] *Ibid.,* 11.
[189] Fyffe, "The Canadian Intelligence…," 8.
[190] Privy Council Office, *Securing an Open Society*…, 18.

intelligence community production effort. It is further responsible to provide senior government officials with unbiased assessments of trends and international developments that might impact Canada.[191] The IAS provides two key functions for the community by maintaining links with the allied intelligence community and through liaison with Canadian academics.[192]

The improved community produced better results according to the Auditor General's 2009 report. The report noted "progress in the organization and coordination of priorities among federal departments and agencies involved in security."[193] Much of the credit for this improvement was attributed to the ITAC while noting that the ITAC may not have sufficient resources and expertise for its mandate.[194] Further, the report noted that there was "some redundancy in the organization and development of strategic intelligence."[195]

The 2008 *Canada First Defence Strategy* (CFDS) was a 20 year plan to modernize the Canadian Forces.[196] The CFDS outlined the strategic environment that the CAF was expected to operate in, and, while it did not specifically articulate trend analysis, except with respect to the Asia Pacific region, it presented a number of current concerns and the expectation that these concerns, or ones like them would continue. These concerns included problems that would be expected as national security concerns including: ethnic and border conflicts, fragile states, unresolved conflicts in South Asia, Africa, the Middle East and the Balkans, nuclear capable

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[191] Minister of Public Safety, *Building Resilience Against Terrorism: Canada's Counter-Terrorism Strategy* (Ottawa: Her Majesty the Queen in Right of Canada, 2013), 17 and James Cox, *Canada and The Five Eyes Intelligence Community*, Strategic Studies Working Group Papers (Toronto: Canadian International Council, 2012), 7.

[192] Arar Commission, *A New Review Mechanism*…, 199

[193] Auditor General, *2009 Status Report*…, 2.

[194] *Ibid.*, 12,14.

[195] *Ibid.*, 11.

[196] DND, *Canada First*…, 2.

adversarial states and resurgent nationalism. Other national security concerns included a number of concerns that were relatively new including unequal distribution of resources, Islamist militants, global criminal networks, and foreign encroachments on Canadian natural resources.[197] Further it refers to planning that included not just current and recent operational experience but also possible missions through the study of scenarios.[198] Details of the analysis were not included but it is clear that the backdrop for the CFDS was trend analysis and Alternative Futures.

The 2009 *National Strategy for Critical Infrastructure* attempted to outline the breadth of national infrastructure that needed to be protected. The breadth of the national security problem had not necessarily been expanded as the ten listed critical infrastructure sectors could be inferred from earlier policy; however, this document delved into more detail. The ten areas were: energy and utilities, finance, food, transportation, government, information and communication technology, health, water, safety and manufacturing.[199] The national security problem was, however, expanded with the publication of the *Canada-United States Action Plan for Critical Infrastructure*, which recognized that the interconnection of the two countries meant that "critical infrastructure disruptions can have direct impacts on businesses and communities on both sides of the Canada-United States border."[200] Rather than being strictly a Canadian national security concern, infrastructure connections between the two countries made national security a bilateral problem.

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[197] *Ibid.*, 6.
[198] *Ibid*., 5.
[199] Public Safety Canada, *National Strategy for Critical Infrastructure* (Ottawa: Her Majesty the Queen in Right of Canada, 2009), 2.
[200] Public Safety Canada, *Canada-United States Action Plan for Critical Infrastructure* (Ottawa: Public Safety Canada, 2010), 3.

Canada's Cyber Security Strategy was published in 2010. This fourteen page document identified three types of cyber threats to Canada and Canadians. These threats were: state sponsored cyber espionage and military activities, terrorist use of the internet, and cybercrime.[201] The strategy notes,

> Cyber security affects us all, in part because even attackers with only basic skills have the potential to cause real harm. Sophisticated attackers can disrupt the electronic controls of our power grids, water treatment plants and telecommunications networks. They interfere with the production and delivery of basic goods and services provided by our governments and the private sector. They undermine our privacy by stealing our personal information.[202]

The strategy notes that the threat is growing and continually evolving with 60% of the malicious code in existence being developed in 2008.[203] The cyber strategy was developed into an action plan in 2013 that contained three pillars: "securing government systems," "partnering to secure vital cyber systems outside the Federal Government," and "helping Canadians to be secure online."[204]

The government issued *Building Resilience Against Terrorism: Canada's Counter-Terrorism Strategy* in 2011. As the title suggested, "resilience is both a principle and an underlying theme of the Strategy"[205] and states "a resilient Canada is one that is able to mitigate

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[201] Public Safety Canada, *Canada's Cyber Security Strategy: For a Stronger and More Prosperous Canada* (Ottawa: Her Majesty the Queen in Right of Canada, 2010), 5.

[202] *Ibid., 3.*

[203] *Ibid.*, 6.

[204] Public Safety Canada, *Action Plan 2010-2015 for Canada's Cyber Security Strategy* (Ottawa: Her Majesty the Queen in Right of Canada, 2013), 5, 7, 11.

[205] Public Safety Canada, *Building Resilience Against Terrorism: Canada's Counter-Terrorism Strategy Second Edition* (Ottawa: Her Majesty the Queen in Right of Canada, 2013), 10.

the impacts of a terrorist attack, ensuring a rapid return to ordinary life."[206] There is no explanation of how that resiliency is to be developed and instead the strategy outlines a four step approach: prevent, detect, deny and respond.[207] The document did not expand the notion of national security but again it delved in greater depth into the threat. Specifically, it noted that the threat could come from a lone individual and identified Sunni Islamist extremism as "the leading threat to Canada's national security."[208]

Finally, *Beyond the Border: A Shared Vision for Perimeter Security and Economic Competitiveness* was published in 2011. It notes that "addressing threats at the earliest possible point is essential to strengthen the shared security of our countries and enable us to improve the free flow of legitimate goods and people across the Canada-United States border."[209] The document announced greater intelligence cooperation including sharing inventories of existing intelligence products and known intelligence gaps.[210] In addition to trade facilitation, the document also considers the bi-lateral critical infrastructure and cyber-security concerns.[211]

The post-9/11 period now defines a multitude of concerns under national security. Table 1 is a summary of the threats and national security concerns articulated over the four eras examined.

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[206] *Ibid.*
[207] *Ibid.*, 13.
[208] *Ibid.*, 7,9.
[209] Foreign Affairs and International Trade, *Beyond the Border: A Shared Vision for Perimeter Security and Economic Competitiveness* (Ottawa: Her Majesty the Queen in Right of Canada, 2011), 3.
[210] *Ibid.*, 4.
[211] *Ibid.*, 28.

Table 1 - The Expansion of the Scope of National Security in Canada[212]

	INTERWAR	COLD WAR	Post-COLD WAR	Post-9/11
International Threats and National Security Concerns	• United States • European Crisis • Support to Commonwealth • US/Japan War	• Soviet Union • China • Nuclear War/ Deterrence • European Defence • Arms Control • Biological/Chemical Weapons • Peacekeeping • Instability • Regional Conflict • Terrorism • Religious Militancy • Foreign Disaster and Humanitarian Relief	• Soviet-Union (only initially) • European Security • Asia-Pacific Security • Outer Space • Nuclear War/ Deterrence (reduced concern) • Arms Control • Chemical and Biological Weapons • Peacekeeping • Political Instability • Failed States • Rogue States with WMD • Rising Nationalism • Economic Instability • Globalization of the Economic System • Global Population • Gulf between Developed and Developing Countries • Regional Conflict • Terrorism • Religious Fundamentalism • Humanitarian Assistance • Illegal Immigration • Drug Smuggling • International Crime • Disease • Global Warming	• North Korea (WMD) • Asia-Pacific military build-up • Arms Control • Nuclear/Biological/ Chemical Weapons • Military Training Assistance • Peacekeeping • Ethnic and Border Conflicts • Resurgent Nationalism • Sub-National, Supra-National Actors, NGOs, and Multi-National Corporations • Regional Tension • Islamic Militants • Disaster Assistance • Globalization • Non-State Actors • Failed and Failing States • Unequal Access to Resources • Uneven Economic distribution • Global Terrorism • Long Standing tensions in the Middle East, Asia, Africa and the Balkans • Global Criminal Networks • Pandemics • Evacuation Operations • Foreign Espionage
Domestic Threats and National Security Concerns	• Sovereignty/Defence of Canada • Aid to the Civil Power	• Sovereignty/Defence of Canada • Air and Coastal Surveillance • Survival Operations (Nuclear) • Search and Rescue • Aid to the Civil Power • Arctic • Foreign Fishing Fleets • Pollution Surveillance • Flooding • Forest Fires • Rapid technological change	• Sovereignty/Defence of Canada • Air, Coastal, and Land Surveillance • Search and Rescue • Aid to the Civil Power • The North • Over Fishing • Environment • Disaster Relief (natural and man-made)	• Terrorism • Sovereignty/Defence of Canada • Continental Defence • Air, Coastal, and Land Surveillance • Border Security • The North • Search and Rescue • Aid to the Civil Power • Illegal Fishing • Illegal Immigration • Drug Trafficking • Human Trafficking • Environment • Disaster Relief (natural and man-made) • Critical Infrastructure including: Energy and Utilities, Finance, Food, Transportation, Government, Information and Communication Technology, Health, Water, Safety, and Manufacturing • Cyber

[212] This table was derived from the following sources: **Inter-war:** Stacey, *The Military Problems of Canada*, Morton, *A Military History of Canada*, Stanley, *Canada's Soldiers*, Middlemiss and Sokolsky, *Canadian Defence*, Harris, *Canadian Brass*, **Cold War:** *1964*, *1970 White Papers*, *Challenge and Commitment* (1987), *Defence Update 1988-89*. **Post-Cold War:** *Canada Defence Policy 1992*, *1994 White Paper*, *1995 Foreign Policy Statement*, **Post-9/11***: National Security Policy*(2004), *International Policy Statement DEFENCE*(2005), *Canada First Defence Strategy* (2008), *National Strategy for Critical Infrastructure* (2009), *Cyber Security Strategy* (2010).

A few observations should be noted about Table 1. Within each era there is some shift in emphasis and change in terminology which is not reflected in the table. Similar changes in terminology occur between eras. Further, Table 1 is not in rank order of significance, rather it captures all of the concerns identified in the source documents. It is clear from this table that Canada, over the four eras examined, has become increasingly able to articulate the national security problem.

Canada no longer sees itself as living in a fireproof house. In the post-9/11 period there was significant expansion of the definition of the national security environment. Canadian national security has come to mean security from safety of individual citizens to the stability of the international system. The scope was both broad, encompassing everything from health concerns to full spectrum combat operations, and deep, looking at individuals, be they lone wolves and individuals, to risk to the international community. While the articulation of the definition of national security was expanding some attempts at *forecasting* were evident. This was primarily in DND where trends analysis and Alternative Futures were used for force development. This Canadian *forecasting* for national security will be discussed further in Chapter 4.

Neither a wise man nor a brave man lies down on the tracks of history to wait for the train of the future to run him over.

- Dwight D. Eisenhower, 1952[213]

CHAPTER 4 – FORECASTING FOR CANADIAN NATIONAL SECURITY

In Chapter 2 the forecasting methods including trend analysis and Alternative Futures were introduced. In Chapter 3 the evolution of Canada's definition of national security was traced showing that it went from having a clearly defined nation state enemy to the current situation where there are non-state actor enemies, the threat lone wolves, and critical infrastructure concerns. This has resulted in a significant increase in national security policy and the articulation of a large number of threats and national security concerns. In *Shaping the Future of the Canadian Forces: A Strategy for* 2020, DND included proactivity, defined as using trend analysis and Alternative Futures, as one of the critical attributes of its strategy. This first section of this chapter will explore the manifestation of this proactivity by looking into the intent and methodology of the Future Security Environment (FSE) and briefly explore similar allied models. Then this chapter will argue that the FSE has been used differently by the Canadian Army (CA), the Royal Canadian Navy (RCN) and the Royal Canadian Air Force (RCAF). Finally, the preliminary steps taken by CSIS to *forecast* will be discussed.

One of the results of the expansion of the scope of national security and the lack of a definable enemy was a desire to have some concrete vision of the future in order to avoid being

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[213] Anonymous, "Foreign Policy: Ike," *Time* 60 no.14 (October 1952), last accessed 30 April 2015, http://eds.a.ebscohost.com/ehost/detail/detail?vid=2&sid=32418e19-ba9a-406c-975d-196b6b6a37f8%40sessionmgr4002&hid=4213&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#db=a9h&AN=54169416

run over by Eisenhower's "train of the future." The 1999 defence paper *Shaping the Future of the Canadian Forces: A Strategy for 2020* was the first attempt to create a future forecast and it was another decade before another forward looking document was published. In 2009 *The Future Security Environment (FSE) 2008-2013* was published. The purpose of this document was to provide foresight for force development. Specifically it was intended to help guide the maintenance of relevant current activities and assist in the design of force structure with a view to ensuring that the CAF was prepared for the spectrum of emerging challenges and threats envisioned by the analysis that produced the FSE.[214] The document is careful to indicate that it cannot predict the future and that "even thinking ahead five years can be highly speculative."[215] This is captured in Figure 6 and represents the difficulty of forecasting the future over time.

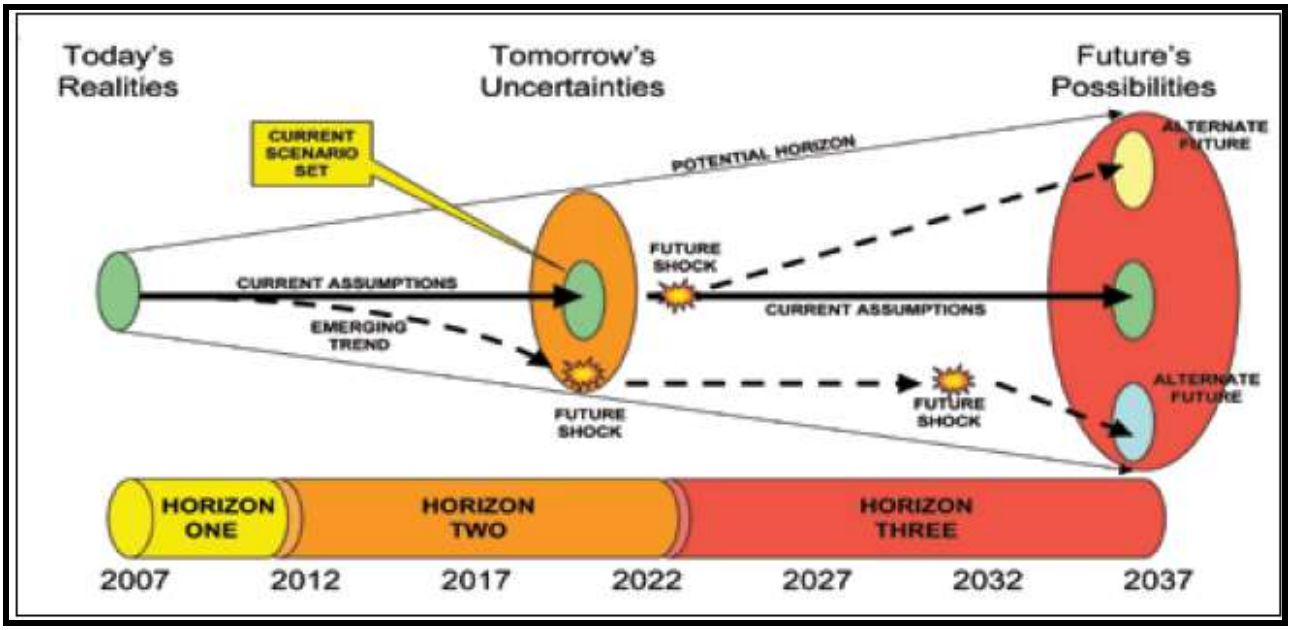

Figure 6: The Difficulty of Forecasting the Future in the Future Security Environment
Source: Department of National Defence, *The Future Security Environment 2008-2030*, 16.

[214] Department of National Defence, *The Future Security Environment 2008-2030*, (Ottawa: Chief of Force Development, 2009), 10.
[215] *Ibid.*, 9.

The FSE was updated in 2014 where the forward noted, "The Future Security Environment examines current and past trends with the intent of providing context to DND/CAF strategic level long-term Force Development activities."[216] It is intended to provide a "pragmatic assessment of important trends" and was part of a series of documents that are envisioned to provide context for force development. The FSE was to be used to design force development scenarios covering the "full spectrum of operations in accordance with Canada First Defence Strategy."[217]

Trends analysis played a significant role in the Capability-Based Planning (CBP) process. "The FSE construct is a critical starting point for any force development process. The FSE is a future trend construct that informs the required strategic outcomes in context of the most likely environments and battlespace in which these outcomes will occur."[218] The CBP process noted that there are difficulties with the mechanism. The process will always deal with uncertainty and it is only based on a probability of being accurate and recognizes that often it will be incorrect. It acknowledged that the post-Cold War environment is much more difficult because there is no longer a clearly defined enemy to prepare for. Instead, CBP must consider a broader range of possibilities. The key to CBP is the force development scenarios built out of the trend analysis in the FSE.[219]

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[216] DND, *FSE 2013-2040*, vii.
[217] *Ibid.*, xv and xvii.
[218] DND, *Capability-Based Planning…*, 7.
[219] *Ibid.*, 10-13.

The FSE analyses trends in isolation and then combines them to create scenarios which are examined in the capability development process.[220] Rather than conducting trend analysis and Alternative Futures analysis separately, a hybrid of these two analytical techniques has been used. Trend analysis' strength and weakness is that it is a projection of the present forward. By being grounded in the present it is vulnerable to being unable to project forward the unknown unknowns. Alternative Futures are, in part, meant to address the possibility of unknown unknowns by allowing free flowing brainstorming. One the one hand, Force Development's hybrid approach allows for a discussion of the convergence of trends which is useful. At the same time, it appears that this hybrid reinforces the weakness of the trend analysis approach of being tied to the present. The scenarios are unclassified but, on very limited distribution, which means that an understanding of how the trends will interact, at least in Force Development's view, is not readily available.

The Canadian FSE is not a unique document and it is similar to products developed by the US and the UK. The United States product is the *Quadrennial Defense Review*(QDR) and the UK product is *Global Strategic Trends*(GST).

The US has published the QDR since 1997. The QDR looks ahead 20 years and covers strategy, force structure and modernization, infrastructure, and budgeting.[221] It has its own version of the FSE which is based on trend analysis but it is very short. The QDR spends only

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[220] *Ibid.*, 20.

[221] Department of Defense, *QDR 101: What You Should* Know, 2010, last accessed 21 April 2015, http://www.defense.gov/qdr/QDR_101_FACT_SHEET_January_2010.pdf.

five pages articulating this future vision while the UK and Canadian products each take over 150 pages to describe the future.[222]

The UK began publishing its Global Strategic Trends in 2003. For the 5th version, published in 2014, the process was as follows:

> The starting point for GST is identifying trends (discernable patterns of change) – an example is the growth in world population. The next step is projecting those trends forward 30 years, analysing their potential consequences and using this to build a series of pictures of what the future could look like in 2045. Finally, these components are combined to produce a strategic context, including defence and security implications, against which policies, capabilities and plans can be tested and refined. Key scenarios illustrate how these trends could interact and shocks provide the reader with examples of how the strategic context could be radically altered by unexpected events. In addition, alternative outcomes emphasise that there are several possible ways trends could impact on the future. Following a complex mapping process (explained further in the methodology section) we have identified 13 clusters of trends and drivers with particularly strong linkages. This provides the overall structure for the document, rather than the STEEP method1 used in GST 4. Some trends (most notably those relating to economics, religion, technology and globalisation – themes that would have been called 'ringroad issues' in previous issues of GST) run through all of the following groups, and are discussed as they arise rather than in their own sections. We hope this brings them to life more clearly.[223]

The GST is somewhat different from the FSE in its organization and approach. The GST looks at trends in part one while part two looks at the trends applied to the geographic regions of the world, providing a written future projection of each region including outer space.[224] This structure may be easier to understand and arguably offers a clearer forecast of the impact of

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[222] Department of Defense, *Quadrennial Defense Review 2014* (Washington, DC: Department of Defense, 2014), 3-8

[223] UK, *Strategic Trends Programme…*," vii-viii.

[224] *Ibid.*, viii.

emerging trends. This allows for criticism but it was intended to allow readers a chance to read the document critically and draw their own conclusions.[225]

Such analysis, however, has to be used with great care. In considering the FSE 2008-2030 with FSE 2013-2040 it is clear that forecasting the future is an inexact science. For example, in FSE 2008-2030 the possibility of inter-state conflict is glossed over and it noted that "in modern warfare, the adversary is more likely to be a non-state group hidden within a larger population than a well-equipped military."[226]In FSE 2013-2040 there appears to be a reversal of this view when it noted that "it is axiomatic that the possibility of armed conflict is ever-present in a system of sovereign states. To think otherwise ignores both the insight of history and the current uncertain international security environment."[227] If Canada were to design a force under the projections of FSE 2008-2030 it would likely aim to build a counter-insurgence centric force largely discounting the prospect of mid to high intensity conflict. Only a few years later, FSE 2013-2040 indicates a requirement for a conventional warfighting capability.

There are both risks and benefits in this type of forecasting is if it is used for purposes beyond its intended role as an aid to force development. While the FSE is clear that it is not a prediction of the future the absence of another readily available product, means that, in effect, it has become the CAF's main forecast of the future. The paragraphs below argue that the CA, RCN and RCAF have all used the FSE in different ways with some risks and some benefits.

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[225] *Ibid.*, viii.
[226] DND, *FSE 2008-2030*, 91.
[227] DND, *FSE 2013-2040*, 88.

The CA has developed the genesis of a whole new set of doctrine based on the FSE.[228] In 2007, the CA published *Land Operations 2021: Adaptive Dispersed Operations* which used the FSE to define the characteristics of the land combat environment.[229] *Adaptive Dispersed Operations* (ADO) are the CA's interpretation of how to apply Manoeuvre Warfare to the envisioned operating environment.[230] While the attempt to develop new doctrine in anticipation of the future is admirable, it is also suspect. If the FSE is wrong in its prediction of the land combat environment, the CA may be ill-prepared to face the operational environment. For example, ADO is heavily reliant on uninterrupted secure voice and data communications that can be maintained against an enemy like the Taliban in Afghanistan.[231] Against a technologically capable adversary such as the Russian forces in Ukraine, however, it may fail dramatically.[232]

The Royal Canadian Navy (RCN) has drawn on the FSE to articulate its strategy. While the *Commander's Guidance and Direction to the Royal Canadian Navy: Executive Plan – 2013*

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[228] There is a very fine line here. In *Canadian Forces Joint Publication 01 Canadian Military Doctrine*, "The CF definition of doctrine is "fundamental principles by which military forces guide their actions in support of objectives. It is authoritative but requires judgment in application." Canadian doctrine further "provides the framework within which military operations are planned and executed. It represents the distilled insights and wisdom gained from experience. Doctrine is developed in the context of contemporary and emerging factors that influence the way that Canada intends to use military force. By building on lessons learned with an *understanding of the future*, military doctrine provides the rationale behind the organization and the employment of military forces and assists in the determination of appropriate roles and missions. A sound doctrinal framework provides the basis for operations and training, guides commanders and helps individuals to think more clearly in the fog of war." The fine line occurs between fundamental principles and writing down to the tactical level. If application of *understanding of the future* gained from the FSE is understood as a *prediction* rather than as a *forecast* doctrine may go too far. See Department of National Defence, *Canadian Forces Joint Publication 01, Canadian Military Doctrine* (Ottawa: Joint Doctrine Branch, 2009) 1-1, 1-2.

[229] Directorate of Land Concepts and Design, *Land Operations 2021: Adaptive Dispersed Operations, The Force Employment Concept for Canada's Army of Tomorrow* (Kingston: Army Publishing Office, 2007), 10.

[230] Directorate of Land Concepts and Design, *Designing Canada's Army of Tomorrow: A Land Operations 2021 Publication* (Kingston: Army Publishing Office, 2011), 30-31.

[231] DLCD, *Land Operations 2021…*, 24. See pages 22-24 for a full explanation of networked enabled operations in ADO.

[232] Defense News, "Editorial: Strengthen Electronic Warfare," *Defense News* 23 March 2015, last accessed 20 April 2015, http://www.defensenews.com/story/defense/commentary/editorial/2015/03/23/editorial-strengthen-electronic-warfare/70324966/.

to 2017 notes that the "future security environment remains highly uncertain and inherently unpredictable,"[233]the RCN appears, on the whole to be relying on the work of force development to chart its course. In, *Securing Canada's Ocean Frontiers: Charting the Course from Leadmark*, there is an entire section devoted to the FSE.[234] Building on the mission of Maritime Command "to generate and maintain combat-capable, multipurpose maritime forces to meet Canada's defence objectives"[235] *Charting the Course from Leadmark* identified seven emerging missions. These missions: Coordination of Government Maritime Security Operations, National Maritime Presence, Forward Security, Maritime Interdiction, Task Group Command, Sea-Based Joint Operations, and Sea Based Logistic Support are articulated but only in general terms. [236] The RCN's potential missions and tasks are significantly generic that it has not narrowed its focus in the same way that the CA, instead, supported by the analysis of the FSE, emphasized the need to be general purpose and capable of a multitude of missions.

The Royal Canadian Air Force (RCAF) has gone in a different direction in building on the work of the FSE in the development of its document *Projecting Power: Canada's Air Force 2035*. *Projecting Power* seeks "to cultivate future concepts, designs and doctrine that are clear."[237] In defining the FSE, *Projecting Power* started with the trend analysis of Force Development's FSE and subjected it to further analysis to determine the impact of the FSE on

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[233] Department of National Defence, *Commander's Guidance and Direction to the Royal Canadian Navy: Executive Plan – 2013 to 2017* (Ottawa: Royal Canadian Navy, 2014), 2.

[234] Directorate of Maritime Strategy, *Securing Canada's Ocean Frontiers: Charting the Course from Leadmark* (Ottawa: Chief of the Maritime Staff, 2005), 13-18.

[235] Department of National Defence, *Leadmark: The Navy's Strategy for 2020* (Ottawa: Directorate of Maritime Strategy, 2001) 92.

[236] Directorate of Maritime Strategy, *Securing Canada's Ocean…,* 19-29.

[237] Department of National Defence, *Projecting Power: Canada's Air Force 2035* (Trenton: Canadian Forces Aerospace Warfare Centre Production Section, 2009), iv.

the RCAF.[238] Further, the RCAF has gone beyond this by publishing two additional forecasts: *Projecting Power: Trends Shaping Canada's Air Force in the Year 2019* and *Projecting Power: Alternative Futures for Canada's Air Force in 2020.* Published in 2009, *Projecting Power: Trends*, forecasts the impact of trends on the RCAF over the next five to ten years.[239] *Projecting Power: Alternative Futures* published in 2010 took four trends from *Projecting Power: Trends* and conducted Alternative Futures analysis on them. These trends were: "Force Generation Issues, Future of Simulators and Training, Unmanned Aerial Systems (UAS) Operations and Air Force Operations in the Arctic."[240] The RCAF has adopted forecasting methodology and incorporated it into its planning out to ten years with positive effects. For example, the first issue, force generation, is described and considered in best and worst case scenarios.[241] This analysis led to deductions that better prepare senior RCAF leaders to deal with issues such as recruiting, retention, career management, and training.[242]

The FSE has permeated the consciousness of the CAF and rather than being an intellectual exercise it is spoken of as the expected future in the ADO. Precisely at a time when the CAF requires flexible, innovative and open minded thinking, the FSE provides a simple solution to the complexity of the modern world and thus there is risk that it may be adopted uncritically. The RCAF, by subjecting the FSE to its own analysis and limiting it to a ten year time frame, has taken a more prudent course.

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[238] *Ibid.*, 2.

[239] Department of National Defence, *Projecting Power: Trends Shaping Canada's Air Force in the Year 2019* (Trenton: Canadian Forces Aerospace Warfare Centre Production Section, 2009), v.

[240] Department of National Defence, *Projecting Power: Alternative Futures for Canada's Air Force in 2020* (Trenton: Canadian Forces Aerospace Warfare Centre Production Section, 2009), iii.

[241] *Ibid*., 5-12.

[242] *Ibid.*, 12-14.

9/11 hit Western intelligence agencies like a psychological freight train[243]and thus it is not surprising that CSIS has increased its forecasting effort for Canadian national security. The CSIS Research, Analysis, and Production branch was publishing open-source documents incorporating forecasting techniques since at least 2000.[244]

CSIS was involved from the outset with the Central Intelligence Agency's (CIA) Global Futures Forum (GFF).[245] With a membership of over 35 countries the GFF is comprised of "intelligence, national security, and nongovernment experts who engage in strategic level, unclassified dialogue and research to better understand and anticipate transnational threats."[246] The forum allows for an exchange of ideas, including new analytic methodologies, collaboration and the creation of new links within the international security, intelligence, and academic communities.[247]

The CSIS Research, Analysis, and Production branch was renamed the Intelligence Assessments Branch (IAB) in 2007.[248] While CSIS had already begun forecasting, this step was

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[243] James R. Clapper, "Commentary: How 9/11 Transformed the Intelligence Community," 7 *Wall Street Journal,* 7 September 2011. Clapper notes that 9/11 hit the community hard and that the result was a move towards greater collaboration and information sharing.

[244] Canadian Security Intelligence Service, "Report # 2000/01 Trends in Terrorism," *Perspectives* (Ottawa: Requirements, Analysis and Production Branch of CSIS, 2000), 8. This article for example, argues that there were reasons for the recent downward trend in terrorism and that a "long-term projection should not be entertained." The report on inter-state conflict concludes with a discussion of positive and negative trends. See Canadian Security Intelligence Service, "Report # 2000/06 Conflict Between and Within States," *Perspectives* (Ottawa: Requirements, Analysis and Production Branch of CSIS, 2000), 6.

[245] Jean-Louis Tiernan, "Using international security research networks: the Global Futures Forum," last accessed 27 April 2015, https://www.google.com/url?q=http://canada.metropolis.net/mediacentre/canada_in_the_global_futures_feb10_e.ppt&sa=U&ei=Yz8-VcW5LcbEogTLmYDQBg&ved=0CAQQFjAA&client=internal-uds-cse&usg=AFQjCNGUKJEMa05CEvUOO1-tDj71otOmbA.

[246] Central Intelligence Agency, "Offices of CIA," last accessed 26 April 2015, https://www.cia.gov/offices-of-cia/intelligence-analysis/organization-1/gfp.html.

[247] Tiernan, "Using international security…,"

[248] Security Intelligence Review Committee, *SIRC Annual Report 2007-2008: An Operational Review of the Canadian Security Intelligence Service* (Ottawa: Public Works and Government Services Canada, 2008), 8.

a clearer articulation of the practice. The role of the IAB included "develop[ing] strategic analyses that examine current and emerging trends or issues that might affect national security in the future."[249]

Recognizing the increased complexity and interdependency of national security, in 2008 CSIS created the Academic Outreach Program (AOP).[250] The AOP is intended "to develop a long-term view of various trends and problems, to challenge our own assumptions and cultural bias, as well as to sharpen our research and analytical capacities."[251] As part of the AOP, CSIS has published a series of documents reporting the findings of foresight workshops. These workshops are conducted under Chatham House rule and include a diverse group of participants.[252] Held two or three times a year, these workshops benefit CSIS in two ways: they help CSIS grapple with non-traditional issues that are, or have migrated to, national security and they allow challenges to CSIS's views in areas where CSIS has long experience improving assessments. This program quickly became an integral part of CSIS's intelligence production and is specifically designed to obtain better understanding of trends and emerging security concerns.[253]

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[249] *Ibid.*

[250] Canadian Security Intelligence Service, "Academic Outreach," last accessed 26 April 2015, https://www.csis.gc.ca/bts/cdmctrch-en.php.

[251] *Ibid.*

[252] CSIS, *Of Threats and Opportunities*…, 5. Other publications include: Canadian Security Intelligence Service, *Pitfalls and Promises: Security Implications of a Post-revolutionary Middle East, World Watch: Expert Notes series publication No. 2014-09-02* (Ottawa: Her Majesty the Queen in Right of Canada, 2014) and Canadian Security Intelligence Service, *The Future of Al Qaeda: Results of a Foresight Project* (Ottawa: Her Majesty the Queen in Right of Canada, 2014).

[253] Canadian Security Intelligence Service, *One Year Through: Taking Stock of the Canadian Security Intelligence Service (CSIS)'s Program of Outreach to Experts*, last accessed 26 April 2015, https://www.csis.gc.ca/pblctns/wrldwtch/2010/takngstck-en.php.

In implementing the AOP, CSIS has taken the lead on organizing workshops within the Government of Canada. Sponsors and participants have included DND, Public Safety, the Privy Council Office, Policy Horizons Canada, and the Department of Foreign Affairs and International Trade. Topics have included Canadian energy security, Russia, and Pakistan.[254]

In Chapter 3 and 4 the evolution of the definition of security in Canadian national security and the adoption of forecasting techniques has been explored. Canada has gone from a "fireproof house" to a country with security concerns that span the globe. The CAF has adopted some forecasting techniques but it has not done so in a deliberate way with the CA, RCN, and RCAF all using them in different ways. National security would benefit from a clearer projection of the future and the work being done in the DND and CSIS. How these issues might be resolved will be explored in Chapter 5.

[254] For a full list of the publications see Canadian Security Intelligence Service, "Publications: World Watch Expert Notes," last accessed 26 April 2015, https://www.csis.gc.ca/pblctns/index-en.php?cat=02. The individual reports list participants and sponsors.

> *There are known knowns. These are things we know that we know. There are unknown knowns. That is to say, there are things we know we don't know. But there are also unknown unknowns. These are things we don't know we don't know.*
>
> – Donald Rumsfeld, 2002

CHAPTER 5 - PROPOSALS FOR CANADIAN NATIONAL SECURITY FORECASTING

Rumsfeld's description of the intelligence problem is apt. The national security problem can be described but only to a point. There will always be "unknown unknowns" that can affect our national security. While the realm of "unknown unknowns" is often the source of surprise, it and "known unknowns" are also the area where forecasting can improve a nation's ability to detect emerging threats. Ideally emerging threats are detected early and disrupted before they can manifest as a crises. Further, if the threats cannot be disrupted, early detection allows contingency planning which can prepare for the impending crises and, thereby, minimize its impact.

In this chapter, improvements to Canadian national security forecasting will be proposed as a means to better enable Canada to deal with the "known unknowns" and "unknown unknowns" and, thereby, improve Canadian national security. The discussion will follow the intelligence cycle from direction through collection and analysis to dissemination and make observations at each step. Under direction it will discuss the lack of National Threat Assessment and some of the implications that has for forecasting. In looking at collection, it will advocate for a Canadian Foreign Intelligence Service (FIS) as a means of indirectly supporting forecasting. The state of the Canadian national security forecasting community will be examined under

analysis suggesting that perhaps it would benefit from better co-ordination. Finally, dissemination will be touched upon to provide another argument for foresight co-ordination.

The intelligence cycle is a process designed "to manage vast quantities of collected information and the resources involved in that collection."[255] It is depicted in Figure 7:

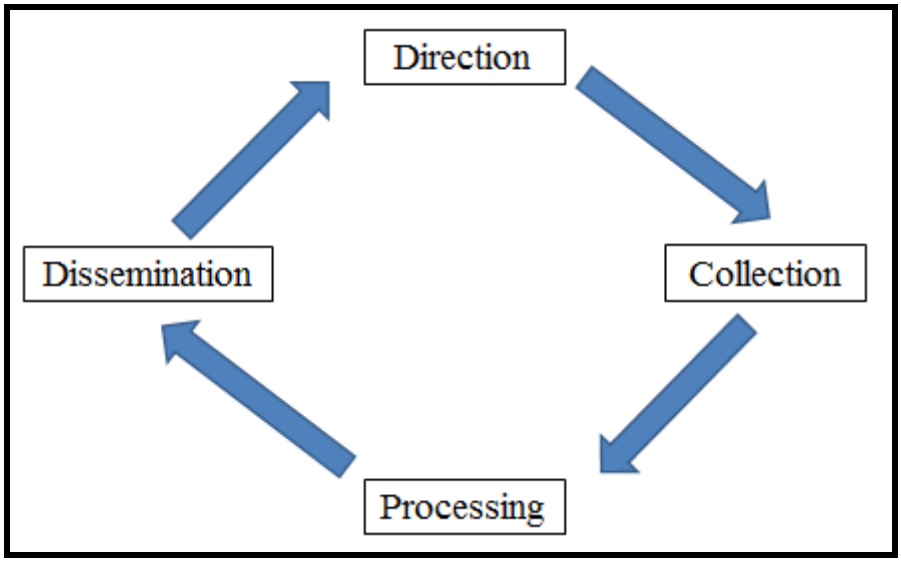

Figure 7: The Intelligence Cycle
Source: derived from *Canadian Forces Joint Publication 2-0 Intelligence*, 3-1.

Dörner, in *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations*, noted that decision makers both in the real world and in the synthetic experimentation environment he created had several problems. When faced with a problem they made the following types of errors:

- Acted without prior analysis of the situation,
- Failed to anticipate side effects and long-term repercussions,

[255] DND, *CFJP 2-0*…, 3-1.

- Assumed that the absence of immediately obvious negative effects meant that correct measures had been taken,
- Let over involvement in 'projects' blind them to emerging needs and changes in the situation,
- Were prone to cynical reactions.[256]

Forecasting can help address these problems but only with effective direction. Fingar argues that "the primary purpose of intelligence inputs into the decision-making process is to reduce uncertainty, identify risks and opportunities, and, by doing so, deepen understanding so that those with policy-making responsibilities will make 'better' decisions."[257]

Direction

Direction of effort in the intelligence cycle comes from both the decision makers and from the intelligence staff. The decision maker provides requirements to the intelligence organization and the head of the intelligence staff provides internal direction to coordinate and manage the process to answer the requirements.[258] It is necessary for this direction to be as clear and precise as possible as it guides the whole process. Given that the amount of data produced in the modern world increases enormously every day,"[259] the only way that amount of material can be tackled is to start with focused questions from the decision maker.[260]

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[256] Dörner, *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations,* trans. Rita and Robert Kimber (New York: Metropolitan Books, 1996),18.

[257] Silver, *The Signal…*,9. Silver notes, "IBM estimates that we are generating 2.5 quintillion bytes of data each day, more than 90 percent of which was created in the last two years." See also Fingar, *Reducing Uncertainty…*, 23 where he observes that the amount of data that must be searched "increases in volume equal to the holding of a major research library every few hours."

[258] DND, *CFJP 2*-0…, 3-1.

[259] Fingar, *Reducing Uncertainty*…, 23.

[260] *Ibid*.

In the survey of the evolution of Canadian national security it was shown that while many national security concerns are relatively constant, overall the number of concerns is expanding. Rather than answering "focused questions from the decision maker," the Canadian intelligence community is faced with an expanding set of questions. Further, Quiggin observes, "many decision makers do not know what kinds of questions need to be asked until a crisis is looming. By that point, insufficient time exists for the intelligence cycle to function and the leadership will not, in all probability, get the information they need."[261] Decision makers need a way to know which questions are important before a crisis develops.

If questions are not anticipated it can lead to a time management problem in the execution of the intelligence cycle. The problem can be illustrated using Stephen Covey's Time Management Matrix shown in Table 2. If direction is not given until a crisis, then the intelligence cycle will operate in Quadrant 1 and 3 of the matrix.

Table 2 – The Time Management Matrix

	Urgent	**Not Urgent**
Important	Quadrant 1 • Crises • Pressing problems • Deadline-driven projects	Quadrant 2 • Prevention • Relationship building • Recognizing new opportunities • Planning
Not Important	Quadrant 3 • Interruptions • Proximate, pressing matters	Quadrant 4 • Trivia • Busy work • Time Wasters

Source: adapted from Stephen R.Covey, *The 7 Habits of Highly Effective People:Powerful Lessons in Personal Change* (New York: Fireside, 1990), 151.

[261] Quiggin, *Seeing the Invisible*…, 53.

Quadrants 1 and 3 on the matrix are the realm of "current intelligence" in modern parlance.[262] These are crises and pressing matters. With a 24 hour news cycle this is partly unavoidable. Answers are required to many unanticipated questions as the media reports new developments and decision makers, especially at the political level, want immediate answers.[263] Forecasting is an activity of Quadrant 2.

Covey notes,

> as long as you focus on Quadrant 1, it keeps getting bigger and bigger until it dominates you. It's like the pounding surf. A huge problem comes and knocks you down and you're wiped out. You struggle back up only to face another one that knocks you down and slams you to the ground.[264]

Failing to prioritize requirements in advance leads to the situation today where intelligence resides in Quadrant 1 and 3. Everything is urgent and there is little time to think, plan and anticipate.

This can be exacerbated when decision makers and analysts alike, when pressed for time by an urgent problem, as they often "revert to 'muddling through,'" and focus on Quadrant 3 while ignoring Quadrant 1.[265] This is what Dörner calls "repair-service behavior" where "we select the problems we will solve on the basis of irrelevant criteria, such as the obviousness of a problem or our competence to solve it."[266]

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[262] Fingar, *Reducing Uncertainty*…, 42.
[263] *Ibid.*, 30.
[264] Stephen R.Covey, *The 7 Habits of Highly Effective People:Powerful Lessons in Personal Change* (New York: Fireside, 1990), 152.
[265] Dörner, *The Logic of Failure*…, 56.
[266] *Ibid.*, 60.

Further, the important but not urgent problems of Quadrant 2 may eventually migrate to Quadrant 1 if they are not addressed in Quadrant 2. Covey argues that by spending time in Quadrant 2,

> Your effectiveness would increase dramatically. Your crises and problems would shrink to manageable proportions because you would be thinking ahead, working on the roots, doing the preventive things that keep situations from developing into crises in the first place. In time management jargon, this is called the Pareto Principle – 80 percent of the results flow out of 20 percent of the activities.[267]

An emerging threat detected early may either be planned for or be disrupted in advance of its manifestation. In the first case the crises may be more easily dealt with because plans are in place. In the second case, disruption may eliminate the threat entirely.

The problem with this sort of approach for Canadian national security is that, while many national security threats and concerns have been articulated they have not been prioritized. This is not surprising as Nunez noted in 2004, "Canada does not have a national security strategy or an interagency process to coherently support its implementation." [268] Since Nunez wrote this comment, however, the national security intelligence architecture has improved through the creation of the NSA and ITAC. Problems remain however, as Fyffe notes:

> A National Security Statement was produced in 2004, but we have not yet in Canada produced the comprehensive type of document published in the United States and the United Kingdom setting out a longer-term strategic vision. A regularization of the practice of issuing such a statement, on a regular if not yearly basis, could be

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[267] Covey, *The 7 Habits*…, 156.

[268] Joseph R. Nunez, "Canada's Global Role: A Strategic Assessment of its Military Power," *Parameters: US Army War College Quarterly* 34 no.3 (Autumn 2004), 87-88.

> another element in building community cohesion by emphasizing overall objectives and priorities.[269]

Quiggin notes that most countries have not actually completed a national threat assessment and as a result policies are often disjointed, priorities never clearly articulated, and the overall security agenda is susceptible to the "flavor of the month approach."[270] Put in Covey's terms, national security operates in Quadrants 1 and 3 not Quadrant 2.

In order to give better direction to the national security intelligence community, Canada may benefit from producing a National Threat Assessment. This assessment could articulate all of the threats and concerns identified in national security policy and expand them as other concerns are articulated by the other members of the national security community. These threats could be analyzed to determine their significance and ranked in order of priority. This analysis may be done through application of each threat to a risk map which compares likelihood of an event to its probable impact. Table 3 shows an example of a Risk Map:

Table 3: Risk Map

IMPACT	**Severe**	Significant	High	High	Very High	Very High
	Major	Medium	Significant	High	High	Very High
	Moderate	Low	Medium	Significant	Significant	High
	Minor	Low	Low	Medium	Medium	Significant
	Insignificant	Low	Low	Low	Medium	Medium
		Rare	**Unlikely**	**Possible**	**Likely**	**Almost Certain**
		LIKELIHOOD				

Source: adapted from Craig Stone, *The Public Management of Defence in Canada* (Toronto: Breakout Educational Network, 2009), 249.

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[269] Fyffe, "The Canadian Intelligence…," 16.
[270] Quiggin, *Seeing the Invisible*…, 28-29.

Once this process has been completed for all national security threats and concerns the result will be a prioritization from "Very High" to "Low" of all known, known and known, unknown national security threats. The national security problem will have been defined less the unknown, unknowns which will be discussed under "analysis."[271]

The National Threat Assessment might be a task for the NSA, PCO, or the ITAC. Adapting this sort of approach will allow for better *forecasting*. Some *forecasting* problems of Quadrant 2, known unknowns, may be "High" threats that are still emerging. By prioritizing threats it could ensure that all threats were covered in order of their importance rather than just by their urgency.

Collection

While the Canadian Intelligence community has significant capability there is one gap in the overall architecture which may have an indirect impact on forecasting. Canada does not have a foreign intelligence service (FIS) like the Central Intelligence Agency (CIA) in the US or the Secret Intelligence Service (MI6) in the UK despite Conservative party promises to create one in the lead up to the 2006 Federal Election.[272] While CSIS does operate overseas, its mandate is

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[271] For the "Risk Map" clear definitions of each term used to describe both the impact and the likelihood of threat or concern need to be defined as well as the definitions of the impact, would all need to be understood by both the analyst and the decision maker receiving the assessment. A "Risk Map" is not the only way to tackle the prioritization problem. See James S. Finan and W.D. Macnamara, "An Illustrative Canadian Risk Assessment," *Canadian Military Journal* 2, no. 3 (Autumn 2001), 29-34, for a discussion using the Analytic Hierarchy Process to complete a strategic risk assessment on Canada.

[272] Paul Robinson, "The Viability of a Canadian Foreign Intelligence Service," *International Journal* 64, no.3 (Summer 2009), 703.

only domestic.[273] The lack of an FIS will be shown to be a collection gap that affects Canada's ability to make independent assessments and to disrupt threats early.

Proponents of the creation of a Canadian FIS note that it would bring advantages by providing our own human intelligence collection capacity rather than relying on allies to provide us with finished products which, lacking the raw data, give us only an allied interpretation of the threat. A Canadian FIS would allow independent Canadian analysis of raw data which could ultimately benefit both Canada and our allies.[274] For example, prior to the 2003 Invasion of Iraq, Canada relied uncritically on American intelligence assessments of the situation. Canada had no ability to collect and analyze data from human intelligence sources on its own and thus had no way to challenge the questionable US assessment with facts.[275]

Further, while Canada could rely solely on intelligence sharing as a member of the "Five Eyes" community,[276] for human intelligence, however, there are three problems with this approach. First, without a Canadian FIS there is a risk of not being seen to bear our fair share of the collection burden.[277] Intelligence sharing is not sharing if you are only taking from the system and not contributing. Canada does make a valuable contribution to the "Five Eyes"

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[273] There has been some debate about the limit of the CSIS mandate outside Canada. See Fyffe, "The Canadian Intelligence Community After 9/11," 10.

[274] Ted Parkinson, "Has the Time Arrived for a Canadian Foreign Intelligence Service," *Canadian Military Journal* 7, no.2 (Summer 2006): 19.

[275] Barry Cooper, *CFIS: A Foreign Intelligence Service for Canada* (Calgary: Canadian Defence & Foreign Affairs Institute, 2007), 50.

[276] James Cox, *Canada and the Five Eyes Intelligence Community* (Calgary: Canadian Defence & Foreign Affairs Institute, 2012), 4.

[277] Cooper, *CFIS*…, 5.

community, particularly through signals intelligence; therefore it can be argued that Canada's lack of an FIS is compensated in other ways.[278]

Second there are inherent risks in relying on another nation's collection and analysis. In addition to the inability to critically judge the analysis received, it is possible that the allied country will provide only the information required to influence Canadian policy in a manner that the allied country desires.[279] Further, such information is seen from an allied perspective and Canada may not perceive threats the same way.[280]

Most importantly, without an FIS, it is more difficult to address threats early. The CSIS Act notes that "the Service shall collect, by investigation or otherwise, to the extent that it is strictly necessary, and analyse and retain information and intelligence respecting activities that may on reasonable grounds be suspected of constituting threats to the security of Canada."[281] This prohibits CSIS from engaging in activities early to prevent threats from developing and limits our response to threats that have already manifested.[282] Put a different way, CSIS has to wait for a threat to manifest before taking action whereas an FIS could root out *potential* problems before they grow into threats.

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[278] Cox, *Canada and the Five Eyes…,* 6,9.

[279] Cooper, *CFIS*…, 41. Robinson in "The Viability of a Canadian Foreign Intelligence Service," counters this point arguing that there is no evidence that intelligence actually influences policy. The question of whether or not policy is based on intelligence is beyond the scope of this paper. This paper is only concerned with ensuring that the government has intelligence to support its national security concerns.

[280] Parkinson, "Has the Time Arrived for a Canadian Foreign Intelligence Service," 19.

[281] Canadian Security Intelligence Service Act, R.S. 1985, c, C-23 (1985), section 12, current to 3 March 2015, http://laws-lois.justice.gc.ca/PDF/C-23.pdf.

[282] Cooper, *CFIS…*, 49-50. This may be partially addressed by the provisions of Bill C-51 Part 4 depending on how it is interpreted in practice. Parliament of Canada, "Bill C-51," last accessed 27 April 2015, http://www.parl.gc.ca/HousePublications/Publication.aspx?Language=E&Mode=1&DocId=6932136&Col=1&File=4.

Proactively dealing with threats may benefit Canada by reducing the number of crises and emerging threats. If successful the amount of concerns in Quadrant 1 and 2 could be reduced allowing more time for forecasting. Such an FIS capability, then, may improve Canada's capacity to forecast.

Processing

The third step of the Intelligence Cycle, "processing," is the step where information is converted to intelligence. This includes the sub-steps of collation, evaluation, analysis, integration, and interpretation.[283] Forecasting falls under the analysis step and it is the additional activity needed to support complete understanding of the national security problem by attempting to address the problem of unknown unknowns.

In chapters 3 and 4 forecasting in the DND and CSIS was surveyed. Forecasting is not a main activity for either organization; rather forecasting is an occasional activity or focused project such as the RCAFs *Projecting Power Trends* and *Projecting Power Alternative Futures*.

There is one government agency outside the national security nexus with forecasting as its raison d'être, is Policy Horizons Canada (PHC). PHC has a team of 25 people of which 11 are policy researchers.[284] Created in 2011, PHC was a transition of the Policy Research Initiative that

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[283] DND, *CFJP 2-0*…, 3-6.

[284] Policy Horizons Canada, "Our Team," last modified14 December 2014, http://www.horizons.gc.ca/eng/content/people.

had been responsible for medium-term analysis support to policy development since 2000.[285]

The mission of PHC is:

> to provide timely and integrated perspectives on emerging policy issues for the Deputy Minister community by: bridging people, ideas, data, issues and evidence in an open and constructive environment; co-creating knowledge for understanding complex Canadian policy challenges; and experimenting with new tools and methods.[286]

PHC is concerned with five areas: society, economy, environment, governance and technology looking out 10 to 15 years.[287] PHC uses scanning and foresight to conduct its' research. Scanning "identifies changes in the domestic and international environments that could affect government policy and programs" and foresight "explores how these changes may evolve and interact to create new policy challenges and opportunities."[288] Further, while PHC is not responsible to look at security but comments on it where appropriate.[289]

In Canada, forecasting is a recent adopted activity in Canada and it is still evolving. From academic research and papers in the 1960s it is now a force and policy development tool. DND's first major endeavour in forecasting was *A Strategy for* 2020 published in 1999, CSIS public efforts have largely been post-9/11 with the creation of the AOP and PHC's predecessor began

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[285] Policy Horizons Canada, "History," last modified 20 August 2014, http://www.horizons.gc.ca/eng/content/history.

[286] Policy Horizons Canada, "Who We Are," last modified 16 December 2014, http://www.horizons.gc.ca/eng/content/who-we-are.

[287] Policy Horizons Canada, "What We Do," last modified 25 April 2013, http://www.horizons.gc.ca/eng/content/what-we-do.

[288] Policy Horizons Canada, "Scanning and Foresight," last modified 23 February 2015, http://www.horizons.gc.ca/eng/content/scanning-and-foresight-0.

[289] Policy Horizons Canada, "*MetaSCAN 2011: Exploring four global forces shaping our future*"(Ottawa: Government of Canada, 2011), 5, 11.

forecasting in 2000. With less than 20 years of experience in this field, there are already divergent approaches to the problem of forecasting.

The current situation is less than ideal as the organizations conducting forecasting have different mandates but their work inevitably overlaps. PHC, for example, prepared a short report in February 2014 entitled *Fragmentation and Resurgence of Islamic Terrorist Groups in Asia* which notes that "the changing form of Islamic terrorism has additional policy implications for counter-terrorism strategies."[290] This is arguably outside PHC's mandate. Further, DND's FSE is primarily concerned with security threats it also considers all five areas of PHC's mandate. While some overlap is inevitable, it may be a symptom of inefficient direction and allocation of resources.

Terminology and methodology are not standardized in Canadian forecasting. The lack of a common lexicon and agreed methodology may lead to misunderstandings as reports are read across government departments.[291] Further as this is an emerging field, it might benefit from a directed inter-agency approach to developing and adopting new methodologies.

CSIS has taken the lead on much of this forecasting activity by establishing its AOP. To date there has been cooperation with several departments across the Canadian government. This is a sound approach. The complexity of problems today makes it impossible for analysis to be an individual effort. A diverse team from a number of disciplines working collaboratively is

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[290] Policy Horizons Canada, "*Fragmentation and Resurgence of Islamic Terrorist Groups in Asia*," last accessed 24 April 2014, http://www.horizons.gc.ca/sites/default/files/Publication-alt-format/251_647kb_3pages_eng.pdf.

[291] The FSE uses the term "future" while CSIS and PHC use "foresight." The FSE is referenced like an academic document whereas the PHC products are not. CSIS references some documents but not others. The FSE looks out to 2040 while CSIS and PHC look out to shorter time frames.

required if all the relevant data is to be collected and understood.[292]Indeed, while group forecasts are not always accurate, research indicates that they are more accurate than the work of individuals. Multiple perspectives make for better products.[293] As forecasting is a new pursuit, it is time to consider if a central authority might better able to direct and co-ordinate this activity.

Where this central authority might best reside is an open question. If it rests with the NSA there is a risk that the pressing matters of current crises and operations of Quadrant 1 will leave forecasting off of the agenda. If it continues to reside in CSIS it risks addressing the needs of a single department rather than the whole community. CSIS, DND, and PHC do not have the mandate to direct the other departments and national security is outside of PHC's mandate. A resolution of this question may be necessary to move Canada's emerging forecasting capability forward.

Dissemination

"Dissemination is defined as the timely conveyance of intelligence, in an appropriate form, and by any suitable means, to those who need it."[294] This survey found no evidence of significant problems with "dissemination" and many documents are readily available online. There is one concern in that forecasting analysis is not captured in one place; rather, forecasting reports are typically on department websites or in the government of Canada archives.[295] The potential difficulty with this is that because the documents are not indexed it can be difficult to

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[292] Fingar, *Reducing Uncertainty*…, 131.
[293] Silver, *The Signal*…, 66
[294] DND, *CFJP 2*-0…, 3-11.
[295] This can also been seen as a collation problem (analysis). As the reports in question are forecasts that may benefit analysis in the future, this problem has been placed under dissemination. Collation does not start until there is a question to answer and when forecasts are prepared some of those questions may not yet be known.

find a document unless it is already known to exist. This is another area which might benefit from central co-ordination which could direct the creation of a single repository for all products.

In this chapter the intelligence cycle was used to look for ways to improve Canadian national security forecasting. There were three main suggestions offered. A National Threat Assessment could be prepared to better understand and tackle the national security problem. Creating an FIS to pre-empt some future crises and emerging threats and, thereby, free capacity for forecasting. Finally, it was suggested that improving co-ordination of the forecasting community may allow it to analyze and disseminate more efficiently. The implementation of these proposals may leave Canada better situated to deal with the unknown unknown challenges of the future.

The future is called 'perhaps', which is the only possible thing to call the future.
And the important thing is not to allow that to scare you.

- *Tennessee Williams, Orpheus Descending*[296]

CHAPTER 6 - CONCLUSION

The future excites our imagination as we await the latest episode of the *Star Wars* franchise or ponder when mankind will "boldly go where no man has gone before," like the cast of *Star Trek*. The trauma of 9/11, however, has also made the future a scary place as we wonder where the next threat will come from. Tennesssee Williams was right, however, we should not allow the uncertainty of the future to scare us. Perhaps challenges will come but there are ways to mitigate our fears.

Starting by making a distinction between *prediction* and *forecasting* this paper considered reasons why *forecasting* is desirable from a national security perspective. In the contemporary environment, in the absence of a defined enemy, *forecasting* is a useful tool in national security activities like procurement. By examining the complexity of national security in the modern world, and the practical problems of prediction, it concluded that the future could not be predicted but we can learn about the future possibilities, including threats, by *forecasting*. Surveying *forecasting* techniques concluded that some valuable insight can be gained from these analytical techniques which can better prepare decision makers to face possible future challenges.

In reviewing the history of the articulation of national security threats and concerns in Canada, it was seen that over time the understanding of what constitutes Canadian national

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[296] Goodreads, "Orpheus Descending Quotes," last accessed 30 April 2015. http://www.goodreads.com/work/quotes/198518-orpheus-descending.

security threats and concerns has expanded greatly. Today, Canada has identified more things to be worried about than at any other time in its past. In response, Canada has begun to look to the future, and DND has been developing a *forecasting* capability since the end of the post-Cold War era to support national security efforts.

Delving further into Canadian *forecasting* attempts in DND and CSIS revealed that this nascent *forecasting* capability is growing. Canada is not alone in this endeavour, it is part of an emerging international *forecasting* community including our traditional national security partners: the US and UK. DND's *forecasting* product, the FSE, has been applied in the CA, RCN, and RCAF with mixed results. A cautionary note was offered on the application of the FSE to doctrine while noting that the application of the FSE to guide the RCAF over the mid-term is probably a useful development. CSIS's *forecasting* efforts, through academic outreach and international co-operation bode well for the future.

The time has come for Canada to decide what it wants to do with this nascent *forecasting* capability. Three main recommendations were offered to move Canada's *forecasting* capability forward. First it was argued that Canada should complete a National Threat Assessment and argued that, until the assessment is complete, Canada will not have a complete appreciation of the scope of its national security. A National Threat Assessment, however, will only cover known known and known unknown threats. Other avenues to enhance our national security include an FIS, and co-ordinating the Canadian *forecasting* community.

It was observed that some possible future challenges may be disrupted before they become threats if Canada creates an FIS. In doing so, an FIS may be able reduce the number of

urgent national security threats. A reduction in the national security threats, freeing up some analytic capacity, would create an opportunity to put more effort into our *forecasting* capability.

In order to complete the National Threat Assessment, Canada must have a process to anticipate problems coming from the realm of the unknown unknowns. Currently the only methodology to analyze the realm of the unknown unknowns is *forecasting.* While Canada is conducting *forecasting*, it is a relatively new capability that has developed independently in various government departments and currently lacks central co-ordination, and, indeed, a champion within the government is necessary to move it forward. This paper concluded that these efforts need to be better co-ordinated in order to develop a common lexicon and methodology so that the products can be understood across the government and to minimize redundant analysis. As *forecasting* identifies emerging threats and this effort is fed into the National Threat Assessment, the scope of national security will be better understood.

Ultimately the problems encompassed by national security may be better managed through the effective employment of *forecasting*. By identifying potential future threats early, and acting before they manifest, Canada could reduce its national security concerns and the number of crises threats can pose. This could be an ever accelerating cycle, resulting in fewer and fewer pressing security concerns, but it can only develop if Canada makes a conscious choice to assign greater priority to *forecasting*.

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