Conceiving an Army for the 21st Century

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DRDC CORA TM 2010-264
December 2010

Defence R&D Canada

Centre for Operational Research and Analysis

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National Defence Défense nationale

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Technical Memorandum
DRDC CORA TM 2010-264
December 2010

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Abstract

If military planners are to be systematic and rigorous in future planning, utility may be found in futures methodology. Indeed careful application of such methods can allow for investigation of the future and its implications in a manner that is both more systematic and rigorous than is likely to occur otherwise. This paper details two such methods and their application to Army 2040 – a project being conducted by the Directorate of Land Concepts and Designs (DLCD) aimed at investigating how Canada's Army must evolve to maintain its effectiveness in the 2040 timeframe.

Following a brief overview of the capability development process which the Army employs to prepare for the future, the paper describes the futuring, or foresight methods of Environmental Scanning and the Futures Wheel and their application in analysing seven key components of the future strategic environment. It then identifies twelve converging drivers which emerged from the analysis and describes the process by which identified trends and the second and third order effects they generate may be used to produce a number of alternative futures. The alternative futures depict a world the Army, and in turn the Canadian Forces (CF), must consider in order to maintain their relevance in the 2040 timeframe. An elaboration of one such framework – based on those trends ranked as particularly high in terms of the potential impacts they may produce as well as the degree of uncertainty that surrounds them (i.e. energy and environmental sustainability) – concludes the paper.

Résumé

Si les planificateurs militaires doivent se montrer systématiques et rigoureux dans l'établissement de leurs plans d'avenir, ils peuvent également tirer profit de l'utilisation de méthodes prospectives. L'application attentive de telles méthodes permet en effet de scruter l'avenir et de cerner ses conséquences, d'une manière à la fois plus systématique et rigoureuse qu'il ne serait possible de le faire sans elles. Ce document donne des détails sur ces deux méthodes et leurs applications à Armée de terre 2040 – un projet conduit par la Direction – Concepts et schémas de la Force terrestre (DCSFT) qui vise à étudier la manière dont l'Armée de terre du Canada doit évoluer pour préserver son efficacité à l'échéance de 2040.

Après un survol rapide du processus de développement des capacités que l'Armée de terre utilise pour préparer son avenir, ce document décrit les méthodes de projection ou méthodes prospectives que sont l'Analyse de l'environnement et le Diagramme du futur, ainsi que leurs applications à l'analyse de sept volets clés caractérisant le futur environnement stratégique. Il introduit ensuite douze facteurs convergents qui découlent de cette analyse et le processus permettant de repérer des tendances, ainsi que les effets de deuxième et de troisième ordres qui résultent de ces dernières et servent à esquisser quelques scénarios prospectifs possibles. Ces scénarios prospectifs constituent un cadre que l'Armée de terre et les Forces canadiennes (FC) à leur tour devront prendre en compte pour préserver leur pertinence à l'échéance de 2040. En conclusion, ce document propose un cadre de cette nature – reposant sur des tendances classées

par ordre d’importance au regard des effets qu’elles peuvent générer et du degré d’incertitude qui les entoure (à savoir la viabilité énergétique et la durabilité environnementale).

Executive Summary

Conceiving an Army for the 21st Century

Michael A. Rostek; Peter Gizewski; Regan Reshke; DRDC CORA TM 2010-264; Defence R&D Canada – CORA; December 2010.

Introduction or background: The main purpose of state militaries is to fight and win wars. In an environment where a state has a clearly defined enemy, it often has little difficulty in securing the social and political support required to achieve this goal. The Cold War period is illustrative. Indeed, during this era military plans were abundant and equipment acquisitions were designed to defeat a specific enemy – the Warsaw Pact. Today, however, adversaries are less clearly defined and military planners are faced with the conundrum of how to plan against opaque threats. In the absence of a clear enemy, state militaries around the world are debating between structuring their forces for conventional warfighting, counter insurgency, or stability and reconstruction to fit the current and future operating environments.

If military planners are to be more systematic and rigorous in future planning, (to hedge costs in future blood and treasure) utility may be found in the application of structured methods for exploring the future. Indeed such methods, commonly utilized during foresight or futuring studies, allow for investigation of the future and its implications in a manner that is not only systematic but which adds rigor. Moreover, the results obtained through the use of such methods are likely to be more credible and potentially useful than any that might be obtained in their absence.

This paper details two such methods: Environmental Scanning and Futures Wheel. More importantly, it examines their application to Army 2040 – a project being conducted by the Directorate of Land Concepts and Designs (DLCD) aimed at investigating how the Army must evolve to maintain its effectiveness in the 2040 timeframe. The former method involves a scanning process aimed at gathering both factual and subjective information on the environment in which the Army will be operating out to the 2040 timeframe in order to identify new developments that can challenge past assumptions or provide new perspective to future threats or opportunities while the latter, through structured brainstorming, aims to derive second and third order interaction effects from those same trends extrapolated into the future.

Results: Following a brief overview of the capability development process which the Army employs to prepare for the future, the paper describes futuring, or more formally foresight methodology, and its application in analysing seven key components of the future strategic environment: security, science and technology, demographics, the economy, international law, the physical environment and the social and political environment. It then identifies and ranks twelve converging trends which emerged from the analysis (i.e. Impact of Age & Demographics on Military Composition, Energy Security, Exponential Technology Growth, Human/Social Response to Technology, Expansion of Operating Environments, Global Environmental Change, Globalization, Conflicting / Shifting Identities, Shifting Power Balances, Resource Security, Distribution of Wealth, and Weapons Proliferation). Elaboration of four alternative futures, which the Army and in turn the Canadian Forces (CF) must consider in order to maintain their relevance in the 2040 timeframe concludes the paper.

Significance: The investigation illustrates how careful study of ongoing trends and their interaction, using the methods described above, can highlight certain areas that could inform defence policy decisions today in order to effectively address challenges in the future. Indeed, by offering an example of the step by step application of two common futuring methods, it illustrates their potential to help ensure that such inquiry is conducted in a manner that is systematic, and that possesses a degree of rigor and reliability unlikely to exist in their absence.

Future plans: The paper concludes with a description of four alternative futures that when viewed as a whole, offer a plausible, broad window into the future, within which it is reasonable to anticipate that actual events might unfold. This work represents a preliminary step towards the conceptualization of a Future Army circa 2040. Next steps will entail examining the functionality and utility that current and soon-to-be-fielded capabilities will offer with respect to the security challenges envisioned in the four alternative futures. Resulting capability gaps will then be analyzed and prioritized. Drawing upon trends in science and technology, new concepts and capabilities will then be proposed and war-gamed. In this manner, conceptual capabilities offering the most potential circa 2040 will be identified, prioritized and formalized within the Army's Capability Development Process. A final step in the process will be to contemplate the impact of shock, or black-swan events[1]. Such events have the potential to drastically alter the previously evaluated alternative futures. Indeed, while the probability of their occurrence may be low, their potentially high impact makes assessment of the ability of conceptual Army 2040 capabilities to handle such risks important. Where risks are deemed to be too severe, an additional round of concept development will be needed to close the capability gaps associated with these shock events.

[1] Shocks or black swan events are low probability events that would have a high impact if they were to occur.

Sommaire

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Michael A. Rostek; Peter Gizewski; Regan Reshke; DRDC CORA TM 2010-264; Recherche et développement pour la défense Canada – CARO; Décembre 2010.

Introduction ou contexte: Le principal objectif des forces militaires nationales est de combattre et de remporter des guerres. Dans un environnement ou un État a un ennemi clairement défini, cet État n'éprouve guère de difficultés à obtenir le soutien social et politique dont il a besoin pour atteindre cet objectif. À cet égard, la période de la guerre froide est un exemple révélateur. En effet, durant cette période, les plans militaires ne manquaient pas et les équipements étaient acquis pour vaincre un ennemi précis – ceux du Pacte de Varsovie. Or, de nos jours, le visage des adversaires est moins clairement défini, de sorte que les planificateurs militaires doivent trouver des solutions à un problème très épineux : quel plan établir face à des menaces obscures. En l'absence d'ennemis précis, les forces armées des États s'interrogent, partout dans le monde, sur la nécessité de structurer leurs forces, pour répondre aux besoins d'une guerre conventionnelle, de mesures anti-insurrectionnelles, ou bien pour assurer la stabilité et la reconstruction afin de s'adapter aux contextes opérationnels d'aujourd'hui, et de demain.

Si les planificateurs militaires doivent se montrer plus systématiques et rigoureux dans l'établissement de leurs plans d'avenir (pour se prémunir contre les coûts des futurs effectifs et ressources), ils peuvent également tirer profit de l'application de méthodes structurées leur permettant d'explorer l'avenir. Ces méthodes, couramment utilisées dans le cadre d'études prévisionnelles ou prospectives, permettent en effet de scruter l'avenir et de cerner ses conséquences d'une manière qui ne se veut pas seulement systématique, mais aussi plus rigoureuse. De surcroît, les résultats que procurent de telles méthodes ont plus de chance d'être crédibles et virtuellement utiles que tout ce qui pourrait être produit sans y avoir recours.

Ce document donne des détails sur ces deux méthodes : Analyse de l'environnement et Diagramme du futur. Il se penche surtout sur leur application à Armée de terre 2040 – un projet conduit par la Direction – Concepts et schémas de la Force terrestre (DCSFT) qui vise à étudier la manière dont l'Armée de terre doit évoluer pour préserver son efficacité à l'échéance de 2040. La première méthode met en jeu un processus d'analyse destiné à recueillir des renseignements à la fois factuels et subjectifs sur les environnements dans lesquels l'Armée de terre sera appelée à intervenir d'ici à l'horizon de 2040; il s'agit de cerner les nouveaux développements aptes à vérifier d'anciennes hypothèses, d'offrir de nouvelles possibilités ou de nouvelles perspectives en réponse à de futures menaces. La seconde méthode, qui s'appuie sur des échanges d'idées structurées, vise à déduire les effets d'interactions de deuxième et de troisième ordres qui découlent de ces mêmes tendances, extrapolées dans le futur.

Résultats: Après un survol rapide du processus de développement des capacités que l'Armée de terre utilise pour préparer son avenir, ce document décrit des méthodes de projection, ou de façon plus formelle des méthodes prospectives, ainsi que leurs applications à l'analyse de sept volets clés caractérisant le futur environnement stratégique : sécurité, science et technologie, démographie, économie, droit international, environnement physique et environnements sociaux

et politiques. Il introduit ensuite douze tendances convergentes qui découlent de cette analyse et classe ces dernières par ordre d'importance (à savoir les effets de l'âge et de la démographie sur la composition des Forces armées, la sécurité énergétique, la croissance exponentielle de la technologie, les réactions humaines ou de la société face à la technologie, l'élargissement des contextes opérationnels, les changements environnementaux à l'échelle planétaire, la mondialisation, les identités nationales conflictuelles ou changeantes, les transferts de l'équilibre des pouvoirs, la sécurité des ressources, la distribution de richesse et la prolifération des armements). En conclusion, ce document propose quatre scénarios d'avenir possibles que l'Armée de terre et les Forces canadiennes (FC) devront à leur tour prendre en compte pour préserver leur pertinence à l'échéance 2040

Portée: Nos recherches illustrent à quel point une étude attentive des tendances en cours et de leurs interactions, à l'aide des méthodes présentées plus haut, peut mettre en évidence certaines questions susceptibles d'éclairer les décisions qui sont prises aujourd'hui en matière de politique et de défense pour répondre plus efficacement aux défis de demain. En présentant un exemple d'application, étape par étape, de ces deux méthodes prospectives ordinaires, nos travaux témoignent de leurs potentialités à contribuer à veiller à ce qu'une étude de ce type soit conduite de manière systématique et présente un degré de fiabilité et de rigueur qui n'aurait pu être atteint sans elles.

Plans d'avenir: Ce document s'achève sur la description de quatre scénarios prospectifs possibles qui, pris dans leur ensemble, esquisse un panorama d'avenir plausible dans le cadre duquel il est raisonnable d'imaginer que des événements concrets vont se produire. Le travail qui est présenté ici constitue une étape préliminaire de la dynamique de conceptualisation de l'Armée du futur vers 2040. Les prochaines étapes nous conduiront à examiner les fonctionnalités et l'utilité que les capacités actuelles et celles devant être prochainement mises sur le terrain offriront eu égard aux défis sur la sécurité que laissent présager les quatre scénarios d'avenir possibles. Les lacunes en termes de capacité qui en résulteront seront ensuite analysées et classées par ordre de priorité. En nous appuyant sur les tendances des sciences et de la technologie, nous proposerons ensuite de nouveaux concepts et de nouvelles capacités et procéderons à des jeux de guerre. C'est de cette manière que nous parviendrons à cerner, à classer par ordre de priorité et à formaliser au sein du processus de développement des capacités de l'Armée de terre les capacités conceptuelles pouvant offrir vers 2040 les potentialités les plus importantes. La dernière étape de ce processus consistera à observer les effets d'événements dits du « Cygne noir »[2]. De tels événements peuvent avoir des conséquences spectaculaires sur les scénarios prospectifs possibles préalablement évalués. Bien qu'il s'agisse d'événements hautement improbables, leurs répercussions de grande ampleur justifient l'importance d'évaluer l'aptitude des capacités conceptuelles de l'Armée de terre à gérer de tels risques en 2040. De fait, chaque fois que ces risques seront jugés importants, il conviendra d'engager un nouveau développement de concepts pour combler les lacunes de capacités associées à ces événements chocs.

[2] Les chocs ou événements dits du « Cygne noir » sont des événements hautement improbables qui auraient des répercussions très importantes s'ils survenaient.

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Acknowledgements

The authors thank Colonel John Crosman, Lieutenant Colonel Brad Boswell, Lieutenant Colonel Steve Larouche, Lieutenant Colonel Ron Bell, Major John Sheahan, Mr. Neil Chuka, and Ms. Nancy Teeple for their fine work and contributions to this project. Naturally, any errors either of omission or commission, are the responsibility of the authors alone.

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1 Introduction

The future cannot be accurately predicted. Indeed, uncertainty is a predominant characteristic of the future global security environment and defence establishments around the world continue to strive to understand and define how their national security policies will fit within this emerging paradigm. State militaries routinely engage in forward planning for a variety of reasons that extend from defence procurement, to recruitment and retention of personnel to assessment of emerging forms of warfare. Typically however, planners seek to diminish uncertainty rather than to learn how to function within it. Such an approach carries risks. In fact, Colin Grey notes that:

> The challenge is to cope with uncertainty, not try and diminish it. That cannot be achieved readily. Such ill-fated attempts will place us on the road to ruin through the creation of unsound expectations.[1]

Yet, if the future cannot be accurately predicted and uncertainty rules, how *do* military planners prepare for the it? A vast amount of information exists today which can usefully offer guidance for understanding the future. However, making sense of that information and its military application is difficult. For example, few politicians heralding the benefits of a peace dividend resulting from the end of the Cold War foresaw the dramatic increase in intrastate conflict and the coincident increased demand for armed forces which marked the 1990s. The proclamation of a "new world order" failed to materialize in the manner that many had anticipated. While it would be unwise to proclaim that future conflict will look much like that occurring today 'only more so', it is equally foolish to advance the prediction that it will bear few of the hallmarks of conflict as we have known it.[2] A balanced yet reliable and systematic method of future analysis is required to stave off reactionary defence planning which may be costly in both blood and treasure.

The main purpose of state militaries is to fight and win wars. In an environment where a state has a clearly defined enemy, it often has little difficulty in securing the social and political support required to achieve this goal, the Cold War experience is again illustrative. Indeed, during this era, western military planners were able to plan strategies and design equipment acquisitions against a familiar and quite well defined enemy – the Warsaw Pact. Today, however, the enemy is less clearly defined and military planners are therefore faced with the conundrum of how to plan for a less clear future. State militaries around the world are debating between structuring their forces for conventional warfighting, counter insurgency, or stability and reconstruction to fit the current, and what is believed the likely, future operating environments.

If military planners are to be systematic and rigorous in future planning, (so as to hedge costs in future blood and treasure), utility may be found in employing futures methodology. Indeed, as noted below:

> The purpose of futures methodology is to systematically explore, create, and test both possible and desirable futures to improve decisions. It includes analysis of how those conditions might change as a result of the implementation of policies and actions, and the consequences of these policies and actions. Futures research can be directed to large or small-scale issues, in the near or distant future; it can project possible or desired conditions. It is not a science; the outcome of studies

> depends on the methods used and the skills of the practitioners. Its methods can be highly quantitative or qualitative. It helps to provide a framework to better understand the present and expand mental horizons.[3]

Several futures research methods exist and greater rigour is obtained when one or more methods are employed as a means of pursuing such inquiry. This was the case for the Army 2040 project – an ongoing investigation which employs both Environmental Scanning and a Futures Wheel method. The former involves a process of obtaining information about events, trends, and relationships in an organization's external environment while the latter, through structured brainstorming, aims to derive second and third order interaction effects from those same trends. While this research does not claim to be prophetic, a careful study, using the methods described above, may highlight certain areas that could inform defence policy decisions today in order to meet expectations in the future. As Colin Grey explains, 'We do not just discover the truth about future warfare as time passes. In addition, we construct the truth through the decisions we make."[4]

The Army 2040 team fully expects that portions of its analysis will be inaccurate. Yet it is the process rather than the product that is most important. Indeed, Dwight D. Eisenhower highlighted this issue when he proclaimed: "In preparing for battle I have always found that plans are useless, but planning is indispensable." Further, the Army 2040 team fully expect that surprises (shocks) will occur. Military planners win when the effects of surprise do not inflict lethal damage.[5] As shocks are often derived from known trends interacting in unexpected ways, the Army 2040 team must provide analysis that will allow military decision makers to get it right quickly to ensure their mitigation. It is commonly understood that the further we project into the future the less confident we can be in our analysis. However, it is also understood that without a path, "any" road will take you to the future.

This paper begins with a brief overview of the capability development process which the Army employs to prepare for the future. A description of futuring or foresight methodology, a key initiating component of the concept development process, follows. This in effect constitutes the framework used to develop Army 2040. The framework commences with a description of the future strategic environment described through seven lenses commonly used in futuring: security, science and technology, demographics, the economy, international law, the physical environment and the social and political environment. Converging trends emerging from this analysis create second and third order affects which in turn point to several potential outcomes for the Army and the Canadian Forces (CF). These outcomes are reflected in alternate future frameworks. An elaboration of one such framework – based on those trends which project participants ranked as particularly high in terms of the potential impacts they may produce as well as the degree of uncertainty that surrounds them (e.g. energy and environmental sustainability) – concludes the paper.

2 The Capability Development Process

In dealing with the future, the Army utilizes a capabilities based development process. For Army purposes, being "capable" is derived through fulfillment of specific human, scientific, doctrinal, infrastructural, environmental, material and institutional conditions essential for successful service; that is the ability to achieve an effect. In developing capabilities, a three step process is used (see Figure 1):

- Conceive – concepts are developed and translated into capability requirements;
- Design – selected capability requirements are translated into validated designs for future use;
- Build – validated designs for force capabilities are refined and realized for use in the field.

The objective of the process is to meet defence requirements allowing the Army to remain relevant and effective in the current and future operating environments. While each step in the process is considered a distinct activity, considerable overlap occurs as a capability is first conceived, then designed and finally built over a number of years.

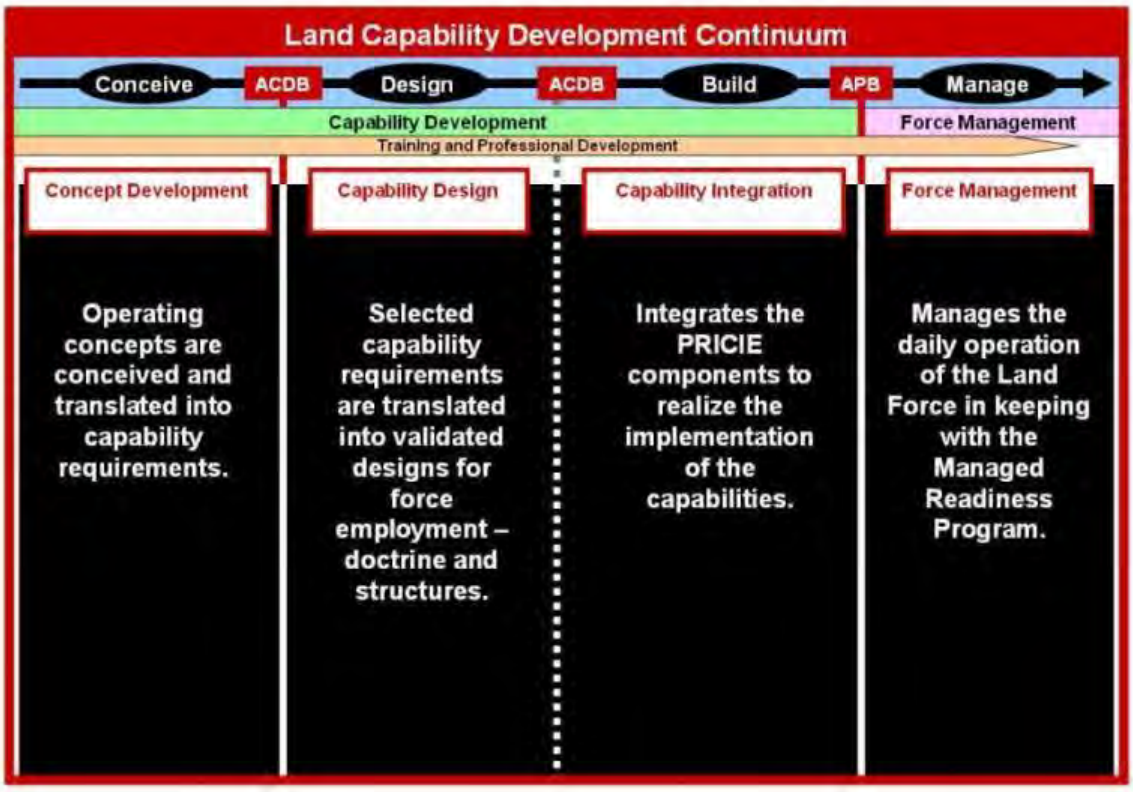

Figure 1: The Land Capability Development Continuum

The capability development process is also aligned with three separate time horizons:

- The Army of Today which encompasses a 0-5 year outlook and is roughly correlated with the Build stage of the process,
- The Army of Tomorrow which encompasses a 5-15 year outlook and is roughly correlated with the Design stage of the process, and
- The Future Army which entails a 15-30 year outlook and is roughly associated with the Conceive stage of the process.

While each time horizon has its own set of challenges and outcomes, it is the Future Army outlook, 15-30 years into the future, which perhaps requires the greatest degree of abstract thinking. Indeed, the individuals working in this realm can be considered futurists[3] engaging in what is commonly referred to as foresight. This group – known as the Concepts Team – examines the future security environment and identifies areas requiring more focussed research which leads to the identification of the capabilities required to operate in the future. In turn, the team will propose alternative concepts and technologies to achieve desired capabilities.

The Concepts Team consists of a scientific advisor, a strategic analyst, operations researchers, and operational function[4] experts (Command, Sense, Act, Shield, and Sustain). The Team may also include functional area experts as needed such as lawyers, personnel selection officers, and demographic experts. The focus of this paper is on the process employed by the Concepts Team over the last two years. Indeed, the process outlined here attempts to template the "conceive pillar" of the Land Capability Development Continuum and is not necessarily product focussed. As mentioned above, this small team is in essence a futurist think-tank, which utilizes foresight methodology, the focus of the next section.

[3] To study the future is to study potential change - not simply fads, but what is likely to make a systemic or fundamental difference over the next 10 to 25 years or more. Studying the future involves not simply economic projections or sociological analysis or technological forecasting, but a multi disciplinary examination of change in all major areas of life to find the interacting dynamics that are creating the next age.[6]

[4] All Army activities can be grouped under one of five operational functions: Command: the operational function that integrates all the operational functions into a single comprehensive strategic, operational or tactical level concept; Sense: the operational function that provides the commander with knowledge; Act: the operational function that integrates manoeuvre, firepower and offensive information operations to achieve the desired effects; Shield: the operational function that provides for the protection of a force's survivability and freedom of action; Sustain: the operational function that integrates strategic, operational and tactical levels of support to generate and maintain force capability.

3 Futuring and Foresight

Futuring[5] and foresight[6] are growing international disciplines designed to "…critically examine the difficulties associated with making decisions with long term future consequences in conditions of uncertainty and to provide methods through which these difficulties can be minimised."[7] While several methods exist in this growing field, the Concepts Team employed Environmental Scanning and a Futures Wheel approach in order to better understand the possible outcomes for the Army in the 2040 timeframe.

These methods accorded especially well with the demands and purposes of the project. Both are characterized by simplicity of use well suited to a team consisting of a small group of analysts with varying backgrounds, skill sets, time constraints and limited resources. Indeed, their "user–friendliness" expedited the team's capacity to focus on the analytical phase of the inquiry. Beyond this, and most important, they were particularly well-suited to the project's chief purposes – i.e. the investigation and determination of long term trends and drivers (an exercise which often involved qualitative data), and the investigation of the possible causal interactions that could occur between them.

3.1 Environmental Scanning

Environmental Scanning is a process involving the acquisition and use of information about events, trends and relationships that may have a strategic bearing on how an organization does business. The knowledge and insights gained from scanning serve to assist in more effectively planning the organization's future course. The process typically focuses on a large number of areas – in effect covering every major sector of the environment that can assist management in planning for an organization's future.[9] It also involves the use of four basic techniques (i.e. undirected viewing, conditioned viewing, and both informal and formal search of both primary and/or secondary sources of information). All four techniques are essential to the method's effective use. Indeed, as one observer explains:

> Undirected viewing helps the organization to scan broadly and develop peripheral vision so that it can see and think outside the box. Conditioned viewing tracks trends and gives the organization early warning about emerging issues. Informal search draws a profile of an issue or development, allowing the organization to identify its main features and assess its potential impact. (And) formal search gathers all relevant information about an issue to enable intelligent decision making.[10]

[5] World Futures Society publication on Futuring by Edward Cornish provides a comprehensive treatment of the subject.[7]

[6] Some prefer the term "futures research" and by that mean the use of methods to identify systematically the consequences of policy options and alternative futures with policy implications for decision makers. Others prefer the term "future studies" and by that mean any exploration of what might happen and what we might want to become. Still others, ostensibly in Europe, and Francophone Africa prefer "prospective studies" and by that mean the study of the future to develop a strategic attitude of the mind with a long-range view of creating a desirable future.[8]

[7] Philosophy, Aims and Objectives of the MA Foresight and Futures Studies, Leeds Metropolitan University (10 May 1999).

Use of the Environmental Scanning method led to the identification of seven focus areas as being key for the Army in the 2040 timeframe. All were then researched and studied in depth to gain a full appreciation of potentially important changes – drivers, trends and "weak signals". Indeed, the method allowed for an analysis of what is constant, what changes and what constantly changes, in the areas under scrutiny. It also helped to provide team members with some general, wide-ranging hints as to the direction that the future may take.

The focus areas selected and researched were as follows: Science and Technology, Social, Political, Economic, Legal, Physical Environment, and Security:

- **Science and Technology**. Although its benefits are not shared equally amongst all societies, the exponential growth in science and technology has led to unprecedented global prosperity and an enrichment of the quality of life for humankind. Yet while so many aspects of human health and welfare are dependent upon continued progress in science and technology, the very survival of the species is imperilled by its potential destructive power. Developments in science and technology will influence the other focus areas in many positive and negative ways. Key trend areas of technological development include: exponential technology growth and convergence, broadening cognitive and brain science, focus on green and clean technology, emergence of "small-tech" (e.g. micro- and nanotechnologies), biotechnology and genetics/genomics expansion and expertise, increasing robotics automation and artificial intelligence, and pervasive networks and networking.
- **Social**. Social characteristics of importance in assessing the nature and dimensions of future threats and challenges typically include: population growth, location, age, ethnicity, general health (i.e. mortality and fertility rates), literacy, socio-economic status, and/or religion. Additional indicators include individual views regarding key issues of importance in life (survival vs. self awareness/actualization) as well as attitudes and orientations toward the outside world (insular vs. cosmopolitan, religious vs. secular).[8] Of particular interest in the social realm is the Human Dimension which focuses on human capital within the organization. In discussing the future, there is often a tendency to focus on science and technology. However, in the 2040 time period, the Army's essence will continue to be its people. Its effectiveness will be achieved by their collective efforts, and the success of its outputs will be measured in the human domain. Thus, human capital will continue to represent the foundation upon which the institution exists, functions, succeeds, and endures. The Army draws its human capital from the very society that it is entrusted to safeguard; therefore, the Army's strength and continued success will be directly dependant upon its ability to provide value, to be seen as relevant, and be seen as a constituent part of the evolving Canadian population. To continue to achieve these goals, there will be enduring characteristics that the Army as an institution must recognise, cultivate, nurture, and sustain within its human capital, and ultimately, it must reflect the best of Canadian society and evolve within the Canadian cultural mosaic.

[8] See for instance, Ronald Inglehart, *Modernization and Postmodernization: Cultural, Economic and Political Change in 43 Societies*, (Princeton: Princeton University Press; 1997) and Ronald Inglehart and Chris Welzel, *Modernization, Cultural Change and Democracy: The Human Development Sequence*, (Cambridge: Cambridge University Press; 2005).

- **Political**. Trends in the area of politics are numerous and can be tracked on a number of indices. Key indicators of importance include the overall configuration of power - or the basic structure of the international system, the processes which characterize its ongoing development and character, the nature, diversity, stability and legitimacy of the political units or organizations that make it up and the basic issues which generate political action and competition.

- **Economics**. Today, and perhaps more so in the future, the first step in understanding one's national economy is to understand global economic issues. This is perhaps best illustrated by globalization and the divergence between the relative prosperity of the Northern hemisphere (developed states) and the widespread poverty and squalor characterizing its Southern counterpart (developing states). While prospects for global markets, partnerships and alliances contribute to international cooperation and peace through increased mutual-dependence in the North, poverty and subjugation of human rights in the South create conditions for increased global insecurity. This dichotomy and its global impact singularly highlight the necessity to first understand the global economy prior to any study of a national economy.

- **International Law**. In discussing law into the future, the legal profession, domestic law, international law, supranational law[9] and cyber law are of particular interest. Key to emergent legal issues are the enforcement mechanisms used to garner compliance. While this issue is well established and articulated within domestic law, mechanisms in international law, supranational law and cyber law are substantially weaker. While progress is being made in each of these areas, mechanisms to garner compliance are anticipated to evolve at a slower rate. This rate of progress is perhaps best exemplified by the increasingly permissive nature of international law sanctioning the use of outside force to intervene in state affairs based on humanitarian grounds.

- **Physical Environment**. For more than a decade there has been debate about the role that physical geography plays in the broad context of international security. Some have argued that the resources present in our natural environment (and the manner in which they are utilized) can have a contributing impact on the development of collective violence. The impacts of physical geography are assessed by examining global resource scarcities, climate trends and the subsequent implications for regions such as the Canadian Arctic.

- **Security**. Industrial war - masses of people and machines in a trial of national or alliance strength - is no longer truly practiced; rather, since the end of WW II, what we have now is "war among the people" - more a struggle or clash of collective wills. The peace-crisis-war-resolution cycle is replaced by continuous confrontation punctuated by outbreaks of conflict. Approaches to these situations range from amelioration within the environment, through deterrence and coercion, to destruction of opponents. Rather than achieving strategic political aims through crushing the capability of a state to resist the imposition of an outside political will, now the often unstated goal of intervention on the international stage is to create conditions in which containment or management of the situation is enhanced. This general description of the global security environment seems likely to hold sway for the foreseeable future.

[9] Supranational law is a form of international law, based on the limitation of the rights of sovereign nations with respect to one another.

Investigation of the potential shocks and uncertainties which could significantly alter outcomes in each area[10] was also undertaken by team members to further enhance their understanding of the various forces and causal mechanisms that could arise as the future unfolds. As such, the basic identification and extrapolation of drivers, trends and weak signals[11] provided by Environmental Scanning was supplemented to ensure a more comprehensive appreciation of future possibilities and potential occurrences.

3.2 Futures Wheel Method

While the examination of trends, drivers, uncertainties and shocks does offer a relatively robust perspective on the future environment, it was determined that in order to provide useful data to Army decision-makers today, an even more robust approach was required. Indeed, it is well acknowledged in futures research that "[n]o single method should be trusted; hence, cross referencing methods improves foresight."[10] As such, the Concepts team subjected their initial analysis based on Environmental Scanning to an additional futures methodology designed to investigate the potential second and third order effects of interacting trends – i.e. use of a Futures Wheel.

The Futures Wheel is one of the most common methods employed by futurists. It is a simple way of organizing thoughts and exploring the future. It can be compared to what is more commonly referred to as structured brainstorming and is aligned closely with mind mapping, a similar futures methodology. It is a simple graphic organizer that allows for a representation of complex interrelationships between trends (see Figure 2) and can be described as follows:

> The futures wheel is a simple futures research method designed to systematically capture qualitative expert knowledge. The futures wheel allows researchers to identify and present secondary and tertiary consequences of trends and events.[12][11]

[10] Each Subject Matter Expert (SME) produced a short paper highlighting the key drivers, trends, shocks and uncertainties within each of these categories. Analysis of the trends within these broad areas, using the Futures Wheel method, was then used to elicit the complex interconnections between them.

[11] A driver is a factor that directly influences or causes change; a trend is a discernable pattern of change; and, a weak signal is an early warning indicator of change, which typically becomes stronger by combining with other signals.

[12] Further details can be found at http://www.palgrave-journals.com/thr/journal/v8/n1/full/thr20082a.html.

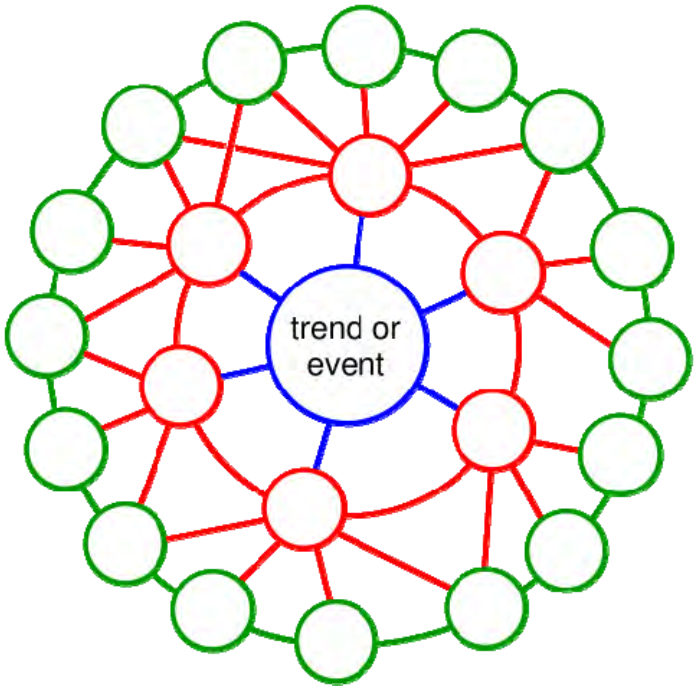

Figure 2: Futures Wheel

While the Futures Wheel method is easily grasped by participants, an undisciplined approach can result in what is referred to as "intellectual spaghetti" [12] i.e. the generation of a myriad of interactions that become so complex that they tend to complicate and confuse the implications of the trend. This method is limited to the knowledge of the participants and while information overload can occur, confining analysis to the primary, secondary and tertiary rings, allows for the visualization of a vast amount of qualitative information that has both depth and contextual richness. [13] [For example, considering the political focus area, a second and third order effect flowing from the accelerating global interconnectedness trend might include the decline of the state as we know it and the rise of regional super states leading to new international law or supranational law dynamics.]

By enabling an examination of the convergence of trends rather than simply the extrapolation of a trend itself, use of Environmental Scanning and the Futures Wheel method allowed the Concepts team to refine their thinking about the future environment in more concrete terms. By tracing the higher order impacts of the numerous trends that were examined within various futures wheel sessions, the team subjectively identified twelve key drivers of change deemed significant for the Army in the 2040 time frame:

1. Impact of age & demographics on military composition,

2. Energy Security,

3. Exponential Technology Growth,

4. Human/Social Response to Technology,
5. Expansion of operating environments,
6. Global Environmental Change,
7. Globalization,
8. Conflicting / Shifting Identities,
9. Shifting Power Balance,
10. Resource Security,
11. Distribution of Wealth, and
12. Weapons Proliferation.

3.3 Data Management and Display: The Personal Brain Software

While the futures wheel method does not require the support of information technology to be effective, use of such technology is advantageous for managing and mitigating the 'intellectual spaghetti" that results from the myriad of complex interactions flowing from each trend. Accordingly, the Army 2040 team chose to utilize PersonalBrain™, a software application developed by TheBrain Technologies to facilitate data capture and presentation of future wheel brainstorming session results. Figure 3 below provides a screen shot of the PersonalBrain™ displaying the upper-most hierarchy within the Army 2040 data repository.

PersonalBrain™ is a knowledge mapping software tool that provided the Army 2040 team with the ability to display large amounts of information across multiple categories and develop associated relationships. Information items in the PersonalBrain™ are called "Thoughts", and can include files, web pages, or records. The PersonalBrain™ interface is organized around a Thought, which is surrounded by all related Thoughts. Clicking on any Thought brings it to the centre of the display, and the interface is automatically reconfigured to the new related Thoughts. As analysts navigate through the data, the information on the screen is always related to the selected data. PersonalBrain™ lets one follow a train of Thought, flowing from one item to the next.

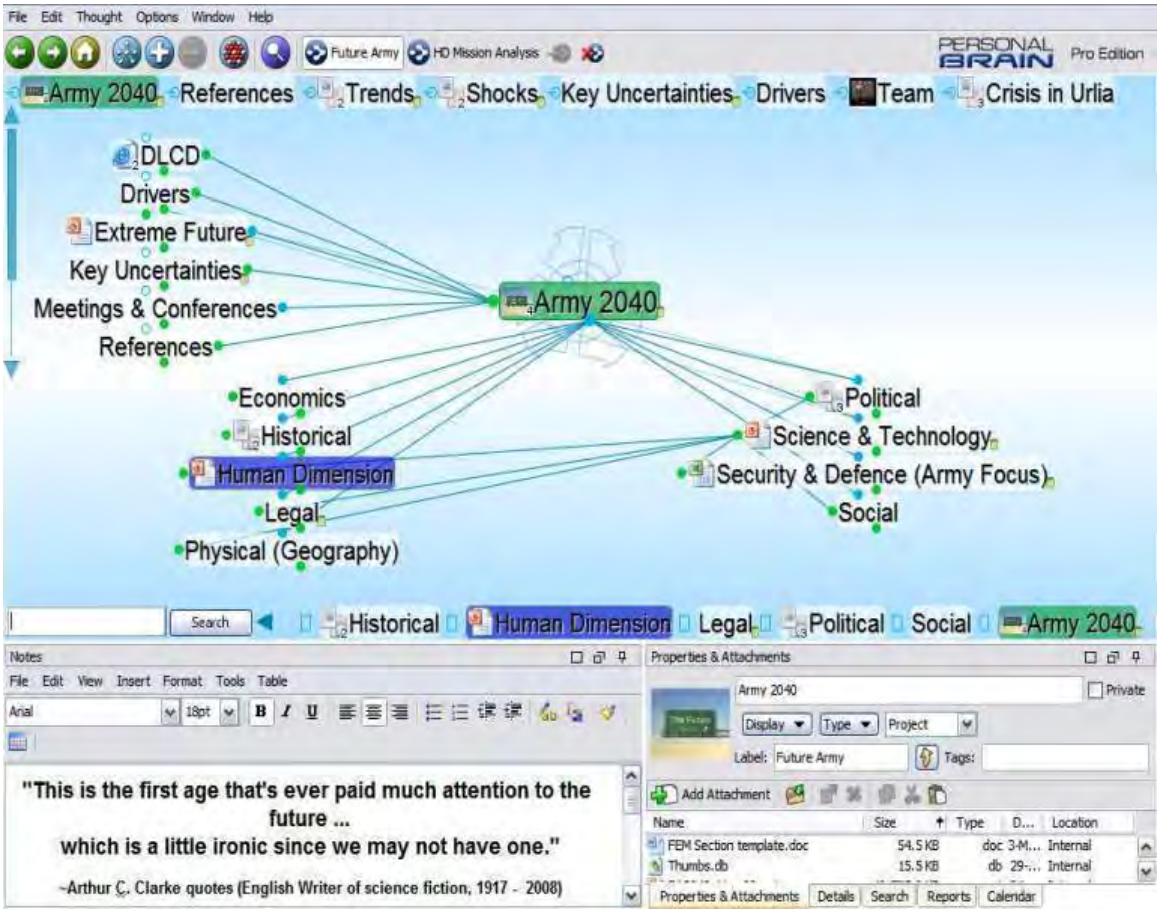

Figure 3: PersonalBrain™ Data Capture Software

3.4 Developing Alternative Futures

As described above, an alternative future is a logical, coherent, detailed, and internally consistent description of a plausible future operating environment. Alternative futures provide a means to hedge against uncertainty and perhaps to envision a range of possible future requirements. The term alternate future is often used interchangeably with alternate worlds, future worlds and future scenarios. For our purposes, alternative futures describe in objective terms, what a future might look like. A scenario, the next step in the process, in effect tells a story incorporating the components of the alternative futures. The probability of each alternative future emerging is not assessed; rather, we consciously argue that each future meets a "not implausible" standard.[13]

Developing alternative futures is an important activity for an organization in an increasingly complex world; and the Canadian Army cannot afford to be excluded. Alternative futures are a long range planning tool designed to highlight changes in the operating environment that could influence and indeed shape the trajectory of Army capabilities in future decades. While it is

[13] It should be noted here that this is the same assessment used by John Gordon IV and Brian Nichiporuk[14].

anticipated that several aspects of the alternative futures may be wrong, their development can assist in guiding long-range Army planning. In essence, the process provides a hedging strategy against uncertainty.

There exist several approaches to creating alternative futures all of which resemble, to a certain degree, the process described below:[14]

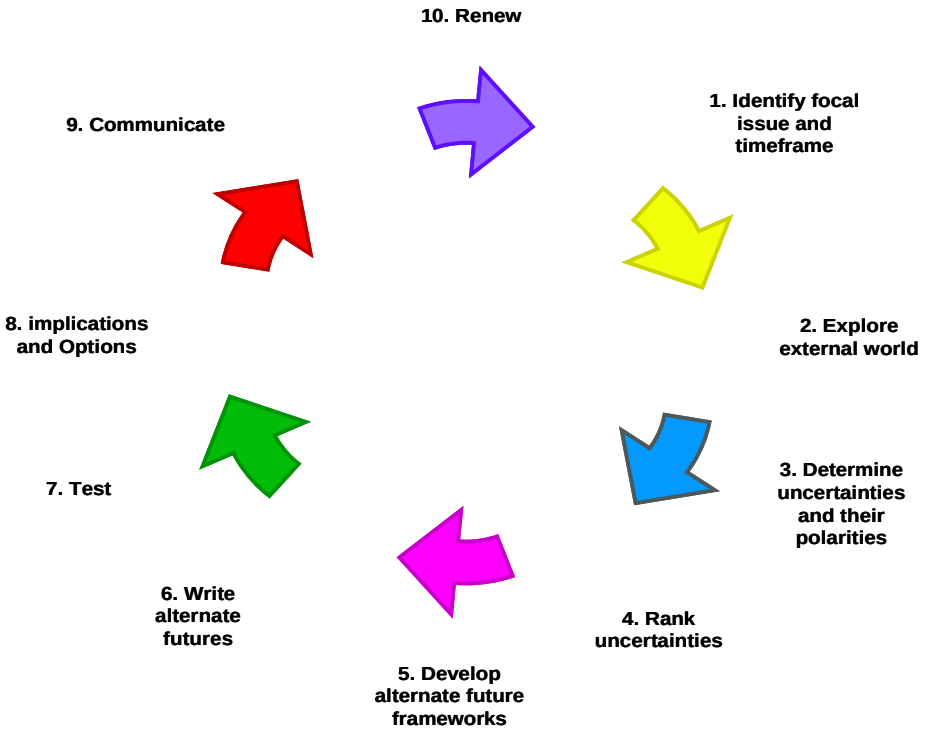

Figure 4: Alternative Futures Method

3.4.1 Step 1: Identify the Focal Issue and Timeframe

An alternative future is most useful when a focal issue and a timeframe are identified. In our case the timeframe is 30 years into the future, 2040, and our focal point is articulated as follows: How should the Army evolve in order to remain a key instrument of national power in 2040?

3.4.2 Step 2: Explore the External World

This step is characterized by the research undertaken within the seven focus areas described above and coupled with the Environmental Scanning and Futures Wheel methodologies described above.

[14] The process detailed in Figure 4 derives from two sources: see [17] and [18].

3.4.3 Step 3: Determine Uncertainties and their Polarities

Critical uncertainties are the "big questions" that are most critical to the focal issue at hand; that is, how should the Army evolve in order to remain a key instrument of national power in 2040? A solid alternative future framework ultimately rests on two critical uncertainties affecting the Army and is relevant to the focal issue. The polarities or endpoints of the drivers of change were first established to further define and understand each driver. This resulted in the following polarities for each:

1. Impact of age & demographics on military composition – population decline and aging societies vs. population growth and younger societies,

2. Energy Security – surplus of energy vs. energy deficiency,

3. Exponential technology growth – set the pace by actively engaging in technological development and innovation vs. fall behind by rejecting or at best passively accepting new developments and innovations,

4. Human/social response to technology – reject technology vs. embrace technology,

5. Expansion of operating environments – defensive strategies vs. offensive strategies (i.e. monitoring new operating environments vs. actively exploiting new operating environments),

6. Global environmental change – crisis reaction vs. proactive action,

7. Globalization – acceleration vs. deceleration,

8. Conflicting / shifting identities – global community vs. fragmentation,

9. Shifting power balance – cooperative/less friction vs. competitive/more friction,

10. Resource security – sustainable supply of resources vs. an unsustainable supply of resources,

11. Distribution of wealth – uneven vs. even, and

12. Weapons proliferation – disarmament vs. acceleration of weapon spread.

3.4.4 Step 4: Rank Uncertainties.

Upon establishing the polarities for each change driver, the team then followed a process whereby each driver was subjectively assessed to establish its level of "uncertainty" and its "impact" in the future on a low, medium and high scale thereby indicating a ranking of the change drivers. Uncertainty refers to a subjective assessment of the degree to which the key change drivers and their related trends are known or well understood. Thus lower uncertainty suggests a higher degree of confidence that an extrapolation of the trends will closely resemble actual future events. Impact refers to a subjective assessment of the degree to which the key change drivers will influence future events. This subjective assessment allowed the team to collectively understand

the position of each change driver with respect to each other on an impact and uncertainty graph. The focus of the alternate futures frameworks thus rests with those change drivers that are both high on impact and uncertainty; in our case, energy security (2) vs. global environmental change (6) (see Figure 5).

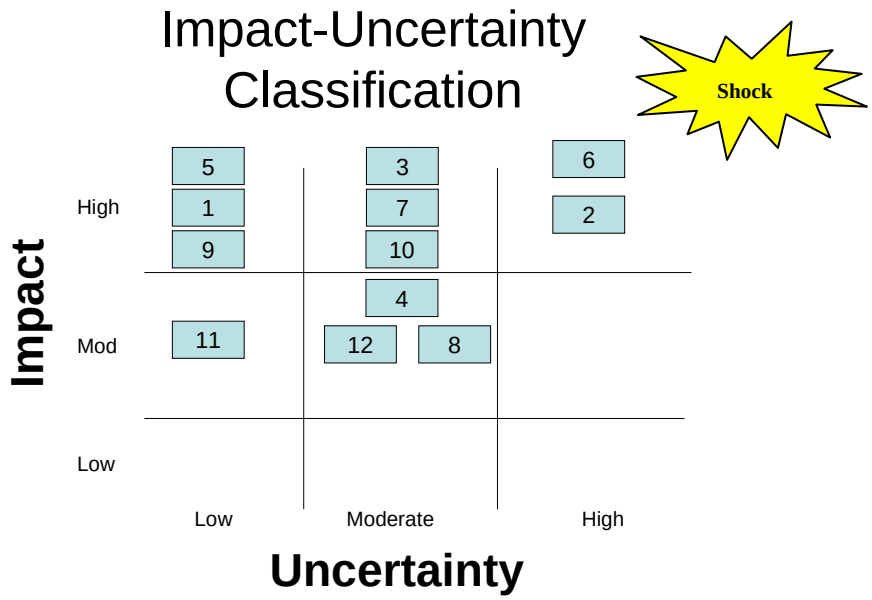

Figure 5: Impact-Uncertainty Classification

3.4.5 Step 5: Develop the Alternative Future Framework.

Having established the axes of the framework to be developed, based on the two critical uncertainties determined by the team as having a high ranking in impact and uncertainty, the team then commenced brainstorming the four potential futures: the good, the bad, and two mixed quadrants, i.e. not so good/bad (see Figure 6). These four alternative futures were eventually given relevant names based on the message or theme to be relayed by each quadrant.

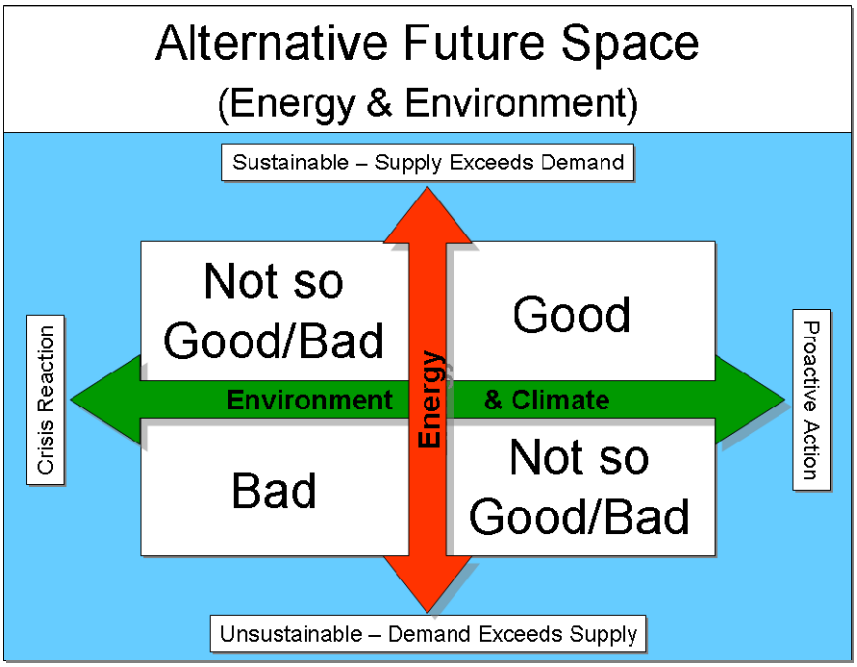

Figure 6: Alternative Future Space

3.4.6 Step 6: Write the Alternative Futures

The "good" quadrant (i.e. characterized by a proactive approach to the environment and a sustainable energy supply) might feature more environmentally responsible multinational corporations and a Canada that is a world leader in developing alternative energy sources. The bad quadrant (i.e. featuring a reactive approach to the environment and unsustainable energy supplies) might by marked by increased global competition for scarce energy resources and a greater need to protect Canada's Arctic region. The other two quadrants would represent a mix of these two extremes. Further, in each of the four alternative futures, consideration is given to those change drivers that are considered to be of high impact but of low to medium uncertainty – i.e. as represented in Figure 5 by key driver items 5, 1, 9, 3, 7, and 10 (see section 3.4.3 for list of drivers). It is important here to consider these items within the context of the established alternative future space, since each item will be influenced in subtlety different ways by the unique context of each quadrant. As such, each quadrant becomes internally consistent with the overall framework. This allows for more robust futures and assists in the process of crafting scenarios – the next step in the process. [15]

Scenarios are essentially stories about the future which are underpinned by the work done to support the alternative futures. Scenarios will have a plot, a hero or heroine and essentially tell a story. A process of storyboarding, i.e. the articulation and extrapolation of a series of events from today until the selected point in the future, can be used. Shocks. i.e. unexpected events, such as a

[15] It should also be noted that the team's determination of key drivers in no way prevents additional examination of the other change drivers identified either in terms of how they could shape future worlds or in terms of their implications for Canada's Army. Indeed, such work is encouraged.

revolutionary discovery or a natural disaster, which can cause a rapid shift in direction, can be used to add substance to the scenario and potentially allow for exploration of contingency plans.

Shocks (see Figure 5) refer to the onset of extraordinary developments and events which have major consequences for individuals groups and/or communities. Such phenomena can dramatically alter the trajectory of subsequent events and generally prompt a fundamental reconsideration of outlooks, approaches and options. In essence, shocks are unforeseen events that change the expected direction of planning and policy.

Consideration of such events and their potential occurrence provides useful means for challenging conventional thinking. A focus on the emergence of shocks demonstrates how radical changes in the world as we know it are not impossible – encouraging greater flexibility of mind in considering potential futures as a result. In fact, engaging in careful consideration of such phenomena can serve as a crucial first step in the construction of alternative future scenarios to more fully inform sound planning and policy development.

3.4.7 Step 7/8: Test and Identify Implications and Options

Future Army capability testing through the use of the alternative futures can occur through less formal discussion or more formal seminar war games aimed at refining results. In the case of the Army 2040 project, a preliminary seminar wargame will be undertaken to explore capability requirements that will allow the Land Force circa 2040 to operate effectively within each of the quadrants defined by the alternative future space. A subsequent seminar wargame will explore capability deficiencies (gap analysis) posited to exist between the Army 2021 force employment model and the Army 2040 capability structure derived from the alternate futures analysis. The results of this testing will, in turn, allow military planners to cope with and take advantage of future change. Subsequent research or monitoring activities as well as policy change can further help steer the Army toward a more desirable future.

3.4.8 Step 9: Communicate

The alternate futures should be widely communicated to educate and inform the CF and other public and private agencies. They will also provide the foundation for further exploration, discussion and improvement of the process and its outcomes.

3.4.9 Step 10: Renew

The alternate futures process is not a static undertaking. Research and monitoring activities must continue throughout. And at a predetermined time in the future, the process will recommence. The first step in a new cycle must be a critical review of previous futures work which aims to gauge its accuracy and relevance. Completion the full lifecycle of the process thus allows the Army to keep pace with the ever changing global environment.

4 Army 2040 Alternative Futures

4.1 Energy and Environment – Four Futures

The following section illustrates the application of the methods discussed earlier by elaborating on four alternative (energy and environment) futures. The futures detailed herein are based on the research team's identification of two global factors judged as ranking especially high in terms of impact and uncertainty (i.e. energy sustainability and global environmental change), and their extrapolation into four quadrants (see Figure 7) each representing a potential future (i.e. the good, the bad, the not so good, and the not so bad). Each is given a name reflective of the key message (or theme) that characterizes each quadrant (see Figure 8 through Figure 11). When viewed as a whole, this collection of alternative futures offers a plausible, broad window into the future, within which it is reasonable to anticipate that actual events might unfold.

Consideration is also given to those change drivers considered of high impact but of low to medium uncertainty – (i.e. the expansion of operating environments, the impact of age and demographics, shifting power balances, exponential technology growth, and globalization – See Figure 5). The intent is to ensure the development of more robust alternative futures and thus a solid base for the eventual process of crafting scenarios.

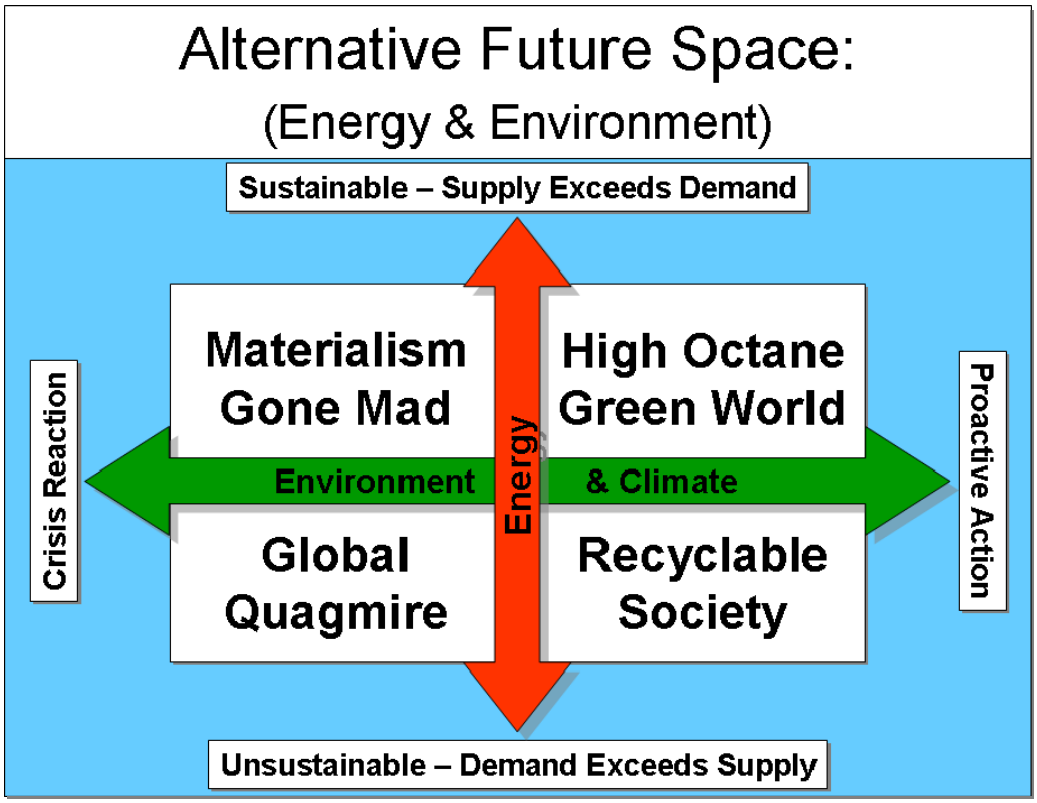

Figure 7: Energy & Environment Alternative Future Space

4.1.1 High-Octane "Green" World

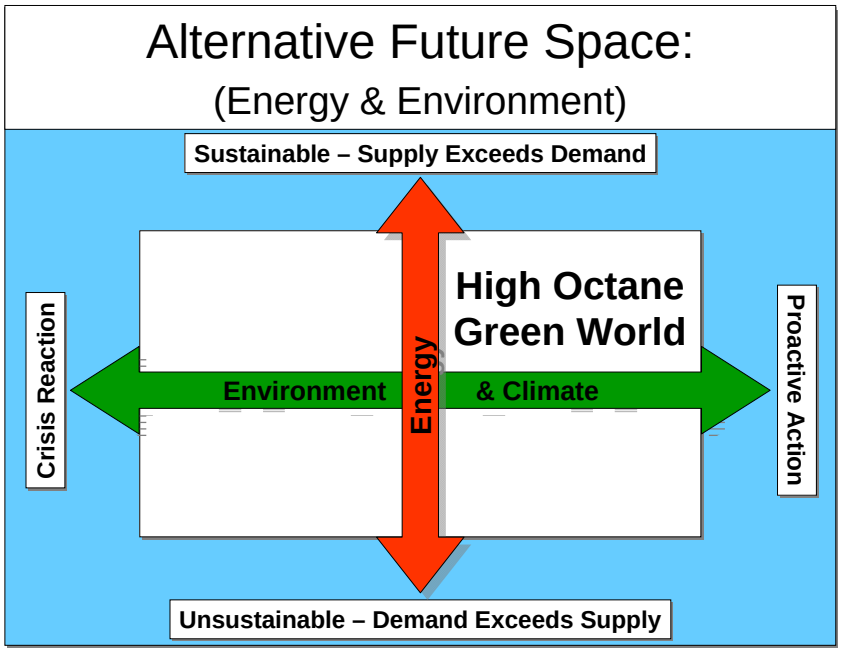

Figure 8: High-Octane "Green" World Alternative Future

> *A future in which global energy supply exceeds demand (i.e. is sustainable) and at the same time in which the world is taking a proactive approach to the environment.*

Decades of steadily increasing resource depletion and environmental crisis lead to growing international awareness of the need for substantial change in policies surrounding energy and the environment. In the midst of rising societal concerns, world leaders from a number of quarters move to take action. The result by 2040 is a "high octane," "green world" in which energy is relatively plentiful and at the same time in which the environment is ever-more sustainable and sound.

Science and technology are increasingly underpinned by policies encouraging innovation both on the energy and the environmental fronts. Major powers such as the US, China, Brazil and Russia invest heavily in the development and distribution of energy. A number of significant breakthroughs (e.g. in areas such as nano and bio-technologies) ensure not only that traditional energy sources (e.g. oil, gas, coal) are used more efficiently and effectively, but that alternatives are developed, widely implemented and distributed as well (solar, wind, bio-fuels, "clean" coal). In fact, by 2040 the world sees a marked rise in renewable and sustainable energy sources of energy supply and a reduction in the use of fossil fuels.

At the same time, international campaigns underlining the critical interdependencies which characterize the global eco-system result in the increasing adoption of an ethic of sustainability among general publics. Traditionally narrow and often short term conceptions of national interest

are gradually replaced by broader views. Environmental responsibility is seen as integral to prosperity.

Increasingly, states and societies rally to strengthen international organizations and institutions. New international norms and rules along with increasingly reliable, robust surveillance and enforcement mechanisms – many reflecting a strong focus on sustainability – emerge. Sustainable practices are in fact encouraged through a litany of incentive schemes. Actions resulting in environmental damage are harshly penalized. Not surprisingly, forces in charge of security and law enforcement take on an ever-more environmental focus. And markets focus more and more effort on delivering "green solutions" to problems – a practice made increasingly feasible by the adoption of more responsible energy policies and greater cooperation between government and industry.

While pockets of poverty and human misery continue to plague various regions – particularly in the developing world – societies generally enjoy higher living standards worldwide. Aided by ever advancing technology and innovative governmental practices, key staples such as food and water become increasingly sustainable – and shortages in a number of regions are increasingly mitigated through use of genetically engineered crops and use of a range of food substitutes.

Global migration continues to occur. Yet population movements derive less from need than desire – as the introduction of technologies offsets projected labour shortages in the developed world, while prosperity and economic stability increases elsewhere. Moreover, while urban growth continues, it is more intelligently managed – with sustainability representing an integral aspect of city planning and development.

Canada stands at the vanguard of the global sustainability ethic. Nationally, the development of strong legal regimes has worked to more fully ensure the sustainable use of Canadian resources – with both the military and other government departments and agencies playing strong surveillance and enforcement roles. On the international front, a series of technology sharing agreements with other leaders in the energy and environmental spheres (e.g. Brazil, India) along with active support for the continued development of sound international regimes and practices have enhanced Ottawa's reputation as a global leader in both the alternative energy and environmental fields.

Progress on the sustainability front and rising prosperity work to gradually alleviate disparities between have's and have not's – thus reducing a key source of strife in the international system. Nevertheless, armed clashes continue to occur – particularly in a number of less developed regions of the world. At times, the quest for wealth and power overrides new norms of sustainability. As shifts in energy and environmental practices increase demands on old orders for economic and societal restructuring, some states experience considerable turmoil. Beyond this climate change, environmental degradation and a range of natural disasters continue to ensure their share of human misery and societal dislocation.

Such forces and their consequences become a more pressing concern for militaries. Interventions abroad take on ever more salient humanitarian focus. And UN mandated environmental enforcement missions focusing on the negative impacts generated by climate change and environmental degradation gain particular salience. The delivery of emergency relief and aid are priorities. And technology sharing and transfer are increasingly used as options to mitigate the

impacts of such forces when they occur. Moreover, when armed intervention does occur, it is increasingly informed by plans, technologies and doctrines of employment reflecting norms of sustainability. Emphasis is placed on discrimination, and where possible, the use of non-kinetic responses to avoid the destruction of energy resources and the physical environment.

4.1.2 Global Quagmire

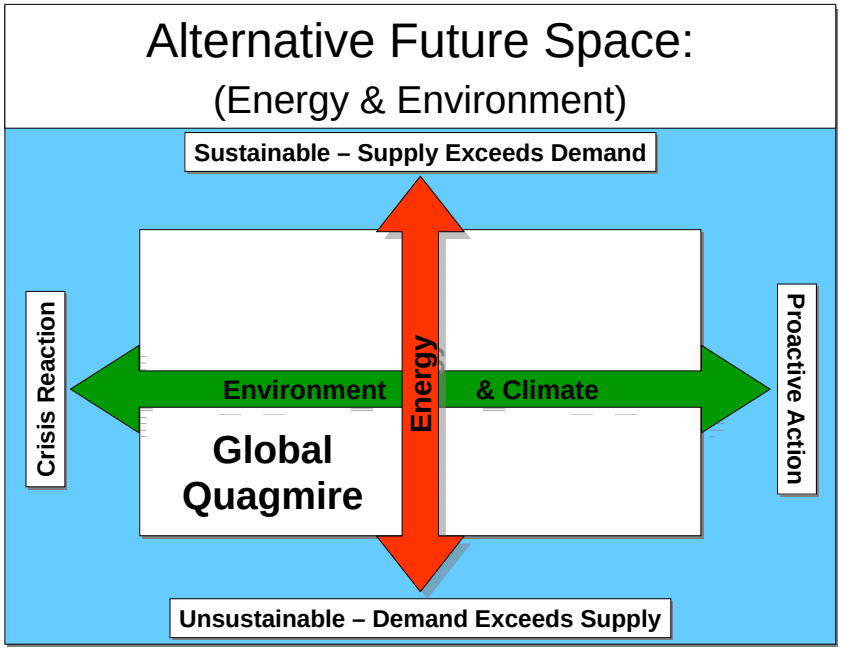

Figure 9: Global Quagmire Alternative Future

> *A future in which energy supply is increasingly scarce (i.e. is not sustainable) and the globe is taking a reactive approach to the environment.*

By 2040, the international system has crossed a dangerous precipice. Decades of wasteful energy exploitation and mistreatment of the environment have led to a steady decline in energy supplies and increasing environmental ruin. The world is increasingly trapped in a vicious "Catch-22"—where the energy resources required to achieve environmental sustainability are increasingly absent and yet the lack of environmental sustainability works to progressively reduce the energy options that are crucial to future productivity. The result is an unending spiral of economic and societal decline.

Growing pessimism and a focus on short term solutions to problems increasingly dominates calculations of security. Internationally and on the domestic front, human interaction is governed by highly competitive, zero-sum thinking – with narrow conceptions of self interest trumping aspirations of international cooperation.

Ever-greater emphasis is thus placed on national survival. And concerns over the maintenance and attainment of greater power are acute. Conquest of energy rich territories and the aggressive exploitation of existing resources increasingly eclipse investment in the development of new,

more sustainable energy supplies and extraction technologies. To the extent that some sustainable practices are explored (such as in the nano- and biotechnology spheres) efforts are limited. Moreover the dangers of international espionage and theft are high – as states and businesses seek any advantage to gain capability and additional power over their peers in the global arena. Accordingly, states and societies move toward greater protectionism. And existing energy resources are tightly guarded.

Markets are highly unstable. Commodity prices increase and, economies increasingly experience stagnation as investment in science and technology wanes, automation declines, and labour becomes increasingly important for production – particularly in the developed world. Meanwhile, competition among multinational corporations intensifies and often occurs at the expense of the environment – as the quest for profit works to encourage environmentally unsound practices as well as a significant decline in the quality and often the safety of goods and services provided.

Societies continue to become more urban in character; yet, urban growth often occurs in the face of an increasing inability of cities to absorb rising populations – particularly (although not exclusively) in developing countries. As essential services and infrastructure deteriorate urban squalor becomes ever more pervasive, and opportunities for the onset of societal tension and the spread of disease intensify. In turn, prospects for much needed investment, and improved economic productivity are dashed.

Amidst the downward economic spiral, global migration intensifies as the developed world's need for cheap labour combines with the increasingly desperate conditions of developing societies to encourage the movement of populations from South to North. Indeed, while deterioration of societal conditions is by and large a global phenomenon, conditions in developed states continue to offer a lifestyle preferable to those in less developed regions.

Canada remains a destination of choice for migrants as its vast territory and still considerable resource base continue to offer newcomers the prospect of living space, work opportunities and a level of environmental quality rarely matched elsewhere. Still, the need to compete in an ever-more competitive and ruthless international environment works to encourage adoption of many of the unsustainable practices found elsewhere. Accordingly, energy supplies gradually contract, the environment suffers and the economy worsens.

While Alberta's oil sands are actively exploited, issues over the control and disposition of energy increasingly come to the fore. Federal-provincial tensions rise as energy-rich provinces seek to retain greater shares of control and revenue from their assets. Resource extraction in Northern areas encounters similar problems with aboriginal leaders. Nevertheless, existing energy resources (oil, gas, uranium, fresh water) as well as key storage and distribution systems are heavily monitored and guarded. In fact, this along with dangers such as espionage and unchecked migration from abroad leads Ottawa to adopt a more pronounced domestic security focus.

As states and societies increasingly jockey to retain and, if possible, expand their control of increasingly scarce energy resources, the dangers of both inter and intra-state conflict rise. Conflicts involving ownership and access to oil, water and food are ever-more widespread. Indeed, the danger of resource wars, both between and within states, is acute. And when fighting occurs, it reflects little regard for international norms.

Much of the violence occurs in the developing world, as dictators, organized crime groups, and revolutionary movements fight for control of increasingly desperate societies. Yet developed countries are by no means immune from strife. As environmental conditions worsen, elements of society lash out against the ongoing exploitation of the earth's resources and the irreparable damage it causes. Often, action turns violent with acts of terrorism directed against select government officials and corporations becoming ever-more salient.

An increase in the incidences of environmental disasters compounds problems. With pressures for quick development on the rise, and the quality of practices and procedures of energy extraction and distribution in decline, incidents such as oil spills, forest fires and even nuclear accidents become more frequent. Meanwhile, the effects of natural disasters are magnified as economically stressed societies prove increasingly incapable of marshalling the resources required to mitigate their effects.

Humanitarian crises and calls for international assistance increase markedly. Yet in a world of intense competition, mistrust and declining budgets – such aid is often less than forthcoming. UN interventions are thus problematic and increasingly rare, making self-help often the only alternative to the growing misery of a world in peril.

4.1.3 Materialism Gone Mad

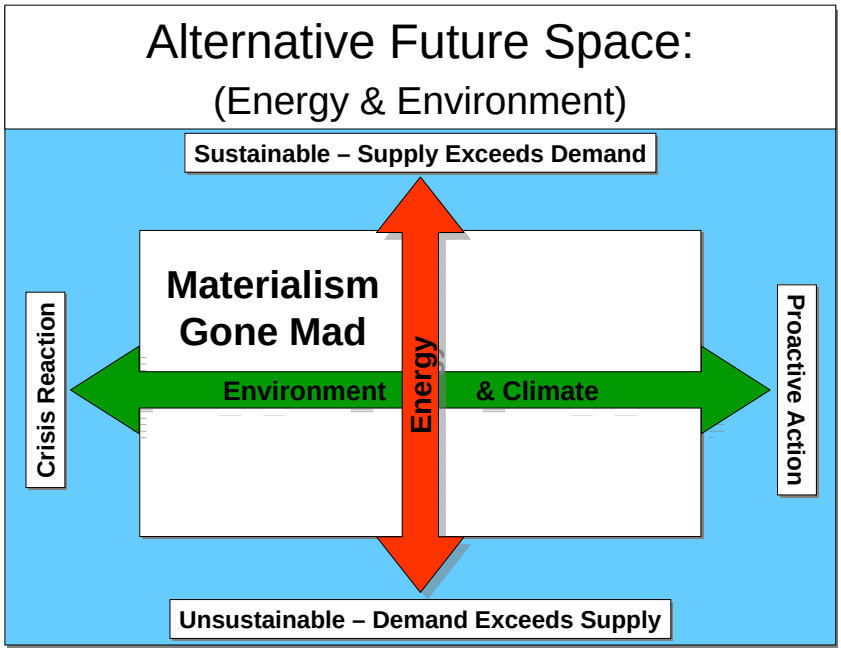

Figure 10: Materialism Gone Mad Alternative Future

> *A future in which energy supply exceeds demand (i.e. is sustainable) but in which the globe continues to take a reactive stance on the environment.*

Rising concerns over a looming energy crisis and fears of an extended and deepening global recession work to spur states and societies to take concerted action on the energy front.

Aggressive exploitation of existing sources and exploration of new energy alternatives soon follows. Yet efforts to ensure environmental sustainability are secondary. The result is an "energy rich" world in which economic growth, development and consumerism are attained at a considerable and steadily growing environmental price – as the waste, pollution and environmental degradation generated becomes increasingly widespread and threatening to global security.

Short term thinking and narrow self interest predominate – as states and their citizens revel in the increased wealth and rising living standards made possible by available energy. Nationalism increases, with states using the renewed economic growth that energy provides to aggressively compete for still more power and influence on the international stage. Also returning is a sense of confidence and optimism in human ingenuity and the capacity of science and technology to solve global problems. Yet such optimism is not accompanied by concerted efforts to ensure that growth is sustainable – as the quest for national power and increasing consumerism trump social responsibility and the longer term welfare of the global commons.

Technological advance yields some gains in sustainable energy. And while plentiful energy produces some solutions to environmental problems – most notably in partial rectification of degradation in food and water supplies, efforts are limited. "Dirty" energy represents the lion's share of global supply. As use intensifies in the service of state power and societal growth, environmental damage increases – especially in the developing world. Populations within environmentally stressed areas experience declines in health. Meanwhile, efforts at remediation and cleanup are reactive – and increasingly lag behind environmental realities.

International cooperation is limited. While some agreements exist in the development and exploitation of energy resources, most are temporary or regional in character (e.g. Western hemisphere, Middle East, Central Asia). Yet, on the environmental front, international organizations are fragmented and by and large impotent. While "lip service" is paid to the need for greater environmental sustainability, international legal regimes offer little in the way of sound regulation or enforcement. Protection of the environment is largely a function of individual state interests.

Economic prosperity is relatively widespread. Yet developed powers and the wealthy remain the chief beneficiaries of energy affluence. They also represent the principle global polluters. In fact, the conquest and exploitation of foreign territories undertaken to help achieve energy plenty eventually leads to tensions with the developing world. Violent protest and armed action increases, as societies in the South increasingly charge the developed world with neo-colonialism, "environmental rape" and use of their native lands and branch plants and dumping grounds.

Global population experiences a modest rise and urban growth continues to occur at a moderate rate. Yet the drive for rapid industrial and commercial expansion ensures that the development of urban centres is uneven and environmentally unsound. Urban sprawl is a rising problem. And urban squalor, pollution and disease become growing concerns as traditional waste disposal systems prove unable to cope.

Global migration increases, as developed societies seek additional labour from the developing world to service burgeoning economies, and populations from developing regions in turn move to escape environmentally pressed homelands. Yet the latter motivation is particularly acute –

resulting in increasing waves of environmental refugees seeking entry into more developed societies. Illegal immigration flourishes, crime increases and a number of immigrant communities soon become the targets of backlash in receiving nations. Meanwhile, developed states strengthen their entry requirements as well as their border security to block this rising tide.

Canada is no exception. A solid resource base and impressive economic growth ensures that it represents a destination of choice for immigrants. And while aggressive resource extraction (e.g. development of oil sands, various Arctic resources) and ongoing urban growth ensure that the country is no stranger to environmental problems, its sheer size helps ensure that Canada remains one of "the best of the increasingly bad" vis-à-vis its environment. Yet, significant increases in those seeking entry challenges the country's absorptive capacity. Border security is heightened. Still, Ottawa continues to engage internationally, offering considerable amounts of donor aid to a rising number of countries in need. Stabilization and reconstruction also remain key areas of activity for Canadian security forces abroad.

Competition for power and influence in the international sphere is intense, and both inter and intra-state conflict remain ever present possibilities – with potential areas of dispute including: cross border pollution, industrial espionage, conquest of neighbouring territories – often to provide additional living space for citizens in environmentally stressed regions – and religious and ethnic issues.

The majority of strife, however, is South-South and North-South in character – with the issue of environmental destruction representing an especially prominent flash point. In this regard, governments and their representatives, as well as businesses and multinational corporations become major targets of hostility – and kidnapping, murder and sabotage represent key methods of attack. Meanwhile, the negative impacts of climate change and various natural disasters (e.g. floods, tornados, and tsunamis) become ever more frequent and serve to heighten insecurity – particularly in already fragile regions of the globe. Societal misery, tension and conflict rise further as a result.

Humanitarian crises and emergencies increase, and calls for international assistance proliferate. Interventions under the United Nations Responsibility to Protect (R2P) increasingly take on an environmental focus. Yet need increasingly outstrips the capacity for effective response. And states must rely more and more on their own devices to address increasingly frequent security concerns that a world heavily focused on aggressive growth and rising consumerism generates.

4.1.4 Recyclable Society

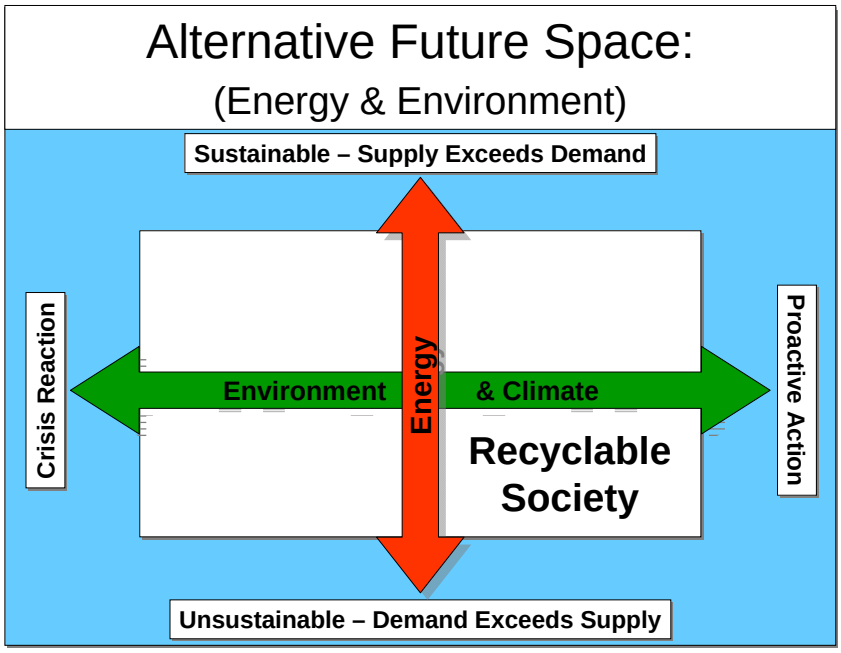

Figure 11: Recyclable Society Alternative Future

> *A future in which energy is scarce (i.e. demand exceeds supply) but one in which global actors are taking proactive approaches to the environment.*

Decades of wasteful, unsustainable energy consumption and environmental neglect combine to generate global energy scarcity and increase ecological fragility. As energy deficits work to limit the economic growth and technological innovation needed to address key societal needs and challenges, states and societies increasingly recognize that they must do "more with less" if continuous economic decline and disaster are to be averted. The result is a world of radically changed priorities and lifestyles – priorities and lifestyles that increasingly reflect the need for aggressive energy conservation and more proactive approaches to environmental protection and improvement.

With energy deficits limiting growth and fuelling declining prosperity, states and citizens focus less on expansion than on national interests and survival. Yet leaders increasingly recognize that such survival is intimately connected to if not dependent on sustainable practices and policies - both at home and abroad. Particularly in an energy poor world, this amounts to living and acting within recognized limits and adopting where possible, an ethic of sustainability.

Accordingly, governments and industries drastically reign in spending in a range of areas including infrastructure, education, social services and health and welfare, and citizens are compelled to shift from an emphasis on unchecked consumption, consumerism and the pursuit of ever more material goods to a post-materialist, recyclable society. Self–discipline, restraint,

recycling and reuse become the new watchwords of everyday life. Greater attention is now focused on the goals of environmental correction and protection.

Overall, energy deficits and economic stagnation limit options for achieving sustainability. Where feasible, low-cost energy technologies are developed and used to meet the basic necessities of life. Yet economic stagnation often reduces the ability to procure technological solutions. More often than not, societal needs and challenges are met through an ever-greater reliance on local bartering systems, community action and community living.

Markets are unstable as commodity prices rise. States increasingly adopt protectionist policies on the energy front and the practice of energy hoarding rises. Economies are virtualized and reliance on cyberspace grows to avoid transportation and related costs. E-commerce is a strong force. Manual labour becomes ever-more important to economies in light of energy shortages. So too does tele-working. And the use of human-powered transportation – both for leisure and business – is more widespread.

Recessions are nonetheless continuous, as a lack of surplus energy inhibits growth and development. In Canada, untapped resources in the North lie dormant as exploration and extraction costs rise. Notably, the effects of the global downturn are particularly acute in developed countries –as limitations and disruptions force far more drastic changes in lifestyle than those required in developing societies. In fact, gaps in living standards decline somewhat across the globe. The pace of life slows down in many regions. Still, crime rates increase – with localized offences exhibiting an especially high rise.

International cooperation increases – particularly on the energy front – with many international organizations and institutions adopting a radicalized "green" focus. While monitoring and enforcement capacities are somewhat underdeveloped due to a lack of capacity – compliance with international rules and norms on the environment is relatively strong – a fact deriving both from a greater recognition of the interrelationships between national interests and sustainable development, and from an increasing sense of global community more generally. Yet, in other areas, cooperation is more limited – with states adopting a more regional focus.

Urban growth continues. Yet it is marginal and slow at best, as economic decline reduces incentives among many to move to cities. In some cases, urban dwellers move to rural areas – preferring life off the land over the high densities and noise and pollution levels of the cities. Global migration decreases as well. Economic stagnation reduces the need for cheap labour in the developed world as does the ability and incentive of citizens from developing regions to move.

International politics remains anarchical. And a multi-polar power distribution helps to ensure that both states and non-state actors continue to compete for influence on the world stage. Yet the competition for power is more muted. States and their citizens view the costs of expansion and intervention abroad as increasingly prohibitive. In an energy poor world, skilful diplomacy and dialogue are at a premium and there is a move toward the adoption of more cautious foreign and defence policies. Protection of scarce resources and energy supplies represents a key responsibility for governments and their militaries. And armed forces themselves are designed and trained to be more environmentally conscious in the conduct of operations.

Notably, growing global allegiance to a strict environmental ethic works to mitigate some ecological degradation as well as the human disaster and societal dislocation that at times accompany it (e.g. starvation, disease, sickness, refugee flows, state failure and collapse). Nevertheless, armed conflict and crises continue to occur – as civil wars, state failure and natural disasters continue to plague various regions – particularly in the developing world. And calls for humanitarian aid and assistance remain a fact of international life. Yet while members of the international community continue to respond, such assistance is increasingly selective, as the willingness to intervene is frequently eclipsed by an absence of financial capacity to do so. Accordingly, the quest for policies and practices aimed at prevention of such tragedies rather than reacting to their occurrence becomes ever-more crucial to security and stability.

4.2 Next Steps

Determining the specific implications that each of the four worlds hold for the Canadian forces in general and the Army in particular represents the next logical stage in the research agenda. Once again, the exercise will involve deductions based on the trends and drivers identified and the directional values accorded them in each quadrant.

In the case of the High Octane Green World for instance, the development of a new ethic of sustainability would suggest that the CF and Army must be strongly committed to clean energy sources, and to operations that are environmentally justifiable. Beyond this, emphasis on influence operations and investment in non-kinetic means to conduct them could increase. In contrast, the downward energy and environmental spiral of the Global Quagmire would see Canada's armed forces undertaking a strong role in the protection of dwindling energy assets. With national survival becoming the chief goal, defence budgets would rise relative to other national programs. Yet investment in a higher-tech military could well dwindle in the face of ever declining economic fortunes.

The unbridled consumption and steadily deteriorating environment reflected in a world of Materialism Gone Mad would tend to increase the emphasis of Canadian forces on the conduct of interest driven expeditionary operations often in an increasingly polluted and unstable developing world. In contrast, the dwindling energy resources and pro-active environmental ethic of the Recyclable Society would see a smaller CF heavily focused on environmentally green operations, yet one in which deployment is highly selective given energy and economic constraints.

Once a full assessment of the implications of each world for the Army is completed, a second stage, consisting of a seminar war game aimed at exploring deficiencies in capability posited to exist between the Army 2021 Force Employment Model and the Army 2040 alternate futures would follow (i.e. gap analysis). These results will, in turn, aid military planners to cope with and take advantage of future change. Subsequent research and monitoring activities as well as policy change will further help steer the Army toward greater relevance and effectiveness in the future.

A final step in the process will be to contemplate the impact of shocks, or black-swans, which are defined as low probability but high impact events. Such events have the potential to drastically alter the previously evaluated alternative futures, and thereby stress the capability requirements derived from the alternative futures posited. While the probability of such events occurring may be low, their potentially destructive or destabilizing impacts makes it important to assess of the

ability of conceptual Army 2040 capabilities to handle the dangers they pose. Where potential consequences are deemed to be too severe, an additional round of concept development will be necessary to identify the means to address potential capability gaps.

5 Conclusion

The future is uncertain and defies prediction to any useful degree. Indeed, uncertainty is a predominant characteristic of the 21st century global security environment and defence establishments around the world continue to strive to understand and define how their national security policies fit within this paradigm. Arguably, the increasing pace of change and resultant complexity of the world offers little prospect for complete understanding. As such, organizations must learn to operate within uncertainty – the Army is not excluded from this reality.

In coping with uncertainty, futuring and foresight are gaining international recognition as disciplines which assist in understanding our increasingly complex world. Perhaps the greatest benefit is to be found not in the results of this new discipline but rather in the process itself. As Jerome Glenn notes:

> The value of futures research is less in forecasting accuracy, than in its usefulness in planning and opening minds to consider new possibilities and changing the policy agenda. Its purpose is not to know the future but to help us make better decisions today via its methods which force us to anticipate opportunities and threats and consider how to address them. And strategically it is better to anticipate, rather than just respond to change.[15]

Reactive planning for militaries can result in high costs of blood and/or treasure. Adoption of a futuring research agenda and use of futuring methods offers a more proactive approach, allowing state militaries to anticipate and possibly highlight certain areas that require policy decisions today – both in defence and national security – in order to meet future expectations. While the Army has always looked to the future in its planning, there is little evidence to suggest that this has ever been approached in a systematic manner.

To this end, the Army has employed a Concepts Team in an attempt to better understand the distant future (2040). Through the use of Environmental Scanning and Futures Wheel methods, a small dedicated team is providing information on the key drivers, critical uncertainties, and alternative futures so as to allow Army decision makers to more effectively assess and act today in order to meet the challenges of coming decades. The results may very well add value to the creation of a more robust national security policy. If we accept the dictum that "the future is not something that just happens ... (but rather) something we do, by the choices we make or avoid", maintaining a small team dedicated to its investigation makes sense. While much of the research conducted and conclusions advanced may eventually prove inaccurate, the intention is not to get it fully right. Rather, the underpinning philosophy of such inquiry is to provide the insight required to enable the Army to get it right *when it matters*. Here, Sir Michael Howard's declaration is instructive:

> I am tempted to declare dogmatically that whatever doctrine the Armed Forces are working on now, they have got it wrong. I am also tempted to declare that it does not matter that they got it wrong. What does matter is their capacity to get it right quickly when the moment arrives.[16]

To restate, military planners succeed when the effects of surprise or shocks do not overwhelm the institution's ability to adapt and respond. As surprise comes from the unanticipated consequences of known trends interacting in unexpected ways, this study attempts to provide analysis aimed at allowing military planners to get it right quickly when the time comes. In short, it is conducted with the goal of allowing for the swift adjustment needed to exploit opportunities and help mitigate inevitable risks and surprises.

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List of symbols/abbreviations/acronyms/initialisms

DND	Department of National Defence
DRDC	Defence Research & Development Canada
DLCD	Directorate Land Concepts and Designs
ES	Environmental Scanning

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Conceiving an Army for the 21st Century

4. AUTHORS (last name, followed by initials – ranks, titles, etc. not to be used)

Rostek, M.A.; Gizewski, P.; Reshke, R.

5. DATE OF PUBLICATION (Month and year of publication of document.)

December 2010

6a. NO. OF PAGES (Total containing information, including Annexes, Appendices, etc.)

45

6b. NO. OF REFS (Total cited in document.)

18

7. DESCRIPTIVE NOTES (The category of the document, e.g. technical report, technical note or memorandum. If appropriate, enter the type of report, e.g. interim, progress, summary, annual or final. Give the inclusive dates when a specific reporting period is covered.)

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9a. PROJECT OR GRANT NO. (If appropriate, the applicable research and development project or grant number under which the document was written. Please specify whether project or grant.)

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If military planners are to be more systematic and rigorous in future planning, utility may be found in futures methodology. Indeed, careful application of such methods can allow for investigation of the future and its implications in a manner that is both more systematic and rigorous than is likely to occur otherwise . This paper details two such methods and their application to Army 2040 -- a project being conducted by the Directorate Land Concepts and Designs (DLCD) aimed at investigating how the Canada's Army must develop to maintain its effectiveness in the 2040 timeframe.

Following a brief overview of the capability development process which the Army employs to study the future, the paper describes futuring or foresight methodology, and its application in analysing seven key components of the future strategic environment. It then identifies 12 converging trends which emerged from the analysis and describes the process by which the trends identified and the second and third order effects they generate may be used to produce a number of alternative futures which the Army and in turn the Canadian Forces (CF) must consider in order to maintain their relevance in the 2040 timeframe. An elaboration of one such alternate framework – based on those trends ranked as particularly high in terms of the potential impacts they may produce as well as the degree of uncertainty that surrounds them (i.e. energy and resource scarcity) -- concludes the paper.

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