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The Future Security Environment 2008-2030

PART 1: CURRENT AND EMERGING TRENDS



National Défense
Defence nationale

Canada



The Future Security Environment 2008-2030

PART 1:
CURRENT AND EMERGING TRENDS



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FOREWORD

I am pleased to present *The Future Security Environment 2008-2030 Part 1: Current and Emerging Trends* (FSE 1) for general reference by the Department of National Defence (DND) and the Canadian Forces (CF). The purpose of this document is to provide the Defence Institution with an authoritative analysis of current and emerging geopolitical, socio-economic, environmental, technological and military trends that affect the future security environment. This document will inform integrated CF Force Development, and act as both a resource for CF Professional Development and other department needs.

This well-researched document, reviewed by academia, both within and outside of DND, will also provide us with the means to collaborate with our national and international defence and security partners in planning and developing our future forces. FSE 1 is the first of a series of three documents that examines future security issues from the present out to Horizon Three (20+ years). It seeks to anticipate, not predict, future conditions. The other FSE documents, *Part 2: Future Shocks* and *Part 3: Alternate Futures*, will be promulgated within the year.

The need to comprehensively understand the future security environment is important for many reasons. If we are to maintain a relevant and adaptive force in the challenging years ahead, we must always be asking the vital questions: “what is changing?” and just as importantly, “what is not changing?”. Failure to strike a balance between maintaining current capabilities and making investments for future emerging threats, could result in activities that concentrate on planning for yesterday’s conflicts.

With this in mind, the CF Force Development community at large will use FSE 1 as a driver for integrated capability development, as a starting point for more specific security environment analysis, and as a means to inform concept development for CF and operational domains.

I encourage all members of the Defence Team to use this document. It will assist each member in maintaining a high level of awareness of current and emerging trends as well as improve their understanding of how these trends may affect our ability to remain strategically relevant, operationally responsive, and tactically decisive in the years to come.

S.A. Beare
Major-General, Chief of Force Development



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EXECUTIVE SUMMARY

Economic and Social Trends

Unlike the quest for power, supremacy, and territory that often characterizes traditional state inter-relations, economic and social drivers will not necessarily directly result in inter-state conflict (although they may be secondary causes). Instead, negative trends in economics, demographics, and social well-being may generate tension and aggravate existing hostilities and problems in regions plagued by discontent, disparity, and desperation. Such destabilizing factors could possibly result in humanitarian crises or create a need for stabilization and/or reconstruction missions aimed at putting an end to instability and chaos and restoring an acceptable form of peace.

Globalization, despite the plethora of opportunities it offers, also poses numerous challenges and intensifies social and economic trends that are potential causes of instability. Economic disparity, over-population, migration, urbanization, disease, poverty, and extremism can all have destabilizing effects; globalization will ensure that these effects will be felt around the world. Migration, diasporas, and urbanization in the developing world are of concern because the instability and conflict that these trends could trigger will not only garner global attention but will probably require international intervention at some point. Urbanization without proper health and sanitary infrastructure will accelerate the spread of infectious disease, and the ease of mass transit – of both trade and people – will only facilitate the spread of potential pandemics. Because of the increasing interconnectivity of nations, unrest triggered by unemployment, economic collapse in specific regions, and escalating conflict will now be felt all over the world. Globalization has caused these local and regional events to resonate around the world like never before.

The DND/CF will be competing with the private sector and other government departments for recruits from a dwindling labour pool. Due to Canada's aging population, the number of Canadians over the age of 65 will exceed those under the age of 15 by the year 2016. Consequently, the DND/CF will have to devise innovative recruitment and retention strategies that will attract men and women from all ethnic sectors of Canadian society, people who are interested in serving Canada in uniform and willing to accept the ethos of the profession of arms. Operational tempo, quality of life standards, and complications arising from a person's having multiple citizenships are some of challenges that will have to be resolved if the CF is to attract

and retain personnel. The Public Service will need to build capacity to deploy more civilians on international operations, which will become the norm. This will require a forward-looking review of legislation, policies, and compensation offerings.

Environmental and Resource Trends

As climate change negatively affects the developing world – which is already suffering from economic hardship and social stresses – existing tensions and instabilities will be exacerbated. Although competition for resources such as water and food is unlikely to result in state-on-state conflict, internal or inter-regional disputes could possibly break out amongst people trying to secure these resources for their survival. The quest for energy and mineral resources will certainly interest states who want the wealth and prestige that comes from controlling the supply as well as states searching to fulfill their markets' demands. While diplomacy and trade agreements will be the way most states satisfy their resource needs, aggressive and irrational responses in the pursuit of self-interest cannot be dismissed. Humanitarian missions are probable if large masses of population lack basic needs to the point of disaster, and stabilization/reconstruction missions could possibly be required if civil unrest and instability turn into actual conflict amongst already distressed peoples.

Climate change will worsen existing water and food shortages, and thus increase the likelihood of regional instability resulting in humanitarian and economic crises. Canada must also be prepared for the challenges that climate change will bring to the Arctic. As the polar ice melts, there will be an increase in northern security challenges. As the Northwest Passage is open for longer periods of time, there will be an increase in international traffic in Canada's northern waterways. The Canadian government will probably increasingly call upon CF assets to help with sovereignty patrols, search and rescue operations, resource protection, and the monitoring of international military activities.

The expected decline in fossil fuel resources and the simultaneous rise in oil prices will necessitate that the DND/CF find alternative means of power for its vehicles. As fuel prices continue to rise, the cost of training, let alone conducting domestic or expeditionary operations, will become prohibitive and consume an already stretched budget. Research and development into alternative fuels will remain a priority. The development of viable alternatives to fossil fuels would be revolutionary, and could possibly decrease tensions if there are fewer nations competing for dwindling oil supplies. Nevertheless, the reduction in oil dependency would not be without negative consequences. Supplier nations that do not take steps to diversify their



economies, once wealthy because of oil exports, could possibly experience economic depression and social instability if the demand for oil decreases.

Geopolitical Trends

The growing interdependence of global finance and trade networks appears to have deterred much interstate conflict in order to avoid any disruption of trade routes or the flow of capital. Because of globalization and the reduced occurrence of war amongst nation states, confrontation with non-state actors has recently become the prevalent form of conflict and will continue to be so for the foreseeable future. Nevertheless, the possibility of state-on-state conflict will never be totally eliminated. Multilateral organizations have been a prominent feature of international relations since the Second World War and have become increasingly common as nations form diverse new agreements and initiatives involving different partners. The existing hegemonic superpower – the United States – will continue to dominate. Nevertheless, there are emerging powers whose economic growth and military expansion may eventually challenge the position of the United States, especially in Asia and Africa. The interstate relationships of the regions surrounding these larger powers need to be closely examined, given that many of these areas are somewhat unstable and could possibly attract the attention of existing or emerging regional powers. Failed and fragile states are also of concern because such areas of instability represent potential sources of humanitarian and stabilization crises, as well as potential safe havens for terrorists involved in developing, organizing, and preparing for asymmetric attacks.

The themes of cooperation and conflict underlie the key geopolitical trends. Cooperation will occur within the various multilateral organizations, although their capacities for effective action will probably be limited by size and lack of consensus. The alternative – ad hoc coalitions of like-minded states acting in common interest – will sometimes be the preferred method of putting together intervention forces. Nurturing and establishing connections with international bodies will be critical in raising global awareness. Canada and its allies must pay special attention to the actions and ambitions of countries and organizations with which Canada has not traditionally had close diplomatic ties. Being cognizant of the plans and developments of these countries will be just as important as keeping abreast of allies' policies and priorities.

Canada will maintain its relationship with the UN and with NATO and could possibly benefit from exploring new bilateral and multilateral partnerships that are in Canada's interest; thus, Canada should try to nurture healthy relationships with

like-minded nations from around the world. Nevertheless, Canada will certainly need to maintain close relations with its continental neighbour, the United States. Hence, interoperability with the United States will be an important goal for the CF, where possible and essential. Because of shared continental responsibilities, Canada and its neighbour have mutual security interests that must be addressed through effective cooperation that respects individual sovereignty.

Although asymmetric attacks currently pose the main security threat to the world, the potential for state-on-state conflict cannot be dismissed. National aspirations, regional instabilities, and the desire to challenge a balance of power that currently favours the United States all represent potential triggers for war among states. Conflict is also likely to emerge in regions of instability, in failed or fragile states, or among states that feel a need to assert/reassert state power at the expense of regional – if not world – peace. Consequently, the DND/CF will need to be prepared to address the full-spectrum of conflict.

Science and Technology Trends

A comprehensive scan of science and technology futures supports the supposition that automation, customization, and miniaturization will underpin many technological breakthroughs that contribute to future defence and security capabilities. These include nanotechnology, information systems (computing) and sensors, networking technologies, biotechnology, new energy/power technologies, and cognitive, behavioural, and social sciences. Innovation in these sectors will enable developments in artificial intelligence, organic electronics, mass production of nano-materials, molecular imaging and personalized medicine, access to space, and programmable “intelligent” drugs. Nevertheless, the seemingly positive trends will possibly be offset by various negative ramifications of these science and technology breakthroughs – namely perverse applications of genetic engineering, designer bio-weapons, and other unanticipated effects arising from experimentation. Certainly, unethical actors have and will continue to take advantage of science and technology in the future.

Science and technology trends are characterized by innovation and rapid change. There are also potentially serious consequences of these technologies being available commercially to both friend and foe alike. Science and technology have historically contributed significantly to the development of defence-related capability and will continue to do so in the future. In the past, advances in science and technology have been driven to a large extent by massive investments by national governments in



their military programs. Future advances in science and technology will continue the current trend of being driven by massive investments from private and multinational companies.

Given global accessibility to future science and technology, any military advantage will belong to whomever is best able to acquire, integrate, and exploit new capabilities the fastest. Traditional “have-not” nations and non-state actors could possibly gain significant influence and equal footing in certain capabilities with long-established military powers through the acquisition of commercially available technological developments. The pursuit of low-tech solutions by adversaries could possibly offset the advantages of sophisticated/advanced weaponry. Also particularly challenging for traditional western militaries is the fact that asymmetric adversaries are not necessarily constrained by the same moral, ethical, or legal considerations. It will be of primary importance, therefore, that DND/CF be able to recognize the potential for new innovations to contribute to military capability – both their own capability and the capability of the adversary – and to address the problem of periodically updating their military capability with new science and technology in a relevant and effective manner.

Military and Security Trends

To say that the future security environment of the post-Cold War period is more complex than previous eras is not to downplay the complicated nature of past wars and diplomatic relations. Rather, it is meant to illustrate the increased complexity of international relations and national survival in a world that no longer consists of two main blocs of states with good situational awareness of each other’s capabilities. The security environment of today and tomorrow contains a plethora of potential threats, adversaries, and actors with divergent motivations not limited to traditional theories of international relations. In addition to states with contrary philosophical and ideological outlooks, including rogue states that regularly act outside the norms of international laws and protocols, Canada and its allies will also be challenged by the activities of problematic non-state actors such as trans-national criminal organizations, terrorist groups, and violent religious extremists, among others. In modern warfare, the adversary is more often likely to be a non-state group hidden amongst a larger population rather than a well-equipped traditional military. Adversaries will be harder to identify, their actions will be less conducive to anticipation or deterrence, and they will probably use asymmetric tactics in lieu of risking a conventional, head-on confrontation. Asymmetric means will be the tactic of choice for those wanting to exploit state vulnerabilities and avoid conventional

armed strength and the bounds of national and international law. Proliferation of weapons amongst many state and non-state actors is also expected, thus empowering an increasing number of potential adversaries.

Technology defines part of the future threat environment. Technological developments can be disseminated among unfriendly states or groups, thus posing a challenge to the capabilities of Canada and its allies. Just as significant is the imaginative use of existing technology in ways not conceived by their original developers and for purposes inimical to Canadian goals.

Implications for DND/CF

Meeting the challenges of the complexity of the future security environment will require contributions from all instruments of national power; achieving the desired effects will require the participation of, and cooperation with, allied defence teams, other government departments, the private sector, and, where applicable, non-governmental organizations – this is commonly being referred to as the Comprehensive Approach among Canada's allies. At the institutional level, an integrated vision will be required across a number of organizations; this will imply the use of governance, policy, and legal mechanisms to enhance the synergies among cooperative entities that are working to resolve complex situations. In order to achieve the benefits of a complementary team for complex problem solving, there needs to be an enhanced trust mechanism that enables the sharing of resources and information in a more transparent and effective manner. In order for this to be possible, DND/CF and its defence and security partners need to be adaptive to changing situations and find the means of creating a more networked focus in order to benefit from the strengths and capabilities of all potential contributors to the solution, including non-governmental entities. Hence, DND/CF should expect to continue working within the larger defence and security team: participating with other government departments, with allies in coalitions, and alongside non-governmental organizations. The mix of ever-present conventional threats and the ever-increasing number of asymmetric threats that are continuing to emerge will demand more than a military response. Other government departments and non-governmental organizations must contribute to – and take the lead in – prevention, intervention, stabilization, reconstruction, and capacity-building in regions of instability.

The future security environment will offer both opportunities and challenges for military forces. The difficulty not only of maintaining readiness to respond to



conventional threats but also of coping effectively with capable non-state actors operating in austere, urban, and littoral battlespaces will continue to strain conventional forces and call for new capabilities and new approaches. In both domestic and expeditionary taskings, the defence team of the future will need both conventional and unconventional capabilities. The DND/CF will also need to be able to respond to chemical, biological, radiological, and nuclear (CBRN) or cyber attacks. Whether at home or abroad, intelligence, surveillance, and reconnaissance capabilities will remain essential in maintaining situational awareness in a world where sensing technology is becoming increasingly pervasive and universally available. Communications will remain essential in ensuring command and control. Given Canada's extensive coastline and the fact that over three-quarters of the world's population live in littoral areas, the defence team of the future will need to be able to project maritime force. Furthermore, given Canada's immensity and the vast distances that separate it from probable theatres of operations, strategic lift and transport capabilities are essential. Meeting the complex challenges of the future security environment will require an integrated, adaptable, and capable force that can work cooperatively with other government departments, agencies, and stakeholders in both domestic and international operations. Therefore, the complex future security environment described in the following chapters will demand a comprehensive, integrated, adaptive, and networked focus in the application of government policy.



INTRODUCTION

Throughout its history, the DND/CF has been called upon to deploy both at home and overseas on varied and largely unpredictable missions that cover the full spectrum of operations. The word “unpredictable” is key to any discussion about the future: surprise factors such as strategic shocks, changing demographics, infectious diseases, newly influential ideas, or the rise to power of charismatic leaders can easily render predictions about what may happen thirty years from now irrelevant. Even thinking ahead five years can be highly speculative. Who, in August 2001, could have predicted that Canada would be deeply involved in combat operations in Afghanistan today? Nevertheless, the fear of being wrong should not – and cannot – prevent people from studying trends in the future security environment so as to limit surprise and prepare for situations that might reasonably be foreseen or expected. DND/CF must not only be ready to respond to a wide range of contingencies today, it must plan for the threats and challenges of tomorrow. A thorough analysis of the future security environment is a necessary first step in this process. It is not the purpose of this document to predict the future, but rather to examine and project how trends might reasonably unfold out to 2030 and beyond and to help DND/CF to be as prepared as possible to face the security threats that are most likely to emerge.

Globalization

This analysis of the future security environment is situated within an all-encompassing trend: Globalization. Globalization is a process of increased connectivity and interdependence transcending social, economic, and political spheres. To be sure, globalization is not a new phenomenon; however, the current wave of globalization has achieved an unprecedented speed and scope of effect. Rapid advances in telecommunication and transportation technologies have compressed traditional perceptions of time and space, allowing interactions to occur virtually, in real time, and across cultural barriers. This has had a profound impact on the day-to-day economic transactions and has greatly accelerated the integration of global markets. There has been an erosion of conventional political boundaries that has further facilitated the flow of goods, services, capital, people and – most importantly – ideas. While such an integrated system has clear benefits, it also brings into focus the degree of material and political disparity that exists both domestically and globally. Furthermore, the benefit accrued by Canadians in this integrated environment is somewhat offset by a diminished capacity to keep potential threats at a distance.

Facilitated by the mechanisms made available through globalization, individual actors, aggregates, and states are able to “jump scale” of effect, exerting influence beyond their previous reach. For example, individual actors are able to exercise an influence on a global scale, often through networks that negate the need for geographic proximity and, in the context of criminal activity, avoid interdiction by state-based law enforcement institutions. Such a trend has great implication for the security environment. The degree to which non-state armed groups are able to recruit, procure resources, disseminate ideology, network, and even virtually train members is a case in point. Not only are borders less of an impediment to mobilization, but non-state actors at various scales are increasingly empowered to occupy political space previously reserved for the state.

Globalization is often characterized in terms of its economic and technological drivers. It is important to note, however, that the relationship between drivers and effects is not necessarily linear; rather, there is a reticular or fractal quality to the relationship, often with feedback loops. While first and second order effects of trends are easily discerned, due to the complexity of the system, further effects are far more difficult to recognize, especially when each trend is viewed in isolation. In a globalized world, local and regional shocks often resonate worldwide and alter the character of the security environment. When conducting its analysis of the future security environment, it is therefore instructive for DND/CF to survey a variety of emerging trends in order to map possible points of convergence where shocks may occur.

Purpose

The exploration of these trends suggests how key global issues could possibly affect Canada over the next twenty years and how the evolving security environment could possibly influence when and where the CF will be deployed – whether at home or abroad. The people responsible for force development must then use this insight to maintain existing activities, to plan for a long-term relevant force structure, and to invest in a CF that is prepared for the threats and challenges that are expected to emerge within a time frame extending to 2030 and beyond. This document, *The Future Security Environment 2008-2030: Current and Emerging Trends* (FSE), highlights challenges that Canada and DND/CF will probably face in the future. It will be the responsibility of the Force Development community to identify capability needs and gaps, and to propose specific solutions.



Document Cycle

The program of analysis for the future security environment will not only include current and emerging trends out to the year 2030 (Horizon Three), but it will also analyze potential consequences of these trends through the consideration of future shocks and alternative futures. The review of current and emerging trends aims to lay the ground-work for understanding the future by outlining and reflecting on geopolitical, economic and social, environmental and resource, science and technology, as well as military and security trends. Analysis of future shocks and alternative futures will occur with the goals of elaborating on the consequences of emerging trends, speculating on the impact of unforeseen shocks, challenging common assumptions about the future's shape, and identifying vulnerabilities that DND/CF will need to mitigate. Work on future shocks will aim to identify possible shocks and analyze both their probability and impact on Canada and DND/CF. Analysis of alternative futures will present a selection of alternative future scenarios that could follow from trends or strategic shocks and will serve as an exercise to challenge conventional thinking, to demonstrate that radical changes to the world as it is known are not impossible, and to illustrate what impact trends and shocks could plausibly have on Canada and DND/CF.

This document is the first FSE iteration published by DND/CF. It is anticipated that the FSE will be revised and re-issued on a regular cyclical basis in order to take into consideration changes in the future security environment and to update what the evolving and dynamic international situation means for DND/CF. However, significant changes may demand more frequent re-issues or updates through special topic discussion papers. Future versions of the FSE could possibly include a scorecard for assessing the deductions, the implications for the force development process, and the utility and accuracy of previously identified trends.

Document Outline

The chapter on economic and social trends highlights foreseeable developments in economics, demographics, and social well-being. The discussion of environmental and resource trends enumerates the challenges that are expected to arise as a consequence of resource scarcity, competition for energy and minerals, and climate change. The chapter on geopolitical trends provides an overview of future multilateral players, rising powers, regional relationships, unstable states, and potential triggers for state-on-state conflict.¹ The chapter on science and technology demonstrates that progress in nanotechnology, biotechnology, new energy, and cognitive sciences

will impact daily, economic, and security realities. The final chapter on military and security trends looks at the proliferation of weapons and battlespaces, the growing threat of modern asymmetric warfare, and the emergence of new technologies that will be available to both state and non-state actors for use in both conventional and irregular warfare. The concluding chapter discusses the implications for DND/CF and the impact of operating with a comprehensive, integrated, adaptive and networked focus for the application of national intent in the future security and operating environment described in this document.

Assessment of Probability

The terminology of probability used in the deductions and throughout this document has been carefully selected to help the reader determine which trends are most important and which are most likely to occur, to have an impact on Canada and to require consideration and response by DND/the CF. This approach is similar to that taken by the United Kingdom's *DCDC Global Strategic Trends Programme 2007-2036*.

TERMINOLOGY OF PROBABILITY

Will

Circumstances are already moving in this direction, and moving off this trajectory is not foreseeable.

Probably

A change in circumstances could change the trend's trajectory, but this is not likely to happen.

Possibly

This occurrence is foreseeable, but a change in trends is not out of the question, thus bringing about a different outcome.

Unlikely

The outcome is deemed improbable as there is little or no evidence projecting its occurrence.



NOTES

1 ADM (Policy) and Chief of Defence Intelligence's purview is trends likely to happen up to ten years from now; DFSA looks out beyond ten years. This chapter does not purport to be an exhaustive study of geopolitical interactions since there are other organizations within DND tasked with assessing international relations and geopolitical developments. Instead, the inclusion of geopolitical trends here is meant to provide the reader with a situational background and to acknowledge that future security trends are also affected by regional and inter-regional threats.



ASSUMPTIONS

Canadian national values will not change any time soon. Not only will Canada remain a democracy, but Canadians and their government will continue to stand up for peace, order, and good government; for human rights and freedoms, respect for the dignity of all persons; and for obedience to and support of lawful authority.¹ This includes a commitment to justice, a balance between individual and community rights, a belief in equal opportunity and tolerance of diversity, and the ideal of responsible and democratic government. In Canadian democracy, the principle of subordinating the military to civilian political authority and the principle of collective security for any international intervention are paramount.²

The Canadian Forces (CF) will continue to be relevant to the Canadian public, the Canadian government, and the allies of Canada. Canadians will continue to want an institution that will protect Canadian interests and values and that will do so in a manner that is open, responsive, effective, and based on high ethical standards. The Government of Canada will continue to expect DND/CF to provide coherent advice on military matters and defence policy and to be a national tool for achieving Canadian domestic, continental, and international defence and foreign policy objectives. Allies will continue to want Canada to be a competent partner capable of making a meaningful contribution to combined operations while keeping pace with evolving military concepts, doctrine, and technology.³

The three roles assigned DND/CF by the Canadian Government will remain unchanged. Consequently, DND/CF can expect to continue protecting Canada, Canadians, and national sovereignty; defending North America in cooperation with the United States; and contributing to international peace and security through stabilization, humanitarian, and/or reconstruction operations in regions of instability. Although DND/CF must be fully capable of protecting Canada and responding to domestic crises on its own in support of civilian first responders, Canada will remain committed to multilateralism and consequently will rarely venture into international missions alone or outside of a coalition. The United States will remain Canada's most important military ally and trading partner; hence, it will continue to be in Canada's interest to cooperate closely with the United States so long as national sovereignty is not sacrificed.

The occurrence of a strategic shock will cause the trajectory of a trend to deviate off its existing course. The advent of a strategic shock – such as a major transformative technological breakthrough or a socio-political or military event –

tends to disrupt patterns and often leads to fundamental changes in the world situation. Once this occurs, the trajectory of new trends may take a whole new direction. The interaction of multiple trends can result in unpredictable and non-linear trajectories and thus act as strategic shocks as well.

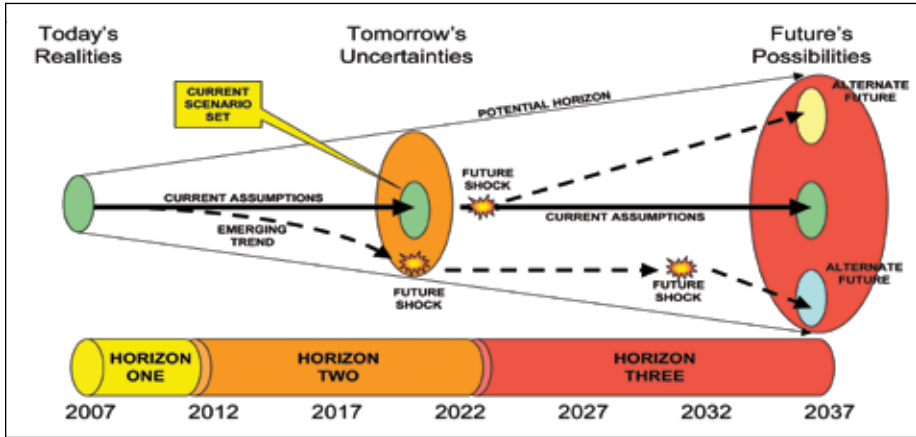


FIGURE 1: TIME HORIZONS: THINKING ABOUT THE FUTURE SLIDE FROM CDB PRESENTATION (8 NOVEMBER 2007).

NOTES

- 1 Government of Canada. *Defence Ethics Program: Introduction to Defence Ethics*. 2nd Edition (Ottawa: Department of National Defence). Course Case Study Guide Handouts, 10 March 2008.
- 2 Department of National Defence, *Military HR Strategy 2020: Facing the People Challenges of the Future* (Ottawa: ADM (HR-Mil), 2002), p. 3.
- 3 Department of National Defence, *Development of HR 2020: A Review of External Driving Factors*, DSHRC Research Report 2/2000 (Ottawa: Directorate of Strategic Human Resource Coordination, December 2000), pp. 32-3.



ECONOMIC AND SOCIAL TRENDS

Introduction

As populations grow, economies must keep pace or standards of living will probably decline. Owing to the broad diversity in the range of living standards, no universally accepted benchmark exists for judging societies as stable, fragile, or failed. The most comprehensive standard-of-living scale is tied to both the quality life and to the expectation that the current standard can be maintained and/or raised. However, standards of living are relative from the perspective of both experience and expectation. An awareness of the affluence of the developed world cannot help but increase expectations or the level of dissatisfaction in the developing world.

Unlike the quest for power, supremacy, and territory that defines traditional state inter-relations, economic and social drivers will not necessarily result in inter-state conflict (although they may represent secondary causes). Rather, negative trends in economics, demographics and social well-being may serve as sources of tension and aggravate tensions and problems already present in areas where discontent, disparity, and desperation are rife. These destabilizing effects could possibly result in humanitarian crises or the need for stabilization and/or reconstruction missions to put an end to instability and chaos and restore an acceptable form of peace to the security environment.

Economic Trends

Potential Economic Disparities

Economic forecasting is notoriously difficult. However, barring a major shock, and despite cyclical slowdowns and occasional disruptions, the global economy will probably continue growing through to 2030. In its study of global prospects, the World Bank's "central scenario" anticipates that global economic output in 2030 will be USD \$72 trillion, up from USD\$35 trillion in 2005.¹ This economic growth will be driven by population growth, improvements in productivity and greater integration of the global economy.

Although the world economy will expand as a whole, not all countries will grow at the same pace. Along with population growth, economic growth will be concentrated in the developing countries, which are predicted to expand at an average rate of 4.2 % per year until 2030.² Politically, this will translate into an increased ability on the part

of developing countries to achieve their objectives on the international stage. While the United States will probably remain the world's largest economy in 2030, China, India, and Brazil will have dramatically increased their economic stature by that time.

Regional economic disparities could possibly increase the propensity for violence between states and hence could possibly be a driver of conflict and war. A country with a rapidly expanding economy could possibly be tempted to channel its new wealth into aggression, trying to attain goals that were formerly out of reach. Alternatively, a more powerful country with a slow-growing economy might be afraid that its position will be overtaken by another country whose economy is expanding more rapidly. Differing rates of economic growth can open and close windows of opportunity for states that are hoping to maintain or improve their position on the international stage.

Similarly, change (or the expectation of change) within national economies has the capacity to stimulate rivalries and competition along existing social fault lines, potentially leading to violence and instability. Violence and instability will also be a probable outcome of the empowerment of warlords, their links to international crime, and the lack of equitable distribution of financial benefits. Although sustained world growth should logically reduce the numbers of people living in dire poverty, any benefits accrued will be spread unevenly within societies. Income disparities could possibly widen. Social groups, such as unskilled labourers or disadvantaged ethnic groups, could be possibly be left behind by the process of globalization. While this dynamic will be seen in both developed and developing countries, the majority of developed countries, due to greater capacity, will be better able to mitigate the hardships suffered by the disadvantaged. Nonetheless, economic upheaval and deepening inequalities may spark conflicts within developed or developing countries.

DEDUCTION 1

WHILE GLOBALIZATION WILL BRING GREATER ECONOMIC PROSPERITY TO MORE NATIONS, THE GAP BETWEEN RICH AND POOR NATIONS AND INDIVIDUALS COULD POSSIBLY WIDEN. ECONOMIC DISPARITY WILL BE A SOURCE OF TENSION AND POTENTIAL CONFLICT.

Security of the Oceans

Ensuring the security of the world's oceans will be paramount in the future security environment. More than two thirds of the planet is covered by water, 90% of the world's trade is conducted by water and 80% of the world's urban centres are located



in the littoral. Globalization has only increased the importance of the maritime domain as a vital conduit for the transportation of goods all over the world. Canada needs to maintain this extensive global supply chain in order to preserve freedom of the seas and ensure that there are no interruptions in the transport of desirable goods and people. This increased shipping activity has also identified a need to interdict the movement of illicit goods and people.

The maritime domain is of particular importance to the international energy market. More than two thirds of the world's oil is transported by sea. Much of this oil transits through various chokepoints (Strait of Hormuz – 17 million bbl/day, Strait of Malacca – 15 million bbl/day, Bab el-Mandab – 3.3 million bbl/day), which makes these areas strategically important to oil importing nations. Any interruption in the supply of oil resulting from an inability to keep the sea-lines open could be catastrophic and will be an increasing vulnerability. The blockage of a chokepoint – even for a short period of time – could lead to oil shortages and skyrocketing energy prices. Chokepoints also pose a serious threat to oil tankers, which become more vulnerable to terrorist attack, piracy, and shipping accidents. The expected increase in the demand for oil by Asian nations like China and India will increase competition for oil and may make distribution networks and chokepoints even more susceptible to security threats in the future.³

DEDUCTION 2

DEVELOPED NATIONS WILL FIND IT IN THEIR BEST INTEREST TO PURSUE DIPLOMATIC SOLUTIONS FOR THE PROTECTION OF ECONOMIC INVESTMENTS, TRADE, AND TRANSPORTATION ROUTES; HOWEVER, AGGRESSIVE RESPONSES TO THREATS TO TRADE OR ECONOMIC WELL-BEING ARE ALWAYS A POSSIBILITY.

Canada – A Trading Nation

Canada will continue to be a trading nation. In 2006, Canada exported \$523.7 billion of goods and services, which accounted for roughly 36.4% of its GDP. Over that same period, Canada imported \$486.5 billion of goods and services.⁴ The country's most important trading partner is the United States, which currently takes about 80% of Canada's exports and is the source of 65% of its imports. Each day, \$1.9 billion of goods and services cross the border between the two countries, which represented an annual total of \$708.9 billion in 2006.⁵ In contrast, Canada's second most important export market, the United Kingdom, accounted for just 2.8% of Canada's exports, while China, the second largest source of imports, accounted for no more than 8.7% of total imports.⁶

While trade with other countries will continue to expand, it is unlikely that another country will overtake the United States (US) as Canada's primary trading partner by 2030. Preserving the free flow of goods and services across the border, as well as maintaining mutual trust and confidence, will therefore continue to be critically important to both countries. Nonetheless, the expansion of ties with other countries, particularly in the developing world, will have important security implications for Canada, which will have to address, for example, the importation of illegal cargoes or CBRN threats, and the protection of ports and trade routes from attack. Finally, the increasing movement of goods and people, while beneficial, will expose Canada and Canadians to additional threats, such as terrorism or disease.

With the world's longest coastline, the impending opening of the Northwest Passage, and the increased movement of goods and resources by sea, it is probable that in future, Canada will have to place more importance on maritime security. Given that 97% of all goods destined for Canada are transported by sea, it is clear that maritime trade is critical to the Canadian economy. Canadian ports (both east and west) have seen marked increases in container traffic over the past few years, which is resulting in an increased vulnerability to asymmetric attacks and international crime. Vancouver, in particular, accounts for almost half the container and cargo traffic in the country. Between 2005 and 2006, the Port of Vancouver saw a 4% increase in cargo volume, an increase of almost 3 million tonnes. Montreal and Halifax have seen similar increases, and all three of those ports have been expanding and improving their infrastructure to compensate. This trend is expected to continue, with the volume of trade expected to double by 2037.⁷

Vancouver and Prince Rupert will become increasingly important as the Asia-Pacific Gateway is developed. Both of these locales are closer to Asia than any other ice-free North American port, a significant competitive advantage. The Gateway is envisioned as a comprehensive maritime, air, road, and rail transportation network that would vastly improve Canada's ability to handle increased importation traffic and facilitate export of Canadian raw materials to Asian manufacturing centres.⁸ Clearly, if Canada's Western ports are to become a gateway for North American-Asian trade, future infrastructure expansion will have to take place. For example, there will be a need for inland container processing terminals and dedicated rail corridors to decongest crowded port terminals and to move container processing away from dock facilities. In Canada, such facilities could conceivably be built as far east as the Alberta side of the Rockies.⁹



This expansion of maritime commerce and the related infrastructure raises a number of security questions. For example, how does our country monitor what comes across our borders from the sea? At the present time, only 3% of inbound containers are inspected upon arrival in Canada.¹⁰ Moreover, inland-processing terminals, while necessary to economic growth, could result in a situation where illegal, dangerous, or other undesirable cargos are shipped immediately into the interior of the country. Since Canada has only two rail corridors through the Rocky Mountains, ensuring the protection and safety of these easily disrupted arteries represents another security challenge. These are serious vulnerabilities capable of exploitation by trans-national terrorists and criminals alike. Maintaining the security of these ports, vessels and cargo poses a difficult security challenge that will only increase in the future.¹¹ Without supporting security policies and processes, these western ports may become a gateway for threats as well as trade.

DEDUCTION 3

PROTECTION OF BOTH CONTINENTAL AND INTERNATIONAL TRADE ROUTES FROM DISRUPTION WILL BE ESSENTIAL TO CANADA'S ECONOMIC WELL-BEING. BECAUSE OF THE TRANS-NATIONAL NATURE OF MARITIME TRADE, THE CF COULD POSSIBLY BE ASKED TO PROVIDE INCREASED SURVEILLANCE AND OTHER RESOURCES TO KEEP POTENTIAL THREATS AWAY FROM VULNERABLE PORTS AND TRANSPORTATION ROUTES AND TO RESPOND TO THREATS THAT FIND THEIR WAY INTO CANADA'S TRANSPORTATION INFRASTRUCTURE SYSTEM.

Causes of Instability

Migration and Population Displacement

The developed world is expecting little or no increase in population (and in some cases a decrease) over the next decade. The population of the developing world, on the other hand, will continue to grow. The recruitment by developed nations of skilled labour from the developing world is expected to continue as the wealthier countries attempt to address the consequences of an aging population. This is expected to cause a greater than normal migration to the developed world, both legal and illegal, and these new citizens will probably continue to change the social, political, and economic structures of the societies they join. States that see a net increase in emigration might experience decreased productivity owing to a shrinking labour pool. States that see a net increase in immigration will probably be concerned about the economic impact of an influx of new workers on their domestic labour markets.

Events as diverse as natural disasters or the outbreak of war can spark mass migrations of people to adjacent areas, sometimes across borders and often into areas with little to no capacity to cope with sudden new stresses. Such mass movements can be politically and socially destabilizing and can spread conflict across large areas. Furthermore, refugees and internally displaced groups, often forced to live in dense and unsanitary conditions, are prone to infectious disease, which can spread rapidly. Uprooted and displaced, such populations are vulnerable to an array of hazards and may require immediate humanitarian aid.

DEDUCTION 4

THE MASS MOVEMENT OF LARGE SEGMENTS OF PEOPLE IS DESTABILIZING AND MAY RESULT IN CIVIL UNREST, REGIONAL CLASHES, OR HUMANITARIAN CRISES THAT REQUIRE RESPONSE AND RESOLUTION THROUGH THE DIPLOMATIC, DEVELOPMENT, AND/OR DEFENCE INSTRUMENTS OF DEVELOPED NATIONS.

Urbanization and Mega-Cities

According to UN reports, 60% of the global population will live in urban areas by 2030 (70% by 2050). In 2008, the world's urban population equalled the world's rural population; in the future, as populations grow, most of the global population will live in urban areas. Population projections forecast that 4.9 billion people will be living in cities by 2030, and this will almost double to 9.2 billion people by 2050. Urban areas are expected to absorb all this population growth, and they will continue to attract rural dwellers seeking more lucrative opportunities and better living standards. Population growth will be concentrated in the urban centres of the less developed world, particularly in regions like Asia, Africa, Latin America and the Caribbean.¹²

A corollary of global urbanization is the rise of mega-cities – urban agglomerations of more than ten million inhabitants. In 2007, there were nineteen mega-cities; the projected number by 2025 is 27. By 2025, 10% of the world's population will reside in mega-cities. Eighty percent of these projected mega-cities will be in the developing world. Because these cities are already so large, and because they will be inundated with an overwhelming influx of residents over the next few decades, sizable areas of these cities will be poor, congested, polluted, and poorly served by transportation and housing. Hence, shanty-towns lacking running water and sewers will not be uncommon accommodations for the urban poor. Seven percent of the urban population will live in large-cities (urban centres with five to ten million inhabitants). By 2025, there will be forty-eight of these large urban centres (there



were thirty in 2007), and 75% of these mega-cities-in-the-making will be found in the developing world.¹³

Projected Mega-city Population of 2025	
Urban Agglomeration	Population (millions)
Tokyo, Japan	36.4
Bombay, India	26.4
Delhi, India	22.5
São Paulo, Brazil	21.4
Mexico City, Mexico	21.0
New York-Newark, USA	20.6
Calcutta, India	20.6
Shanghai, China	19.4
Karachi, Pakistan	19.1
Kinshasa, Dem Republic of Congo	16.8
Lagos, Nigeria	15.8
Cairo, Egypt	15.6
Manila, Philippines	14.8
Beijing, China	14.5
Buenos Aires, Argentina	13.8
Los Angeles-Long Beach-Santa Ana, USA	13.7
Rio de Janeiro, Brazil	13.4
Jakarta, Indonesia	12.4
Istanbul, Turkey	12.1
Guangzhou, Guangdong, China	11.8
Osaka-Kobe, Japan	11.4
Moscow, Russia Federation	10.5
Lahore, Pakistan	10.5
Shenzhen, China	10.2
Madras, India	10.1
Paris, France	10.0

FIGURE 2: PROJECTED MEGA-CITY POPULATION IN 2025.

Source: United Nations, *World Urbanization Prospects: The 2007 Revision*, p.10.

Urbanization and the growth of mega-cities raise a number of security concerns. The expansion of large cities and mega-cities will occur in littoral, coastal areas within 100km of the coast. Currently, 60% of the world's population inhabits regions within 100km of a seacoast, while 70% live within 320 km of the sea. Such regions

are vulnerable to environmental risks such as extreme weather and the flooding of low-lying coastal regions. Due to the fact that the vast majority of growing urban centres are located in the developing world, these cities will suffer from a shortage of infrastructure and housing, meaning that much of the poorer population will live in slums that lack basic public services. Mega-cities will put a great deal of strain on municipal and state institutions. While competent and well-resourced governments will probably manage fairly well, city-dwellers in failed and fragile states are likely to experience a lack of economic opportunity, inadequate infrastructure, exposure to disease, and criminal predation. The result may be civil unrest, and people who feel disenfranchised may be more likely to join criminal or terrorist groups out of fear or dissatisfaction.¹⁴

These large and chaotic urban centres will become a new battleground. Large, unregulated cities will provide criminals, terrorists, and insurgents with new havens from which they can organize and launch operations; they will also offer a ready pool of disenfranchised recruits. Not only will adversaries be able to blend and embed themselves into massive city populations, they will be able to hide behind civilians and mitigate the firepower advantages of nations who abide by international law and whose rules of engagement and/or public opinion preclude collateral damage. The failure of a megalopolis owing to a government's inability to provide essential services or a governance vacuum will only aggravate the humanitarian crisis, create a vulnerability to political extremism, increase the demand for stabilization and reconstruction through intervention, and exacerbate the lawlessness that will help shelter and facilitate the work of criminals, terrorists, and insurgents. The sheer geographical size of such a city reduced to chaos and the huge numbers of people who either need help or are abetting massive unrest could possibly ultimately overwhelm the defence teams that developed nations are able to send, thus leading to mission failure and enabling the criminals, terrorists, and insurgents to operate with impunity.¹⁵

DEDUCTION 5

THE URBANIZATION OF THE WORLD'S POPULATIONS WILL CONTINUE. THE FAILURE OF THE MEGALOPOLIS IN THE DEVELOPING WORLD WILL INCREASE THE RISK OF DISEASE, PANDEMIC, AND HUMANITARIAN CRISIS AND WILL ALSO ACCENTUATE THE INCREASINGLY URBANIZED NATURE OF CONFLICT AND THE NEED FOR URBAN WARFARE CAPABILITIES.



Disease and Pandemics

The localized or global appearance of any infectious disease could have a direct or indirect effect on Canada and the world, whether demographically, economically, militarily, or politically. Globalization, rapid urbanization, mass transit, climate change, and changing social behaviours...all have the capacity to increase the incidence and spread of disease. The ease and affordability of air travel make it possible for people, animals, and products to move quickly from one part of the globe to another; consequently, any diseases hosted by these carriers can be easily transported and introduced into areas where the disease was not previously endemic.¹⁶

Increased death rates in developing countries resulting from infectious disease epidemics could possibly reduce the segment of the population (ages 15 to 64) that is not only the most economically active but is also the pool that supplies the labour force, the armed forces, government employees and leaders. With such a loss in worker productivity – because of illness, caring for sick relatives, or raising the orphaned children of relatives – the gross national product of such countries could possibly stagnate over the next thirty years, or fall below present-day levels. Infectious disease can deprive law enforcement and national security forces of trained personnel and expertise. In a nation that is unable to mitigate or control an outbreak, governance capabilities may become compromised as experienced bureaucrats, politicians, and cabinet ministers succumb to disease.¹⁷

Outbreaks of disease could have a substantial impact on the global economy and international relations. Governments, in an effort to prevent the transmission of infectious diseases, may close their borders to international travel or trade. In response to Mad Cow Disease (Bovine Spongiform Encephalopathy) and Avian Influenza (H5N1), one third of the world's meat supply was embargoed in early 2003, according to a UN Food and Agriculture Organization report.¹⁸ The potential economic impact on Canada of such incidents should not be underestimated. The 2003 outbreak of Severe Acute Respiratory Syndrome (SARS) cost the Canadian economy \$419 million and the Ontario health care system \$763 million.¹⁹ Similarly, the May 2003 identification of a BSE-infected cow in Alberta led to a ban on beef exports to the US that lasted over two years, resulted in an estimated 4,200 jobs lost and had an ongoing direct fiscal impact on Canada's beef industry estimated at around \$7 billion.²⁰ Many recent widespread outbreaks of infectious diseases have originated in animals, including Avian Influenza, SARS, Ebola and Swine Influenza (H1N1). The cross-border movement of people and meat products creates a risk that such diseases will be spread around the world in short periods of time.

Such movement also increases the probability that existing animal diseases will mutate and become zoonotic – have the capacity to infect humans.²¹

Developing nations are short of health care funding, hospitals, equipment, vaccine stockpiles and health care workers. For example, a typical Human Immunodeficiency Virus (HIV/AIDS) drug cocktail costs approximately \$15,000 per patient per year, a price few developing states are able to bear. Another example: the influenza vaccine is only commercially produced in nine countries and at a rate insufficient to satisfy global demand. A scarcity of educated health care workers in developing regions and an inability to compete with western recruitment campaigns is causing a further drain on the health care systems of these countries. An example of this is the active recruiting of nursing school graduates in Botswana by South Africa and the United Kingdom. Overall, these situations are significantly eroding the ability of developing states to prevent and respond to the spread of disease and potential pandemics.²²

It is virtually impossible to accurately predict which strain of which disease will cause the next epidemic or pandemic. There are a number of diseases, however, that are currently commanding a lot of attention in the public and political spheres. The outbreaks of SARS, H5N1, H1N1, and HIV/AIDS were not predicted, and dengue fever and malaria have yet to be eradicated after thousands of years of existence. While at the same time re-emerging in developed nations, tuberculosis, polio, bubonic plague, leprosy, yellow fever, measles, and mumps continue to strain the capacities of weak health care systems in Africa and Asia and other developing regions.²³ It is expected that the numbers of annual HIV/AIDS deaths globally will rise from 2.2 million in 2002 to 6.5 million in 2030. Sub-Saharan Africa is the most HIV/AIDS infected region of the world and posted 2.1 million deaths in 2006. During that same year, 590,000 people died of HIV/AIDS in South and South-East Asia. Trends indicate that the centre of the HIV/AIDS pandemic will shift to the Eurasian region in future, with China, India, and Russia recording, in a mild epidemic scenario, some 66 million new cases between 2000 and 2025.²⁴

The primary problem with epidemics and pandemics is that their economic, demographic, and political impacts can be severe regardless of whether the victim is a developed or a developing state. Moreover, it is extremely difficult, owing to the nature of globalization, to control the spread of infectious diseases in today's world of interconnectivity and world travel, and it is even more difficult to predict coming outbreaks, as recent events have shown. There is a good chance that multiple infectious disease events of varying severity will occur in different locales between now and 2030. Also there is the very real possibility that, without effective



medical support and precautions, infectious diseases will be imported to Canada by both travelers from the general public and returning members of deployed forces. Acknowledging these threats and vulnerabilities and developing preparedness is key to limiting global impact.²⁵

DEDUCTION 6

NATIONS WILL HAVE TO BE PREPARED TO RESPOND TO THE CONSEQUENCES OF THE GLOBAL OUTBREAK OF INFECTIOUS DISEASES.

Poverty

According to a report of the UN Commission on Social Development, 735 million people will be living in extreme poverty (living on less than \$1 a day) by 2015. Although this is fewer than the 1.22 billion impoverished people tallied in 1990, it still represents an enormous number of people who lack access to money, education, health care and power. China has seen the most success in reaching its poverty reduction targets (for the UN Millennium Goal) before 2015. South America and the Caribbean are struggling to meet those goals; many countries in Sub-Saharan Africa have made no progress, and Europe and Central Asia have actually seen their poverty rates increase.²⁶

Many obstacles impede the goal of poverty eradication, and these are prevalent in the developing world. Weak economic growth and unequal income distribution within a nation forestall the reduction of poverty. Sub-Saharan Africa and Latin America have the highest levels of income inequality. Another barrier to poverty reduction is unequal representation by males and females in the workforce and levels of school enrolment. In Southern Asia, Western Asia and Northern Africa, only 20% of non-agricultural sector jobs are held by women. Rural communities are more impoverished than urban centres since rural areas lack access to services. HIV/AIDS has had a devastating effect on the third world, particularly on Sub-Saharan Africa. Bread-winners are struck down in the prime of life, and their dependents are left in poverty. Surviving children are often unable to attend school but must immediately make a living by joining the workforce. Grandparents (already surviving on fewer economic resources in their old age), as well, are called upon to support orphaned grandchildren. Armed conflict reinforces this poverty and diverts government attention and funding from resolving the problem. Nearly 40% of the world's conflicts are taking place on the continent of Africa.²⁷

Based on current trends, the failure to eradicate poverty in Africa does not bode well for the future, particularly with respect to security issues. The result could possibly be mass migration, as people leave impoverished or war-torn regions in search of more resources or better employment opportunities. In most cases, the final destination of these refugees will not be any better at accommodating them than their original place of residence. A mass influx of people may generate a humanitarian crisis or an ethnic clash, which will call for either humanitarian assistance or a stabilization mission, or both. Discontented and resentful people could possibly also spark domestic conflicts with riots or protests concerning economic disparity or resource shortages. This could possibly result in calls for developed nations to mount humanitarian and/or stabilization operations. Regions full of desperate and disenfranchised people also serve as pools of recruits for terrorist organizations crusading against the secularism, materialism, and unshared wealth of developed nations.

DEDUCTION 7

SUB-SAHARAN AFRICA AND CENTRAL ASIA ARE REGIONS WHERE INSTABILITY AND INEQUALITY STEMMING FROM EXTREME POVERTY COULD POSSIBLY REQUIRE HUMANITARIAN AND/OR STABILIZATION MISSIONS.

Violent Religious Extremism

Examples of violent religious extremism can be found throughout history, but globalization has allowed the reach and effects of violent extremist actions to have a truly international impact.²⁸ The term “violent religious extremism” is meant to describe religion-based ideologies and violence carried out using religious piety as a motivator and as justification. These actions typically contravene conventional, moderate, interpretations of classic religious texts and scriptures. For example, the killing of innocents contravenes the scriptures of all three major monotheistic religions (Judaism, Christianity, Islam), while suicide, the taking of hostages, and even coercion on religious matters is strictly forbidden according to many interpretations of the Koran.²⁹ Frequently, religious extremism is predicated on literal, rather than spiritual, interpretations of scripture, and this extremism is supported by a selective and superficial use of historical material and mythology that resonates with a particular target audience. By manipulating these various components, religious extremists create what they purport to be logic-based narratives which are then used to attract, retain, and inspire recruits.³⁰ The goal is to influence political dialogue at the international, regional, and local levels through the use of violence and propaganda. Though almost all major religions have extremist elements, it is the growth of Muslim extremism that will have the greatest impact on the security



environment over the next several decades. There are numerous reasons for this, which include demographic trends; the global, yet personal and comprehensive nature of Islam; and ongoing and potential conflicts in predominately Muslim-populated areas of the world.³¹

Most modern religious extremism, at least with the three major monotheistic religions, began to develop approximately a century ago and parallels the rise of secular democracy and the expansion of scientific thought in the West.³² Though drawing on history, it was not until the 20th century that influential writings that now form the basis of extremist narratives became popularized, particularly with regard to those employed by Muslim extremists.³³ Although grievances such as poverty and inequality are a component of typical extremist narratives, the central pillar is a rejection of modernity because of a perceived absence of God and religion in modern society.³⁴ Context-specific grievances are used in a supporting manner by the overarching narratives, but they have more salience at regional and local levels when employed by specific groups and individuals to justify their actions.

The narratives employed by violent extremists normally clash with traditional, moderate streams of thought within religions. In some cases, particularly within Islam, this clash is partly responsible for creating and exacerbating a bifurcated system of orthodox or fundamentalist thought and moderate thinking that is compatible and comfortable existing within modernity.³⁵ Unfortunately, the violent and often spectacular nature of extremist violence garners much more attention than the critiques of such actions by moderate voices. This obscures the limited acceptance of such actions within a community of believers while creating perceptions of credibility and legitimacy that may not be accurate.

The global spread of extremist Islamist ideology has occurred because it resonates with a small minority of often middle-class, educated, young Muslims who are globally aware, technically savvy, and frequently members of diasporas living in Western secular democratic countries. Indeed, the major centres of extremist thought are often located in developed and relatively wealthy countries. It is not those in poverty-stricken, underdeveloped regions that represent the major threat; rather, it is those upper- and middle-class people who are relatively well-off, exist within Western society, and possess the knowledge and fiscal resources to create and disseminate propaganda supporting overarching narratives; they generate funds to support extremist activities globally, help in the conception and execution of operations, and are able to leverage international networks to achieve their goals. Combined with other trends and threats, including ungoverned spaces in failed and fragile states that provide enabling sites and ready recruits, extremist religious ideologies pose a

serious, persistent and, in many ways, unmanageable threat to Western interests. The narratives of religious extremism pose a major threat because they have enabled followers to strike within Western states while sustaining regional conflicts in the developing world through the supply of human and fiscal resources.³⁶

DEDUCTION 8

RELIGIOUS EXTREMISM WILL CONTINUE TO BE MOTIVATED BY NARRATIVES FOUNDED ON DISAGREEMENT WITH SECULAR, PLURALISTIC SOCIAL AND GOVERNANCE MODELS. THE SIMPLICITY OF THESE NARRATIVES WILL CONTINUE TO ATTRACT FOLLOWERS ACROSS THE GLOBE, THREATENING CANADA AND ITS INTERESTS AT HOME AND ABROAD.

Demographics

Youth Bulges

Population growth patterns in the developing and developed worlds are following two very different trends. The demographic profiles of developing countries are characterized by large youth bulges (the population between the ages of 12 and 24) which accounts for over 50% of the population. The ten states with the largest youth bulges are located in sub-Saharan Africa; the next five states with significant youth bulges are found in the Middle East. Once this youth bulge begins to reproduce, the birthrate in these countries will most likely increase. It is projected that by 2050 populations on the Arabian Peninsula and in Iraq and the Palestinian Territory will more than double in size. Egypt's population is expected to reach 120 million. Iran and Turkey are projected to have populations of approximately 100 million each. While the elderly populations in these countries are expected to increase, they will remain a small percentage of the overall population. By 2050, the population of people 60 or older in Saudi Arabia is expected to grow to 18%, whereas the UN projects that the same group in Europe will account for 33% of the total population.³⁷

The large youth cohorts in these developing, and often unstable, regions is placing heavy social and infrastructure demands on governments that lack the capacity to give their people proper education, social services, housing, and employment opportunities. When people are unable to attend high school or university, find gainful employment on graduation, or afford housing or marriage, they understandably become dissatisfied. While young people have a tendency to protest vocally and feel an attraction to radical political expressions of discontent, unemployed university



graduates have the education to lodge articulate grievances against their governments. Impoverished youth without hope of economic improvement or social legitimacy provide a ready pool of recruits for suicide operations or terrorist organizations. Even when these over-represented young people are given employment in a state's legitimate military, large standing armies may cause regional instability by making neighbouring countries nervous from the military threat they pose, whether imagined or explicit.³⁸ Studies have shown that countries with youth bulges are three times more likely to experience civil wars, coup d'états or armed insurrections.³⁹

DEDUCTION 9

YOUTH BULGES AND HIGH UNEMPLOYMENT WILL CONTINUE TO CHARACTERIZE THE DEMOGRAPHIC PROFILE OF THE DEVELOPING WORLD AND WILL ACT AS A ROOT CAUSE OF REGIONAL AND INTERNATIONAL INSTABILITY.

Aging Populations

The developed world, on the other hand, has been posting much lower birthrates than the developing world. Consequently, population growth has been fuelled solely through migration, and the demographic profile is that of an aging labour force. The UN projects that the population aged 60 and over in the world's developed regions will increase from 245 million in 2005 to 406 million in 2050, and that the population under age 60 will decline from 971 million in 2005 to 839 million by 2050.⁴⁰ Canada is representative of a phenomenon that is taking place in the US, the UK, and Japan, to name just a few countries. Based on the 2006 census for Canada, it is forecast that by the year 2016 the number of Canadians over the age of 65 will exceed those under the age of 15. That means that DND/CF will be recruiting from a dwindling skilled labour pool that will be targeted with equal tenacity by other employment sectors. The next obvious pool of recruits is Generation Y – the children of baby-boomers; these potential recruits, however, have extremely non-traditional attitudes toward work ethics, hierarchical institutions, and career loyalties.⁴¹

Immigration is rapidly changing the face of Canada. Having surpassed a population of 32.5 million people (2006), Canada is expected to reach approximately 39 million by 2030. Much of the skilled labour required today in Canada is being supplied through immigration. Statistics Canada predicts that by 2011 virtually all labour force growth will result from the contributions of immigrants, many of whom currently belong to under-represented groups. Statistics Canada estimates that by

2017, one out of every five people in Canada will belong to a visible minority and that more than half of the visible minority population in Canada will be from either Chinese or South Asian groups.⁴²

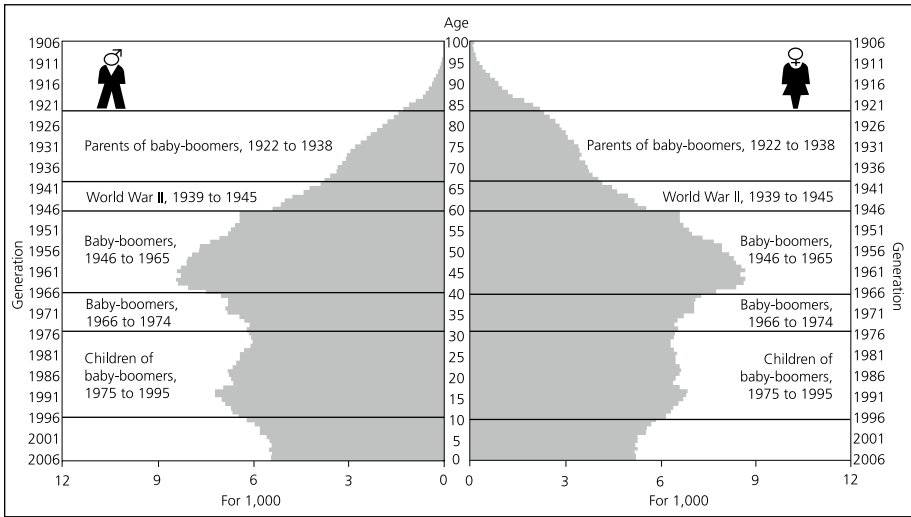


FIGURE 3: CANADA'S DEMOGRAPHIC DISTRIBUTION IN 2006. Source: Statistics Canada

The labour force in coming years will most certainly include a significant number of older Canadians who are not yet willing to retire. While some skills lend themselves to replacement by new labour force entrants, this is not the case for increasingly valuable non-technical skills that are usually garnered through experience, including management, communication, and teaming skills. Consequently, this older labour force, with proper development training and upgrading, will in coming years represent an excellent source of skills for organizations that are having difficulty attracting and retaining youth; this approach is not sustainable over the longer term, however, and as we approach the twenty-year horizon it will become increasingly difficult to use this remedy.

The fact that more people will be retiring from the workforce than entering it will have profound ramifications for government spending. Not only will there be a labour shortage, but there will also be a smaller tax base at the same time as higher public pension payments and increased health care costs: along with a projected \$20 billion loss in tax revenue, Canada will be dealing with a \$12 billion increase in pension payments and a \$38 billion increase in health care spending. Of concern to the CF is the fact that this predicted shift in government spending will be concurrent with the provisions in the CF's capital program for the acquisition of its next major combat capability replacements.

**DEDUCTION 10**

AGING WESTERN POPULATIONS WILL BE CHALLENGED TO FIND RECRUITS TO SUSTAIN DEFENCE AND ARMED FORCE STRUCTURES AS COMPETITION FOR LABOUR WILL OCCUR WORLDWIDE IN THE PRIVATE, PUBLIC, AND DEFENCE SECTORS, ESPECIALLY IN CANADA.

Conclusion and Implications for DND/CF

Globalization, despite the wealth of opportunity it affords, also poses many challenges and intensifies social and economic trends that are potential causes of instability. Economic disparity, demographic profiles, migration, urbanization, disease, poverty, and extremism – all can have destabilizing effects; and globalization means that these effects will be felt around the world. Migration, diasporas and urbanization in the developing world are of concern because instability and conflicts not only attract global attention, they will also likely require international intervention at some point. Urbanization without proper health and sanitary infrastructures will further the spread of infectious diseases, and mass transit – of both goods and people – will facilitate the spread of potential pandemics. Conflict, unrest stemming from unemployment, and economic downturns in certain regions will now be felt all over the world owing to the increasing interconnectedness of nations.

Because of this aging population, the CF must seek innovative solutions to recruiting and retention in order to sustain its force structure. The CF will be competing with the private sector and other government departments, as well as other countries, to attract recruits from a dwindling labour pool. Consequently, the CF will have to devise recruitment and retention strategies to reach men and women from every ethnic group in Canadian society, people who are not only interested in serving Canada in uniform but are also willing to accept the ethos of the profession of arms.⁴³ Operational tempo, quality of life and complications stemming from multiple citizenships are some of the issues that will have to be addressed if the CF is to attract and retain personnel. Human Resources (Civilian) will need to expand its capacity in order to accommodate more civilians on international operations, which will become the norm. This will mean a forward-looking review of legislation, policies, and compensation.

More agile approaches to recruiting may have to be pursued in order to compensate for the declining numbers of Canadians available for traditional military service. In future, human resources will likely need to take a more holistic approach to the

Whole Defence Team, a approach where both military and civilian personnel (public servants, contractors, and student apprenticeships) are used as efficiently as possible to ensure that there are sufficient numbers of uniformed personnel trained and available for contingencies at any time. This would involve revisiting existing force structures and removing the barriers to a plethora of human resource solutions/concepts, implementing a Whole of Defence Team approach and a Multi-Tiered CF that transcends Regular/Reserve designations so as to capture more people according to their capabilities, skill sets and availability. Other avenues worth exploring when it comes to finding this required talent could include international exchange programs, education incentives and investments in cross-functional programs and/or MOUs with other government departments and the private sector to outsource work to organizations already in possession of the people and capabilities.

Globalization is empowering non-state and multinational actors, thus challenging Canada and its allies to find a means of dealing with both legitimate non-state partners and legitimate and illegitimate non-state adversaries. Migration and urbanization are increasing the incidence of conflict in the world. The CF must ensure that it has a developed capacity to conduct operations in urban and littoral environments. Although each driver on its own is unlikely to spark a crisis or conflict, the convergence of negative trends in economics, demographics, or social well-being can be expected to create and/or exacerbate pre-existing tensions and threaten a fragile peace. Humanitarian missions to address social crises will be probable, as well as stabilization and/or reconstruction missions should social unrest get out of hand and turn into internal or inter-regional conflict.

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ENVIRONMENTAL AND RESOURCE TRENDS

Introduction

The consequences of climate change will continue to be felt around the world for decades to come, even after nations begin to successfully and significantly reduce greenhouse gases and other emissions detrimental to the environment. Although some nations may experience positive changes as a result of climate change and global warming, other areas of the world will see even greater stress on their resources. As climate change negatively impacts the developing world – regions already suffering from economic hardship and social stress – pre-existing tensions and instabilities will be even further intensified.

The competition for resources such as water and food is unlikely to result in state-on-state conflict, although internal or inter-regional disputes will possibly erupt among people trying to secure these resources for their survival. The quest for energy, metal, and mineral resources will certainly interest states that want the wealth and prestige that comes from controlling such supplies, as well as states searching to fulfill their markets' demands. Although the majority of states will satisfy their resource needs through diplomacy and trade agreements, the possibility of aggressive and irrational

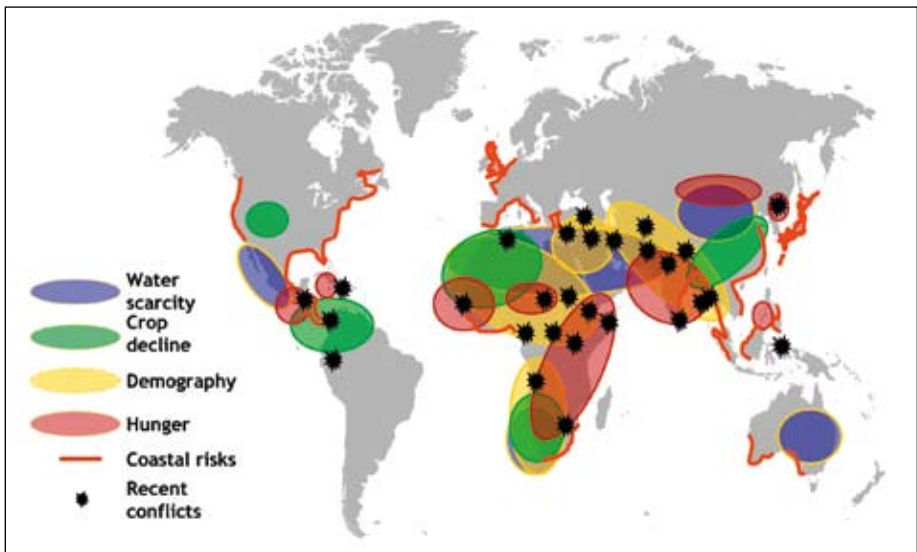


FIGURE 4: CONVERGENCE OF DESTABILIZATION TRENDS.

SOURCE: *Realising Britain's Potential: Future Strategic Challenges for Britain*, p. 34.

responses in the pursuit of self-interest cannot be dismissed. Humanitarian missions will probably be mounted in cases where large populations lack basic needs to the point of disaster, and stabilization/reconstruction missions could possibly be staged if civil unrest and instability deepen to the point of conflict among already distressed peoples.

Climate Change

Climate change is linked both to natural factors and to human activity resulting from economic and demographic growth. The carbon dioxide already present in the atmosphere is projected to raise the average global temperature by 0.5°C over the next few decades.¹ Regardless of whether the international community achieves consensus and successfully acts to aggressively lower greenhouse gas emissions, climate change is expected to exacerbate the many conditions that cause destabilization and will be felt well beyond 2030. Global climate change poses its own unique geo-strategic risks and opportunities and has significant implications for defence and international security.

In a scenario where the impacts of climate change are not addressed, climate change will have severe consequences, including melting polar ice, rising sea levels, desertification and a decline in crop yields in some regions (particularly Africa), habitat shifts, species extinction, and the increasing spread of tropical diseases into temperate zones. Rising sea levels and melting glaciers are expected to increase the possibility of land loss and, owing to saline incursions and contamination, reduce access to fresh water resources, which will in turn affect agricultural productivity. More frequent and more severe extreme weather events and related natural disasters, including storms, flooding, heat waves and coastal erosion, will be aggravated by climate change. Changing weather patterns, including altered precipitation patterns and unpredictable growing seasons, will likely disrupt global agriculture and diminish food security, particularly in regions already struggling with food shortages.

Climate change is expected to bring severe flooding to low-lying countries – whose land is barely above sea level – as extreme weather intensifies seasonal rains, tropical cyclones, and storm surges. The result will be mass migration as people flee their homes. While climate change is predicted to bring increased rainfall to already wet regions, it will simultaneously make arid regions even drier. Food productivity in Africa will probably drop significantly as the loss of arable land to desertification will result in a 50% decline in crop yields. The Himalayan glaciers will probably disappear by 2035, which will mean the loss of a major water supply for 750 million people



in the Himalaya-Hindi-Kush region and in China. Some regions, however, including Canada, may experience higher temperatures and longer growing seasons, which may could boost agricultural production and allow for the cultivation of new and potentially more profitable crops and tree species that yield economic benefits. Certain regions (notably Europe) could possibly experience cooling.²

Environmental stress and water/food shortages caused primarily by natural cycles will increase economic disruption and trigger humanitarian crises between now and 2030.³ The resulting pressures occasioned by migration and the refugee flows of displaced populations have the potential to generate increased ethnic, religious or territorial tensions, instability, and perhaps state collapse. These effects will be more pronounced in coastal regions (where 75% of the world's population resides), particularly among populations, sectors and communities that are already economically or ecologically sensitive to climate variability. Although nations with robust economies and well-developed infrastructure will be better positioned to adapt and mitigate the impacts of climate change, such states could possibly find themselves called on more frequently to provide stabilization forces, international development assistance, disaster relief and/or aid to address natural or humanitarian crises resulting from ecological devastation. These nations could possibly be besieged with floods of environmental refugees seeking new resources and a more stable environment.

DEDUCTION 11

CLIMATE CHANGE WILL RESULT IN INCREASINGLY VIOLENT WEATHER PATTERNS, DROUGHT AND NATURAL DISASTERS THAT WILL CALL FOR MILITARY SUPPORT TO ASSIST VICTIMS AROUND THE WORLD, RANGING FROM HUMANITARIAN RELIEF TO FULL SCALE STABILITY OPERATIONS.

Impact on the Arctic

The continued melting of polar ice is leading to increased human activity and easier access to the planet's poles, which will result in an increased search and rescue demand. Canada's north is expected to be affected by a warmer climate, increased competition for decreasing global resources, and advanced exploitation technologies. The increasing navigability of these northern waters also heightens the potential for illegal trafficking of goods and people in the Arctic. Although opportunities for economic growth exist, there are security challenges presented by the increased transit of air, surface, and sub-surface vessels, notably with respect to surveillance and monitoring, border control, law enforcement, search and rescue, and disaster

response. This traffic also poses serious environmental, safety and security threats to the Arctic Archipelago, one of the most fragile ecosystems on the planet. As the scope of global climate change becomes more widespread, the CF will need to consider the effectiveness of military systems, capabilities and platforms associated with operating in extreme environmental conditions. Canada will have to maintain its vigilance in protecting the peoples, resources, and ecosystems of its northern territories.

DEDUCTION 12

AS THE IMPACT OF GLOBAL CLIMATE CHANGE BECOMES MORE WIDESPREAD, THE CF WILL NEED TO CONSIDER THE EFFECTIVENESS OF MILITARY SYSTEMS, CAPABILITIES, AND PLATFORMS ASSOCIATED WITH OPERATING IN EXTREME ENVIRONMENTAL CONDITIONS. INCREASED ACCESS TO THE ARCTIC, BROUGHT ABOUT BY CLIMATE CHANGE, WILL HAVE SOVEREIGNTY, SECURITY, AND ENVIRONMENTAL IMPLICATIONS FOR CANADA THAT WILL RESULT IN INCREASED CF ENGAGEMENT IN THE ARCTIC REGION.

Impact of UNCLOS

Under the United Nations Convention on the Law of the Sea (UNCLOS), coastal states with a continental shelf that extends beyond their 200 nautical mile Exclusive Economic Zone (EEZ) have ten years from their ratification of the Convention to submit a scientific claim regarding the outer limits of their continental shelf to the Commission for the Limits of the Continental Shelf. Under UNCLOS, coastal states have sovereign rights to explore and exploit the resources in their continental shelves beyond the EEZ. Acceptance of a submission by the Commission would establish the full extent of the area over which a state may exercise these sovereign rights. A number of countries, including Russia, Denmark, and Canada, are expected to make their submissions to the Commission in the next few years. While the US has yet to ratify UNCLOS, it has already begun scientific work to determine the outer limits of its continental shelf in anticipation of ratification. Canada, which must make its submission by 2013, estimates that its continental shelf beyond 200 nautical miles in the Atlantic and Arctic Oceans covers approximately 2.0 million square kilometres (twice the size of Ontario), roughly half of which is in the Arctic.⁴ There is a possibility that some states' claims regarding the outer limits of their continental shelves will overlap, prompting some analysts to suggest that competing claims could lead to an escalation of conflict in the Arctic. It is expected, however, that any overlapping claims will be resolved as boundary disputes commonly are, through discussions, negotiations, and/or arbitration.⁵



Another potential area of concern is the increasing accessibility of the Northwest Passage to maritime traffic. The melting of the Arctic ice cap could make the Northwest Passage a feasible international shipping route by approximately 2050, significantly shortening the distances between certain destinations in North America, Eastern Asia and the western Mediterranean. While the less hazardous Northern Sea and Transpolar routes will likely attract the majority of international shipping, the Northwest Passage is expected to be increasingly used for shipping to and from destinations in the Canadian Arctic. The prospect of a reliably accessible Northwest Passage may bring to the forefront the debate over whether the Passage constitutes Canadian internal waters or an international strait.⁶

DEDUCTION 13

WORLDWIDE HARVESTING AND EXPLOITATION OF THE OCEAN'S RESOURCES WILL NOT ONLY CONTINUE IN THE FUTURE BUT WILL ALSO INTENSIFY TO THE POINT WHERE ACCESS, STEWARDSHIP, AND OWNERSHIP MAY BE POSSIBLE SOURCES OF CONFRONTATION. THERE WILL BE GREATER DEMAND FOR THE MARITIME SURVEILLANCE CAPABILITIES OF THE CF AND FOR STANDING PATROLS OF MARINE SPACE UNDER CANADIAN JURISDICTION.

Sources of Competition

Water and Food Shortages

Current water scarcity will only intensify as climate change exacerbates the dryness of already arid regions. Although there is no expectation of state-on-state conflict,⁷ humanitarian crises will probably ensue as large masses of population not only suffer from a lack of water (and a lack of food that needs water for production), but also begin migrating in search of relief, heightening tension or destroying the delicate balance that exists in neighbouring regions. The areas most likely to experience water scarcity are found in North Africa, the Middle East, Central Asia, and China. Attempts to force water-sharing agreements or to reroute waterways to satisfy national self-interest are possible.⁸

Desertification: "The degradation of land in arid, semi-arid, and dry sub-humid areas. It is caused primarily by human activities and climatic variations. Desertification does not refer to the expansion of existing deserts."

Source: UN Food and Agriculture Organization.

States that share common supplies of fresh water will be more prone to rising tension over water quality.⁹ Downstream riparian nations that have set stringent water quality standards are impacted by the practices of upstream nations and, in

some cases, will be forced to process water that does not meet those standards. While disputes between friendly states will continue to be dealt with through legal processes, states with neutral or negative relations may be tempted to take direct action against populations and or industries that pollute or abuse water supplies. For Canada, concerns over water will include the protection of its own resources and the stabilization of regions where tensions over water threaten to lead to conflict.

Closely linked to water shortages are food shortages resulting from soil degradation, desertification, or droughts. The diversion of land to the production of bio-fuels (such as corn-based ethanol) will also contribute to world food shortages as the amount of land available for growing food is further reduced. As food becomes more scarce and in greater demand, food prices will soar. Not only will there be insufficient food for the world's population (to feed nine billion people by 2050, global agriculture will have to double), but millions more will face poverty and starvation because they cannot afford what food is available. The angry riots and protests that erupted in Egypt, Cameroon, Ivory Coast, Mauritania, Ethiopia, Madagascar, the Philippines, and Indonesia in spring 2008 offer a foretaste of the destabilizing effects of resource scarcity and the pending humanitarian crises that will require intervention to prevent further escalation of instabilities.¹⁰

DEDUCTION 14

SUFFICIENT POTABLE WATER AND FOOD – BASIC LIFE REQUIREMENTS – WILL REMAIN INACCESSIBLE TO MILLIONS OF PEOPLE, PARTICULARLY IN THE DEVELOPING WORLD. DEVELOPED NATIONS WILL PROBABLY BE CALLED UPON TO PROVIDE HUMANITARIAN, STABILIZATION, AND/OR RECONSTRUCTION ASSISTANCE.

Energy Stocks

Based on current trends, energy consumption by 2030 will have increased by approximately 50%.¹¹ Oil has been fundamental to the development and sustainment of modern economies. With increased competition by states for oil and other energy sources, the gap between supply and demand will continue to grow. This will increase the strategic value of oil and may render consuming economies more beholden to energy producing nations. This, in turn, will probably contribute to significant increases in energy prices and potentially result in an economic slowdown.¹² New oil deposits have recently either been discovered or have finally become economically viable to develop. These include off-shore deposits in Venezuela, deep water deposits off Brazil, Arctic oil, and the Canadian tar sands development. Nevertheless, many experts believe that peak oil has been reached



and that few new reservoirs remain to be found. There is also a worldwide shortage of refining capacity. Consequently, the world will face oil shortages and disruptions, rising prices, and increased competition. The effects of these events will be felt in developed and developing nations alike.¹³ As supplies become increasingly scarce, and in the absence of viable alternatives, the potential for oil-related conflict will probably continue to increase.

In working to secure access to declining oil supplies, nations will seek out supply from multiple sources and perhaps through bilateral agreements, thereby avoiding the vulnerability that comes with single source dependency. A number of nations may find themselves entering into arrangements with nations in unstable regions and perhaps with governments of questionable legitimacy. This may lead to unforeseen tensions. In the pursuit of access to oil, nations with more developed economies will enjoy an advantage over less developed nations, a setting that may lead to conflict. To help offset shortages and the resulting effects, research and development investments will be directed to new sources of energy, including coal derivatives, hydrogen fuel cells, bio-ethanol, and nuclear fusion.¹⁴

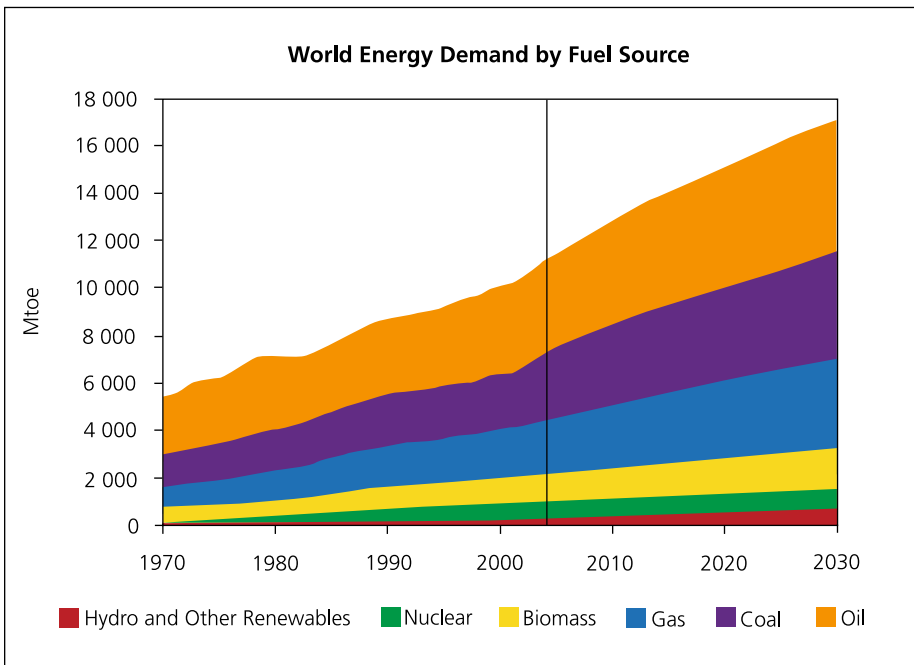


FIGURE 5: WORLD ENERGY DEMAND BY FUEL SOURCE.

Source: World Energy Outlook 2006.¹⁵

Nations that possess nuclear reactors are able to reduce their dependence on oil-producing countries. At the present time, there are about 435 nuclear reactors in thirty countries, and the number of reactors is increasing. In the near term, it is projected that an additional twenty nations, ranging from highly developed to still developing countries, are likely to acquire some form of nuclear power generation capability.¹⁶ An additional consequence of the proliferation of nuclear reactors in areas of global instability is the possibility that neighbouring states will be inclined to take preventive military action against their rivals. The possibility of a neighbour possessing nuclear technology may be sufficient to heighten tension in the region. While the wider use of nuclear power may ease pressure on energy stocks, increasing security concerns will need to be addressed through the creation of new – and the improvement of existing – international control mechanisms to ensure that nuclear technology is used for peaceful means only.

DEDUCTION 15

CONCERNS OVER RISING PRICES FOR, AND ACCESS TO, OIL WILL PROBABLY BE ADDRESSED THROUGH DIPLOMATIC MEANS, BUT TENSIONS AND – EVEN CONFLICT – COULD POSSIBLY ARISE BETWEEN STATES THAT ARE PURSUING CONTROL OVER DWINDLING SUPPLIES. AS DEMAND FOR OIL BEGINS TO OUTSTRIP SUPPLY, VIABLE ENERGY ALTERNATIVES WILL HAVE TO BE FOUND TO RUN ECONOMIES AND MILITARIES.

Minerals and Metals

Since both developing and mature economies will rely increasingly on nuclear power to meet national energy requirements, the subsequent increased demand for uranium will drive prices up. Nevertheless, the perceived negative environmental and political impact of additional uranium exploration may limit the capacity of supply to meet demand, acting as a cost driver and a source of tension. For Canada, opposition from environmentalists and potential eco-terrorists who are determined to prevent increased uranium exploitation will be a source of tension that may also develop into a threat to security. Canada, with 30% of global uranium production, is the world's top producer, followed by Australia with 20% and Kazakhstan with 10%.¹⁷ These three nations account for 50% of the world's recoverable sources of uranium.¹⁸ At the present time, the three leading global uranium consumers – the United States, France and Japan – account for almost 60% of global demand. Although there will be only a moderate increase in the number of nuclear reactors by 2020, a further increase can be expected by 2030 that will increase our reliance on nuclear power as an energy source.¹⁹



Tungsten is considered a strategic resource because it is used in the manufacturing of high speed steel for cutting, stamping and casting tools and dies; alloy steel armour for military applications; armour piercing ammunition; high temperature coating materials used in jet engines; and high-temperature materials used in the construction of nuclear weapons. Tungsten was once mined in the United States; however, environmental concerns and cheaper imports led to a cessation of its extraction there.²⁰ In 2006, China produced 80% of the global tungsten supply.²¹ With the current market cornered, China has the ability to control the price of tungsten and deny access to the mineral. As a consequence, it is possible that the United States will resume tungsten mining and seek other suppliers. Other strategic metals include coltan and cassiterite. The extraction of both of these metals has been credited with economically sustaining warring factions in African civil wars. Coltan and cassiterite, used to produce tantalum and tin respectively, are increasingly in demand because of advances in communication and information technology – tin in the pursuit of miniaturization and tantalum for its ability to hold high voltages at elevated temperatures. Increased competition and heightened tension would probably result from denied access to these metals.

DEDUCTION 16

COMPETITION FOR STRATEGIC MINERALS AND METALS WILL SLOWLY INCREASE AS TECHNOLOGICAL DEVELOPMENTS RESULT IN INCREASED DEMAND FOR THEM. DOLLAR DIPLOMACY AND DIPLOMATIC PRESSURE COULD POSSIBLY SUCCEED IN SECURING ADEQUATE SUPPLY AND ACCESS FOR THE MOST POWERFUL STATES.

Conclusion and Implications for DND/CF

Climate change will exacerbate existing water and food shortages, thus increasing the likelihood of regional instability, and ensuing humanitarian, stabilization, and/or reconstruction crises. Although climate change will not necessarily have a negative impact on Canada – warmer temperatures and longer growing seasons will be welcome in many circles – Canada must be prepared for the changes that climate change will bring to the Arctic. As the polar ice melts, there will be an increase in northern security challenges. As the Northwest Passage is open for longer periods of time, there will be an increase in international traffic through waterways considered to be Canadian. The Canadian government will likely call upon CF assets to help with sovereignty patrols, search and rescue operations, resource protection, and the monitoring of international military activities.

The anticipated decline in fossil fuel resources and the simultaneous rise in oil prices will oblige the DND/CF to find alternative power sources for its platforms. As fuel prices rise, the cost of training – let alone the cost of undertaking domestic or expeditionary operations – will become prohibitive and consume an already stretched budget. Research and development into alternative fuels need to become a priority. The development of viable alternatives to fossil fuels will have revolutionary effects and will ease tension as fewer nations compete for dwindling oil supplies. Nevertheless, the reduction of oil dependence will not be without negative consequences. Supplier nations, once wealthy from oil exports, will eventually plummet into economic depression and social instability if oil supplies become irrelevant.

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GEOPOLITICAL TRENDS

Introduction

At first glance, it would appear that asymmetric warfare has become the dominant mode of belligerency. The growing interdependence of global finance and trade networks has deterred interstate conflict in order to avoid disrupting trade routes or the flow of capital. Owing to globalization and the reduced occurrence of war amongst nation states, confrontation with non-state actors has been the prevalent form of conflict and will continue to be so for the foreseeable future. Nevertheless, the possibility of state-on-state conflict will never be totally eliminated. As long as there are states, there will be the triggers for state conflict: economic competition, nationalism and national pride, raw emotions, marginalization, and irrational decisions by fallible human leaders. As tensions increase, so too will the possibility of inter-state conflict.¹

Multilateral organizations have been a major element in international relations since the Second World War, and they have become a growing phenomenon as nations from diverse regions develop new agreements and initiatives that bring them together as partners. The existing hegemonic superpower – the United States – will continue to dominate. Nevertheless, there are emerging powers whose economic growth and military expansion could challenge the United States' position, especially in Asia and Africa. The inter-state relationships in the regions surrounding these larger powers need to be given consideration, seeing as many of these areas are somewhat unstable and might attract the attention of existing and emerging hegemonic powers. Failed and fragile states are cause for concern because these regions of instability are a potential source of humanitarian and stabilization crisis, not to mention potential safe havens for terrorists interested in developing, organizing, and preparing for asymmetric attacks.

Multilateral Organizations

Multilateral cooperation is, and will continue to be, the foundation of a stable and peaceful international system. The nature and complexity of today's threats, ranging from failed states to terrorism, require a coordinated approach and an investment in resources that could never be achieved by governments acting on their own. Consequently, Canada will have to maintain its contributions to international bodies, particularly the UN and NATO, since membership in these institutions continues to serve Canadian interests.

Canada might also consider contributing to other organizations (perhaps in the Asia-Pacific region) and possibly participating in less formal coalitions of like-minded states – the approach used in the international campaign against terrorism. Because international and regional institutions have experienced organizational inertia or the lack of consensus because of size, some states (e.g. the United States) have come to depend increasingly upon multilateralism in the form of coalitions of the willing.

DEDUCTION 17

MULTILATERAL COOPERATION WILL REMAIN ESSENTIAL, ALTHOUGH COALITIONS OF THE WILLING WILL ARISE TO CHALLENGE THE PERCEIVED INERTIA OF TRADITIONAL ORGANIZATIONS.

United Nations

During the Cold War, the UN saw success in reaching peace settlements, developing treaties and international norms and leading humanitarian missions; it was less effective, however, in responding to major or complex crises unless supported by at least one superpower. Although it has adapted to the changed security environment by developing such concepts as election observations, inspections, and international tribunals, the six-decades-old rules that govern the structure and activities of the UN are not well-suited to dealing with the current, much less the future, security environment. The UN itself recognizes its limitations and the need for modernization.²

The UN report, *Strengthening the United Nations: Agenda for Further Change* articulates the UN Secretary General's vision for an altered organization. A stronger General Assembly, an enhanced Economic and Social Council and changes to the Security Council will, if pushed through, put the UN in a stronger position.³ Despite these issues, the UN remains an important organization.

The UN, through its Agencies, such as the World Food Program (WFP) and the World Health Organization (WHO), has reduced humanitarian suffering through relief interventions and has improved the standard of living through development programs. As long as nations continue to contribute to the UN's resources, the relief and development work undertaken by UN Agencies will continue to be of primary importance in the future security environment as its application to crisis situations will be instrumental in helping mitigate and contain humanitarian emergencies.

**DEDUCTION 18**

THE EFFECTIVENESS OF THE UN IN DEALING WITH VIOLENT CRISES WILL CONTINUE TO BE LIMITED, BUT THE ORGANIZATION WILL CONTINUE TO PLAY AN IMPORTANT RELEVANT ROLE IN HUMANITARIAN CRISES.

North Atlantic Treaty Organization

Since its foundation, the North Atlantic Treaty Organization (NATO) has continuously adapted to a changing security environment.⁴ While its principal role will remain collective defence, NATO will continue to broaden its ambitions relative to non-traditional operations such as stabilization and counter-insurgency missions in order to remain relevant in the absence of a direct conventional threat to continental Europe. NATO will also continue expanding its membership and remain open to new European members, although most European countries already belong to the alliance, which likely heralds an eventual end to expansion.⁵ However, it is probable that the organization will become more politically focused, with operations conducted on a case-by-case basis by limited NATO-member coalitions that possess niche capabilities because of differential political risk-aversion considerations. Unsuccessful applicants to NATO may be induced to make other security arrangements. One result of expansion may be a decrease in NATO's consensus-based decision-making capacity and the consequent undermining of its operational effectiveness. Thus, while the addition of new members to the alliance theoretically enhances NATO's capability to conduct military operations (through increases in deployable troops and equipment), the increasing asymmetry of its membership on every level of military capability might actually diminish its ability to respond effectively to crises by complicating bureaucratic and administrative processes.

DEDUCTION 19

NATO WILL CONTINUE TO PLAY AN IMPORTANT ROLE IN WESTERN SECURITY AFFAIRS IN THE FORESEEABLE FUTURE. HOWEVER, IT IS PROBABLE THAT COALITIONS OF THE WILLING WILL DISPLACE THE ALLIANCE ON MANY MISSIONS CONSIDERED POLITICALLY SENSITIVE OR URGENT.

European Union

The European Union (EU), which currently consists of twenty-seven member states, despite the recent failure of its proposed constitution, has seen its external influence

increase over the last two decades. The EU's model of economic integration has been largely successful and has served as a model to other integration projects around the globe. The bulk of the EU flourishing has come from what it has been able to achieve within the confines of its borders. Responsibility for all legislation that pertains to the issues of the Common Market has passed from the hands of individual states to EU institutions, as labour and goods move across Europe unfettered by borders.⁶ Labour standards as well as environmental standards have also risen across Europe as a consequence of integration. In sharp contrast to the clear internal successes of the European project, the EU's track record as an international actor is mixed at best.

The emergence of the EU Common Foreign and Security Policy (CFSP) led to the adoption of the European Security and Defence Policy (ESDP). In December 2003, the European Security Strategy (ESS) affirmed EU support for a multilateral international order with the UN playing a central leadership role. The intent of the ESS is to support the attainment of UN objectives. The ESS also articulated the key threats to European security, including international terrorism, WMD proliferation, regional conflicts, fragile and failed states, and trans-national organized crime. The ESS, in line with the 1992 Petersberg Tasks,⁷ envisions EU military missions that span the spectrum of conflict, from humanitarian, peacekeeping and peace support operations, to combat missions in support of crisis management.

Despite the progress the EU has made, it will not displace NATO as the primary instrument of collective defence in Europe. Although the EU seeks the capacity to conduct independent crisis management, the ESDP was not formed as a collective defence instrument.⁸ In some ways, this may lead to distinct missions for the EU and NATO; the EU taking on European-region missions short of combat, and NATO taking on more robust out-of-area missions. Moreover, the pool of military resources made available by its members corresponds almost exactly to those offered to NATO, meaning that European military capacity is not enhanced to any significant degree. Finally, there is little real interest in actually marginalizing NATO because to do so would also cause US disengagement in European security matters.

The EU's role as an international actor may be further limited by the realities of its common market and its population dynamics. A declining birth rate coupled to a significant cohort of citizens approaching retirement will have a large impact on Europe's political and economic future. Low birth rates in the majority of European countries will cause continued reliance on migration to sustain the workforce population. This fact means that migration will remain a contentious issue in many European countries, potentially stoking extreme right-wing political parties as well



as social unrest in migrant communities unable or unwilling to socially or culturally assimilate or make significant economic gains. The dual challenge of declining birth rates and migration of people from economically depressed areas of Eastern Europe will continue to adversely affect their countries of origin. Specifically, it will cause similar workforce, economic, and social problems to those creating the demand for immigration in Western Europe.

Apart from the social stresses of immigration and migration, the economic impacts of the “greying” of Europe will have far-reaching consequences. The pensioner/worker ratio, expected to double in most European countries by 2050, will stress a shrinking tax base, as fewer workers support more pensioners.⁹ The likely outcome of this will be large discretionary budget cuts in areas such as defence, in order to ensure that European states can maintain expected levels of social welfare and the growing needs of an aging population.¹⁰

The failure of the EU to conclude a Europe-wide constitution will limit development and implementation of the ESDP the policy will continue to be hampered by an ad hoc decision-making process. It also demonstrates that many Europeans still hold reservations regarding deeper political integration. Despite this, the main strengths of the EU, economic union and more harmonized social and environmental policies, will continue to make the EU a useful and powerful organization. However, complete integration will likely require the passage of multiple generations to truly temper nationalism to the point where deeper political union and a European constitution are possible.

DEDUCTION 20

THE EU WILL PLAY A GROWING ROLE IN EUROPEAN SECURITY AFFAIRS BUT, BARRING THE EMERGENCE OF A DIRECT AND CLEAR THREAT TO EUROPEAN SECURITY, WILL PROBABLY CONTINUE TO FOCUS MORE ON ISSUES OF INTERNAL GOVERNANCE THAN ON INTERNATIONAL SECURITY.

Organization of American States

The Organization of American States (OAS) is of interest to Canada as it is the Western Hemisphere’s principal multilateral forum for addressing democratic values, defending common interests, and implementing cooperative strategies against poverty, terrorism, narcotics, and corruption. It has an active roster of thirty-four member states, including Canada and the United States; Cuba has been suspended from participation since 1962. The OAS works to establish political stability among

Central and South American states by promoting democratic values and good governance. It has done so by sending special missions to support democratic processes, by observing elections, by establishing independent courts, and by helping to resolve bilateral disputes. The OAS also offers training opportunities for young political leaders and the region's citizens who wish to embrace a greater appreciation for the elements of democracy promoted by free and fair elections, respect for human rights, the rule of law, pluralistic systems of political parties, independence of government branches, transparency, responsible administration, freedom of expression, and citizen participation.

In addition to promoting sustainable social and economic development, OAS nations also work together to address the security challenges posed by international terrorism, drug trafficking, money laundering, illegal weapons dealing, human trafficking, institutional corruption, organized crime, natural disasters, poverty, disease, and environmental degradation. The Inter-American Convention Against Terrorism, concluded in 2003, focuses on preventing terrorist financing, strengthening border controls and increasing law enforcement cooperation. The Inter-American Committee on Terrorism facilitates training for port, airport, customs, and border security; information exchanges; the strengthening of cyber security; and the upgrading of identification and travel documents.¹¹

The lack of policy consensus amongst a large group of nations and the persistence of some authoritarian dictatorships may hamper the OAS's ability to expand and extend its influence region-wide. Nonetheless, these initiatives are vital in improving social conditions, maintaining regional stability and continuing to eliminate potential sources of disenchantment and disenfranchisement.

DEDUCTION 21

CANADA WILL CONTINUE TO BE INTERESTED IN, AND SUPPORTIVE OF, THE INITIATIVES OF THE ORGANIZATION OF AMERICAN STATES SINCE IT WILL ENSURE GREATER POLITICAL AND SOCIAL STABILITY IN THE REGION AND WILL CONTINUE TO BE A MECHANISM FOR ASSISTING IN THE PREVENTION OF TERRORIST ATTACKS IN THE WESTERN HEMISPHERE.

Association of South-East Asian Nations

Established in 1967, the Association of South-East Asian Nations (ASEAN) encompasses a region with a population of 500 million and a total trade volume worth \$850 billion USD. The Association has two aims: "to accelerate economic



growth, social progress, and cultural development in the region and to promote regional peace and stability through abiding respect for justice and the rule of law in the relationship among countries in the region and adherence to the principles of the United Nations Charter.” Since 2003, the ASEAN community has consisted of three pillars: the ASEAN Security Community, ASEAN Economic Community, and the ASEAN Socio-Cultural Community.¹²

The ASEAN Community could serve as a strategic partner for Canada and its allies in preventing the spread of conflict throughout the developing world. The activities and initiatives of the ASEAN community are aimed at maintaining peace and promoting democracy in the region. The Association is in agreement with Canada and its allies concerning the importance of bettering the day-to-day lives of the people living in the region and the need to head off conflicts stemming from discontent and disenchantment.

DEDUCTION 22

THE ASSOCIATION OF SOUTH-EAST ASIAN NATIONS WILL CONTINUE TO PLAY A REGIONAL SECURITY ROLE BY PROVIDING A FORUM FOR DIALOGUE AND COOPERATION; THIS WILL PROBABLY INDIRECTLY ENHANCE THE SECURITY OF THE MEMBER COUNTRIES BY BUILDING ECONOMIC AND CULTURAL RELATIONSHIPS.

Asia-Pacific Economic Cooperation

The Asia-Pacific Economic Cooperation (APEC) forum was established in 1989 to enhance economic growth and strengthen the Asia-Pacific community. APEC has twenty-one members who account for 41% of the world’s population, 56% of global GDP, and 49% of world trade. One of APEC’s goals is to eliminate trade barriers and reduce tariffs in the Asia-Pacific region both to increase exports and to improve the economies of its members. This organization has also worked to address issues such as health, security, energy, and agriculture in an effort to improve the living standards of its members. Canada’s membership in APEC allows for bilateral and multilateral engagement in one of the globe’s largest economic zones.¹³

DEDUCTION 23

THE ASIA-PACIFIC ECONOMIC COOPERATION WILL CONTINUE TO PLAY A VALUABLE ROLE IN FOSTERING AND MAINTAINING NON-SECURITY RELATED RELATIONSHIPS, BUT ITS EFFECTS ON THE SECURITY ENVIRONMENT WILL BE OF SECOND ORDER, RATHER THAN DIRECT.

African Union

The African Union (AU) was established in 1999 with a view to improving the continent's ability to participate in the global economy and to address social, economic, and political problems exacerbated by globalization. The hope is that member states, by adopting joint positions on issues of common concern to the entire continent, will strengthen unity, sovereignty, solidarity, and development. The AU's long term goals of addressing the undermining of democratically elected governments, ensuring the recognition of the freedom of the press and the rights of opposition parties, restoring regional stability and state law to create an environment for investment, and preserving human lives are key to ensuring that fragile and failed states do not become centres of humanitarian crisis and havens for terrorists.¹⁴ The mandate of the AU is more robust than that of its predecessor, the Organization of African Unity (OAU), in that the body has the authority to intervene when requested to do so by a member state or to intervene pursuant to a vote in the assembly in the case of war crimes, genocide and crimes against humanity. Given this mandate in conjunction with the formation of the Peace and Security Council, the regional body has the structural prerogative to move beyond mechanisms of mediation and political pressure. In fact, recently the AU has intervened in Burundi, Darfur, Côte d'Ivoire and the Democratic Republic of the Congo; however, these initiatives have generated mixed results indicating that a sound interventionist body is not yet a reality.¹⁵ A large membership is important as it speaks to the engagement of the whole continent; nevertheless, it is extremely difficult to achieve consensus on concrete policies amongst fifty-three nations of diverse ethnicity, religion, geography, history, economic well-being, and political stability.

DEDUCTION 24

THE AFRICAN UNION IS A POTENTIAL ENTITY FOR CONTRIBUTING TO PEACE, PROSPERITY, AND STABILITY ON THE AFRICAN CONTINENT. INCREASING AU CAPABILITIES COULD POSSIBLY REDUCE DEMAND FOR MILITARY ENGAGEMENT IN AFRICA, AS UNREST AND INSTABILITY COULD POSSIBLY BE ADDRESSED THROUGH THE AU AND THROUGH DIPLOMATIC AND DEVELOPMENT AID.

Shanghai Cooperation Organization

The Shanghai Cooperation Organization (SCO) is a permanent international organization that was formed in Shanghai on 15 June 2001 by six countries – China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan, with Mongolia having observer status. In 2006, India, Pakistan, and Iran were also granted observer status.



Although the primary aims of the SCO are to strengthen mutual trust and good-neighbourly relations among member states and promote their effective cooperation in political affairs, economy and trade, it is also highly probable that the overall strategic aim of the alliance, particularly for Beijing and Moscow, is to curb American influence in Central Asia. For Beijing, in particular, a key goal is to ensure access to the considerable energy resources of the region, and to seek markets for its goods, outlets for investment, cooperation against Islamist terrorist movements, and the suppression of nationalistic independence movements that pose a threat to China's sovereignty and integrity.

While China opposes Iran's membership (for fear that the SCO could no longer be a vehicle for combating Islamic extremism) and the idea of the organization becoming a military alliance, Russia seeks both these objectives. Russia also foresees full membership for India, Pakistan, Mongolia, Turkmenistan, Afghanistan, and Iran. In Russia's estimation, the SCO's multilateral model will more effectively combat terrorism than what it perceives as the UN's approach of unilateralism and ad hoc coalitions. From the perspective of Russia's leadership, the organization also serves as a check on China's intentions and influences in the Central Asian region.

The continued expansion of SCO membership may eventually create a sizeable block of states that are opposed to the West, NATO, and the US and its allies. This would be particularly troubling if the organization eventually becomes a military alliance, as Russia seems to favour. One clearly foreseeable result is another East vs. West cold war. The anti-Western agenda of the SCO would preclude either the EU or the US having friendly relations with the organization, and the economic and geographical influence of China and Russia would prevent any expansion of NATO membership into Central Asia region. On the other hand, the long-term existence of the SCO is not guaranteed, since China and Russia's ambitions in Central Asia (gradual encroachment, ethnic emigration, procurement of raw material by China vs. pipeline development and domestic intervention by Russia) are mutually incompatible.¹⁶

DEDUCTION 25

THE CONTINUED EXISTENCE AND EXPANSION OF THE SHANGHAI COOPERATION ORGANIZATION (SCO) WILL HAVE TO BE MONITORED CLOSELY AS THE SCO COULD POSSIBLY INCREASE TENSIONS BETWEEN EASTERN AND WESTERN POWERS.

Existing and Emerging Hegemonic Powers

United States

No other country currently possesses the power (diplomatic, social, economic, and military), the range of capabilities, and the global reach currently wielded by the United States. It is the world's only superpower with the ability to promote its interests in every corner of the globe, and this situation will almost certainly remain unchanged through the period to 2030. However, it is expected that due in part to a sense of dissatisfaction with American hegemony, other nations will rise as challengers, making gains relative to the US as their economies and militaries grow. Consequently, we can reasonably expect to see the rise of a multi-polar balance of power as regional challengers to US power erode the ability of the US to operate at will. The rise of other powers will demand greater international cooperation and negotiation amongst the world's major states, but this will also raise the prospect of large-scale war between states, as states rarely cede power to other states willingly or without challenge.

Peer Competitor to the United States:

"A state or collection of challengers with the power and motivation to confront the United States on a global scale in a sustained way."

Source: Thomas Szayna, *The Emergence of Peer Competitors*, pp. 7-8.

Long-term strategic planners in the United States are primarily concerned with the possible emergence of a new peer competitor – i.e. a state or coalition of states possessing both the capacity and the desire to challenge American military dominance, as the USSR and the Eastern Bloc did during the Cold War. There are several states (or quasi-states, in the case of the European Union) whose economic and military potential make them plausible counterweights to American power. It is likely that some of these will achieve a level of power sufficient to challenge the United States within a specific region, though most will certainly choose not to do so.

As such countries grow more powerful, they will become more assertive; consequently, it will be more challenging to maintain the peace between them. Although it is probable, therefore, that Western militaries will still see most of their action against non-state actors in 2030, there may be a trend by that time back towards traditional state-on-state conflicts. Indeed, by 2030, the greatest risk to international stability may be American leadership fatigue, and, for domestic reasons, the United States may decide to reduce its international commitments. Such



a decision would likely increase tension in parts of the world where the US currently serves as the guarantor of stability.

There is a high probability that the United States will seek to maintain its dominant position. To that end, it will continue to invest in economic and military growth and leverage strategic alliances. Its current plans for military investment far outweigh those of any other nation, and its military transformation program is designed to guarantee continued military superiority over any potential security challenge. Nevertheless, the United States will continue to look for support from its allies, particularly given the growth of new regional threats. It is ironic, therefore, that US investment in advanced technologies and the continuous evolution of its military doctrine will challenge its allies' attempts to keep pace.¹⁷ As the technology gap widens between the American military and its primary allies, their ability to cooperate will diminish.

DEDUCTION 26

THE UNITED STATES WILL RETAIN CONVENTIONAL MILITARY SUPREMACY, BUT INCREASING ECONOMIC CHALLENGES MAY ERODE ITS DOMINANT POSITION. BECAUSE OF ITS UNMATCHED MILITARY CAPABILITIES, ADVERSARIES WILL FOCUS ON ASYMMETRIC WAYS AND MEANS OF UNDERMINING THE SUPERPOWER STATUS OF THE UNITED STATES.

China

China's massive economic power has brought it to the verge of surpassing Japan as the world's second largest economy, which will likely occur around 2015.¹⁸ The developed world's dependence on Chinese products and the massive Chinese investment in US debt securities (second only to Japan) has assured China's pivotal position in the global economy. A major economic downturn in either China or the US would have massive repercussions for the other side owing to the interdependence of their markets.¹⁹ China's economic growth, however, has not been without problems, most of them on the domestic front. Unchecked inflation or a severe economic setback combined with simmering domestic discontent with governance and wealth distribution, coupled to the effects of serious environmental degradation, would pose a serious threat to the stability of mainland Asia and the global economy.

As a case in point, China's population trends paired with inadequate governance figure prominently as potential sources of instability. In the coming decades, the country's postwar baby boom generation will reach elderhood, altering the

demographic make-up in both rural and urban areas. The first generation to be born under China's one-child policy will reach middle age in this time, amplifying the effect of population aging. In a society largely dependent on informal, family-based care structures and absent vast improvements in pension and health care programs, this trend threatens to overburden a shrinking labour pool, exacerbate social tension, and erode government legitimacy.²⁰ Trends of environmental degradation present still more challenges to governance. Urban areas are faced with such problems as poor air quality and over-production of industrial waste while rural areas are faced with soil erosion and shortages of clean water. As a result, the government will continue to be confronted with the social and political consequences of pursuing policies supportive of economic growth that compromise the integrity of the environment and thus the quality of living of its citizens.²¹

China's massive economic growth has enabled the expansion and modernization of its military. China's military has typically possessed quantitative, rather than qualitative advantages over potential adversaries'. However, recent modernization plans and activities will produce domestically designed and manufactured next-generation platforms that, while likely continuing to lag behind next-generation Western platforms, will close a significant portion of the qualitative gap that currently exists.²² China is striving to develop comprehensive national power based on modern, professional forces, doctrine, and an indigenous military industrial capacity. This drive befits a nation desirous of becoming both a regional and global powerhouse.

China's military power is tempered by a lack of strong military or diplomatic alliances. In the past, China has pursued a program of muted diplomacy, preferring in most cases to assert its political strength on regional issues such as North Korea's nuclear program, Taiwanese and Tibetan independence, and relations with Japan. China's diplomacy has instead focused on offering aid, development and investment funding in exchange for diplomatic loyalty, generally at the expense of either, or both, Taiwan and the US. Chinese efforts to secure natural resources are also a major goal of these diplomatic efforts. The normal pattern of diplomacy, which will likely continue in coming years, involves China offering states aid and development funding, expertise to build (but not necessarily operate or maintain) infrastructure, and some access to domestic Chinese markets, in exchange for diplomatic allegiance, access to aid recipient country natural resources, and access to recipient markets for Chinese investment. This "dollar diplomacy" does not conform to Western (OECD) aid standards, and lacks any incentive or requirement to introduce positive political changes aimed at improving governance in the recipient state, which for some states can be appealing. China has repeated this pattern in Africa, Latin America,



the Caribbean, and throughout the Pacific, where the destabilizing effects are particularly noted. The pattern of Chinese dollar diplomacy creates real problems in recipient states, since this flood of Chinese funding often upsets fragile economic and political balances in developing regions. This has been particularly true in the South Pacific.

DEDUCTION 27

THE ECONOMIC, MILITARY, AND DIPLOMATIC RISE OF CHINA WILL ALTER THE GLOBAL BALANCE OF POWER IN THE COMING DECADES. CHINA WILL BE A REGIONAL, AND POSSIBLY GLOBAL, CHALLENGER TO THE ECONOMIC POWER OF THE UNITED STATES AND, AT THE VERY LEAST, A REGIONAL CHALLENGER TO US MILITARY POWER IN THE ASIA-PACIFIC REGION. IT IS UNLIKELY THAT THE US WILL QUIETLY ACCEPT THE EROSION OF ITS INFLUENCE, WHICH COULD POSSIBLY LEAD TO INCREASED TENSIONS.

India

India is poised to become a major economic power, driven in large part by its vast population that, by 2050, is expected to exceed that of China;²³ however, this will be constrained, at least in the short term, by low resource availability, by an educational system that may not be capable of training a sufficient number of skilled workers and by its efforts to industrialize. Security challenges include ongoing tensions with Pakistan over Kashmir, an unresolved Indo-Tibetan border dispute with China, and Islamic fundamentalist terrorism.

India's military has benefited from the acquisition of sophisticated US military technology. India has sought to strengthen its ties to the US through such initiatives as participation in the Quadrilateral Initiative, a subsequent naval exercise and civil nuclear cooperation. It has also made overt efforts to improve defence, economic, and security ties with neighbouring countries. These moves are of major concern to Beijing, despite China's increasingly confident and outward-looking foreign policy in the region and further afield. As part of their desire for a multi-polar international system, both New Delhi and Beijing are striving to develop comprehensive national power for the purpose of becoming a recognized regional power.

In the half-century following Indian independence, Sino-Indian relations have often been difficult; over the past two decades, however, there has been a thaw between them, although some tensions persist. Consequently, while India's defence policy has always been shaped by its rivalry with Pakistan, New Delhi sees China as India's greatest long-term potential threat. Some of India's missiles have a much

greater range than is needed to attack Pakistan, which would allow them to hit much of China. Nonetheless, India's arsenal of nuclear warheads is much smaller than that of China. The 2004 "Indian Maritime Doctrine", further suggests that a truly independent foreign policy requires credible strategic capabilities in the form of a submarine-based nuclear deterrent.²⁴ Although years away from maturity, as is India's goal of a blue-water navy based on three aircraft carriers, India's limited ability to project power is growing.

DEDUCTION 28

INDIA'S PLANS FOR MILITARY MODERNIZATION ARE AMBITIOUS BUT WILL TAKE MANY YEARS TO COME TO FRUITION.

Russia

Since 1999, Russia has been experiencing an economic revival largely based on its oil and natural gas exports. Over that same period, Moscow has been working successfully to reclaim a dominant political and security role in its immediate neighbourhood. However, Russia's ability to project military power, save through strategic nuclear strikes, has diminished to encompass only its immediate neighbourhood. Unlike the USSR, modern Russia is not challenging the world order, only the current power distribution.

Russia has shown concern about its marginalization in a world where the United States is the sole superpower. To this end, Russia has shown an interest in seeing the EU develop its military capability, thereby decreasing its reliance on NATO. Over the last decade, NATO/Russia relations have, save a few glaring exceptions, generally been more positive, as NATO continues to transform from its traditional focus.²⁵ Russia is aware of the challenge of the superpower status of the United States and consequently has aimed to use cooperation with the United States as a means to furthering its own ends. Since 2001, emerging global security concerns have given the two states a basis for cooperation. Russian leadership believes greater cooperation with NATO and the EU could logically lead to a role for Russia in the management of European security, particularly in the "near abroad".²⁶

Russia's renewed ability to play a role external to its borders can be attributed to its economic re-emergence. The Russian economy, spurred on by its energy sector, has experienced annual GDP growth exceeding 7% over the last several years, as the price of oil and gas has risen.²⁷ The pace of Russian economic growth has not been without domestic ramifications, as high inflation as well as unequal income



distribution continues to plague the Russian economy.²⁸ The decision of the Russian government to maintain artificially low domestic oil and gas prices could have serious political consequences in the future as Russian citizens strain to cope with higher energy prices and continued inflation.

Another potential source of stress on the Russian economy centres on the sustainability of its energy market. While current projections hold that Russia will become the world's largest natural gas exporter by 2020²⁹, its oil and gas sector faces significant challenges. Even as greater state control over the energy sector has generated higher revenues through taxes, these same taxes have also resulted in less revenue being reinvested by energy producers into infrastructure. Investment in oil infrastructure has also been hampered by the strict regulations that the Russian government has placed on foreign investment. With some scholars claiming that the current supply of Russian oil exports is nearly exhausted, oil and gas supplies may become more difficult to obtain without significant investment in technology and infrastructure.³⁰ Limits on Russian energy production would be problematic for the global economy as Europe is projected to rely on Russia for upwards of 40% of their energy supply by 2015.³¹ To mitigate this possibility, the Russian government will have to enact policies geared towards encouraging energy companies to invest heavily in technology.

Social and political trends in Russia have been decidedly less encouraging than economic trends. Environmental degradation remains a concern as a lack of legislative environmental standards paired with little government enforcement has led to conditions that pose risk to human life and natural ecosystems. A lower birth rate paired with the lack of formal migration policy has left Russia unable to sustain the workforce population. The government has attempted to rectify the gaps in immigration policy but so far has met with little success. As Russia struggles to promote continued economic growth, domestic stability, and security both within its borders and the near abroad, it will likely maintain the current course of cooperating with the west. This continuation of policy does not emerge from any pro-western bent; rather, it is the result of a pragmatic recognition that consolidating leadership in the Russian political arena requires both domestic support and internal credibility. This approach may be manifested in continued and even increasing cooperation between Russia and the West, at least in the short term.³² However, as Russia continues to regain its economic vigour and political influence, its needs may change. The pragmatic direction of its policy may no longer coincide with the interests of the west, leading to policy divergence.

DEDUCTION 29

WANTING TO BE A PLAYER ON THE WORLD STAGE AGAIN, RUSSIA WILL PURSUE CONTINUED RELATIONS WITH EUROPE, NATO, AND THE UNITED STATES IN ORDER TO PREVENT MARGINALIZATION AND HELP RECREATE RUSSIA AS AT LEAST A REGIONAL POWER. FOR THE FORESEEABLE FUTURE, RUSSIA WILL NOT AGGRESSIVELY CHALLENGE THE UNITED STATES OR ITS ALLIES.

Regional Instabilities and Relationships

Central and South America and the Caribbean Basin

Central America, South America, and the Caribbean Basin have become increasingly stable over the past number of years as a trend of democratization and reform has taken hold. However, there are a number of major variables that could result in political instability or localized violence that could destabilize the region. One such variable involves territorial disputes, both within and across state borders. Within numerous Latin American countries, the focus on land claims has risen in tandem with the positive trend of democratization, and the continued process of settling these claims will remain a key component of fostering stability in the region. Relations between states remain fairly good; nevertheless, despite some latent border disputes³³ and tensions between Venezuela and Columbia and Brazil, relations between certain states are sufficiently strained to partially drive military modernization and capability acquisition, particularly in South America. Issues of sovereignty underpin regional politics and are continuing to inform current decisions regarding defence planning and procurement. However, the production and trade of narcotics by trans-national criminal cartels and gangs remains the biggest threat to stability in the region, with repercussions to the security of North America. The mainly positive trends in this region mean that the tenuous stability in Haiti represents more of a worst-case scenario rather than an example of a trend, but is a useful picture of what could potentially result if the stability of the region would probably look like should destabilizing factors not be dealt with effectively.

Throughout the region, particularly in South America, militaries are being modernized both through the purchase of new platforms and professionalization through the adoption or creation of doctrine and improved training and education. Particularly with Venezuela, Brazil, and Chile, this modernization involves the purchase of first-class aviation and naval platforms. Military modernization is not a negative trend, as professionalized militaries are less likely to become involved in political matters,



although Venezuela's military remains directly controlled and responsive to the country's leader.

The presence of drugs, gangs, and transnational criminal organizations is a major negative trend in the region. Revolving around the growth, processing, and shipment of drugs, powerful networks of gangs and trans-national criminal organizations have been able to take control of poorly or ungoverned spaces in Latin America, despite massive US and various host nation efforts.³⁴ Although these criminal organizations have in the past, and may possibly again in the future, couch themselves in revolutionary language, they represent a form of criminal insurgency whose goals are centred on group survival and gaining wealth rather than seizing governance of territory. However, the control of territory is key for such groups to operate successfully. Major problem areas currently include several urban centres in Brazil and rural areas spread throughout Mexico, the Central American Isthmus, Columbia, Jamaica, and Haiti.³⁵

The implication for security in the Americas is great. Drug flows from Latin America are directed to the North American market, but consumption has also risen in Latin America itself. Recent saturation of the North American drug market has caused certain locales in Argentina to become processing centres and trans-shipment points for Europe. Closely linked to the drug trade is trafficking in arms, munitions, and humans, the latter often forced into prostitution. There are strong business and even familial ties that bind gangs from across Latin America and the Caribbean to gangs throughout the major urban centres of Canada and the United States. Furthermore, the violence that accompanies the activities of these groups has spread to urban centres in North America, particularly the Southern US.³⁶

The criminal groups that control the drug trade have a direct interest in undermining governance through intimidation, bribery, violence, and any other means available so as to establish the physical and psychological space required to operate. This represents a direct challenge to even the largest, seemingly most stable states in the region because of criminals' ability to undermine the capability of governments to govern and provide the essential services that are the exclusive purview of most governments.³⁷

The consequences of the gang and drug problem are severe and systemic. At a macro level, there is the potential to push weak states into failed or failing status. At a lower level, there is the potential to exacerbate existing unlawful migratory and refugee flows,³⁸ which in turn could undermine the ability of a destination state to

govern territory. A potential threat is the exploitation of these flows by extremist terrorist groups as an access point to the US and Canada.³⁹ Another consequence is the potential of the actions of these non-state actors to, as a second or third order effect, spark state-on-state conflict.⁴⁰

The potential for conventional conflict in the future must be considered somewhat increased given the limits of traditional sovereignty, the trans-national nature of criminal organizations in the region, disagreements in policy, and the necessity to pursue trans-national adversaries across artificial geographic boundaries. This is where the improved military capabilities and criminal organizations intersect: as the events on the Columbian-Ecuadorian border of late February 2008 demonstrate, there is the potential for the actions of non-state actors to spark conflict between states. The consequences of a regional conventional conflict could be enormous and include disrupted trade through the Panama Canal and massive refugee flows into neighbouring states, not to mention increased opportunities by gangs and trans-national organizations to spread chaos and work with impunity.

DEDUCTION 30

THE EXISTING SECURITY ENVIRONMENT IN LATIN AMERICA APPEARS BENIGN AT FIRST GLANCE, BUT THE ACTIVITIES OF VIOLENT NON-STATE ACTORS WILL INCREASE, POSSIBLY CAUSING, AS A SECOND- OR THIRD-ORDER EFFECT, LIMITED STATE-ON-STATE CONFLICT.

Maritime Southeast Asia and Oceania

Maritime Southeast Asia encompasses Indonesia, Brunei, and the Philippine archipelago.⁴¹ Oceania, or the South Pacific, includes Papua New Guinea, the Solomon Islands, Micronesia, and Melanesia, Polynesia, Australia, and New Zealand. Weak states plagued by poor governance, challenging economic conditions, and social discord, populate much of the region. In recent years, there has been a growth in localized violence, political upheaval, and criminal activity in places such as the Solomon Islands, Fiji, Bougainville, Papua New Guinea, East Timor, and Vanuatu. Common factors in many of these cases include weak economic growth, problematic relationships between state and society, inability of governments to deliver essential services, fragile institutions, and corruption.⁴²

Exacerbating these significant developmental problems is a latent Islamist terrorist threat in Indonesia, the Philippines, and the Malayan peninsula. A major factor in state-to-state relations is the “dollar diplomacy” competition between China and



Taiwan. Australia and New Zealand have struggled to reconcile traditional defence requirements, geopolitical balancing, fiscal, demographic and other constraints on capacity with the imperative to help maintain stability in the region. Australia, as the strongest military and diplomatic power in the region, will continue to find its national capacity to deal with the major issues in the region challenged by the sheer enormity of geography, socio-cultural and ethnic variance in the root causes of the problems, significant international commitments, and a general lack of US attention specifically in the South Pacific.⁴³

Maritime Southeast Asia and the island states of the South Pacific have been characterized as internally divided and weakly governed, among the most impoverished and least developed countries in the world, and therefore heavily dependent on foreign aid.⁴⁴ The social, political, economic, and other root causes of the problems plaguing each individual state are as diverse as the geography that separates the often-tiny polities.⁴⁵ For example, Indonesia is struggling with Muslim extremism, specifically with Jemaah Islamiyah (JI) and affiliated groups, separatists in Aceh and Papua, and socio-economic problems.⁴⁶ The government of the Solomon Islands is teetering on the brink of collapse owing to a number of problems, including ethnic disputes, corruption, crime, and environmental and economic issues. In Fiji, a military coup overthrew the government in December 2006, ostensibly to enable it to deal more effectively with corruption, racism, and other governance issues. In the Philippines, economics, land distribution, and Muslim extremism are major issues, particularly in the Southern regions of the country where some groups have cooperated with the Indonesia-based JI.⁴⁷ Despite their seeming similarities, each of the problems faced by these countries has a different ethno-social background. Notwithstanding the geographic isolation of many of the states in the region, a latent threat stemming from their fragility exists nonetheless. Trans-national terrorism and trans-national organized crime, the latter using human and drug trafficking and financial and passport scams as revenue generators, have followed in the footsteps of Chinese business investment in places such as Fiji and Papua New Guinea.⁴⁸ This is a trend witnessed in many developing regions of the world that lack strong and effective governance. Finally, the repercussions of the “dollar diplomacy” competition between China and Taiwan have exacerbated ethnic tensions in some areas, notably, the Solomon Islands and Fiji, as Chinese business interests have upset local market balances. Worse, Taiwan has openly tried to influence the outcome of local elections in the Solomon Islands, and Taiwanese money has been linked to both the 2003 instability that led to the multinational Regional Assistance Mission Solomon Islands (RAMSI) and the 2006 violence that wracked the capital of Honiara.⁴⁹

Maritime Southeast Asia and the South Pacific are viewed as a vital strategic bulwark for Australia and New Zealand.⁵⁰ In Australia, the region stretching from the Malayan peninsula to the Fijian Islands has been described as an “arc of instability.”⁵¹ New Zealand has not employed such rhetoric, although it shares many of the concerns of its larger, more powerful, neighbour.⁵² The major concern for Australia is that diplomatic influence in the South Pacific today could lead to Chinese satellite military bases in the future. Such a situation would threaten or breach this strategic bulwark and is a major future military concern for a primary allies in the region. Geography still matters, and Chinese forces stationed that close to the Australian continent would constitute a direct military threat unknown since 1942.⁵³ Such a situation is not beyond the realm of possibility given declining US presence in the South Pacific, and competition for renewable and non-renewable resources between most major countries in the region.⁵⁴

DEDUCTION 31

MARITIME SOUTHEAST ASIA AND THE SOUTH PACIFIC WILL CONTINUE TO FACE MASSIVE DEVELOPMENTAL CHALLENGES OVER THE COMING DECADES, WITH A NUMBER OF KEY AREAS THREATENED BY MUSLIM EXTREMISM. AUSTRALIA AND NEW ZEALAND WILL CONTINUE TO BE CHALLENGED BY THE NEED TO BALANCE GREAT AND REGIONAL POWER RELATIONSHIPS, INSTABILITY WITHIN WHAT THEY CONSIDER THEIR INNER STRATEGIC ARC, AND THE ENORMITY OF THE GEOGRAPHIC REALITY OF THE REGION, AND THE VARIANCE IN SOCIO-CULTURAL AND ETHNIC CONTEXT OF STATE FRAGILITY THAT DOES NOT ALLOW FOR BLANKET REGIONAL STABILITY AND DEVELOPMENT STRATEGIES.

Middle East

The Middle East will remain volatile for the foreseeable future. Iraq will continue to be a fragmented society with a government that is struggling to achieve legitimacy and self-sufficiency. Instability in Iraq and the likely continuation of the confrontation between Iran and the US will require Washington to prolong its military presence, albeit in reduced numbers, and maintain a high level of financial support for its allies in the region. Further Turkish incursions into Iraqi Kurdistan have the potential to escalate conflict throughout the northern tier. Given the slim likelihood that the Annapolis Peace Initiative will produce tangible results, both Israel and Palestine will continue their struggle to find a satisfactory solution. The political crisis in Lebanon will most likely result in either a compromise president or an ongoing political deadlock, thus benefiting Syria and Hezbollah. The southern tier will continue to experience strong economic growth, but it is unlikely that this will offset the



demographic growth it is experiencing. Unemployment, particularly among young people, will remain high, with the expected result being greater social instability and radicalization in the Middle East. Iran, the world's fourth largest oil exporter, continues to be a cause for concern among the Western powers as it pursues and expands its uranium enrichment projects despite the sanctions imposed by the UN Security Council.⁵⁵

Stability in the Middle East is also heavily impacted by environmental and population trends. Twelve of the world's fifteen water-scarce countries are located in the Middle East and North Africa (MENA) region, making it the most water-scarce region in the world.⁵⁶ On its own, water scarcity is not a sufficient driver for inter-state conflict. In fact, much progress has been made in generating cooperative strategies for managing demand. However, when combined with other factors such as population growth, the resulting strain on water sources heightens domestic and regional tensions.⁵⁷ The current youth bulge and the associated future population growth in MENA suggests that the region will see further challenges to the tenuous mechanisms for cooperation.

DEDUCTION 32

THE MIDDLE EAST WILL REMAIN VOLATILE FOR THE FORESEEABLE FUTURE, AND CURRENT CONFLICTS SHOW LITTLE PROMISE OF QUICK RESOLUTION. WESTERN NATIONS WILL PROBABLY OPT FOR DIPLOMATIC ASSISTANCE RATHER THAN ENGAGEMENT IN PROLONGED REGIONAL AND INTERNAL DISPUTES. NONETHELESS, AN EXPANSION OF AMERICAN INVOLVEMENT IN MIDDLE EASTERN CONFLICTS CANNOT BE RULED OUT IF THIS IS DEEMED TO BE IN THE INTERESTS OF THE UNITED STATES.

Central and South Asia

Central and South Asia is a region in flux, with an insurgency in Afghanistan and ungoverned spaces in Pakistan's Federally Administered Tribal Areas (FATA) and North West Frontier Province (NWFP) standing in stark contrast to the steady rise of India's global influence (FSE page 63). Trans-national crime, especially narcotics trafficking, is a leading regional concern.⁵⁸ Demographically, a "youth bulge" and widespread poverty are endemic to the region and major causes of social and political tension. There continues to be a growing regional trend towards radicalized Islam, as disaffected Muslim populations turn to more extreme measures to effect political change. These socio-political trends, coupled with the lack of economic opportunity, have helped to sustain a rise in anti-government forces including a resurgent Taliban; foreign fighters adhering to a global jihadist ideology; drug traffickers and other

criminal elements; and the continuing influence of provincial or local warlords. In addition to domestic challenges, the region faces increasing interventionism by China, India, Russia, and Iran as they seek to secure access to strategic resources and counter each other's regional influences.⁵⁹

In many respects, Afghanistan has enjoyed a period of success in terms of development since the ouster of the Taliban regime in 2002. The international community has been instrumental in sponsoring the redevelopment of major infrastructure, such as ring roads, electrical grids, schools, and medical facilities. These efforts have spurred significant direct foreign investment in the country, mainly in the extractive industry sector, although there has been some investment in construction, agriculture, transportation, power generation, and telecommunications. The sum of these undertakings has brought double-digit economic growth since 2002, and this is expected to continue in the near- to mid-term, so long as there is no uncontrollable deterioration in the security situation.⁶⁰ While the country has seen significant success in the past six years in terms of economic development, sustained commitment on the part of the international community and continued growth in governance capacity are essential if this progress is to be maintained. Crucially, the stability (or lack thereof) of its neighbour, Pakistan, plays a major role in future Afghan security and development.⁶¹

Pakistan remains a linchpin for regional stability in South Asia, but there are two major factors influencing Pakistan's future stability: relations with India and the radicalization of domestic politics. While the immediate potential for conflict between Pakistan and India appears to be waning, the Pakistani use of militants as a tool of foreign policy in both Afghanistan and Kashmir will continue to be a potential cause for confrontation as the two nations jockey for position in the region. Moreover, while contemporary Indo-Pakistani relations have begun to warm, domestic trends within Pakistan may reverse those gains. In 2007, the World Bank ranked Pakistan in the lowest tenth percentile for political stability, and the country ranked ninth in the 2008 Failed States Index.⁶² Among the major sources of danger are an increasing population, decreasing economic productivity and a degrading of effective governance. By 2050, it is estimated that Pakistan's population will have grown by 147 million people, while economic growth will likely continue to stagnate.⁶³ A growing population, coupled with increasing economic crisis, has limited the ability for central governance structures, especially social institutions such as schools, to be maintained outside of core areas and increased social pressures in poor or remote areas of Pakistan. Increasingly, tribal areas in Pakistan are falling under the de facto political control of extremists. The erosion of central authority in Pakistan will have



serious ramifications for regional, and global, security as the government struggles to retain control of outlying provinces – and its nuclear stockpiles – in the face of trends towards instability.

The Central Asian states of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan have entered a period of relative economic growth, benefiting from being a strategic resource transit link within the region, as well as possessing large deposits of natural resources in their own right. However, while economic opportunity exists, environmental degradation from the Soviet era and a lack of infrastructure remain obstacles for long-term economic development. This is particularly the case in the Caspian Sea region where desertification and pollution have degraded once vibrant fish stocks and severely impacted local industry.

DEDUCTION 33

A GROWING TREND TOWARDS RADICALIZED ISLAM AND INCREASINGLY WEAK GOVERNANCE STRUCTURES WILL CONTINUE TO THREATEN THE STABILITY OF THE CENTRAL AND SOUTH ASIAN REGION, PROLONGING THE NEED FOR AN INTERNATIONAL PRESENCE IN AFGHANISTAN AND FURTHER ERODING CENTRAL AUTHORITY IN PAKISTAN.

Failed and Fragile States

Governments in failed and fragile states lack the capacity and/or the inclination to perform the basic functions of defending sovereignty, ensuring national security, and providing for a fair judicial system, a physical infrastructure, national services and economic management.⁶⁴ Once a government fails to provide its citizens' basic infrastructure, education, and medical needs, the population ceases to have any reason to remain loyal to those in power. With the absence of effective institutions, the lack of rule of law, and the corruption of leaders, the government loses legitimacy in the eyes of its people. Loyalty is easily transferred to tribes, warlords, mercenaries, paramilitary groups, guerrillas, foreign militaries and any other groups that offer to provide security and meet other basic needs. Extreme poverty and armed clashes often spark refugee crises and population shifts as people move in a bid to escape injustice, starvation, and conflict. Domestic instability can spill over borders and destabilize neighbouring countries. Humanitarian crises are not unexpected in cases where refugee flows, civilian casualties, and civil wars make international intervention necessary. Organized crime and terrorist networks benefit from these chaotic situations because they are able to operate and recruit with

impunity: desperate individuals welcome any source of income and represent a pool of ready recruits; and because national institutions are too weak to drive out illicit organizations, such states are ideal safe havens for training and operations.⁶⁵

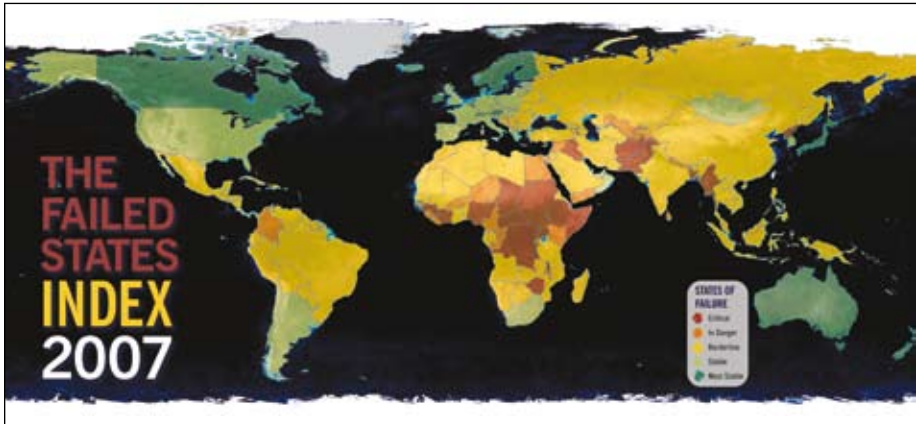


FIGURE 6: THE FAILED STATES INDEX.

Source: Foreign Policy.com July/August 2007.

In an effort to identify likely areas of instability, various organizations have compiled and analyzed lists of indicators that suggest whether or not a state is in danger of failing.⁶⁶ Such indicators can be grouped into three broad categories: social/demographic, economic/environmental, and political/military. The top indicators for nations deemed at risk of failing completely include uneven economic development, mounting demographic pressures, de-legitimization of the state, and deterioration of public services. Also high on this list are human rights violations, the presence of refugees and displaced persons, and human flight.⁶⁷

DEDUCTION 34

BASED ON INDICATORS OF INSTABILITY, SUB-SAHARAN AFRICA WILL PROBABLY SEE A SIGNIFICANT NUMBER OF STATES FAIL. THE REQUESTS FOR DEVELOPED NATIONS – INCLUDING CANADA – TO INTERVENE WITH HUMANITARIAN, STABILIZATION, AND/OR RECONSTRUCTION MISSIONS WILL PROBABLY INCREASE.

Conclusion and Implications for DND/CF

The theme of cooperation and conflict underlies the key geopolitical trends identified in this chapter. Cooperation will occur within the various multilateral organizations, although their capacities for effective action will remain limited owing to their size



and the absence of consensus. The preferred method of organizing intervention forces, however, will be through ad hoc coalitions of like-minded states acting in their common interests. Nurturing and establishing connections with international bodies will be imperative for global awareness. Canada and its allies must also pay special attention to the actions and ambitions of countries and organizations with which close diplomatic ties have not traditionally existed. Being cognizant of non-allies and foes' plans and developments are just as important – if not more so – as keeping abreast of allies' policies and priorities.

Canada will continue its relationship with the UN and with NATO, could benefit from exploring new bi-lateral and multilateral partnerships where in Canada's interests, and should have healthy relationships with like-minded nations from around the world. Nevertheless, Canada will certainly need to continue close relations with its continental neighbour, the United States. Hence, interoperability with the United States will be an important factor for the CF to achieve where possible and where essential. Because of the shared border and the shared continent, Canada and its neighbour have mutual security interests that need to be addressed for the safety of the two countries' citizens, for the efficiency of cooperation, for the respect of sovereign decisions and policy, and for the harmony of continental cohabitation.

Although asymmetric warfare is presently the prevalent security threat, the possibility of state-on-state conflict cannot be dismissed. National aspirations, regional instabilities, and the desire to challenge the balance of power, which currently favours the United States, are all potential triggers for states to wage war on each other. Conflict is also likely to emerge in regions of instability, in failed or fragile states, or between states that feel a need to assert/reassert state power at the expense of regional – if not world – peace. Islamist terrorist attacks are a significant threat in the Maritime South-East Asia and Oceania regions, as well as South-Central Asia. Consequently, the possibility of inter-state armed confrontation means that the CF needs to be prepared to address the full-spectrum of conflict, not just asymmetric threats.

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SCIENCE AND TECHNOLOGY TRENDS

Introduction

Over time, developments in science and technology and the defence-related capabilities from such developments have had a dramatic impact on the outcomes of military operations and the manner in which such operations have been conducted. One concept worth noting involves the disruptiveness of both mature and emerging technology. Rapid, revolutionary and novel scientific discoveries that are transferred or applied by cultures (including military, business, economic, or popular) in unexpected, innovative ways can have the unanticipated effect of disrupting the status quo. Advances in science and technology are sometimes unexpected and non-linear, and these are capable of triggering revolutionary changes in the way humans adapt, manipulate, and control their environment.¹

A scan of existing developments in science and technology appears to support the hypothesis that automation, customization, and miniaturization will underpin many of the technological breakthroughs that will contribute to future defence and security capabilities. These existing areas of interest include nanotechnology, micro-electromechanical systems (MEMS), information systems (computing) and sensors, networking technologies, biotechnology, new energy/power technologies, and cognitive, behavioural, and social sciences. These primarily evolutionary developments will enable breakthroughs in machine intelligence, organic electronics, the mass production of nano-materials, molecular imaging and personalized medicine, greater access to space, and programmable “intelligent” drugs. Nevertheless, these seemingly positive trends are balanced by the various negative ramifications of these science and technology breakthroughs – namely, perverse applications of genetic engineering, designer bio-weapons, and other unanticipated products of experimentation (regulated or non-deliberate). Undoubtedly, unethical actors will be prepared to profit from unregulated aspects of science and technology.

Nanotechnology

Nanotechnology has diverse applications that will be a key enabler of future Canadian (and allied) defence capabilities. This is also observed in a scan of science and technology futures documents from many nations. Nanotechnology deals with matter at length scales below 100 nanometres – about the size of a virus. At that level, matter takes on unique characteristics and properties different from bulk

matter. These include novel electrical, structural, and chemical behaviours that will enable the convergence with biological, material, electronics and cognitive sciences to produce unimagined capabilities in a broad variety of applications.

Applications that are still in a state of infancy will become important capabilities of the future: these include ultra-strong and light materials (aerospace and transportation, uninhabited aerial vehicles), new power (battery) sources and harvesting technologies, ultra-efficient water purification systems, advanced weapons (including non-lethal), nano-electronics, small networked sensors, paper-flat organic nano-LED displays, advanced medical treatments, protection of communications/information systems, and inventions that are cheaper, lighter, smaller, and highly energy efficient. Various futures documents predict that defence applications of nanotechnology will see fruition by 2020, mainly in the area of electronics materials. In the coming decades, nano-devices such as nanobots will emerge; in the defence context, these would be extremely small, swarmed, and autonomous machines. Other emerging applications may include miniaturized and affordable sensor suites, uninhabited combat vehicles, virtual reality training and education environments, augmented wound-healing compounds, brain-machine interfaces, highly adaptive clothing, and camouflage.

DEDUCTION 35

NANOTECHNOLOGY WILL BE INSTRUMENTAL IN REVOLUTIONIZING SCIENCE AND TECHNOLOGY DEVELOPMENTS SUCH AS MINIATURIZATION, THEREBY ALTERING DEFENCE APPLICATIONS FOR MATERIALS, PROCESSORS, SENSORS, AND HUMAN PERFORMANCE.

Information, Computing Technology, and Sensors

It is likely that computing capabilities and pervasiveness will continue to increase exponentially, especially as nanotechnology allows the progression of Moore's Law by virtue of smaller chipsets containing vastly more interconnections, microprocessors, and memory. Computer footprints will continue to shrink, thus affording new capabilities that will have tremendous applications to defence. These include prolific and unattended sensing, robotics, autonomous combat vehicles, "constellations" of mini-satellites, autonomous networks, smart weapons, real-time language translators, bio-identification and facial recognition, and seamless command and control. Integrated, pervasive, and inexpensive computing will allow permanent (i.e., anytime) and mobile (i.e., anyplace) connection to the internet. Some analysts



speculate that this area will be a major driver of growth for the global economy (and will fundamentally change the way people relate to one another.)²

Revolutionary supercomputing capabilities will be widely available and support on-demand information requirements. Small, portable, electronic devices will proliferate. When outfitted with sensors, these systems-on-package could be used as “life-boxes” for the detection of toxic substances, including hazardous chemicals or biological agents in the environment, food, or the human body. Dealing with deliberate attacks from “hackers” or other agents will be critical to assuring the protection of such information. In this context, challenges to privacy, intellectual property, and civil liberties will emerge as the convergence of information and communication technologies and continues.

DEDUCTION 36

DEVELOPMENTS IN INFORMATION, COMMUNICATIONS, COMPUTING, AND SENSOR TECHNOLOGIES ARE RESULTING IN NETWORK-CENTRIC CONCEPTS AND SOLUTIONS THAT CHALLENGE EXISTING HIERARCHIES. TRENDS IN TECHNOLOGY WILL REACH A POINT WHERE COMPUTING, KNOWLEDGE ACCESS, SENSING, AND THE INCREASED USE OF AUTONOMOUS INTELLIGENT SYSTEMS ARE OMNIPRESENT.

Biotechnology

Advances in molecular biology, pharmacology and the burgeoning biotechnology industries will facilitate the convergence of nano and biotechnology enabling targeted drug delivery, genetic manipulation, *in-vivo* surgery, and advanced high-resolution medical imaging. In the coming decades, nanotechnology and biotechnology may even be able to modify human body chemistry without recourse to drugs to compensate for sleep deprivation and reduced alertness so as to enhance human performance and survivability. Human age spans in wealthy countries will continue to lengthen because of the control of disease control and the eradication of degenerative diseases. Projected quality-of-life improvements include bionic implants, organic/computerized prosthetics and organs, memory drugs, brain-machine interfaces, and a myriad of human performance enhancement technologies. Genetically modified foods will become widespread, which may have major positive repercussions on a global level with respect to climate change, population growth and changes in irrigation capacities and arable land. Biotechnology applications will enhance the ability to wage war because of advancements in body protection and human performance. Soldiers will probably have access to real-time and transparent

battlefield vital signs monitoring, rapid tissue healing, full-spectrum drugs for protection, and treatments against designer bio-weapons and agents. On the other hand, a broader array of adversaries will also have access to new and emerging developments in biotechnology. Individuals, state-sponsored opponents, or nation states will probably not only have the ability to design and insert new and highly virulent bio-weapon strains, but they will possibly also have access to extremely effective delivery systems such as micro-uninhabited aerial vehicles. Such advances in technology should also enable better detection capabilities both for nanomaterials and bioagents.

DEDUCTION 37

CONVERGENCE OF BIO AND NANOTECHNOLOGY WILL DEVELOP NEW DRUG THERAPIES, CUSTOMIZED TREATMENTS, ORGANIC PROSTHETICS, AND ENHANCE HUMAN PERFORMANCE. IT IS PROBABLE THAT ADVERSARIES WILL EXPLOIT THESE ADVANCES IN TO CREATE MORE POTENT BIOLOGICAL WEAPONS, WHICH WILL BE COUNTERED BY SIMULTANEOUS ADVANCES IN DETECTION CAPABILITIES.

“New” Energy Technologies

It is projected that the development of new energy sources will continue, driven primarily by market forces and past investments in exploration, infrastructure, surveying, extraction, refining, and distribution facilities. This trend will continue, driven by the expanding industrial economies of India and China. The relentless demand for fossil fuels will be sustained by existing and newly discovered oil stocks (in the Canadian context, the Alberta oil sands) and their anticipated economic benefits. Towards 2030, however, new energy sources will begin to emerge as they become more affordable to exploit. Such sources include “low energy” nuclear fusion (cold fusion), solar, hydrogen fuel cells, tidal, and wind energy.

In the commercial sector, there will be strong market incentives and the continuing introduction of environmental (“green”) legislation for ensuring the maturation of advanced autonomous power sources: hydrogen fuel cells, renewable energy niche markets (bio fuels) and portable highly-dense energy-yielding technologies. These will be supported by advances in other technology areas like carbon nano-tubes (which serve as small and efficient battery storage devices). Such technologies will have important applications and utility in meeting the requirements of the future soldier-borne technologies that are expected to emerge with the development of parallel convergent technologies. The battle-space will see the introduction of



various lethal and non-lethal direct energy weapons including the possibility of mobile Electro Magnetic Pulse (EMP) devices. The soldier of the future will also require continuous, portable, lightweight, and high-output energy sources to power such items as active/passive camouflage garments, C4, medical monitoring, sensing, robotics, and weapons applications.

DEDUCTION 38

ALTHOUGH SLOW TO EMERGE, THE DEVELOPMENT OF NEW ENERGY TECHNOLOGIES WILL BE MARKET DRIVEN AND SHOULD SOMEWHAT REDUCE THE DEMAND FOR OIL AND FOSSIL FUEL WORLDWIDE. RESEARCH AND DEVELOPMENT INTO MORE EFFICIENT ELECTRICAL ENERGY GENERATION WILL ALLOW MILITARY FORCES TO FUNCTION AUTONOMOUSLY IN REMOTE REGIONS FOR EXTENDED PERIODS OF TIME.

Cognitive, Behavioural, and Social Sciences

Efforts to understand the human mind (both culturally and physiologically) will lead to some dramatic breakthroughs in defence and security capabilities. Corresponding advances in computing will underpin the future of the cognitive sciences, a situation that arises from the computationally intensive nature of exploring the complexities of the human brain. It will become possible to do mathematical mapping of social networks, which will combine advances in computing with clearer insights into human motivation, intent, anthropology, and humans in social groups. Advanced neuron-imaging techniques will afford precise localization of cognitive functions mapping, a process that will enable a plethora of capabilities, including seamless brain-machine interfaces, instantaneous language translation, and accelerated learning technologies. Synthetic intelligence will accordingly become feasible for many applications by 2030 (including autonomous combat vehicles in all environments), and the ability to predict adversarial intent will become possible. Advances in the cognitive, behavioural, and social sciences will have moral, ethical, and legal implications and will pose significant policy challenges for western nations.

DEDUCTION 39

ADVANCES IN COGNITIVE AND BEHAVIOURAL SCIENCE MAY MAKE IT POSSIBLE TO OVERCOME TRADITIONAL HUMAN BARRIERS RESULTING FROM SUSTAINED OPERATIONS, ENVIRONMENTAL AMBIGUITY, AND INFORMATION OVERLOAD.

Risks of Future Advanced Technologies

Predicting technological advances continues to be a highly uncertain endeavour because of the complications of globalization, the influence of economies, the vagaries of consumer demand, and even the potential impact of climate change. Notwithstanding this problem, there are certain aspects of future technology that will ultimately shape defence and security applications, projected capabilities, and decisions surrounding their insertion into the battle-space.³

The accelerated rate of technological progress will increase the potential of unintended consequences. On the other hand, fear of the unanticipated negative impacts of technology may inhibit continued research and development and delay the emergence of beneficial technologies (e.g. past fears surrounding genetically-modified foods and, more recently, fear concerning the health risks associated with ingesting or inhaling nano-particles during their manufacture or utilization). As societies become dependant and, to a certain extent, over-reliant upon certain technologies (e.g. cellular devices), they become increasingly vulnerable to disruption, whether intentional or unintentional. The increase in information arising from the pervasiveness of computing will strain human and societal decision-making abilities. The rapid pace of technological change and the abundance of information resulting from the growing presence of computers may overwhelm decision-makers with a flood of data and information. This represents an additional vulnerability that will require improvements in physiological, cognitive, and decision-making sciences that will align information with function.

The emergence of technological capabilities in unstable regimes and developing economies will narrow the technological advantage currently enjoyed by "industrial technological" nations. This problem will be further perpetuated by an increase in industrial espionage and organized crime. The growth in artificial intelligence capabilities (e.g. "agents") could be exploited by adversaries so as to disrupt critical infrastructure and societies. Consequently, authorities and militaries will find it increasingly challenging to authenticate electronic information and/or protect infrastructure. Owing to the pervasiveness of computing and information, these adversaries will have access to new means of acquiring sensitive and previously protected scientific and technological information, thus leading to the proliferation of CBRN and other advanced weapon systems. As surveillance capabilities increase in response to continued terror threats, privacy and human rights, as well as moral, ethical, legal, and cultural standards will be challenged. Technological advances will be apportioned unevenly around the globe. In some regions, societies will see



benefits, while in other regions (with challenges imposed by economic disadvantage, climate change, religious barriers, and unstable regimes), these benefits will be barred, discouraged, or bypassed, thereby widening the gap between “have” and “have-not” nations. As demonstrated by improvised explosive devices in Afghanistan and Iraq and the use of commercial aircraft in the attacks of 9/11, adversaries will not necessarily require access to advanced technologies but can simply use existing and conventional technologies (e.g. explosives) in order to generate catastrophic effects on society.

Rapid obsolescence will continue at a non-linear rate, rendering the period between the introduction of a new technology and its obsolescence shorter and shorter. This will challenge defence procurement plans and budgets in advanced nations, while allowing less advanced societies to skip the updating of legacy systems. For example, the implementation of cellular telephone networks in emerging regions has enabled them to bypass the installation of landline systems altogether.

Conclusion and Implications for DND/CF

Trends in science and technology are often characterized by innovation and rapid change. The fact that many technologies are commercially available to friend and foe alike, however, also has potentially serious consequences. Historically, science and technology have contributed significantly to the development of defence-related capabilities, and they will continue to do so in future. In the past, advances in science and technology were largely driven by the massive investments of national governments in their military programs. Future advances in science and technology will be driven by the massive investments by private and multi-national companies.

Given global access via the Internet to future science and technology, the military advantage derived from the effective integration and exploitation of this science and technology will belong to whoever is best able to acquire, integrate, and employ emerging science and technology. It might be possible for traditional “have-not” nations and non-state actors to gain significant influence and equal footing with long-established military powers through the acquisition of commercially available technological hardware. The pursuit of low-tech solutions by adversaries could also neutralize the advantages offered by sophisticated/advanced weaponry. Another issue particularly challenging to traditional western militaries concerns the fact that asymmetric adversaries are not necessarily constrained by the same moral, legal, ethical, or policy considerations. It is imperative, therefore, that DND/CF develop the ability to clearly recognize, early on in the development cycle, the potential for

new science and technology to contribute to military capability – both their own and the capability of their adversaries – and that they address the issue of periodically updating their military capability with new science and technology in a timely and effective manner.

Accelerating technical obsolescence needs to be anticipated. New technologies and the application of networking and information concepts will challenge hierarchical structures and necessitate organizational change. The exploitation of new technologies will create policy challenges, particularly in the fields of artificial intelligence and biotechnology. Science and technology developments could also result in a new arms race and bring about adversarial dominance. This underscores the critical importance of innovation and the rapid exploitation of new technologies. DND/CF must be capable of recognizing the potential of new and emerging science and technology developments for both Canada and its adversaries. There are serious consequences associated with falling behind the capabilities of those adversaries who are able to leverage the benefits of emerging science and technology developments; likewise, there are also risks associated with falling behind the capabilities of one's allies and thereby endangering interoperability. Can DND/CF afford the capital costs of keeping up with the technical capabilities of military allies? A better question would be: can DND/CF afford not to? A balance will have to be found between costs and capabilities.

The ever-expanding realm of opportunities offered by science and technology developments necessitates that DND/CF be both imaginative and proactive in this area. Informed imagination is required to understand how science and technology advances could be employed in a conflict situation by Canada and its potential adversaries. Consequently, DND/CF must stay abreast of science and technology developments (including those on the open market) that may have an impact on defence and security. If it is to maintain or regain the upper hand, DND/CF will have to stay ahead of adversaries' science and technology developments, develop imaginative offences, and anticipate problems using counter-measures.

Advances being made in nanotechnology, information technology, biotechnology, new energy technology, and cognitive sciences will necessitate policy revision and formulation to regulate application in Canada and to address the consequences of adversaries' unfettered application of these technological advances. Research should continue into alternative and/or "green" fuels, efficient energy generation, smaller footprints, and means of operating more remotely, autonomously, and for extended periods of time. Because funding is limited in small and middle power



nations, participation and exploitation opportunities might be increased through collaboration with academia, the private sector, or international partners (both civilian and military). Nations should also ensure that they have sufficient resources invested in monitoring and analyzing research programs and developments (and potential impacts) undertaken by friend and foe alike. In order for the DND/CF to take full advantage of science and technology advances, bureaucratic impediments will have to be removed, procurement processes accelerated and streamlined, and moral, legal, ethical, and policy challenges resolved.

NOTES

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MILITARY AND SECURITY TRENDS

Introduction

To say that the future security environment of the post-Cold War period is more complex than previous eras is not to deny the complexity of past wars and diplomatic relations. Rather, it is simply meant to illustrate the impact of globalization – greater connectivity and complexity – on international relations and national survival in a world that is no longer characterized by two dominant blocs of states with opposing ideological perspectives. The security environment of today and tomorrow contains a multitude of potential threats, adversaries and actors with divergent motivations that are not limited to simple political theories. In addition to states with contrasting philosophical and ideological outlooks, including rogue states that regularly act outside the norms of international laws and protocols, Canada and its allies will also be challenged by the activities of malignant non-state actors, such as trans-national criminal organizations, terrorist groups, and violent religious extremists. In modern warfare, the adversary is more likely to be a non-state group hidden within a larger population than a well-equipped traditional military. Adversaries will be harder to identify, their actions will be less conducive to anticipation or deterrence, and they will be more likely to employ asymmetric tactics than risk a conventional, head-on confrontation.

Non-State Actors

The influence of Non-Government Organizations (NGOs) has been steadily growing over the past decade. The vast majority of NGOs are beneficial, working to achieve goals that are positive. Individual NGOs vary according to their purpose, but their continuing involvement in areas marked by crisis and tension has obliged governments to improve their coordination. Moreover, globalization has made the work of NGOs and their effects more prominent. Given the public's heightened interest in humanitarianism and the increased interest of governments in stabilizing the security environment, the number of NGOs working in area of crisis and conflict areas will probably rise over the coming decades. NGOs will also continue to require a relatively secure environment in which to conduct their operations, which in some cases can be assured by maintaining a position of neutrality. It is possible, however, that many groups will be forced by the nature of some conflicts to rely on governments or private security firms to provide this security, while avoiding any direct affiliation with those organizations. Although NGOs have traditionally avoided

close relationships with the military components of operations, they will probably have fewer qualms about associating with the diplomatic and development elements of a given mission.¹

Potentially problematic non-state actors include (but are not limited to) such entities as militias, warlords, local defence groups, rebel groups, radical ecological and religious organizations, terrorist groups, criminal organizations and private military firms. These non-state actors are expected to play a larger role in the future security environment, and their presence will further complicate traditional military operations, primarily because they operate outside the international laws and norms governing the use of force by which state militaries are bound. Thus, such instruments as the traditional laws of war prescribed by the Geneva conventions would only end up constraining the actions of state actors in a conflict. The inability of failed or fragile states to ensure the security of their citizens is expected to increase the complexity of future operating environments by causing a proliferation of armed groups.²

Meta-national: A company that “builds a new kind of competitive advantage by discovering, accessing, mobilizing, and leveraging knowledge from many locations around the world.”

Source: Yves Doz et. al., *From Global to Meta-national: How Companies Win in the Knowledge Economy*, p. ix.

A growing feature of the complex security environment of the future will be the rise of the meta-national corporation. The place (and, by extension, the nation state) where the meta-national is located is relatively inconsequential, since its strength will be derived from its ability to identify and leverage knowledge, labour, and raw materials wherever they exist. Since the meta-national will, by definition, operate outside of a traditional geographically bound base of operations, it will also frequently operate outside national or even international laws. The presence of these entities in operational theatres may further complicate existing crises. This will be particularly true if these meta-nationals employ private military firms to protect their interests. Private military firms – which are used not only by meta-nationals but also by governments, militaries, and NGOs – will become increasingly important players in operational theatres. There is also a growing tendency in the developed and the developing world to employ armed civilians to perform some of the security or military functions previously provided by military personnel. The fact that these organizations operate outside of international law and that their members are civilians raises troubling legal and ethical questions for traditional militaries that operate alongside or against such entities.³ It will also be difficult – but often necessary – to distinguish combatants from non-combatants and to understand the complicated relationships between all the relevant actors.

**DEDUCTION 40**

FUTURE OPERATIONS WILL FIND THE CF WORKING AMONGST, WITH, AND AGAINST A DIVERSE ARRAY OF OTHER ARMED GROUPS, SUCH AS PRIVATE MILITARY CONTRACTORS, MILITIAS, ARMED FOLLOWINGS, BANDITS, CRIMINAL SYNDICATES, GANGS, AND INSURGENTS. ADDITIONALLY, THE CF AND ITS ALLIES WILL ALSO NEED TO WORK WITH NGOS, WHO WILL BE INCREASINGLY PRESENT IN FUTURE THEATRES OF OPERATION, WHENEVER POSSIBLE TO HELP ACHIEVE DESIRED ENDS.

Asymmetric Warfare

It is anticipated that malignant non-state actors will regularly adopt asymmetric means to circumvent conventional military strengths and take advantage of weaknesses. Asymmetric threats and asymmetric techniques in warfare can include the use of conventional weapons in unexpected ways, the acquisition of weapons of mass destruction by non-state actors and rogue nations, the exploitation of non-military technologies and platforms in a manner incongruent with the original design, and the regular use of deception and surprise against military and civil targets. Asymmetric threats can also be of the low-tech variety, such as improvised explosive devices, assassination, ambushes, and the use of graffiti to pass messages. Non-state actors will likely target the civil sectors of state adversaries by attacking such targets as critical infrastructure, including power distribution systems, bridges, electronic information and banking systems, in an effort to undermine a state's legitimacy, leadership and governance structure.

Terrorist groups and non-affiliated sympathizers will likely target civilian, business, and government computer networks as a means of disrupting normal societal behaviour in the targeted regions. Cyber-attacks offer an adversary maximum anonymity and a low risk of personal injury. The infrastructure required to conduct such attacks is relatively small, which makes this type of operation extremely attractive. Malicious cyber activity can have political and economic consequences. The overall sophistication, volume and degree of coordination of these attacks have increased, which means that there will be a continuing demand for improved protection and countermeasures.⁴

Asymmetric warfare is not new, although certain specific methods of attack have emerged only recently. New means of aggression will be found as technology continues to evolve. Asymmetric warfare does not preclude or replace more conventional methods of attack. Actually, these two forms of warfare should not be considered as

separate and mutually exclusive, since all types of tactics could possibly be employed in the same conflict and perhaps at the same time in a hybridized fashion. Hybrid wars can be fought by both state and non-state actors, and may incorporate conventional capabilities, irregular tactics, terrorist acts, and criminal disorder.⁵

DEDUCTION 41

ADVERSARIAL NON-STATE ACTORS WILL SEEK TO OVERCOME AN ADVANCED MILITARY'S STRENGTHS THROUGH EMPLOYING SUCH MEANS AS IRREGULAR WARFARE, THE ACQUISITION AND USE OF WEAPONS OF MASS DESTRUCTION, AND THE DISRUPTION OF ELECTRONIC INFORMATION INFRASTRUCTURES THROUGH CYBER ATTACKS. ASYMMETRIC TACTICS WILL ALSO BE VIABLE OPTIONS FOR STATE ADVERSARIES.

Terrorism

Terrorism is a tactic used by individuals, groups or states as part of a larger strategy to intimidate and coerce state governments or societies. Spectacular terrorist attacks call attention to their perpetrators and their causes and may help them win the support of potential sympathizers. Terrorism is most often used to strike at civilian targets, which normally have limited means of self-defence.⁶ Because the state is theoretically the sole possessor of force, successful terrorist attacks undermine the legitimacy of governments by exposing their weaknesses or their limited ability to respond. The aim of terrorism is to cause sufficient societal psychological trauma, either through a single attack or multiple attacks over time, to force policy changes or specific actions by the affected government(s). Various groups and states holding a broad range of political and religious ideological perspectives have used terrorism throughout history as a means of achieving their desired ends.

Terrorism: "The threat or use of physical coercion, primarily against noncombatants, especially civilians, to create fear in order to achieve various political objectives."

Source: Bard O'Neill, *From Revolution to Apocalypse: Insurgency and Terrorism*, p. 33.

Terrorist tactics employed in the past have included assassinations, bombings, hostage-takings, kidnappings, hijackings and sabotage. Typically, the specific method chosen will attempt to exploit a perceived psychological weakness within the adversary. Given this situation, it is impossible to set limits on how terrorist groups will adapt new or old technology to attain their desired ends. Over the coming decades, the tactics of terrorism will continue to evolve in tandem with changes in



technology, the availability of weapons, the political environment and in response to preventative measures taken by governments. Security enhancements to public transportation systems may discourage attacks, but will also encourage terrorists to search for other targets, such as power generation facilities.

The proliferation of technologies and weapons, the expansion of the internet and the growth of trans-national links associated with globalization have all made it easier for would-be terrorists to communicate, recruit, train, and launch attacks with little regard to state borders. These changes have only strengthened the traditional network-based cell structures favoured by terrorists and other malignant groups. This will probably reduce the efficacy of certain traditional countermeasures, such as targeting leadership, and make such organizations extremely difficult to penetrate due to the absence of direct physical linkages. At the same time, advanced communications technologies and the global news media have created a worldwide audience for terrorist events. As a result, terrorism in the age of globalization has become a cheaper and more effective tool than in the past. Finally, there are proven links between terrorist groups and trans-national criminal networks, despite outwardly divergent goals, which demonstrates the truth of the proverb “the enemy of my enemy is my friend”.⁷

DEDUCTION 42

COUNTERING TERRORISM IS PRIMARILY A POLITICAL AND LEGAL CHALLENGE, BUT THE TRANS-NATIONAL NATURE OF THIS THREAT MEANS THAT MILITARIES WILL PROBABLY BE CALLED UPON IN CERTAIN CIRCUMSTANCES TO ASSIST CIVIL AUTHORITIES AND WILL CERTAINLY BE FACED WITH THE EFFECTS OF TERRORISM IN OPERATIONAL THEATRES.

Proliferation of Weapons

Conventional Arms

The proliferation of advanced, conventional weapon systems is often sought by developing countries that perceive Western style militaries as a source of prestige and status. The funds that are available are often spent on acquiring cruise and ballistic missiles, submarines and advanced fighter aircraft, even if the buyers ultimately lack the doctrine to employ these systems effectively or even perform basic maintenance. Nevertheless, the deterrence value of advanced weapons systems can seriously affect a decision to enter a region, engage in a military operation or cause a coalition or government contemplating intervention to think otherwise.

In the future, irregular forces, such as insurgents or ethnic militias, will also have greater access to more sophisticated weaponry and technology. Items such as night-vision goggles and global positioning system (GPS) devices are already commercially available, as is access to satellite imagery. This represents a significant narrowing of the gap between developing and Western militaries. Today's technical advantages will become less critical in determining tomorrow's success in combat. In most cases, doctrine that enables the proper employment of sophisticated weapons systems will continue to be a major military advantage. It is foreseeable that a non-state group will be able to develop and absorb doctrine that will challenge conventional militaries in ways not commonly seen (such as Hezbollah did during the 2006 war with Israel).

CBRN

Chemical, biological, radiological and nuclear (CBRN) threats include the intentional spread of a biological virus (such as smallpox) or chemical agent (such as Sarin gas) and the explosion of a radiological dispersal device to spread radioactive material. CBRN weapons are often referred to as Weapons of Mass Destruction (WMD) or Weapons of Mass Effect (WME). The threat of such a weapon falling into the hands of an adversary can be disruptive and costly, as all such threats must be dealt with as if they are real.

The possession of such weapons provides tremendous power. The overriding fear in the future is that WMD/WME will find their way into the hands of extremists and eventually be threatened or employed against civilian populations. Various protocols and conventions have been put in place aimed at limiting the spread of both the weapons themselves and the technologies that create them. Nevertheless, despite these efforts, many countries have tried to build or acquire nuclear weapons over the past two decades, and several others have successfully done so. The possession of radioactive materials in itself allows for the production of "dirty bombs." Chemical and biological materials are widespread, and the production or deployment of such weapons requires far less technology, equipment and technical expertise than the development of a nuclear device, thus making the acquisition of such devices even more appealing.

Novel Technology

Weapons that postpone the decision to use deadly force will play an increasingly important role in asymmetric warfare. In such conditions, the requirement to delay the use of deadly force long enough may possibly permit a situation to clarify itself and determine if it is really necessary to use such force. Emerging technologies that



will enable such scenarios may become operationally and technically feasible in the near future. For example, transportable equipment that directs a beam of high power electromagnetic waves could be used to distract or disperse individuals in crowds, or disrupt and destroy electronic devices (computers, sensors, navigation aids, and communication devices) at a distance of hundreds of metres. Precision weaponry, such as laser-guided munitions, will also permit action to be taken against discrete targets with significantly fewer unintended consequences, allowing force commanders to minimize collateral damage and unintended loss of life.⁸ Non-lethal capabilities, which can be applied to a given target in moderation, may also be considered a type of precision weaponry and can be used to minimize collateral damage while managing the escalation of conflict. Though developed primarily for non-combat operations such as crowd control, non-lethal capabilities may see increased use in combat operations. For instance, a variety of technologies, including heat- or sound-based weapons, air-burst munitions and anti-traction material, can be used to temporarily disable a target without causing permanent harm.⁹ Given this option, military commanders will be in a better position to apply force selectively in line with strategic requirements, which may involve minimizing collateral damage or winning the hearts and minds of a skeptical population.

Future mines will also incorporate new capabilities. These will include electronics and microcomputers with improved signal and logic processing, firing mechanisms with reduced power requirements, modern signal processing and sensitive sensors to expand threat radius and improve target discrimination, resistance to countermeasures, unconventional shapes, anechoic coating on mine cases to reduce mine target strength, wireless or acoustic remote control links or networked sensors, longer ranges, and improved guidance during attack for propelled-warhead mines. The distinction between mines and torpedoes is becoming increasingly blurred. Rising and mobile mines and encapsulated torpedoes fall between the traditional categories and will be difficult to evade, escape, or jam. Mines, surveillance sensors or surveillance networks could be integrated into a defensive system capable of tracking and attacking intruders. Mine fields could possibly consist of a smart network of sensors linked to a few mobile warheads.

Uninhabited vehicles are becoming more reliable, more sophisticated and less expensive. Unmanned Underwater Vehicles (UUVs) are seen as an increasingly likely threat to maritime security in the future. Low-cost UUVs are increasingly attractive, affordable and desirable as platforms for illegal activities such as drug smuggling and terrorism. UUVs are now manoeuvrable and intelligent enough to carry out sophisticated operations and could conceivably be used to plant mines and conduct

other operations against high value assets. Similar to the likely proliferation of UUVs in the future, small tactical Unmanned Aerial Vehicles (UAVs) are also highly affordable, easy to operate, relatively stealthy owing to their small size and silent operation, and capable of conducting intelligence, surveillance and reconnaissance operations or aggressive missions at long ranges. UAVs will perform tasks that would otherwise put humans in harm's way; hence, they can be used within range of an adversary's weapons with greater impunity. UAVs are ideal for approaching threats and their related targeting systems, and disrupting information systems. This may include combined stand-in and standoff jamming, with the latter being delivered either by UAVs or unattended ground sensors.

DEDUCTION 43

THE INCREASING COMMERCIALIZATION OF WEAPONS WILL ALLOW SOME DEVELOPING NATIONS AND NON-STATE ACTORS TO ACQUIRE INEXPENSIVE AND SOPHISTICATED MILITARY CAPABILITIES. HENCE, CANADA AND ITS ALLIES WILL BE CONFRONTED BY A MIXTURE OF CONVENTIONAL, CBRN, AND NOVEL TECHNOLOGY WEAPONS IN THE HANDS OF A VARIETY OF STATE AND NON-STATE ACTORS, THUS NECESSITATING THAT CANADA BE ABLE TO APPLY THE FULL SPECTRUM OF CAPABILITIES, EVEN AGAINST NON-STATE ACTORS.

Military Use of Space

The commercialization of space refers to the use of outer space to generate profit. Commercial space-based activities include satellite navigation, satellite imaging, weather monitoring, space transportation, and entrepreneurial space communications such as satellite radio and television. In the future security environment, the commercialization of space means that many of the technologies employed by advanced militaries (e.g., GPS, satellite imaging, and satellite communications) will also be available to adversaries on the market. In addition, advanced militaries could possibly find their space-based assets targeted by an adversary intent on either blinding them prior to an attack or denying them their space-based technological advantage. As nations become more dependent on space-based assets and as the commercial sector continues to invest in outer space, the defence of space will become of increasing interest.

The revolution in information technology is resulting in a growing dependence on space-based systems and communications and is a point of vulnerability for western nations, Canada included. Data capture and protection represents a key challenge in securing a common and complete operating picture, and both depend on air, space,



and cyberspace superiority. While space-based assets confer a distinct advantage for modern Western militaries, these militaries are also vulnerable if adversaries interfere with these assets. The technology required to reach space and disrupt, damage, or destroy an object with a stationary orbit such as a satellite is far less sophisticated – and expensive – than the amount of investment required to create a full communications network.¹⁰

Any comprehensive C4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance) capability will have some space-based component. The defence and security implications of such development include the appearance of increasingly lower-cost convergent technologies for exploiting space as a platform. Nations with emerging technologies will be able to consider space-based missions owing to the narrowed technological gap and the decreasing costs. Combining dual-use civilian communication systems with weather and climate monitoring, geophysical monitoring and high-resolution reconnaissance systems and weapons will further augment the viability of successful space-based missions. Projected technological advances in space include lightweight/small size (1 kg) satellites with multiple imbedded convergent technologies (e.g., nano-structured materials, power sources, camera, and sensing suites). These satellites will be launched from low-cost sites, located in diverse geographic regions, and will be deployed in groups or swarms. This is a particularly attractive option for nations with large landmasses where ground-based or conventional aerial reconnaissance methods are expensive and incomplete.

DEDUCTION 44

MODERN NATIONS WILL HAVE A STAKE IN PROTECTING SPACE-BASED ASSETS AND WILL NEED TO MAINTAIN ROBUST AND REDUNDANT CAPABILITIES THAT ANTICIPATE THE LOSS OF AT LEAST SOME CURRENT COMPETITIVE INFORMATION TECHNOLOGY ADVANTAGES. INTERSTATE RIVALRIES AND CONFLICT IN THE FUTURE WILL PROBABLY EXTEND INTO SPACE, AND EVEN NON-STATE ACTORS AND SOME LESS DEVELOPED NATIONS WILL PROBABLY BE ABLE TO ACCESS AND USE ASSETS IN THIS ENVIRONMENT, THUS ERODING THE EXCLUSIVE ADVANTAGE CURRENTLY POSSESSED BY MODERN MILITARIES.

Conclusion and Implications for DND/CF

The security environment of the post-Cold War era is populated by a plethora of potential threats, adversaries, actors such as traditional state actors and benign NGOs, and problematic or malignant non-state actors such as irregular forces,

mercenaries, meta-nationals, and private military firms. Asymmetric warfare will be the tactic of choice for those who want to exploit state vulnerabilities and avoid direct confrontation with conventional armed forces and the bounds of national and international law. Proliferation of weapons among state and non-state actors is expected and will likely empower an increasing number of potential adversaries.

Technology defines part of the future threat environment. While much of today's emerging technology and ideas are being developed in the West, imaginative and often very different approaches have been employed by potentially hostile cultures to develop their military requirements. This technology is often disseminated to other unfriendly states or groups, posing a challenge to the capabilities of Canada and its allies. Equally significant is the imaginative use of existing technology in ways not envisaged by their original developers for purposes inimical to Canadian objectives.

With the proliferation of military and security threats, the level of uncertainty and unpredictability for DND/ CF has increased. Canada's defence team could be called to go anywhere, at any time, and into any physical terrain. Furthermore, DND/CF must be prepared for missions across the full spectrum of operations. It must be capable of conducting and countering conventional, as well as asymmetric tactics. It must be prepared to fight states and coalitions as well as non-state actors. It must also be prepared to share the battlefield with a broad range of unconventional forces, and DND/CF must itself be prepared to work with a variety of partners – be they allied militaries, other government departments, or NGOs.

NOTES

1 World Bank Definition, "Categorizing NGOs, World Bank Criteria," Duke University Perkins Library, <http://docs.lib.duke.edu/igo/guides/ngo/define.htm> [accessed 24 April 2007].

2 DCDC, *Global Strategic Trends Programme*.

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7 Allan Castle, *Trans-national Organized Crime and International Security*, University of British Columbia Institute of International Relations Working Paper No. 19, November 1997.



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CONCLUSIONS

Emerging geopolitical, economic and social, environmental and resource, science and technology, and military and security trends all have profound implications for Canada, DND, and the CF. Greater external pressure and increased demands for defence capabilities coupled with future personnel and resource constraints, will require creative leadership and adaptive responses for addressing future challenges.

Future Security and Operating Environment

The future security environment will be characterized by potential state-on-state conflicts, by ever-evolving asymmetric threats, by non-state actors and rogue states, and by social, economic, environmental, and resource problems that could possibly lead to instability. Although states recognize that economic well-being, international trade, and nuclear weapons are major deterrents to state-on-state conflicts, tensions rising from economic, social, and resource competition will always exist and could possibly motivate attacks on fellow states. Asymmetric attacks by non-state actors or smaller, discontented states have proven to be an effective means of enabling weaker powers and entities to push their agendas on the world stage. The future will be replete with increasingly creative, sophisticated, and injurious asymmetric attacks on both military and civilian (including infrastructure, economic, and iconic) targets. The continued existence of failed and fragile states will mean that such ungoverned and poorly governed regions will continue to serve as safe havens and provide recruits for terrorist and criminal organizations. This will also mean that such regions could possibly descend into chaos, thus requiring humanitarian, stabilization, and/or reconstruction missions to ameliorate the security situation. Poverty, unemployment, the devastating effects of climate change, and resource scarcity will probably worsen and generate instability that may lead to humanitarian or stabilization crises as impoverished regions struggle with mass migration, displaced populations, and competition for food, water, and other resources.

Given this future security environment, the battle-space of the future will necessitate operations at home or abroad, in physical or cyber engagement spaces, in urban-littoral areas, or in extreme terrains (e.g., jungle, desert, or arctic climates) – all of which may involve the use of conventional and asymmetric means and weapons. The defence team of the future can expect to be tasked across the full spectrum of operations on both domestic (routine, contingency, sovereignty) and expeditionary missions (humanitarian, stabilization, reconstruction, combat) that call for both conventional and asymmetric capabilities.

Future DND/CF Roles and Missions

Canada, in particular, faces a litany of security concerns. The CF's first priority is to protect Canada and Canadians at home. Its second priority is defending North America in cooperation with the United States. Both of these missions involve supporting the prevention of domestically-generated attacks, the maintenance of border security, and the conducting of continental defence missions. Cyber threats and potential attacks from space are increasingly conceivable in the present and future security environments. Of particular concern to Canada – both now and in the future – is the melting of the polar ice in the Arctic. The increased transit of aircraft, surface vessels, and sub-surface vessels presents new security challenges, especially in terms of border control, environmental threats, and disaster response. Canada will have to remain vigilant in protecting the peoples, resources, and ecosystems of its northern territories.

Domestic (routine and contingency) operations might involve assisting civil authorities in responding to natural disasters, cyber attacks, terrorist attacks, crises in urban centres, threats to critical infrastructure (pipelines, power grids, industry, roads and bridges, ports of entry), risks to health and food systems, or CBRN attacks. As the competition for resources around the world intensifies, Canadian resources (such as energy, minerals, fresh water, and fish stocks) will require greater protection. The CF will need the capacity, therefore, to ensure improved national surveillance. Owing to the potential for an increase in domestic threats, DND/CF as a whole needs to become more integrated within the domestic response community – in particular, the security and intelligence sectors. The future security environment will require a level of domestic integration among agencies that does not exist at the present time.

In addition to being ready to defend Canada, the CF must be globally deployable to austere, urban, and littoral regions beset by conflict or disaster. International operations could possibly involve humanitarian relief, non-combatant evacuation, policing and constabulary roles (which currently falls outside of the CF's mandate), reconstruction, stabilization missions, or high-intensity combat. Information operations, cyber or CBRN attacks by terrorist and non-state organizations, conventional threats – all are potential elements of current and future expeditionary operations. Consequently, the CF of the future must be a multi-role, combat capable force that can perform a broad range of tasks and operate in all engagement spaces (land, maritime, air, space, cyber, and cognitive). The CF must continue working to become a joint, interoperable, and integrated force and must have the capacity to work in an environment where there are non-state actors and NGOs.



The Changing Face of Canadian Public Opinion

The Canadian public's attitude toward defence spending and foreign policy cannot be expected to remain unchanged between now and 2030. Just as public opinion currently varies across Canada's age groups, geography, and ethnicities, so too will public opinion be affected by younger generations' reaching voting age and by new immigrants who express their experiences in the votes they cast. One cannot assume that because Canadians support DND/CF's missions and capabilities today they will support the government in allowing DND/CF to pursue these same interventions and policies tomorrow.

Immigration will change the face of the Canadian voting public. By 2011, almost all labour force growth will be derived from immigration. While roughly 20% of Canadians currently belong to a visible minority and almost 60% of these minorities are from Asia and the Middle East,¹ these levels will probably continue to increase through to 2030. The life experiences of immigrants before their arrival in Canada will undoubtedly shape the particular foreign policies they will support or oppose. People who have relocated from unstable and troubled areas may want the Canadian government to intervene with humanitarian, stabilization, and/or reconstruction missions. On the other hand, people who are fleeing war-torn countries or oppressive military regimes may oppose the use of the Canadian military in their country of origin. In addition, new Canadians and younger Canadians may not necessarily feel the same level of commitment to traditional allies (US, UK) and organizations (NATO) as Canadian citizens who experienced the Cold War from a Western Hemisphere perspective. The voters of tomorrow – today's young Canadians and immigrants from diverse backgrounds – will probably have different attitudes toward, and expectations of, the DND/CF in the future. These opinions will have to be taken into consideration in making decisions on policy, organizational structure, recruiting, procurement, and deployment.

Working in a Complex Security Environment

The conflicts that occur in this complex security environment will involve geopolitical, social (ethnic, religious, ideological), economic, resource, environmental, science and technology, military, and security drivers. Hence, it will not be possible to successfully prevent and/or resolve disputes solely with military power because addressing security the threats that underlie instability and conflict involves addressing issues and problems in all the constituent parts of society. In developing lasting solutions, military power will only be one component among many – for creating and

maintaining security – but it will not be the lead component. Hence, humanitarian crises, human security needs, and counter-insurgency operations in the future will require harnessing all the instruments of Canada’s national power: governance, diplomacy, development, defence and security forces, legal institutions and law enforcement, trade and commerce, economic development, education, health, social services, negotiations skills, reconciliation processes, and institution building. This will have to be applied in a comprehensive and coordinated fashion in order to achieve the desired effects – the resolution of dissatisfaction, the elimination of conflict, and the restoration of peace.² Furthermore, an integrated defence team can expect to operate in an increasingly networked environment in the future, where coalition partners will include more than allies’ military elements; national and international government departments/agencies and NGOs will be an important part of future partnerships.³

Deliberate engagement and active cooperation will require a concerted effort on the part of all players. The goal will be to achieve a certain effect – peace and stability – by using the most effective means possible. Hence, before allies can decide how best to work together on coalition operations, each country’s government must define the division of labour amongst the instruments of national power to ensure that the appropriate department takes the lead, that all available assets, skills, and personnel are used to the greatest effect, and that there is no duplication of effort.

DEDUCTION 45

A COMPLEX FUTURE SECURITY ENVIRONMENT WILL DEMAND A COMPREHENSIVE, INTEGRATED, ADAPTIVE, AND NETWORKED FOCUS IN THE APPLICATION OF GOVERNMENT POLICY.

Implications for DND/CF

Meeting the challenges of the future security environment will require contributions from all instruments of national power; achieving the desired effects will require the participation of, and cooperation with, allied defence teams, other government departments, the private sector and, where applicable, non-governmental organizations; this is commonly being referred to as the Comprehensive Approach among Canada’s allies. An integrated focus will be required at the institutional level across a number of organizations; this will involve the use of governance, policy, and legal mechanisms to enhance the synergies among cooperative entities working toward resolving a common complex situation. To reap the benefits of team-based



complex problem solving, there must be a trust mechanism to ensure that resources and information are shared in a transparent and effective manner. To this end, DND/CF and its defence and security partners must be adaptive to changing situations and find means of creating a more networked focus in order to benefit from the strengths and capabilities of all potential contributors to the solution, including non-governmental entities.

All future concept development must incorporate the requirement for an integrated, adaptive and networked focus. *The Integrated Capstone Concept* (ICC) will outline how the DND and the CF will need to operate in the future. It will have to reflect the need for the CF to operate within the larger defence team: working alongside other government departments, with allies in coalitions, and in tandem with non-governmental organizations. The mix of ever-present conventional threats and the ever-increasing number of asymmetric threats arising today and in the future demand more than a military response. Other government departments and non-governmental organizations must contribute to – and often take the lead in – prevention, intervention, stabilization, reconstruction, and capacity-building in regions of instability.

The complexity of not only maintaining readiness to respond to conventional threats but also of effectively combating capable non-state actors operating in austere, urban, and littoral battle-spaces will continue to strain conventional forces and call for new capabilities and new approaches. In both domestic and expeditionary taskings, the defence team of the future will need both conventional and counter-insurgency capabilities. DND/CF will also need to be able to respond to CBRN or cyber attacks. Whether at home or abroad, intelligence, surveillance, and reconnaissance capabilities will remain essential in maintaining situational awareness in a world where sensing technology is becoming increasingly pervasive and universally available. Communications will remain essential in ensuring command and control. Given Canada's extensive coastline and the fact that over three-quarters of the world's population live in littoral areas, the defence team of the future will have to be able to deliver maritime effects. Furthermore, due to Canada's vast size and the great distances that separate it from likely theatres of operations, strategic lift and transport capabilities are essential. The broader spectrum of potential partners for both domestic and international operations will also increase the need for interoperability amongst civilian and military contributors. Clearly, the complex future security environment will demand a comprehensive, integrated, adaptive, and networked focus in the application of national intent.



NOTES

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APPENDIX 1: SUMMARY OF DEDUCTIONS

Economic and Social Trends

1. While globalization will bring greater economic prosperity to more nations, the gap between rich and poor nations and individuals could possibly widen. Economic disparity will be a source of tension and potential conflict.
2. Developed nations will find it in their best interest to pursue diplomatic solutions for the protection of economic investments, trade, and transportation routes; however, aggressive responses to threats to trade or economic well-being are always a possibility.
3. Protection of both continental and international trade routes from disruption will be essential to Canada's economic well-being. Because of the transnational nature of maritime trade, the CF could possibly be asked to provide increased surveillance and other resources to keep potential threats away from vulnerable ports and transportation routes and to respond to threats that find their way into Canada's transportation infrastructure system.
4. The mass movement of large segments of people is destabilizing and may result in civil unrest, regional clashes, or humanitarian crises that require response and resolution through the diplomatic, development, and/or defence instruments of developed nations.
5. The urbanization of the world's populations will continue. The failure of the megalopolis in the developing world will increase the risk of disease, pandemic, and humanitarian crisis and will also accentuate the increasingly urbanized nature of conflict and the need for urban warfare capabilities.
6. Nations will have to be prepared to respond to the consequences of the global outbreak of infectious diseases.
7. Sub-Saharan Africa and Central Asia are regions where instability and inequality stemming from extreme poverty could possibly require humanitarian and/or stabilization missions.

8. Religious extremism will continue to be motivated by narratives founded on disagreement with secular and pluralistic social and governance models. The simplicity of these narratives will continue to attract followers across the globe, threatening Canada and its interests at home and abroad.
9. Youth bulges and high unemployment will continue to characterize the demographic profile of the developing world and will act as a root cause of regional and international instability.
10. Aging Western populations will be challenged to find recruits to sustain defence and armed force structures as competition for labour will occur worldwide in the private, public, and defence sectors, especially in Canada.

Environmental and Resource Trends

11. Climate change will result in increasingly violent weather patterns, drought, and natural disasters that will demand military support to assist victims around the world, ranging from humanitarian relief to full scale stability operations.
12. As the impact of global climate change becomes more widespread, the CF will need to consider the effectiveness of military systems, capabilities, and platforms associated with operating in extreme environmental conditions. Increased access to the Arctic, brought about by climate change, will have sovereignty, security, and environmental implications for Canada that will result in increased CF engagement in the Arctic region.
13. Worldwide harvesting and exploitation of the ocean's resources will not only continue in the future but will also intensify to the point where access, stewardship, and ownership may be possible sources of confrontation. There will be greater demand for the maritime surveillance capabilities of the CF and for standing patrols of marine space under Canadian jurisdiction.
14. Sufficient potable water and food – basic life requirements – will remain inaccessible to millions of people, particularly in the developing world. Developed nations will probably be called upon to provide humanitarian, stabilization, and/or reconstruction assistance.
15. Concerns over rising prices for, and access to, oil will probably be addressed through diplomatic means, but tensions and – even conflict – could possibly arise between states that are pursuing control over dwindling supplies. As



demand for oil begins to outstrip supply, viable energy alternatives will have to be found to run economies and militaries.

16. Competition for strategic minerals and metals will slowly increase as technological developments result in increased demand for them. Dollar diplomacy and diplomatic pressure could possibly succeed in securing adequate supply and access for the most powerful states.

Geopolitical Trends

17. Multilateral cooperation will remain essential, although coalitions of the willing will arise to challenge the perceived inertia of traditional organizations.
18. The effectiveness of the UN in dealing with violent crises will continue to be limited, but the organization will continue to play an important relevant role in humanitarian crises.
19. NATO will continue to play an important role in Western security affairs in the foreseeable future. However, it is probable that coalitions of the willing will displace the Alliance on many missions considered politically sensitive or urgent.
20. The EU will play a growing role in European security affairs but, barring the emergence of a direct and clear threat to European security, will probably continue to focus more on issues of internal governance than on international security.
21. Canada will continue to be interested in, and supportive of, the initiatives of the Organization of American States since it will ensure greater political and social stability in the region and will continue to be a mechanism for assisting in the prevention of terrorist attacks in the Western Hemisphere.
22. The Association of South-East Asian Nations will continue to play a regional security role by providing a forum for dialogue and cooperation; this will probably indirectly enhance the security of the member countries by building economic and cultural relationships.
23. The Asia-Pacific Economic Cooperation will continue to play a valuable role in fostering and maintaining non-security related relationships, but its effects on the security environment will be of second order, rather than direct.

24. The African Union is a potential entity for contributing to peace, prosperity, and stability on the African continent. Increasing AU capabilities could possibly reduce demand for military engagement in Africa, as unrest and instability could possibly be addressed through the AU and through diplomatic and development aid.
25. The continued existence and expansion of the Shanghai Cooperation Organization (SCO) will have to be monitored closely as the SCO could possibly increase tensions between eastern and western powers.
26. The United States will retain conventional military supremacy, but increasing economic challenges could erode its dominant position. Because of its unmatched military capabilities, adversaries will focus on asymmetric ways and means of undermining the superpower status of the United States.
27. The economic, military, and diplomatic rise of China will alter the global balance of power in the coming decades. China will be a regional, and possibly global, challenger to the economic power of the United States and, at the very least, a regional challenger to US military power in the Asia-Pacific region. It is unlikely that the US will quietly accept the erosion of its influence, which could possibly lead to increased tensions.
28. India's plans for military modernization are ambitious but will take many years to come to fruition.
29. Wanting to be a player on the world stage again, Russia will pursue warmer relations with Europe, NATO, and the United States in order to prevent marginalization and help recreate Russia as at least a regional power. For the foreseeable future, Russia will not aggressively challenge the United States or its allies.
30. The existing security environment in Latin America appears benign at first glance, but the activities of violent non-state actors will increase, possibly causing, as a second- or third-order effect, limited state-on-state conflict.
31. Maritime Southeast Asia and the South Pacific will continue to face massive developmental challenges over the coming decades, with a number of key areas threatened by Muslim extremism. Australia and New Zealand will continue to be challenged by the need to balance great and regional power relationships, instability within what they consider their inner strategic arc, the enormity of



the geographic reality of the region, and the variance in socio-cultural and ethnic context of state fragility that does not allow for blanket regional stability and development strategies.

32. The Middle East will remain volatile for the foreseeable future, and current conflicts show little promise of quick resolution. Western nations will probably provide diplomatic aid as opposed to engagement in prolonged regional and internal confrontations. Nevertheless, an expansion of American participation in conflicts in the Middle East cannot be dismissed if it is deemed to be in the interests of the United States.
33. A growing trend towards radicalized Islam and increasingly weak governance structures will continue to threaten the stability of the Central and South Asian region, prolonging the need for an international presence in Afghanistan and further eroding central authority in Pakistan.
34. Based on indicators of instability, Sub-Saharan Africa will probably see a significant number of states fail. The requests for developed nations – including Canada – to intervene with humanitarian, stabilization, and/or reconstruction missions will probably increase.

Science and Technology Trends

35. Nanotechnology will be instrumental in revolutionizing science and technology developments such as miniaturization, thereby altering defence applications for materials, processors, sensors, and human performance.
36. Developments in information, communications, computing, and sensor technologies are resulting in network-centric concepts and solutions that challenge existing hierarchies. Trends in technology will reach a point where computing, knowledge access, sensing, and the increased use of autonomous intelligent systems are omnipresent.
37. Convergence of bio and nanotechnology will develop new drug therapies, customized treatments, organic prosthetics, and enhance human performance. It is probable that adversaries will exploit these advances in to create more potent biological weapons, which will be countered by simultaneous advances in detection capabilities.

38. Although slow to emerge, the development of new energy technologies will be market driven and should somewhat reduce the demand for oil and fossil fuel worldwide. Research and development into more efficient electrical energy generation will allow military forces to function autonomously in remote regions for extended periods of time.
39. Advances in cognitive and behavioural science may make it possible to overcome traditional human barriers resulting from sustained operations, environmental ambiguity, and information overload.

Military and Security Trends

40. Future operations will find the CF working amongst, with, and against a diverse array of other armed groups, such as private military contractors, militias, armed followings, bandits, criminal syndicates, gangs, and insurgents. Additionally, the CF and its allies will also need to work with NGOs, who will be increasingly present in future theatres of operation, whenever possible to help achieve desired ends.
41. Adversarial non-state actors will seek to overcome an advanced military's strengths through employing such means as irregular warfare, the acquisition and use of Weapons of Mass Destruction, and the disruption of electronic information infrastructures through cyber attacks. Asymmetric tactics will also be viable options for state adversaries.
42. Countering terrorism is primarily a political and legal challenge, but the transnational nature of this threat means that militaries will probably be called upon in certain circumstances to assist civil authorities and will certainly be faced with the effects of terrorism in operational theatres.
43. The increasing commercialization of weapons will allow some developing nations and non-state actors to acquire inexpensive and sophisticated military capabilities. Hence, Canada and its allies will be confronted by a mixture of conventional, CBRN, and novel technology weapons in the hands of a variety of state and non-state actors, thus necessitating that Canada be able to apply the full spectrum of capabilities, even against non-state actors.
44. Modern nations will have a stake in protecting space-based assets and will need to maintain robust and redundant capabilities that anticipate the loss of at least some current competitive information technology advantages.



Interstate rivalries and conflict in the future will probably extend into space, and even non-state actors and some less developed nations will probably be able to access and use assets in this environment, thus eroding the exclusive advantage currently possessed by modern militaries.

Conclusions

45. A complex future security environment will demand a comprehensive, integrated, adaptive, and networked focus in the application of government policy.



APPENDIX 2: METHODOLOGY

Research into the future security environment is assuming increasing significance for all military force developers because of the uncertainty of the post-Cold War era and the rapidity of technological, social, and political change. The approach to futures research¹ taken by the FSE document is based on an informed methodology that is shared by Canada's allies, where literature research, trend and driver identification/analysis, and wider consultation with subject matter experts are combined. The FSE applies the Delphi Method of futures research, which includes an environmental scan of trends, extrapolation of which phenomena will likely endure over a specific period of time, and a cross impact analysis of how various simultaneously occurring trends would likely impact one another.²

Writing the document itself was the responsibility of the Directorate of Future Security Analysis (DFSA is a directorate within the Chief of Force Development). This task was not done in isolation, however; it was the product of extensive research into authoritative sources and of broad national and international consultations. As a first step, the DFSA writing team³ reviewed the future security environment assessments of allies, other nations, and international organizations, as well as the operating concepts of the militaries with whom the CF is currently working. Through a standing contract with an international strategic intelligence company (which employs some 200 analysts and a global network of over 800 sources),⁴ DFSA received global forecasts on the risks of violence and political upheaval. Unclassified intelligence updates are delivered on a daily basis, and DFSA has access to a wide range of detailed strategic analysis information. After this extensive literature review and wide consultation with stakeholders, the DFSA writing team selected the trends out to 2030 that would not only be the most enduring but would also be most representative and applicable to the Canadian context (either directly to the nation or indirectly through its allied partners and coalitions).

Throughout the writing and revision process, DFSA conducted an extensive series of consultations both inside and outside the Department of National Defence and Canada. The feedback obtained via this consultation process helped refine the deductions and highlighted other important trends worthy of inclusion. On the international level, Canada has access to its allies, including the twenty-six members of NATO; thus, DFSA was able to glean perspectives and insights from fellow force developers and security environment analysts. DFSA also reached out to security environment experts in academia, and industry. As a key member of the Environmental Scanning Practice Group, which is comprised of thirty-seven Government of Canada

departments and agencies, DFSA was able to leverage this pool of expertise and obtain insights and feedback from these other government departments.

Internal DND stakeholders have offered their reviews and comments on the different FSE drafts issued between November 2007 and July 2008. This document was also sent for comments to the Capability Development Board (CDB) in November 2007 and the Joint Capability Requirements Board (JCRB) in February 2008. In December 2007, January 2008, and March 2008, DFSA invited civilian and uniformed members from various sectors of the defence community (including all JCRB members) to participate in consultations concerning the FSE's content, deductions, implications, and military "so-whats." An external review was completed in February 2008 by Dr. James Fergusson (University of Manitoba), Dr. Richard Gimblett (Naval Officers Association of Canada), Peter Padbury (Policy Research Initiative), and Mark Ronald (Development, Concepts, and Doctrine Centre of the UK Ministry of Defence). Between November 2007 and July 2008, the feedback obtained from CDB, JCRB, ADM (Policy), external reviewers, and all the other consultations was meticulously reviewed and incorporated into the final draft.

NOTES

1 Futures research's "primary objective is to help decision-makers gain a better understanding of the potential consequences of present and future decisions by developing images of alternative futures." World Future Society, "Editorial Policy," *Futures Research Quarterly*, <http://www.wfs.org/frq.htm> [accessed 25 March 2008].

2 Darlene Weingand, "Futures Research Methodologies: Linking Today's Decisions with Tomorrow's Possibilities." 61st International Federation of Library Associations and Institutions Annual Conference. August 1995.

3 The DFSA writing team has consisted of Rachel Lea Heide (DRDC-CORA Defence Scientist/Strategic Analyst), Charles Morrisey (DRDC-CORA Defence Scientist/Strategic Analyst), Neil Chuka (DRDC-CORA Defence Scientist/Strategic Analyst), Shaye Friesen (DRDC-CORA Defence Scientist/Strategic Analyst), Steve Hughes (DRDC Ottawa Defence Scientist), Len Goodman (DRDC Ottawa Defence Scientist), David Lehman (ADM Pol Policy Officer), Nicole Alie, (Research Intern), Tom Conway (Research Intern), Nicole Waintraub (Research Intern), LCol Chris Kilford (former A/DFSA), LCol Stefan Koestner (German Air Force exchange officer), Major Bertram Frandsen, LCdr Lorne Hartell, and LCdr Ramona Burke. Further research and writing was contributed by David Rudd (DRDC-CORA Defence Scientist/Strategic Analyst with CANOSCOM COST) and Paul Dickson (DRDC-CORA Defence Scientist/Strategic Analyst with CAS Directorate of Air Strategic Planning), as well as by the DRDC-CORA Defence Scientist/Strategic Analyst team in ADM (Policy) Directorate of Strategic Analysis: Nebojsa Bjelakovic, Brian Greene, Peter Johnston, Tony Kellett, Ben Lombardi, Anton Minkov, Don Neill, and Christina Yeung.

4 Exclusive Analysis Ltd, <http://www.exclusive-analysis.com>.



APPENDIX 3: GLOSSARY

TERM	DEFINITION	USAGE
Adaptive	Able to adjust or modify fittingly. Adaptability is necessary for survival in a complex world.	Canada ¹
Asymmetric Threat	A threat by a opposing party to attack a nation by avoiding strengths, exploiting vulnerabilities and employing unexpected or unusual techniques; a threat relating to the potential use of dissimilar means or methods of circumventing or negating an opponent's strengths while exploiting his weaknesses in order to obtain a disproportionate result.	Canada ²
Asymmetric Warfare	Warfare aimed at disrupting and weakening a nominally superior opponent to the point of strategic exhaustion.	ABCA ³
Biotechnology	A broad term generally used to describe the use of biology in industrial processes such as agriculture, brewing and baking. Recently, the word has come to refer more to the production of genetically modified organisms or the manufacture of products from genetically modified organisms.	Australia ⁴
C4ISR	Command, control, communications, computers, intelligence, surveillance, and reconnaissance.	Canada ⁵
CBRN	Chemical, biological, radiological, or nuclear.	Canada ⁶
CBRN Weapon	A weapon designed to release chemical, biological or radiological material or result in a nuclear detonation.	Canada ⁷
Challenge	Apolitical conditions with the potential to have a negative impact on national interests.	Canada ⁸
Complex	Consisting of multiple interrelated, adaptive, and evolutionary parts where each part can potentially affect all other parts; not easily predicted or replicated.	Canada ⁹
Comprehensive	Of large scope; inclusive.	Canada ¹⁰
Comprehensive Approach	The term Comprehensive Approach (CA) is used in a broad generic sense to describe the broad scope of actions undertaken in a coordinated and collaborative manner by national and multinational military forces, host-nation and other civilian government agencies, international and intergovernmental organizations, non-governmental organizations, or the private sector to achieve greater harmonization in analysing, planning, managing and evaluating coalition interventions in complex contingencies and emergencies.	MNE 5 ¹¹
Conflict	A fight, struggle or clash between alliances, individual States, or factions within a State. This can be over social, economic, resource, environmental, diplomatic, or security drivers. Where the opposing parties resort to the use of weapons, the conflict becomes an armed conflict.	Canada ¹²

TERM	DEFINITION	USAGE
Conventional Forces	Forces having the capacity to conduct operations without using nuclear, biological, or chemical weapons.	Canada ¹³
Desertification	The degradation of land in arid, semi-arid, and dry sub-humid areas. It is caused primarily by human activities and climatic variations. Desertification does not refer to the expansion of existing deserts.	United Nations ¹⁴
Driver	A factor determined to be an important contributor to change affecting the future.	United States ¹⁵
Extreme Poverty	A situation where people are living on less than \$1 a day.	United Nations ¹⁶
Failed State	A state that has lost physical control of its territory and/or the monopoly on the legitimate use of force. Other attributes of state failure include the erosion of the legitimate authority to make collective decisions, the inability to provide reasonable public services and the inability to interact with other states as a full member of the international community.	Foreign Policy Journal ¹⁷
Fragile State	A state whose the government cannot/will not deliver core functions (territorial control, safety and security, public resources management, basic services delivery, protection of the poor) to the majority of its people.	United Kingdom ¹⁸
Futures Research	The formulation and development of visions of alternative futures to enable a better understanding of the possible consequences of present and future decisions. It has strong and sound historical origins in sociology and, more recently, in political science and the other social sciences. It also has independent origins in corporate and institutional planning and in strategic and long-range planning, and it has significant contemporary roots in government, particularly in national security. The successful practice of futures research requires contributions from established academic disciplines and from such cross-disciplinary fields as technology assessment, policy analysis, operations research, and issues management.	World Future Society ¹⁹
Globalization	The growing interconnectedness reflected in the increase flow of information, technology, goods, services, and people throughout the world. The increased mobility of goods, services, ideas, labour, technology, and capital throughout the world.	National Intelligence Council, ABCA ²⁰
Humanitarian Assistance	In the context of an operation, the use of available military resources to assist or complement the efforts of responsible civil actors in the area of operations, or the work of specialized civil humanitarian organizations in fulfilling their primary responsibility to alleviate human suffering.	Canada ²¹



TERM	DEFINITION	USAGE
Humanitarian Operations	An operation specifically mounted to alleviate human suffering where responsible civil actors in an area are unable or unwilling to adequately support a population. It may precede, parallel or complement the work of specialized civil humanitarian organizations.	Canada ²²
Hybrid War	The incorporation of a full range of modes of warfare, including conventional capabilities, irregular tactics, terrorist acts and criminal disorder. Hybrid wars can be conducted by both state and non-state actors.	ABCA ²³
Insurgency	An armed conflict between one or more non-state actors and a state, whereby the former tries to modify the political order and the latter tries to maintain it.	Canada ²⁴
Integrated	Combining or coordinating separate elements to allow them to function cooperatively. Joint is a military form of integration within a force. Combined is another example of the integration of the military services of two or more nations.	Canada ²⁵
Less Developed Regions	All regions of Africa, Asia (excluding Japan) and Latin America and the Caribbean, plus Melanesia, Micronesia, and Polynesia.	United Nations ²⁶
More Developed Regions	All regions of Europe plus North America, Australia/New Zealand, and Japan.	United Nations ²⁷
Megacity	Urban agglomeration of at least 10 million inhabitants.	United Nations ²⁸
Meta-national	A company that builds competitive advantage by discovering, accessing, mobilizing, and leveraging knowledge from many locations around the world.	Academia ²⁹
Nanotechnology	The study of matter on an ultra-small scale. One nanometre is one-millionth of a millimetre.	United Kingdom ³⁰
Networked	Groups of any kind, size, or purpose (political, diplomatic, economic, social, military, media, internet). This term does not refer solely to technology.	Canada ³¹
Peak Oil	The maximum rate of the production of oil in any area under consideration, given that oil is a finite natural resource, subject to depletion	Association for the Study of Peak Oil and Gas ³²
Shock	An event that accelerates or decelerates a trend, reverses the direction of a trend or even precipitates a new trend. Shocks alter the course of trends. Shocks can be sudden and violent and are often unanticipated. They can also occur when a system passes a critical point and undergoes a phase change.	United States ³³
Stability Operations	A tactical activity conducted by military and security forces, often in conjunction with other agencies, to maintain, restore or establish a climate of order.	Canada ³⁴

TERM	DEFINITION	USAGE
Terrorism	The unlawful use or threatened use of force or violence against individuals or property for the purpose of coercing or intimidating governments or societies in order to achieve political, religious or ideological objectives; the threat or use of physical coercion, primarily against non-combatants, especially civilians, to create fear in order to achieve various political objectives.	Canada ³⁵ and Academia ³⁶
Threat	Potential problems posed by political actors (both state and non-state) who have the intent and capacity to do harm	Canada ³⁷
Trend	The direction and speed of change in important components of the international environment. A trend is a description of the manner in which one of these components is changing, accelerating, or decelerating.	United States ³⁸
Weapons of Mass Destruction	A weapon that is capable of a high order of destruction and that can be used to destroy people, infrastructure, or other resources on a large scale.	Canada ³⁹
Weapons of Mass Effect	Weapons capable of inflicting grave destructive, psychological, and/or economic damage. These include include, but are not limited to, CBRN or explosive weapons. Such weapons do not need to inflict physical damage to have mass effect (i.e., cyber attacks).	United States ⁴⁰

NOTES

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