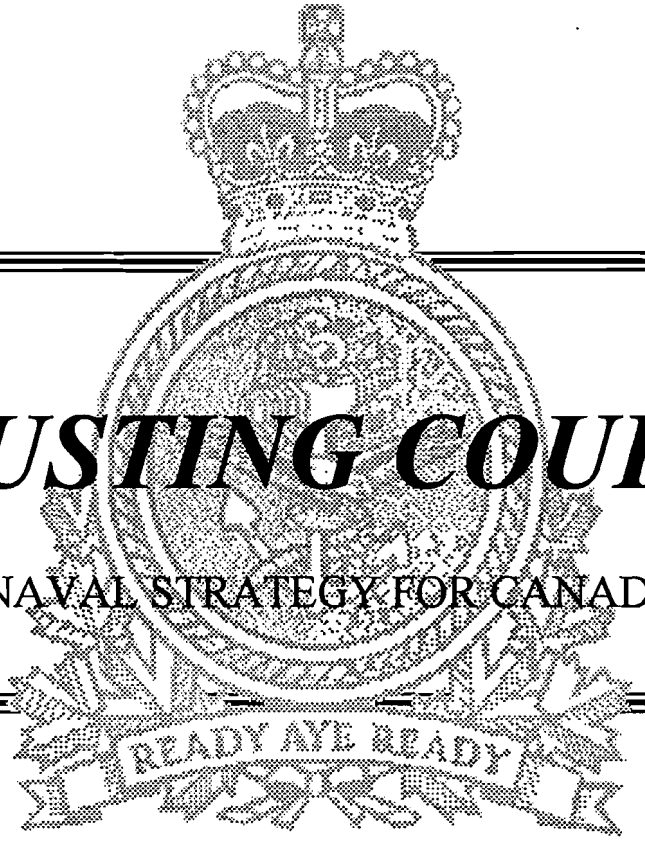

ADJUSTING COURSE:

A NAVAL STRATEGY FOR CANADA

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April 1997

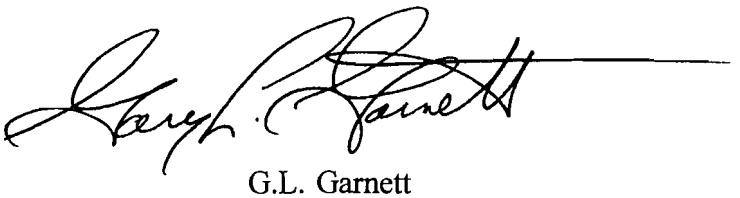
FOREWORD

Canada stands at a historic crossroads. The end of the Cold War removed the strategic certainties that had long bound our horizon. We are faced with the challenge of crafting a truly national stance on the world stage, one unencumbered by colonial baggage and less dependent on Alliance considerations. This paper is the culmination of one of the navy's efforts to respond - to learn from history, understand on-going changes, consider options and, from there, propose a truly Canadian naval strategy.

Adjusting Course: A Naval Strategy for Canada is an ambitious document that projects the future strategic environment and charts a way ahead over the next two decades. The expanding scope of our national maritime interests, exemplified by the Ocean Act's recent proclamation of a 200 mile Exclusive Economic Zone, requires that we pay increased attention to safeguarding our maritime resources. The fundamentals of sovereignty and good stewardship require robust maritime forces with long range and good sea keeping characteristics to complement the efforts of other government departments. As it has throughout our history, the Arctic, with its uniquely harsh environment, will remain a challenge. In the future, new technologies being developed by Canadian companies may allow a more effective presence in our North.

Increasing globalization and the trade dependent nature of our economy mandate that Canada remain engaged internationally if we wish to enjoy continued peace and prosperity. We must expand beyond our traditional Euro-centric focus and adapt to the growing importance of Asia-Pacific and other regions. Naval forces, already employed for national responsibilities, have always had the additional task of promoting Canadian interests abroad. Given the continued lack of order in our world, maritime forces may be called upon at short notice to respond to challenges to global stability and must be prepared to fight alongside like-minded nations. In short, naval forces will continue to be extremely relevant and, as they have in past centuries, will provide diplomats with options, not commitments.

This paper embodies our professional consensus, and provides a common frame of reference for consideration of maritime issues, hopefully as a catalyst for thought. Clearly, periodic reassessment will be required. This paper is published for wide distribution to stimulate dialogue and to promote public understanding of our maritime security policies.



G.L. Garnett
Rear Admiral
Commander
Maritime Command

Executive Summary

Although the Navy's force structure will be ultimately determined by political decisions, the Navy cannot help but have opinions on what is the proper mix of platforms and an appropriate sized fleet. This study is an examination of future developments that will affect the requirements for Canada's Navy. It is based on the following assumptions:

- Despite changes in technology, proliferation of non-state actors, and changing definitions of security, the nature of war will not change;
- Canada's vast size, sparse populations and limited fiscal resources compels us to seek our security through collective efforts;
- Irrespective of this fact Canada will still need to independently assert sovereignty over its borders; and,
- Canada's local security environment will not fundamentally change by 2015.

In part one, the operating environment of the Canadian Navy is examined. This includes global factors, domestic factors, technological factors, and trends in technological modernisation. It finds that:

- Canada's armed forces are likely to be operationally busier in the next century given continuing instability due to growing number of non-state actors, differing levels of economic progress, the proliferation of weapons, and resource scarcity. Growing interdependence will mean that Canada's interests will be increasingly engaged on a global scale;
- The domestic environment will continue to challenge the Navy. The large and expensive ships required by Canadian geography will be difficult to acquire due to economic constraints and a sceptical public. Demographic changes will pose additional problems: although the recruiting base will swell, economic constraints may test the Navy's ability to attract these young Canadians from career paths in the private sector.
- Naval vessels will continue to face dangerous threats on the sea in the form of intelligent anti-ship missiles, increasingly capable warships and submarines, shore based weaponry, and mines;
- The ongoing Revolution in Military Affairs will not impact on the Navy as much as on land forces, however, radical improvements in situational awareness, signature reduction, and command and control can be expected. New methods of crew training may have to be contemplated. Further, these developments will pose special problems for multinational operations, and;
- The Navy will have to concentrate on multinational operations, preserve its ability to protect Canadian sovereignty, maintain the C^3I interface with its partners, particularly the USN, and develop an ongoing public information strategy to explain its force structure and doctrine as well as to educate the public regarding general naval operations.

In part two, Canadian naval operations are examined. This section includes naval missions and roles, and the capabilities required by each. It finds that:

- The Navy must be prepared to take on a wide variety of missions at short notice. It will be critical to preserve capabilities and readiness so as to avoid losing flexibility;
- Distinctions between requirements for national operations and international operations are shrinking;
- Surveillance will be a key capability needing to be protected, as will our ability to interact with foreign vessels;
- Automation may solve some problems, however, there may be critical limits to how far automation can be implemented.

Finally, the paper recommends that the Navy's high standards of professionalism be maintained, and its aging forces be replaced. However, it concludes that this is likely to be a hard sell with the Canadian public and the Media. This future debate cannot be left to the Navy's critics. Naval capabilities will be placed at risk unless the Navy gets in front of the agenda with an ongoing pro-active media and public education strategy. The Navy's future battles will be lost *first* in the living rooms of the Canadian public.

Requirement for Canada's Naval Forces

Looking ahead is an important and challenging activity. The approaching end of the century has provided people and organisations an opportunity to pause and reflect on the coming changes facing us, much as the end of the Cold War did. For the Navy, the next century promises to bring many changes and challenges. Canada's extensive maritime interests, both at home and abroad, make it essential that Canada's naval forces be constantly updated to address them.

National security is addressed at a variety of levels. At its most general, Canadian security is founded upon *strategic* issues of national interests, values, objectives and policies. Each of these refers to purely political concepts which in turn have ramifications for military developments. At a more particular level, national security is affected by the *operational* issues relating to military strategy and operational guidance. These translate strategic issues into actual military policies and operations. Finally, at its most specific, national security is affected by *tactical* level issues such as plans, procedures, and tactics. Thus, security is a sequential concept, with each level building upon the other.

From a different perspective, the requirements for Canada's Navy are entirely dependent upon political decisions made by Parliament and the Canadian public.[1] Although political direction moves along a single heading, the lower levels have distinct ramifications for how or whether political objectives and interests are accomplished. Thus, national security requires strict attention to the environment which envelops the state. While it seems obvious that the most important are the international and technological environments, close attention must be paid to the domestic as well. Non-political issues such as the economy, national geography, and demographics all affect how both political and military objectives are realised. A further domestic issue that bridges both the environment and politics is that of communications. In the future this element will play an increasingly important role in shaping both national policy and military operations.

While the Navy cannot comment on future political developments, this study, ***Adjusting Course***, addresses the environmental matters that will shape both maritime security and naval operations.[2] It also examines how these will affect the missions and tasks currently pursued by Maritime Command.

This study makes the following assumptions which are reinforced by the findings of part one. First, the next century will see little diminution in human conflict. While the nature of war may change substantially given the developments of technology, proliferation of non-state actors, and changing definitions of security, states will still find the use of, or threat of force necessary. Second, given Canada's vast size, sparse population, and limited fiscal resources, we must continue to pursue many of our security objectives through the collective efforts of like minded nations. Third, despite

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[1] Joint Operations for Canadian Forces, pp. 1-9 - 1-10.

[2] In this document the term "maritime" refers to the larger set of elements that comprise ocean related issues. "Naval" is a subset of maritime and refers precisely to military operations conducted at sea. Maritime has been retained for only official institutions and formations so as to assist the document's accessibility outside of its uniformed audience much as The Maritime Vision was renamed The Naval Vision .

this fact, Canada will still need to assert its sovereignty over its borders. While international politics may begin to include more actors than simply states, the state will still be the only institution capable of asserting national interests on the global stage. Last, this study assumes that the international security status of Canada will not change fundamentally in the near future. Thus, no direct threat to our existence will emerge from foreign sources. This is not to say that challenges to our sovereign rights, resources, or interests requiring some use of military force will not occur. Neither does this mean that indirect threats to Canada will not emerge.

This study finds that given the above assumptions, Canadian naval forces will continue to require versatile and capable platforms. Canadian ships will continue to be sent on global missions in support of peace and stability. The areas that they will travel in will often not be as placid as the ocean approaches to our country. Some will be highly dangerous. Our own waters may be periodically challenged by a variety of forces and events. Naval vessels and aircraft capable of a wide variety of missions, tasks, and operations will give the government of the day the widest possible discretion in responding to these challenges whether they be in the Labrador or Andaman Sea.

The consequences of technological and world change will be critical for our future. The assessments that follow are designed to spur reflection on how to deal with the many possible futures we face.

PART ONE: THE OPERATING ENVIRONMENT TO 2015

Rooted in History, Poised for the Future

Naval forces have strongly influenced the evolution of Canada from the settlement of the first Europeans.[3] In the first years after Confederation Canada maintained its previous, traditional, reliance on Britain's Royal Navy. The eventual formation of Canada's Navy in 1910 highlighted the difficult issues that creating and maintaining naval forces pose for Canadians. Canada cannot create naval forces capable of neutralising all potential security threats: a sparsely populated country of immense proportions, bordered by a nation at least ten times stronger cannot possibly fend off all threats with force. This demands that security be sought through alliances or collective agreements. Some naval forces are clearly required, but how much is less easily defined.

Canada began acquiring limited maritime forces soon after Confederation, but these were not true naval forces. A desire to promote good relations with the United States had led to selective British enforcement of Canadian fisheries regulations, often to the detriment of Canadian interests.[4] Therefore, in the late nineteenth century Canada began to conduct patrols to regulate natural resources in her own waters. This situation underlined the risk involved in relying on Allies for support: there may be significant differences over the relative importance of issues.[5] As Canada had to rely on the Royal Navy's support to a large extent, Britain retained significant influence in Canada's foreign policy until after the First World War.

These early initiatives toward maritime forces culminated in the passage of a Canadian Naval Services Act in 1910. Unfortunately, Canadians remained caught between a desire to contribute to collective security and an equally strong desire to focus solely on local defence. [6] Thus only limited naval strength was available in 1914.

When the First World War broke out, the lack of consensus concerning naval policy ensured that Canada's Navy was ill prepared for hostilities. British pre-occupation with European waters also left Canada without local protection and the task of raising emergency coastal defence flotillas under nearly impossible conditions. Before 1914, the Conservatives and many other Canadians had been convinced that any Canadian warship must serve under British control. Now, the Borden government took care to keep the coastal defence force firmly under national control.[7] Strenuous efforts created

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[3] The British navy's decisive defeat of the French at Quiberon Bay in 1759 isolated New France, leading to the establishment of British North America. The looming presence of the Royal Navy provided security for our Dominion in the period after Confederation. B. Gough, "Sea Power and Canada" Canadian Defence Quarterly, Vol 20, No 3, (Winter, 1990), p. 41.

[4] M.L. Hadley, R.F. Sarty, Tin-Pots and Pirate Ships: Canadian Naval Forces and German Sea Raiders 1880-1918 (Montreal & Kingston: McGill-Queen's University Press, 1991), p. 6.

[5] Ibid, pp. 6-7.

[6] Canadian leaders balked at the British Admiralty's suggestion that Commonwealth countries make contributions to the construction of British naval forces, anticipating the resistance of French Canadians and other strong nationalists. Hadley & Sarty, p. 8; R.H. Gimblett, "'Tin-Pots' or Dreadnoughts?: The Evolution of the Naval Policy of the Laurier Administration, 1896-1911", Unpublished MA Thesis, Trent University, 1981, p. 7.

[7] Hadley and Sarty, pp. 63-64; Gimblett 221-222. Gordon, p. 416.

a modest fleet of patrol boats by 1918, enough to contain but not prevent the depredations of German submarines.[8]

Inter-service rivalry and inter-war budgetary constraints, especially during the Depression, almost ended the Navy's existence before rising international tensions encouraged a modest rebuilding. In 1939 the Royal Canadian Navy entered World War II with a small fleet of destroyers and minesweepers.[9] Canada's naval expansion proceeded slowly in the first year of the war. In addition to the slow speed in letting orders for ships, there were three major difficulties about which the Navy had long-since warned the government: the inability of Canada's inexperienced shipbuilding industry to quickly meet the high standards required, the lack of British capacity to fill the gaps, and the lack of the whole range of infrastructure needed to sustain an expanded fleet.[10] Nonetheless, during the war the RCN underwent the largest relative growth of any navy and suffered commensurate growing pains.[11]

After the war Canada's maritime forces were cut dramatically but never to the inadequate state they had decayed to during the inter-war period. Two World Wars had amply demonstrated the costs of inadequate defence preparations. The RCN made a small but important contribution during the Korean War. Within days of the UN resolution condemning North Korea's aggression, three destroyers departed Esquimalt.[12] This deployment aptly demonstrated the flexibility of naval power; the RCN provided Canada with a timely and useful offering, as the first Canadian troops did not arrive at the Korean front until eight months after the war began.[13]

With the stimulus of the Korean conflict, and a growing Cold War, the RCN grew to a strength of 20,000 by the mid-fifties and introduced into service the St. Laurent class, which would form the backbone of the fleet for the next three and a half decades. The Navy remained on the leading edge of ASW technology with the deployment of helicopters with dipping sonar, first aboard Magnificent, and later aboard frigate sized vessels. The RCN also assumed responsibility for a significant portion of the Atlantic as part of Canada's contribution to NATO during the 1950s, a

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[8] Unfortunately, the 'warships' were mainly small trawlers, drifters and converted yachts, hastily improvised for war-time service, manned by some two thousand sailors, mostly raw recruits. When the war ended the condition of Canada's naval ships was generally poor, and the facilities of the dockyard at Halifax so wretched they were the subject of acrimonious debate as to responsibility. The one encounter between the RCN and a heavily armed German submarine during the war witnessed the ignominious flight of the small Canadian vessel. Sarty & Hadley, Op Cit, pp. 291, 293, 301-303;

[9] The RCN boasted a fleet of six destroyers and five minesweepers when war broke out in 1939. In addition, the RCN had a three masted schooner for training, and a converted fishing boat employed for coastal patrols by the Fisherman's Reserve on the West Coast. M. Milner, North Atlantic Run (Toronto: University of Toronto Press, 1985), p. 6.

[10] Milner, Op Cit, p. 8.

[11] These problems are further discussed by M. Milner. U-Boat Hunters (Toronto: University of Toronto Press, 1995), pp. 52-53; and Zimmerman, The Great Naval Battle of Ottawa (Toronto: University of Toronto Press, 1989).

[12] Thor Thorgrimsson and E.C. Russel, Canadian Naval Operations in Korean Waters 1950-1955 (Ottawa: Queens Printer and Controller of Stationary, 1965),p. 3. See also Joel Sokolsky, "Canada and the Cold War at Sea", The RCN in Transition, W.A.B. Douglas (ed.) (Vancouver: UBC Press, 1988) p. 214; T. German, The Sea is at Our Gates (Toronto: McClelland & Stewart, Inc, 1990), pp. 216-232. A personal account of a destroyer commanding officer's tour off Korea is provided by J. Bovey, "The Destroyer's War in Korea, 1952-1953", The RCN in Retrospect, J.A. Boutilier (ed), (Vancouver: UBC Press, 1982), pp. 250-270.

[13] Thorgrimsson and Russel, Op Cit, p. 40 and D. Morton, A Military History of Canada (Edmonton: Hurtig Publishers, 1985),p. 235.

charge which continues today.[14] During that decade the RCN also improved its coordination with the United States Navy, a natural consequence of cooperative efforts to defend North America as well as collaboration within the NATO alliance. The culmination of this close teamwork came during the Cuban missile crisis.[15]

Nevertheless, decreasing defence funding combined with soaring equipment costs imposed increasing constraints on the Canadian defence budget. The recommendations of the *Brock Report*[16] were far more ambitious than the government proved willing to consider, and only a fraction became reality. The eight ship General Purpose Frigate Program, conceived in response to the Report, was first cancelled, then re-emerged as the four ship DDH 280, Iroquois Class, completed between 1969-73. The most tangible example of the decline was the sale of the Navy's last aircraft carrier, the Bonaventure in 1970.[17]

Growing concern over the "rusting out" of the Navy[18] and the resurgence of the Cold War led to the announcement of the Destroyer Life Extension (DELEX) programme for the older ships as well as the Canadian Patrol Frigate programme. DELEX provided the Navy with some breathing room while waiting for the newer CPFs to arrive in service. Although designed to defend against the Soviet Union, the CPFs, together with the modernised Iroquois class destroyers, have proven their worth in the post-Cold War environment as well.[19]

With the fall of the Berlin Wall and the collapse of the Soviet Union, a new situation faces Canada's maritime forces. The reduced threat of global war has permitted a reduction in readiness levels and has made preparations for high level operations against large fleets of enemy warships less necessary. Nevertheless, military activity has actually increased in order to support increasing UN commitments as well as to provide greater support to other government departments. The broadening definition of security, which now includes not only military defence but also many other non-military roles, has contributed to the growing variety of roles undertaken. In view of national economic realities, these increased maritime commitments must be met within an environment of greater fiscal constraint.

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[14] German, Op Cit, 236.

[15] Commander (ret'd) Peter T. Haydon, The 1962 Cuban Missile Crisis: Canadian Involvement Reconsidered (Toronto: Canadian Institute of Strategic Studies, 1993).

[16] In general, the Report recommended an increased ability to lift and deliver troops using a new class of helicopter carrying ships. It also acknowledged the inability of Canada to remain capable in all areas of naval warfare with the recommendation that Canada not replace the soon-to-be-retired fighter aircraft carried aboard the RCN's last remaining carrier. The report also proposed the future acquisition of nuclear submarines, a new class of vessels considered to be the most effective ASW platform. S.M. Davis, Submarine Acquisition in the RCN: From Nuclear to the Conventional, 1955-65 (Kingston: Centre for International Relations, Queen's University, 1988).

[17] S. Soward, "Canadian Naval Aviation, 1915-69", RCN in Retrospect, 1910-1968, J.A. Boutilier (ed.) (Vancouver: UBC Press, 1982), 283.

[18] The status of Maritime Command in this period is succinctly described by Desmond Morton as one of "embarrassing weakness".Morton, Op Cit, 260.

[19] T. Lynch, "DELEXing the Frigates", Canada's Navy: A Special Edition of Wing's Magazine (Calgary, Alberta: Corvus Publishing Group Ltd, 1985), 148; DSP No. M1445 Canadian Patrol Frigate (CPF) Project Implementation Plan (PIP), Rev 3, (DND Document 11900-CPF-2010 (MSM) dated 13 December 1991), 1-4; T. Lynch, "TRUMPed Tribals", Canada's Navy: A Special Edition of Wing's Magazine (Calgary, Alberta: Corvus Publishing Group Ltd, 1985), 137.

Charting the Global Environment

The end of the Cold War transformed the international security situation. The likelihood of global war fell significantly. However, the potential for regional conflict has grown as the discipline imposed by the superpowers gradually dissipates. At the same time, the paralysis that often gripped the UN's Security Council during the Cold War has given way to a more aggressive and interventionist interpretation of the UN Charter, resulting in the growth of peacekeeping and peacemaking missions. In short, the direct threat to Canada has diminished while the operational demands on the Canadian Forces has actually increased.

Globalization of Trade

The continuing expansion and liberalization of international trade has increased the level of economic interdependence throughout much of the world. The North American Free Trade Agreement (NAFTA) and the European Union (EU) are two of the more significant examples of expanding free trade areas. Though the trend towards the globalization of trade is clear, its consequences are not. Growing prosperity may make armed conflict less likely given the mutual vulnerability of states to trade disruption. However, not all areas are advancing as quickly as others: existing tensions between the developed and developing worlds are apt to become exacerbated as states evolve at different rates in response to these trends. Prosperity does not rule out the possibility of conflict based upon cultural, linguistic, ethnic, and religious differences. These clashes are frequently the most difficult to deal with, springing from passions such as hatred, envy, and fanaticism. Worse, greater prosperity may stimulate arms races among regional competitors. Periodic trade or debt crises (such as the crash of the Mexican peso in 1995) may have distinct security implications if the international financial system cannot quickly contain them. Irrespective of these developments, states are likely to face considerable internal problems as they attempt to cope with the effects of these transformations upon their traditional political, social, and economic structures.

The Information Revolution and the Media

The shift to an information based economy is having a profound global influence. Some analysts have compared its effects to the industrial revolution and anticipate similarly far-reaching changes to all facets of society.[20] The advent of new technologies for the rapid transmission of information, especially through televised images, has greatly expanded and increased the media's influence on foreign policy. Governments are now pressured to respond to a greater range of situations that do not directly affect the security of the state but are of concern to its citizens. The UN effort in Somalia in 1992-93 is an example of how concern for a humanitarian crisis can result in an unexpected military tasking.[21] The stillborn operation in Rwanda in 1996 is a clear example how the media can move governments to action even without a public outcry.[22] The ubiquitous global

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[20] Alvin Toffler, The Third Wave (London: William Collins Sons & Co Ltd, 1980), p.25.

[21] MGen (ret'd) Lewis Mackenzie, Peacekeeper, (Toronto: Harper Collins Publishers Ltd, 1994), pp.514-515.

[22] See esp. *Globe and Mail*, Nov. 13, 1996, p. A1 for Prime Minister Chretien's response to the growing tragedy in Rwanda and the role of the media in shaping it. Nevertheless, the inadequate response to another human tragedy, in Rwanda in 1994, demonstrates that the world's reaction cannot be predicted in advance.

media ensures that reporters are present before troops hit the beaches.[23] Two implications are clear: military forces will be called upon to respond to a greater range of situations based upon a broader conception of security, and the commanders of those forces must anticipate and plan for intense media coverage in future military operations as an integral element of operational strategy.

The Evolution of International Politics

The state remains the principal actor in the international system but strong international and sub-national trends affect its role on all sides. International organisations and institutions like NAFTA, the EU, and the United Nations Convention on the Law of the Sea (UNCLOS) are accumulating as fast as their jurisdictions seem to be expanding. This growth of international agencies has increased the points of contact between states as well as the agenda of the international arena. As a result, states are increasingly involved in military and paramilitary contingencies that would have been unthinkable only a decade ago. At the same time transnational forces including fundamentalist religion, frustrated nationalism, and illegal drug trafficking extend across borders and undermine, or directly challenge, the authority of existing governments. A tragic example of the latter is the conflict that has wracked the former Republic of Yugoslavia throughout much of this decade. The spectrum of potential conflicts has increased as a result of attempts by new, non-state actors to exert influence within the international system.

Democratization

Since the end of the Cold War there has been an upsurge in the number of democratic and democratizing states in the world. Such a trend is positive from the perspective of individual human rights and freedoms. The growing number of democratic states has not lead to a commensurate increase in international stability In fact, the very act of changing from autocracy to democracy is a cause of instability and war as states in transition to democracy are significantly more prone to both intra-state and inter-state conflict. Furthermore, most of the newly-democratized states have found the transition to be difficult and, for some, the ultimate success of democracy remains in doubt.[24]

Population Growth

The world's population is projected to reach 10 billion by the middle of the next century. Most of this growth will occur in the developing world in areas least able to support it. "General or uneven population growth often encourages political instability, social unrest or ethnic tensions..."[25] and can have a range of consequences from involuntary migrations of potentially massive proportions to regional instability and conflict, not to mention humanitarian disasters of enormous magnitude.[26] Restricting the scope of these consequences will require innovative strategies if conflict is to be avoided.[27]

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[23] Somalia is a clear example of this, but the reports of Shaw and Arnett from Baghdad also demonstrate this trend.

[24] Edward D. Mansfield and Jack Snyder, "Democratization and the Danger of War", International Security, (Summer 1995: Volume 20, Number 1), p.36.

[25] Air Command, Project 2020: Flight Plan for Change, Phase 1 Report: Through the Looking Glass, February 1994, p.33.

[26] Robert Kaplan. "The Coming Anarchy", The Atlantic Monthly, Feb. 1994; Matthew Connelly, Paul Kennedy. "Must it be the Rest Against the West?", The Atlantic Monthly, Dec. 1994, pp. 61-91.

[27] Kaplan suggests that the turmoil in Sub-Saharan Africa is an ominous portent of what will befall the rest of the world in varying degrees in the succeeding years.

Competition for Resources

It is inevitable that competition for the world's resources will increase as populations continue to grow and economies develop. Such competition is a likely source of future conflicts. Greater attention is now also given to the protection of the environment, and the detrimental effects of another state's environmental practices may be deemed reason for military action.[28]

The Spratly Islands dispute in the South China Sea is one of many examples around the globe where competition for resources, in this case significant potential oil reserves, spurs regional tensions.[29] In the Middle East, control of water resources is already a significant issue, with explosive potential as continued population increases place greater demands on already strained resources.[30] The sabotage of Kuwaiti oil fields at the end of the Persian Gulf War shows that, for some states, the environment is simply another wartime target.

On a national level, military forces are already involved in environmental protection. As a result of their sovereignty and surveillance roles, military forces are often the first to detect instances of environmental damage. At other times, military personnel and equipment may be used to clean up after environmental disasters or help the civilian population to recover from natural disasters. More active roles have also been undertaken. In the South Pacific, international opposition to the French nuclear tests required the French to use naval forces to impose an exclusion zone around the test area.[31] In future, opposition to such nuclear tests may involve more than protest visits from politicians and demonstrators.[32]

Proliferation of Weapons

The spread of new technologies and techniques of warfare is as old as history. Today it occurs at an accelerating rate, spurred both by efficient global communications and the search for hard currency. Still, while Western states formerly had to contend mainly with variants of East bloc weapons technology, increasingly today, the weapons of choice are Western in origin, and primarily American.[33]

High technology weapons are not the only threat facing Western states in the next century. Perhaps at no other time as in recent history has the potential been as great for the horizontal proliferation in weapons of mass destruction (WMD) as it is currently. Non-proliferation regimes have slowed but have not prevented the spread of technologies and materials needed for nuclear, biological, chemical, and ballistic missile programs. Already, many states possess, or are acquiring, chemical and biological weapons, as well as the means to deliver them. The success of the Israeli, Pakistani, Indian, and South African nuclear programs shows that it is possible for states to develop

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[28] Though resolved peacefully, the Turbot Crisis is an example of one nation attempting to protect its environment.

[29] Ethan Casey, "Manila keeps wary eye on South China Sea", The Globe and Mail (10 February 1996), p.A8.

[30] Robert Mandel, "Sources of International River Basin Disputes", Conflict Quarterly (Fall 1992: Volume 12, Number 4), pp.40-4.

[31] Thomas Sancton, "Trouble in Paradise", Time (18 September 1995), pp.39-41.

[32] One journalist speculated, "What would have happened if the Japanese had sent a frigate instead of their finance minister?", Thomas Sancton, "Trouble in Paradise", Time (18 September 1995), pp.39-41.

[33] In 1993, for example, the US exported $14.8 Billion dollars worth of arms while Russia managed only $1.8 Billion. "Clinton's Conventional Arms Export Policy: So Little Change", Arms Control Today (May, 1995), p.11.

nuclear weapons, and North Korea demonstrated that even the threat of proliferation can be used to political advantage. Chemical and biological weapons programs are relatively easy to conceal within legitimate civilian industries. Ballistic missile technology has also proliferated widely. WMD almost certainly will remain an important factor in the international system It is not inconceivable that terrorist groups and other non-state actors will some day acquire WMD.

The impact of this is difficult to predict. Some analysts suggest that weapons of mass destruction have a sobering impact on national leaders, in that the spectre of retaliation tempers actions to the point that the likelihood of conflict is reduced.[34] Others are less sanguine, and many agree that non-state actors like terrorist organizations, being less vulnerable to retaliation than nation-states, are the most likely users of weapons of mass destruction.[35] If recent history is any guide, events such as the Tokyo subway incident suggest that chemical and biological weapons may be even easier to use than nuclear ones.

A consequence of all proliferation is that subversive states and non-state actors will continue to have access to very advanced weapons.[36] Modern technology provides the discontented with devastating, accurate weapons, and proliferation means that even relatively poor, developing countries can possess modern systems. While arms control remains a frequently cited goal of many nations, the economic and political realities of the international arms trade make it difficult to be optimistic. Canadian maritime forces could therefore find themselves facing very sophisticated weapons even in regions of the globe not noted for their technological proficiency. In essence, proliferation has significantly reduced the qualitative superiority traditionally enjoyed by the military forces of developed states.[37] Less developed nations, often with little training, can exploit modern technology as an unexpected equalizer in conflict situations.

Increasing Costs of Military Forces

The price of maintaining and employing military force continues to rise. The rate of defence inflation has consistently exceeded the rate of general inflation due to rapid increases in the cost of military equipment and platforms.[38] European and North American militaries have reduced expenditures significantly in recent years. Conversely, countries in Asia have rapidly increased the resources they devote to defence spending, accounting for over 35% of global arms procurement alone.[39]

The high cost of defence equipment has forced most nations to consolidate their defence industries or to cooperate with other nations in the research, development, and production of major defence systems. Higher development costs have increased the unit costs of equipment and forced nations to reduce the total number of units they acquire. The growth in capability has lead to fewer

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[34] Robert Jervis. The Meaning of the Nuclear Revolution (Cornell NY: Cornell University Press, 1989); Jonathan B. Tucker, "Proliferation and Rationality", Technology Review, (January 1996: Volume 99, Number 1), pp.60-61.

[35] Walter Lacqueur. "Post Modern Terrorism", Foreign Affairs, Sept./Oct. 1996, Vol. 75, No. 5.

[36] "The Softwar (sic) Revolution"The Economist: A Survey of Defence Technology (10 June, 1995),, p.19.

[37] Eric Arnett. Gunboat Diplomacy and the Bomb (Oxford: Oxford University Press, 1990).

[38] John Treddenick, "The Defence Budget", Canada's International Security Policy (Toronto: Prentice-Hall, 1995), p.416.

[39] Ministry of National Defence, Defence White Paper 1993-1994 (Republic of Korea: Ministry of National Defence, 1994), translated by Korea Institute for Defence Analysis, p.38.

weapons being procured As a result, the value of individual units has increased to the point where their loss is greater both financially as well as a proportion of total forces. These two factors together with "...the acute sensitivity of Western electorates to prospective loss of life in the conduct of operations of risk",[40] complicate the operational use of military forces.

Consensual Constraints

International and transnational organisations have gained in power and prominence in recent years, but the autonomy of individual states remains largely intact. The inherent autonomy of states has meant that the United Nations has not been an absolute guarantor of the security of its members. Even with a massive and clear cut act of aggression against a state, similar to Iraq's invasion of Kuwait, such organisations often find it difficult to achieve consensus on an appropriate response. For example, the televised images of genocide in Rwanda in 1993 still failed to stimulate the UN. Alliances such as NATO are equally vulnerable to the decisions of its members to honour their commitments. Nothing can force a state to fulfill its obligations if it chooses not to.[41]

If anything, the end of the Cold War has made it more difficult to reach consensus among states. Successful organisations like NATO that are composed of like-minded nations have experienced great difficulty in achieving consensus on a suitable post-Cold War role. Larger organisations like the UN or the OSCE have found consensus to be virtually impossible to achieve because of the disparate values, goals, concerns, and interests of their members.[42] As greater numbers of states begin to participate in peacekeeping and peacemaking operations,[43] the larger the complications of command and control. A far greater variety of equipment, languages, training levels, and doctrines will make efficient cooperation even more difficult to achieve.

The difficulty in achieving an international consensus is made still more complex by the role of domestic politics. While there has always been a tight relationship between foreign policy and domestic politics, many national legislatures now assert greater influence and control over foreign policy decisions that formerly were more often the preserve of executive levels. The reluctance of liberal democratic states to risk casualties has made politicians cautious about undertaking international operations. Canada, among others, has proposed a 'Rapid Reaction Force' that could be dispatched by the UN in the event of need.[44] However, acceptance of it remains uncertain at best.

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[40] G. Till, "Maritime Power in the 21st Century", The Journal of Strategic Studies (March 1994: Volume 17, Number 1), p.189.See also, Colin Gray "Three Visions of Future War", Queen's Quarterly, Spring 1996.

[41] Josef Joffe. "The Dilemmas of a Nuclear Alliance", Journal of International Affairs, Vol. 43, No. 1, Summer/Fall 1989; Eliot Cohen. "U.S. Strategy and the Northern Flank: A Coalition Warfare Approach", The Military Build up in the High North: American and Nordic Perspectives, Sverre Jerrell, Kare Nyblom, (ed.s), (Cambridge Ma: Harvard University Press, 1986).

[42] Michel Louis Martin, "National Security and Democracy: The Dilemma from a French Perspective", Armed Forces and Society, (Spring 1994: Volume 20, Number 3), p.396.

[43] The number of states participating in multinational operations has increased since the end of the Cold War. Germany and Japan are beginning, to assume military roles commensurate with their economic power. Other states like Russia, Pakistan, Bangladesh, and Argentina now participate in UN peacekeeping operations. A clear example of the greater degree of multilateral participation is the NATO deployment to Bosnia where most of the states participating are non-members of the alliance although the majority of the troops originate in NATO countries. "Over 36 000 IFOR members in place by D+30", Jane's Defence Weekly (24 January 1996), p.3.

[44] Government of Canada, Towards a Rapid Reaction Capability for the United Nations, 1995.

All of these factors mean that multilateral operations remain problematic. Multilateral coalitions are only easily constructed and operated in the face of a clear and recognised threat to its members. The diffuse range of risks presented by the post-Cold War world has already shown that international cooperation will only be achieved with difficulty. Building a consensus on the mission and mandate of multilateral forces is already challenging and will only become more so with the trend towards a greater number of participants in each operation. Field commanders will find their task complicated by the reluctance of national governments to relinquish control of their troops or to risk taking casualties.

Global Trends Summary

This review of global trends helps explain why Canada's armed forces are busier today than they were during the Cold War. The rapid global transformations underway suggest that armed forces retain an important role in the world, and that war, in one form or another, unfortunately remains a possibility.[45] We are unlikely to see a war the size of the great conflicts of the twentieth century in the near term; we are far more likely to see more Bosnias and Somalias than massed tank battles, such as those foreseen for the Central European theatre. Increasing global interdependence will mean that our interests will be affected by far flung events as well as increasing the causes of conflict between nations. The number of actors on the international stage will increase, complicating conflict management and resolution. Should populations continue to increase, and environmental damage escalate, access to resources will become a highly strategic issue. Finally, as weapons spread and become increasingly destructive, Western nations will become less and less likely to volunteer their forces for stability operations unless they directly affect their interests. The sum total of these trends do not indicate a fundamental breakdown of order in the international system, but neither do they indicate that the hopeful predictions of a stable and peaceful 'New World Order' made in 1989 are likely to occur any time soon. The international system will continue to be marked by the use of force to resolve disputes between nations. Global stability will be the exception rather than the rule.

National Security and the Domestic Environment

While the international environment leads to the strategic demands the Navy must meet, the domestic environment often will determine how well those demands are met. During much of the Cold War, the threat was such that strategic assessments could be taken as given. In an increasingly multipolar world with no specific threat to Canada, that is no longer so. Many of the Navy's requirements remain the same, determined by the inflexible logic of geography. However, to an increasingly diverse Canadian population, concerned about instabilities in the job market and cuts to government programmes, the logic of geopolitics (or even geo-economics) is often not apparent or relevant. If the Navy is to realise its plans, it must make its case before the Canadian public and adopt a pro-active strategy, rather than leave the arguments solely to its critics.

Geography

Geographical features are the only constant in the strategic equation. They pose formidable challenges for Canada and determine many of the requirements for naval operations off our coasts.

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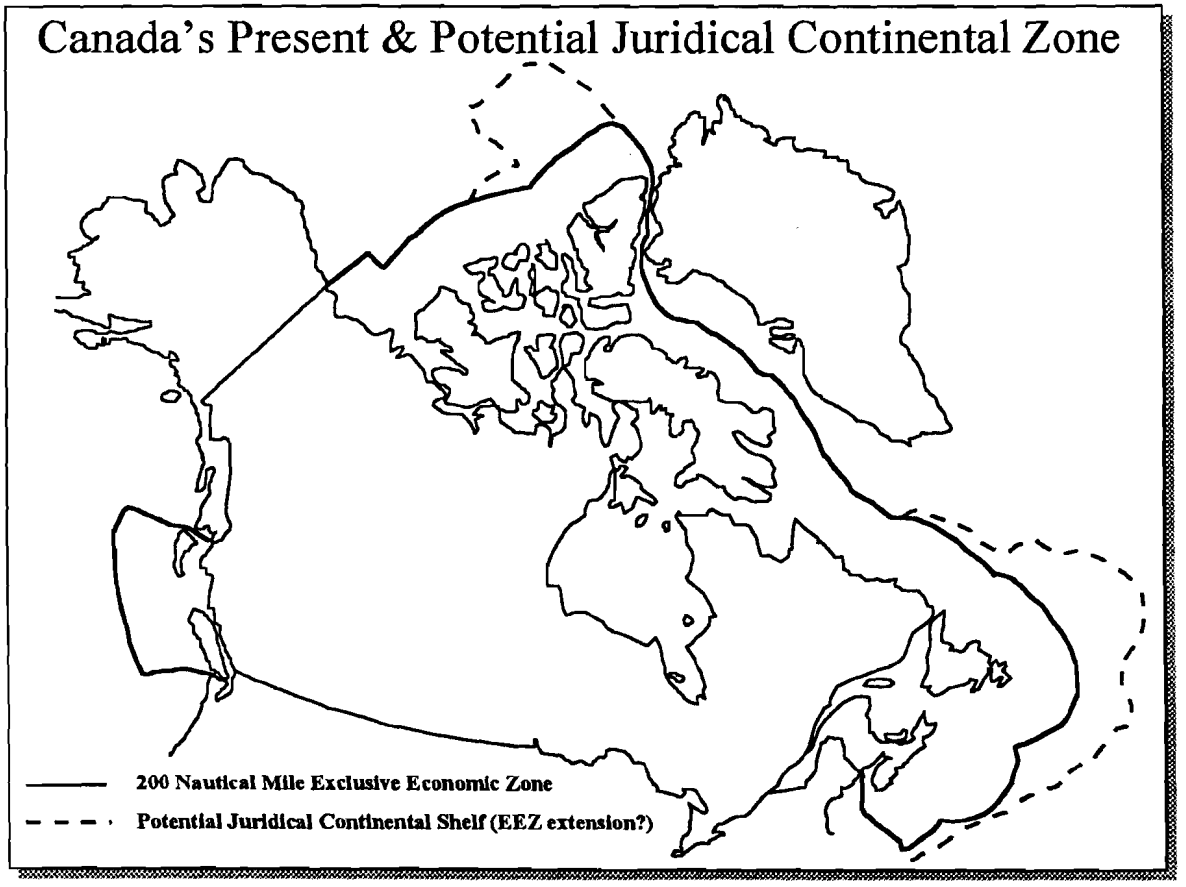
[45] Donald Kagan, On the Origins of War (Anchor: New York, 1995), pp.569-570.

Bordering on three oceans, Canada has the world's longest coastline and currently claims political sovereignty and economic jurisdiction over almost 6 million square kilometres of ocean in the Pacific, Atlantic, and Arctic.[46] This area is likely to expand considerably in the next twenty years given the growing political significance of migratory fish stocks on both coasts.[47] The diagram below illustrates how Canada's areas of ocean jurisdiction may look in the future.[48] Canada's oceans will remain important sources of economic activity as other ocean resources continue to be exploited and new resources are developed. In addition to their direct economic benefit, coastal areas remain of vital importance to the culture and survival of many of Canada's small fishing villages and aboriginal communities.

The challenge of providing responsible stewardship for Canada's maritime regions is



formidable. To establish sovereignty, international law demands that, at a minimum, a state be capable of monitoring activity in nationally claimed areas. Thus, Arctic ice poses real dilemmas for defence

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[46] Letter from Mr. S.B. MacPhee (Director General Hydrography) to Capt(N) McNeil (Director Maritime Force Development) dated 10 April 1996.

[47] "Canada could gain area the size of the Prairies: Scientists preparing undersea claim to vast tract", The Globe & Mail (22 December, 1995) p.A-1.

[48] Ron Macnab, ed, "Canada and Article 76 of the Law of the Sea: Defining the Limits of Canadian Resources Jurisdiction Beyond 200 Nautical Miles in the Atlantic and Arctic Oceans", Atlantic Geoscience Centre, Dartmouth, Nova Scotia, 15 May 1994.

planners. Naval vessels and current Maritime Patrol Aircraft (MPA) are incapable of monitoring sub-surface activity while shore-based underwater surveillance systems can be acquired but only at a substantial price.[49] Furthermore, each system is inherently limited by an inability to respond - even to known threats. Only a submarine is capable of both monitoring and responding to foreign incursions/threats in Arctic waterspace.[50] This problem underscores the real need for air independent propulsion (AIP) technologies in Canadian submarines, if we are to effectively claim and demonstrate our sovereignty over sensitive Arctic waters.

The Atlantic and Pacific are more accessible to traditional naval platforms and surveillance systems but are nonetheless challenging in their own right. The sheer size of Canada's ocean areas and harsh sea conditions off the East and West coasts necessitate ships with the endurance and sea-keeping qualities essential for sustaining extended operations in severe weather; rugged aircraft capable of patrolling long distances in challenging weather conditions are also required. In order to conduct effective patrols in our enormous territorial seas, replenishment vessels (AOR) are an unavoidable requirement for the Navy.[51] In many ways, the conduct of both national and international operations require common characteristics from ships and aircraft. For example, the AORs necessary to sustain task forces on station off our coasts are also invaluable for international operations.

The salient features of Canada's maritime geography for the Navy, then, are its great area, its formidable harshness, the accessibility of certain areas, and the challenging complexity of its undersea features. Aside from the issue of expanded jurisdiction, these features will never change and will remain important factors in naval planning and force structure.

Economic Considerations

There is a complex relationship between Canada's defence and its economy. While trade and resources create demands for defence, the economy continues to be the single biggest constraint on its supply. International trade created 36.6% of our GDP in the first three quarters of 1995[52]; 17% of Canadian exports move by water.[53] Given the likely expansion of NAFTA, the creation of the WTO and the gradual move towards free trade in Asia-Pacific under APEC, Canada's international maritime trade will almost certainly increase in value and importance over the next twenty years. Despite recent problems with declining fish stocks, Canada's fisheries will, if anything, grow in importance.[54] This is especially true if stocks fall elsewhere around the world. Stricter conservation practices could make our waters and straddling stocks increasingly important to other areas. Canada's other abundant seabed resources - hydrocarbons and minerals - are also likely to assume a far greater importance than at present if prices continue to rise. Clearly then, Canada's oceans are a valuable economic resource that deserve the protection of capable maritime forces.

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[49] SCONDVA: June 13, 1995, pp. 4-5.

[50] Bill McKnight, Globe and Mail, April 28, 1989, p. A1; Montreal Gazette, April 28, 1989, p. A8.

[51] A frigate can remain on station for 8-10 days depending on its speed. In that time it can maintain continuous surveillance over about 32,000 km^2. With an AOR, the same frigate can remain at sea for more than a month, effectively tripling the area it can cover. The area requiring surveillance is immense, as the east coast 200 mile limit zone covers 1,400,000 km^2. Fred. W. Crickard, Peter T. Haydon. Why Canada Needs Maritime Forces, (Nepean, Napier, 1994), pp. vii, 23.

[52] Year-end address by the Honourable Roy MacLaren, Minister for International Trade, "Trade Leads in Growth and Job Creation" (95/72), December 13, 1995.

[53] Transport Canada, Marine Policy Review, p.2.

[54] Department of Fisheries and Oceans, Part III Estimates 1995-96, p.17.

The most likely economic scenario for the next twenty years envisages modest, positive, real growth averaging between 2 and 2.5 percent of GDP per annum, though one or two recessions should be expected as part of the normal business cycle.[55] Given popular support for debt/deficit reduction, it is likely that the federal government will succeed in achieving its stated deficit reduction goals. While the debt may continue to grow in absolute terms, it is likely to decline as a proportion of GDP. Under this scenario, debt servicing charges will be reduced and the federal government will therefore have more fiscal flexibility.[56] However, over the short term the OECD notes:

> although weaker economic growth is likely to have an adverse effect on government finances, this should be offset by lower interest rates expected at Budget time. However, this would still imply the persistence of significant - albeit declining - structural deficit, leaving government finances exposed to a possible economic downturn or interest rate increases. Hence the need for continued fiscal restraint....[57]

In the absence of a clear, perceived threat to Canadian interests, the defence budget (as a percentage of federal discretionary spending) will at best, remain stable and may even continue to decline despite the critical importance of armed forces. Should Canada's economy perform poorly, the defence budget is almost certain to be reduced. This eventuality will clearly require the Canadian Forces to make extremely difficult choices given the increasing costs of equipment. It will also make it more difficult to compete with the private sector in attracting intelligent and skilled individuals.

Demographics

In general, current demographic trends are favourable to the Canadian Forces. While the aging of the population may increase the government's social spending, thus limiting the funds available for defence, the size of the military's prime recruiting base will increase. Potential recruits are likely to possess even more education than at present and will be more capable of using sophisticated information technology as the use of such devices in everyday life increases in the next few years.[58]

Some trends are more difficult to predict, however. The percentage of the population that is of neither English nor French heritage will continue to increase. In the long term, this trend could help to globalize the outlook of Canadians. However, how Canadian society will perceive the military is difficult to predict given the wide variety of roles the military plays in other societies.

Other trends may pose significant challenges to the Canadian Forces. The adaptation of the family from the traditional 'nuclear' one to more varied arrangements will need to be addressed through a more flexible personnel system that is responsive to the needs of its members.[59] In the highly mobile work force of the future, the average person can expect to move through several jobs

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[55] This is derived from numerous sources. For comparison, NATO projects a value of 2.9% per annum. Phase I Report on the Implications for NATO's Maritime Operations in 2015, Part 3, "Systems Impact on MNMF Capability Shortfalls", 30 October, 1995, p.10-4.

[56] For a more complete appreciation of the debt/deficit issue, see Report of the Auditor General of Canada to the House of Commons, Chapter 9, "Information for Parliament - Deficits and Debt: Understanding the Choices", October 1995.

[57] OECD Surveys:Canada 1995, (Paris: OECD, 1995), p. 113.

[58] The remarkable spread of personal computers over the last decade, and the phenomenal surge in use of the Internet, are the basis for this prediction.

[59] The statistics and predictions in this paragraph are drawn from Statistics Canada's Canada Yearbook 1994.

over his/her lifetime. The 1994 Defence White Paper reflects this trend in its emphasis on "renewable short-term periods of service".[60] Consequently, the Navy will likely experience a greater turnover of personnel and may find it difficult to retain trained and experienced members. This will be particularly true if wages fail to keep pace with the private sector. In addition, greater use will be made of the reserves. Thus, personnel planning will become more difficult as Career Managers attempt to address the needs of long-service members, short-service personnel, and reservists.

Canadian Political Culture and Media Relations

Canadian political culture plays an important role in shaping our approach to foreign and defence policy. As a liberal democratic nation with a tradition of constructive multi-lateralism, Canada champions the values of "tolerance, justice, generosity, and a desire for peace".[61] Canadians are prepared to go to war when necessary, but the use of force is very much a last resort in their view. Consequently, Canada supports the creation of an international system based upon the rule of law and looks to diplomacy, not military might, as the arbiter of disputes. This approach to international politics means that Canadians often have a difficult time understanding the role of the military in peacetime, and its utility in supporting foreign policy, complicating the task of maintaining up to date, combat capable forces. Peacetime capital programmes, particularly in today's fiscally restrictive climate, are very often controversial.

Civilian control of the military and a free and open media are fundamental and essential features of the Canadian political system. Historically, the Canadian media has had little interest or experience in covering military issues. The Canadian Forces' experience with the media is similarly limited and the resulting relationship has often been strained. However, advances in communications technology as well as the increasing use of the Canadian Forces in global operations will emphasise the importance of the media in the future. These trends will require the Navy to adapt its operating style to meet this challenge. On-scene commanders will need to operate under the intense glare of immediate media scrutiny. The renewed interest in the Canadian military is a development that is unlikely to go away soon, and the Navy must learn to operate in this new context given the crucial importance it will play, not only in operational issues, but also in terms of personnel and force structure.

In the coming years, communicating our message to the Canadian public will be as important as any operation undertaken by the Navy. With intense pressure on the government to maintain many programmes in the face of tight fiscal constraints, the defence budget must be fully justified. However, the collapse of the bipolar world with the end of the Cold War and the uncertainty that surrounds the emerging multipolar system have made consensus on defence policy difficult to achieve. It is essential, therefore, that every opportunity is taken to promote awareness amongst Canadians on the contribution the Navy makes to our security and quality of life, both at home and abroad. Publishing *The Naval Vision* in 1994[62] was an important first step in this process. However, the Navy will have

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[60] 1994 Defence White Paper, p.43.

[61] Joe Clark, Competitiveness and Security: Directions for Canada's International Relations (Ottawa: Department of External Affairs, 1985), p.1.

[62] "Although it is intended primarily to serve as a maritime reference document, I hope that it will also prove of interest to Canadians, whether in uniform or civilian, who want to know more about their country's continuing requirement for capable maritime forces". VAdm. P.W. Cairns. The Naval Vision, (Ottawa: Dept. of National Defence, 1994), p. i.

to develop new innovative ways to ensure this objective continues to be met.

National Context Summation

The domestic environment is certainly a challenging one for the Navy. The Navy remains confronted by the harsh environment it must operate in. In many ways the types of ships that will be required by the Navy in 2015 will be determined by the nature of Canada's waters. Economic issues are likely to lead to further demands on the Navy just as the economy remains the single biggest constraint on the funding and use of the military. While the nation's recruiting base will swell, the military will be hard pressed by the private sector to attract those young Canadians. The lesson that is drawn from these projections is that it will be much harder for the Navy to conduct its business. This is emphasised by the nature of Canadian political culture and the growing influence of the media. The Navy cannot assume that its world view will be taken as given: it must work to see that it is justified in the eyes of the Canadian public. The Navy must develop its plans and operations with a view to conveying its message to an increasingly diverse and sceptical Canadian public concerned with income instability and cuts to social programmes.

Threats to Naval Forces 1997-2015

During the Cold War, Western naval forces focussed on countering the threat posed by the Soviet Union. While its breakup diminishes the immediate threat of conflict, the uncertainty that surrounds the nature of the post-Cold War environment has created new problems for navies to consider. Identifying where future challenges might emerge from is an inexact science, whether they take the form of legal disputes, confrontations with other states, or technological developments. In view of this rather uncertain situation, it is best to focus on capabilities rather than specific nations.

In its strategic vision statement, *From the Sea*,[63] the USN and Marine Corps identified the need to focus on littoral operations in support of American foreign policy. While it is true that many recent naval missions such as sanction enforcement, interdiction operations, and support to ground forces ashore, suggest a shift from blue water to littoral operations, most naval activity during the Cold War took place in littoral areas.[64] The renewed emphasis on littoral operations outside of the familiar European theatre does raise many significant issues that were downplayed during the Cold War, however.

Increasing Sophistication of Small Fleets

During the Cold War, small fleets were often treated as "lesser included cases" given their relative lack of offensive power. The spread of advanced weapon systems to small fleets may be a significant evolution in the new international order.[65] This is not a new development; however. In

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[63] "...From the Sea", Proceedings, Vol. 118, No. 11/1077, Nov. 1992, pp. 93-96.

[64] For example, naval operations during the Falklands war, the Vietnam war, and those occurring during the various Arab-Israeli wars were all coastal in nature. Blue water operations were emphasised throughout the Cold War due to the threat to the sea lanes as well as the strategic ASW commitments.

[65] As speculated on by Michael A. Morris, Expansion of Third World Navies, (London: MacMillan, 1987), p. 20-21.

the past, Western navies concentrated largely on East bloc technology.[66] Since the collapse of East/West rivalry and its associated trade restrictions in technology, nations capable of manufacturing sophisticated weapons and electronics, such as Russia, China, France, and the United States are increasingly willing to export their state-of-the-art technology.[67] Western navies are very likely to face Western technology opposing them in the future. The spread of advanced weaponry will continue for the foreseeable future and serve to complicate maritime operations. An added problem associated with advanced weapons is that incremental improvements in software and electronics are often undetectable.[68]

The introduction of "user-friendly" weapons is yet another consideration. In the past, there was a direct correlation between the technical proficiency of a navy and its ability to employ advanced weapons to their full potential. This is no longer entirely true.[69] The development of user-friendly weapons and systems has progressed sufficiently that even a moderately well-trained navy can use advanced weapons to their full potential. The Argentinean experience with Exocet missiles during the Falklands War serves as an example.[70]

As discussed above, the end of the Cold War has not brought an end to the threat posed by WMD. In simple terms, there is reason to fear that there may be occasions in the future where chemical or biological weapons may be employed. Nor can the use of nuclear weapons be entirely ruled out.[71] Since it is possible that Canadian maritime forces might someday operate in areas where WMD are, *or already have been*, used, measures to counter or neutralize the effects of nuclear, biological and chemical weapons must continue to be pursued.

Modern Anti-Ship Missiles

The current threat from anti-ship missiles is represented by two categories: missiles that are supersonic and highly evasive and missiles which are subsonic and "stealthy". Western navies have traditionally employed the latter type, examples being Harpoon and Exocet. Sales of the Chinese Houdong Fast Attack Craft armed with the C802 Saccade anti-ship missile to Iran demonstrate that that other navies are adopting the western philosophy. Russia continues to market the Switchblade, often referred to as the "Harpoonski" at military trade shows, with India appearing to be a major customer. Supersonic missiles, such as Russia's Sunburn and Krypton, have also been advertised for

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[66] In this sense, the trouble faced by the British during the Falklands war was a harbinger of the problems which are now faced by all Western navies, often faced with countering technology designed to fight a Third World War. Max Hastings. The Battle for the Falklands, (New York: Norton & Co., 1983), p. 116, p. 161; Anthony Cordesman, Abraham R. Wagner. The Lessons of Modern War Vol. IV:The Gulf War, (Boulder: Westview, 1996), p. 431.

[67] Intelligence Summary, para 23.

[68] Hughes, p.206. Paul T. Mitchell, "Third World Navies Revisited: Re-Examining Measures of Proliferation in Small Fleets", Maritime Forces in Global Security, (Halifax: Centre for Foreign Policy Studies, 1995).

[69] There is still some doubt as to the ability of less developed nations' navies to use the most sophisticated of naval weaponry. Smith, Ed. Capt. (USN) "They Can Buy it, But..." Proceedings, Vol 120, No. 3/1092, Feb. 1994, p. 48.

[70] The French withdrew technical assistance to the Argentinean Navy shortly after the crisis erupted, leaving the Argentinean Exocet programme incomplete. The Argentineans completed the project and fired five missiles from their Super Entendard fighters, sinking HMS Sheffield and the merchant ship Atlantic Conveyor. One land based exocet missile fired from the Falkland Islands damaged HMS Glamorgan. Martin Middlebrook. The Fight for the Malvinas, (New York: Viking, 1989), p. 121; Lawrence Freedman and Virginia Gamba-Stonehouse, Signals of War,(London: Faber & Faber, 1990) p.361, 394.

[71] Especially given the threat they represent to naval forces and the "desert war" like nature of naval nuclear warfare.Laurence Martin. The Sea in Modern Strategy, (New York: Praeger, 1967), pp. 87-88. Arnett, Op Cit.

sale at recent air shows. Each type of missile presents specific threats designed to complicate the problem of ship defence by sharply reducing reaction time available. Subsonic and stealthy missiles aim to hide the missile in the clutter of surface radar returns until the last moment. Supersonic missiles aim to reduce the amount of time a ship self defence system has to locate, identify and counter an incoming threat. Intelligence analysts believe that missiles with significantly improved range, speed, manoeuvrability, and intelligent homing systems will pose the greatest threat in the long term.[72] Anti-ship missiles can be carried by both ships and aircraft, or fired from ashore. Research into methods of countering these deadly missiles must continue to be a priority so as to keep Canada's naval forces effective in 2015.

Inshore Threats

While strategic mobility and operational manoeuvre are still inherent strengths for naval forces, care must be exercised when operating within the range of land-based forces. Greater weapon range and lethality have expanded the modern battlefield to the point where some land-based forces must be considered naval weapons.[73] The variety of shore-based anti-ship missiles, and mobile and fixed artillery systems demonstrates the growing reach of shore based forces. Even the exercise of due passage in international waters has been greatly complicated by this fact as the stationing of Iranian Seersucker missiles in the Straits of Hormuz illustrates.

Beyond anti-ship missiles, naval forces involved in coastal operations will face threats from aircraft and helicopters, directly proportionate to the proximity of the shore. In some situations, ground attack aircraft and helicopter gunships will be employed against naval vessels.[74] Many of these aircraft and helicopters are able to engage armoured vehicles or tanks and this capability is more than suitable for attacking merchant shipping and, warships.

Mine warfare is an established, but often downplayed, part of naval operations.[75] Mines are relatively cheap, easy to produce, and simple to deploy. They are capable of creating a threat out of all proportion to the effort required to deploy them. The mere threat of mines is often enough to cause a significant disruption to naval operations or shipping. During the Persian Gulf War, the 1200-1500 mines Iraq laid off Kuwait were largely responsible for the decision not to conduct an amphibious landing during the war.[76]

Mines are an attractive option for many small powers for the following reasons. Maritime powers are highly vulnerable both in peace and war due to their dependence on the sea. Mining

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[72] Intelligence Summary, para 25; Dr. D.G. Kiely. Naval Surface Weapons, (London: Brassey's Defence Publishers, 1988), p. 24.

[73] Wayne P. Hughes, Fleet Tactics, Theory and Practice (Annapolis: Naval Institute Press, 1986), pp.270-271.

[74] The air based threat to the British task force was limited entirely to land based aircraft once the Argentinian aircraft carrier had retired from battle. Lacking both AEW and adequate air cover, the British were saved from inordinate ship losses only by the distance of the Falklands from the Argentinian mainland which made it impossible for the Argentinians to maintain attack aircraft on station stations above the islands. Middlebrook, Op Cit., pp. 90-91; Hastings, Op Cit, p. 117, 183.

[75] Capt. (N) J.M. Martin (USNR Ret.d). "We Still Haven't Learned", Proceedings, July 1991, pp. 64-68.

[76] Till notes that during the Korean War, "the most powerful navy in the world was held for weeks in its planned invasion of Wonsan by a few ancient mines laid by the North Koreans." Till, Modern Sea Power, (London: Brassey's, 1987), p. 153; Cordesman, Op Cit., p. 820-821. More recently, both the USS Samuel B. Roberts and the USS Princeton were nearly destroyed in separate incidents by Iranian and Iraqi mines respectively.

operations are far cheaper than counter mining operations, and they are far cheaper than other types of naval weaponry which inflict similar types of damage. Many small naval powers will attempt to use mines in order to deny their coastal areas to forces arrayed against them. Others will use mines offensively to deny port facilities or egress points to hostile fleets. Given the ease of deployment (mines can be deployed from submarines or from civilian vessels)[77] and the growing sophistication of them, mines will remain effective weapons in 2015.[78] Canadian mine counter-measures capabilities must therefore be developed.

Submarines

The number of countries operating diesel-electric submarines continues to increase and they continue to pose a serious threat to naval operations, in the littoral as well as in the open ocean.[79] Most nations currently operating submarines are endeavouring to upgrade or maintain their capability. The inherent advantages of submarines are apparent to many nations seeking to enhance their naval capability. Given the number of "fire sales" on offer in a variety of states, the ease of acquiring submarines has never been greater than at the present time. The purchase of Russian KILO-class submarines by Iran is a prime example.

Submarines are ideal weapons for states which lack, or cannot afford the capability to assert sea control in their own (or others) waterspace.[80] As such, they can operate in an opponent's backyard, even in the face of determined sea control efforts, they can conduct stealthy and intrusive operations in sensitive areas, and can be inserted early for a wide range of tasks with a high degree of assured survivability.[81]

When equipped with mines, advanced torpedoes, and/or anti-ship missiles, a submarine is a potent political weapon. A conventional submarine able to penetrate a multinational task force's defences could undermine efforts to manage coalition politics in a single strike. The success of HMS Conqueror's mission in the Falklands War demonstrates the effect of the submarine to military operations.[82] The Argentinean Navy - except for their submarines - retired to base following the sinking of the General Belgrano, greatly complicating Argentinean efforts to keep control of the islands. User-friendly weapons such as wire-guided and wake-homing torpedoes increase the probability that even moderately proficient submarine operators will be successful when engaging surface targets. In the Falklands war, the Royal Navy, a highly experienced ASW force, was unable

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[77] RAdm. John Hervey (RN Ret.d). Submarines, (London: Brassey's Defence Publishers, 1994), p. 142. Shallow water deployment of mines would present a difficult operational challenge for submarines, however.

[78] Intelligence Summary, paras 58-62. Hervey, OpCit. Pp. 139-142; Till Op Cit, pp. 153-155. Till notes: (Mines') sensitivity and lethality can both be adjusted to suit the circumstances, and they can remain under the control of the country that deployed them for years if need be. On the terminations of the Vietnam War, for example, it soon became clear that only the Americans could clear the mines they laid off Haiphong harbour.

[79] George Krause. "World Submarine Proliferation and US Sea Control", The Submarine Review, April 1993.

[80] Hervey, Op Cit., p. 11.

[81] Richard Chapman. "Diesel Submarines in a New Security Environment", The Submarine Review, Oct. 1993, p.66; Krause, Op Cit., p. 62.

[82] Lt. Brent Ditzler (USN) "British Submarine Diplomacy", The Submarine Review, April 1993, p. 54. Ditzler notes "if Conqueror's attack had been carried out by Royal Navy Harriers or Exocet missiles it would not have had the same deterrent effect. As it was the Argentinian Navy was coerced into believing it lacked the equipment, confidence and perhaps the competence to meet the SSN threat."

to completely clear its areas of operations of Argentine submarines.[83] The development of Air Independent Propulsion (AIP) systems will further enhance the capability and stealth of conventional submarines.[84]

The serious threat posed by submarines to both land and sea operations highlights the pressing need for continued research and practise of measures to counter them. Canadian ships regularly deploy into areas where there are large numbers of conventional submarines, such as during operations in the Mediterranean, Persian Gulf and Southeast Asia. Losing an effective ASW capability would not only jeopardise Canada's ability to monitor and control its own waterspace, but also its ability to safely deploy abroad and participate in multinational operations.[85] Thus, Canada's naval forces must continue to practise the difficult operations necessary in undersea warfare.

Modern Naval Warships

The threat from surface vessels varies widely, defying precise definition. Procurement trends will run toward smaller and cheaper ships with technological advances being used to increase their capabilities.[86] Older vessels will benefit from sensor, combat system, and weapons upgrades. Less advanced navies have been taking advantage of the cutbacks in many naval forces with the purchase of older, but still highly capable, warships. The Royal Navy has sold Type 22 frigates to Brazil and Type 21 frigates to Pakistan, while ex-USN Oliver Hazard Perry class ships have recently appeared in several navies. In many cases these navies have made a quantum leap from their previous capabilities. More seriously, many navies are modernising older ships with state of the art technology. A case in point is the gradual replacement of the Thai and Taiwanese navies' World War Two era platforms with extremely modern vessels. Taiwan has recently acquired LaFayette class frigates, while the Thais have acquired both Chinese frigates equipped with Western weapon systems as well as a small aircraft carrier built in Spain.[87] India continues to seek aircraft carriers to replace its ancient British built ships. Again, the lesson for Canada's maritime forces is that expertise and capability in surface warfare must be maintained.

Summary of Threats to Naval Forces

With the end of the Cold War there was a great expectation of a peace dividend. To some extent this has been realised. Most Western states have reduced their defence expenditures considerably. Canada is no exception in this process. However, the failure of a "New World Order" to emerge has frustrated efforts to realise a new era of peace and cooperation. Events have tested the

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[83] British forces were primarily units from ASGRU2, NATO's North Atlantic ASW group. Krause, Op Cit., p. 63. Benedict notes that the British failed to achieve a coherent ASW picture despite their experience, numerous ASW assets available, and the existence of an ASW free fire zone. A great number of weapons were expended with no result. Nevertheless, the Argentinean wire guided torpedoes failed, possibly due to the success of Royal Navy torpedo decoys, saving the British from debilitating damage as a result of a successful submarine attack. John Benedict. "Third World Submarine Development", The Submarine Review , Oct. 1990, pp. 53-54; Middlebrook, Op Cit, pp. 80-81.

[84] Hervey, Op Cit, p. 263.

[85] That some fail to see this obvious fact emphasises the need for a more effective public relations effort explaining the critical role of ASW in naval operations. Writing in 1994, the Canada 21 group claimed "In the new strategic context, there is no obvious need to maintain the wide range of air, ground, *and ASW* conventional forces needed to repel an attack because it is difficult to conceive of any military power with the desire or ability to attack Canada." Canada 21, 1994, p. 62.

[86] Intelligence Summary, paras 44-48.

[87] Mitchell, Op Cit., p. 93.

ability of the Western partners to maintain security even in their own areas of interest.

This section has detailed the worrying developments in naval technology. The end of the Cold War, despite its reductions in defence expenditures has not halted the relentless progress in destructive weaponry. The spread of advanced weapons in the form of anti-ship missiles, submarines, and modern surface ships, together with the persistence of older but still effective technology such as mines means that Canadian efforts must continue to upgrade our military hardware. This is especially true if we wish to participate in multinational stability operations such as those conducted in the Adriatic, and the Persian Gulf. To forego modernisation, means to lose the opportunity to participate in operations of interest to this country, and to lose a venue of influence on the world stage.

Trends in Military Technology Modernisation

The most significant trends over the next two decades are the interrelated developments in data processing speeds, artificial intelligence, and data base management usually grouped under the term "information warfare" or "Revolution in Military Affairs" (RMA). Advances in military integrated computer systems will facilitate the manipulation of the vast amounts of information. Closely related are the unfolding advances in communication technology. Not only will more information be moved more quickly than ever, but the locations and methods of analysis can be re-organized to improve efficiency.[88] Together with similar leaps in sensor [89] and weapons technology,[90] ongoing computer developments seem likely to transform the conduct of traditional military operations at sea and especially on the land.[91]

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[88] For an overview of the RMA and its components, see, Steven Metz, James Kievit. Strategy and the Revolution in Military Affairs: From Theory to Policy, (Carlisle Pa: USAWC, 1995), p. 1-8;Jeffery R. Cooper. Another View of the Revolution in Military Affairs (Carlisle Pa: USAWC, 1994); David Jablonsky, The Owl of Minerva Flies at Twilight: Doctrinal Change and Continuity and the Revolution in Military Affairs, (Carlisle Pa: USAWC, 1994), pp. 7-12; Earl H. Tilford jr. The Revolution in MilitaryAffairs: Prospects and Cautions, (Carlisle Pa: USAWC, 1995), PP. 2-7.

[89] Sensor developments are anticipated in several key areas. Perhaps the most significant are improvements in satellite and radar surveillance, SIGINT, underwater, and radar fields. These will be driven by processing improvements and antenna design enhancements (especially array design, eg the HFSW radar). At the platform level, advances in phased array radar, shipboard HFSW radar, and remote unmanned vehicles offer opportunities for earlier detection and better chances of successfully prosecuting anti-ship missiles, perhaps even stealthy ones. Advances in acoustic signature reduction mean that submarines will become increasingly difficult to detect by passive sensors. Developments in LFA sonar and non-acoustic detection systems such as MAD - enhanced by new superconducting technology - provide possible means of countering the stealthy submarine. Sensors and systems mounted on autonomous vehicles will extend sensor ranges and provide enhanced jamming and/or deception capabilities. As smarter, stealthier mines increase the complexity of mine warfare, defenders seeking to neutralize deployed mines will require access to better sensors, especially remotely deployed sensors.

[90] Weapons seem certain to become more precise and difficult to counter in the future. In the future, stealthier, more manoeuvrable anti-ship missiles, guided by active and/or passive sensors as well as sophisticated search and attack programs and capable of a wide range of speeds, will be available. Quiet underwater weapons capable of extremely high speeds will compound the difficulty of defending against torpedo attack, already one of the most difficult aspects of maritime warfare. Energy weapons seem inevitable in the next two decades. The first to appear will likely pose a threat to sensors and electronic systems, but 'hard kill' directed energy weapons might be in existence in twenty years time.

[91] Many of the developments which are currently being introduced into ground units such as integrated C^3I systems have been available in some form or other to navies since the end of World War II. See James J. Tritten, A Doctrine Reader, James J. Tritten, VAdm. Luigi Donolo (IN Ret'd) (eds) (Newport Ri: USNWC Press, 1995).

Consequences of New Technology

The RMA presents new opportunities for military forces as well as challenges to overcome. The overall impact of these changes will be a significant shift in how C^2 is exercised. While these new developments will undoubtably improve a commander's grasp of the "battle space", with these tools come new threats like computer viruses (indeed, some have speculated that Western forces are more susceptible to information warfare given its reliance on computers for virtually every task).[92] The vast new quantities of information now used daily in military organisations also make the introduction of spurious information by either malcontents or opposing forces a possibility. It will also pose increasing problems for international cooperation in multinational operations given differing national levels of technological development.

Situational Awareness

New technology will provide naval forces with the means of achieving far better situational awareness. The growing utility of coordinated weapon and sensor systems, better communications, along with more intelligent analysis systems, will allow partially or fully assessed data, from joint and possibly combined sensors, to be transmitted to a centrally located collation and processing site that integrate all inputs to produce a superior situational assessment. This data can then be summarized and redistributed to all relevant platforms. It can also be used to facilitate weapon engagement or assignment decisions while the re-transmissions are taking place.[93] Realising this potential will require a consistent effort to intelligently exploit automated and operator-assisting systems to produce significant improvements in effectiveness and efficiency.

Signature Reduction

Countering developments in enhanced surveillance and intelligence capabilities will be advances in signature reduction, made possible by such technologies as signature management systems, various stealth applications, potential use of fuel cells to reduce noise and infra-red signatures, and active noise cancellation. These developments will spur the requirement for better electro-optical and infra-red detection systems, as well as active acoustic sensors. In short, the contest between stealth and detection will continue in the future. Simply maintaining current levels of effectiveness will require steady improvements.

Crew Training

A difficult but critical transition concerns the affect of automation on crew sizes. Personnel requirements will certainly contract. More importantly, however, the skill sets required will change, with a greater requirement for information specialists. Whether this change can be accommodated within existing career patterns is unclear. Advances in technology, however, also offer new ways of

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[92] Laqueur, Op Cit.

[93] The Joint Surveillance and Target Attack Radar System (JSTARS) is one of the first such theatre wide systems which is currently revolutionising the way that the US Army and Air Force plan and fight conflicts. First deployed during the Gulf War (before its anticipated IOC date), JSTARS was able to target Iraqi forces for inbound B-52 flights during periods of heavy cloud cover, enabled commanders to determine that the Iraqi attack on Khafji was simply a feint, and detected the Iraqi retreat, allowing VII Corps to better direct its attack. Cordesman, Op Cit., p. 318. To a certain extent, many of the features of JSTARS have long been available to naval commanders in ships equipped with Link 11. However, the integration of satellite communication, there is no theoretical geographical limit to the information available to a naval commander. For example the US military is developing a "Cooperative Engagement Capability" that would link all its various sensor systems together for the first time, allowing more efficient counterstrikes to be conducted.

satisfying training requirements. Simulators for the training of pilots are a familiar and mature system. Similar techniques are available for many other forms of training.[94] Further, such simulators can be used remotely by personnel far removed from operational sites, providing opportunities for training by reserve forces or refresher training for regular forces on temporary duty elsewhere. As these technologies increase in sophistication, they may become so valuable in their own right that they will become state secrets. On the other hand, simulators may become so widely available and inexpensive that developing countries will have the opportunity to employ the most sophisticated training techniques, allowing maximum effectiveness to be gained from their weapons systems. A suggestion that this is less improbable than it sounds is the use of commercial entertainment software for training by the US Marine Corps. Some minor adaptations have allowed the Marines to use a game known as 'Doom' to train effectively in small unit tactics.[95]

New Definitions of Command

An important consequence of better communications is the complications they will introduce to the task of command. These complications result from the greatly improved access to immediate scenes of operational activity by political and remote military leaders. In particular, the line between tactical, operational, and strategic activity will blur or erode in the face of these technical advances.[96] Further, local commanders may be able to conduct their own long range surveillance using a variety of sensors based on small robotic platforms, further challenging the notion of 'tactical' as opposed to 'strategic'. There will always be more data to transmit than communications systems can carry, but the volume of information capable of being moved quickly and effectively to more people is clearly accelerating.

Such developments may do more than complicate traditional command arrangements. The potential to redefine traditional command and control systems exists today. The flexibility of new communications systems will allow 'ad hoc' arrangements to be created at short notice, leading to new command structures in unanticipated situations. For example, there is potential, whether beneficial or otherwise, for other government department's (OGDs) to have charge of Canadian Forces units in the field.

Problems with Multinational Cooperation

Multinational operations may be complicated by the need to share data for weapon assignment, tracking, and engagement decisions. There should be no problems, if all the platforms have the same rules of engagement (ROE). However, in operations where units may follow different weapons release criteria, the possibilities of unintended or inappropriate use of force begin to multiply. This may not be easily avoidable: the increasing speed at which weapon engagements occur dictates the use of automated, and distributed sensor and weapon systems in order to improve self-defence. The US leads developments in these fields today. As the most likely leader of future coalition efforts, interoperability with the USN will be critical to the future effectiveness of Canada's naval forces.

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[94] These include damage control, engineering systems, bridge and operations room simulators as well as boarding operations simulators.

[95] Marine Doom Homepage, http://138.156.15.33/DOOM/DOOM.html

[96] Douglas A. Macgregor, "Future Battle: The Merging Levels of War", Parameters: US Army War College Quarterly (Winter 1992-93, Volume 22, Number 4), pp.33-47.

Complications raised by computing and communications developments suggest that contingencies plans be devised in advance wherever possible.[97] At a minimum, commanders must acknowledge the possibility that rapidly improvised command arrangements may be necessary. Procedural changes may ameliorate some of these problems, through the development of flexible standard operating procedures (SOP) and ROE that provide more options for civil leaders. These SOP and ROE must be both easily understood and compartmentalised. This will facilitate the rapid identification of essential ROE in time urgent contingencies that preclude detailed assessments. Many future conflict situations will occur at such a rapid pace that as much planning as possible must be done in advance.

Summary of Technological Developments

In 1993, the Canada 21 group wrote:

> the choice before Canadians is not between forces that could defend Canada against a military attack and those that could not. Rather, the choice is between, on the one hand, making the decisions that will allow Canada to play a leading role in the new era of common security, and on the other continuing with present policies which both make that option increasingly difficult, and at the same time, maintain an assortment of military capabilities too limited to be effective for any meaningful purpose. ... (Canada 21 recommended) forces well enough trained and equipped to conduct operations in situations where high-intensity conflict is not a significant risk, and in cooperation with other states, would become the backbone of the military forces the *Council* envisages.[98]

Nevertheless, because of the unique nature of naval warfare,[99] and its peculiar ability to shift abruptly between peaceful and hostile operations, Canada cannot avoid preparing for the higher intensities of conflict: naval vessels need to be capable of defending themselves in all circumstances. Pursuing any other course would mean that Canada's ability to participate in all but the most limited ways in multinational operations would be severely restricted. To continue playing a leading role in multinational operations, as we have over the past five years[100] will require a significant investment in C^3I technology, and directed research into the problems and prospects presented by such technology for both international and Canadian participation in these operations.

Summary of Part One: Strategic Signposts for 2015

The history of Canada's naval forces suggests a number of relevant lessons. The unique geographic position of Canada, her long path to full independence, and the costs of naval forces all complicated the birth of the RCN. Since the Navy's inception the most consistent theme has been the challenge of determining the appropriate level of naval forces. Most Canadians accept the requirement for a Navy to provide national protection and promote sovereignty. However, determining the level of forces necessary to support collective defence, whether within the British Empire or NATO, has

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[97] To a degree, the developments of the US Navy's Doctrine Command may ease some of these problems through the promulgation of a common operational doctrine for multinational operation. However certain problems, like differing ROE may be beyond resolution save only in forward planning and effective anticipation.

[98] Canada 21: Canada and Common Security in the Twenty-First Century, p. 63.

[99] James Tritten, "Is Naval Warfare Unique?", *Journal of Strategic Studies*, Vol. 12, No. 4, Dec. 1989; James Tritten, Roger Barnett, "Are Naval Operations Unique", *Naval Forces*, Vol. 5, No. 7, 1986.

[100] This was amply demonstrated in the Persian Gulf where Canada's investment in both training and technology lead directly to our role as Combat Logistic Force Coordinator. See esp. Miller, Op Cit., p. 140.

always proven controversial.

From the outset, Canada's naval forces have been an important expression of national sovereignty. Growing global interdependence and the apparent 'shrinking' of distances caused by technology and trade suggests that the Navy will become still more crucial for pursuing Canadian interests on the shrinking global stage. It further suggests that the difference between purely *national* operations and collective security is diminishing as is the technical requirements for each. Interdependence means that we may have to pursue national operations in an international setting.

Signpost One: Multinational Operations

After World War II, the RCN specialised in an ASW role. This fostered influence or leverage within NATO because Canada offered a vital specialist capability. Debate as to the value and appropriateness of specialisation continues today.[101] In this regard it is important to recall that the addition of the Halifax class frigates to the Fleet and the improvements recently made to the Iroquois class have substantially improved our capability in anti-air and anti-surface warfare as well as maintaining a significant anti-submarine capability. Implicit in the debate over specialisation versus general purpose is the continued importance of collective security for Canada and what role our nation can play. As a power with limited economic and military resources, and highly dependent upon world trade, the multilateral approach must remain the preferred method for achieving all but the narrowest of national security goals.

Signpost Two: Sovereignty and Independence

A lesson derived from the conflicts of the first half of this century is that over-reliance on dominant allies can result in Canada's coasts being threatened by very real but unanticipated threats. Before the First World War the British Royal Navy assured Canada that no naval threat could approach our shores. Unfortunately, in the last year of the war, German submarines cruised successfully off the coast of Nova Scotia, sinking ships. Over-reliance on the Royal Navy throughout the inter-war years caused similar results in World War II. The temporary closure of the Gulf of St Lawrence in the fall of 1942 was but one of these. Both World Wars also demonstrated that large scale mobilization of naval forces in wartime was virtually impossible without a significant organisational infrastructure, including sufficient ships, aircraft, bases, logistics, doctrine, training, and analysis support systems. Simply put, in a national or global crisis, Canada will not be afforded the time to mobilise sufficient forces, as we did in both World Wars. Interdependence, the growing destructiveness of weapons, and their escalating costs means that future crises and wars will be "come as you are" affairs. In order to respond appropriately with minimum risk to Canadian service men and women, the infrastructure for protecting our national interests will have to be continuously updated. Further, those forces must retain the capability for independent action. If this is lost, then Canadian units will be broken up haphazardly among multinational forces, limiting our impact as a nation on a conflict. This would be against every national precedent set since 1914. Similarly, forces too narrowly specialised, whether that be ASW or peacekeeping, will be unable to flexibly attend to the wide range of potential challenges to national sovereignty that will occur in the next century.

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[101] In this respect, Canada 21 was particularly critical of continuing Canada's specialisation in ASW. However, their recommendations also advocated highly specialised forces. See, Canada 21, p. p. 64.

Signpost Three: C^3I and Interoperability

History repeatedly demonstrates that C^3I and infrastructure components such as training, logistics, and doctrine development are of fundamental importance in any naval operation. Concluding on multinational operations in the Gulf War, Cordesman and Wagener note:

> Coalitions without the US will face major operational limits relative to the UN forces in Desert Storm. High volume, long distance, secure, and intelligence related C^4I systems are likely to be critical operational problems in mid- to high-intensity conflicts and could prove critical in many multinational peacekeeping and low intensity operations.[102]

However, it is not as simple as "add technology and stir". The importance of prior experience in multinational operations and exercises clearly demonstrates the need for Canada to remain militarily engaged with its partners. Again on the Gulf War, "Unlike the national commanders of many previous coalitions, senior commanders were used to cooperating with other nations and most had extensive personal experience and training in joint commands, exercises, or planning"[103] considerably easing cooperation and both national and multinational planning in the theatre. Continued cooperation with our partners is the best way of maintaining this critical element of readiness for future crises.

Signpost Four: Public Education

Finally, defence policy and acquisition programs must be attuned to public expectations. The Navy is not a business: the consequences of its failures are far larger than those of a company experiencing market loss or bankruptcy. Still, the Navy does serve a social demand. Without properly understanding its served market, it is entirely possible to be overtaken by extraneous market forces.

Naturally, the Navy has no other competitors for its mission in Canada. However, given the general unfamiliarity of the Canadian public with the military, the Navy needs to prove its expertise to the Canadian public in order for them to trust its judgement regarding force structure and naval operations. Unless Canadians are convinced that their tax dollars are being used prudently, there will be little support for even 'good enough' solutions. However, "getting better at what you do is not necessarily the only answer to securing long term support from the public."[104] As long as the Canadian public is concerned about jobs, and government cutbacks, standing on the accomplishments of the past and present will fail to convince. A prudent naval force structure and strategy can not be sold on the strength of the status quo or an unspecified future. The Navy will have to clearly spell out its role in terms that are relevant to Canadians from St. John's to Victoria. Such an effort is clearly beyond the scope of this single paper. *The Naval Vision* was an important first step that must be continued, however, it must be continued, in other forms and media as well.

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[102] Cordesman, Op Cit., p. 263.
[103] Ibid, p. 233.
[104] LCdr. Neil Golightly (USNR), "Marketing the Fleet", Proceedings, Vol. 12, No. 7/1109, July 1995.

PART TWO: OPERATING CANADA'S NAVY IN 2015

Future Missions of Canada's Naval Forces

It is difficult to foresee precisely all the contingencies that the Navy will be called on to address: most situations are likely to arise with little or no warning, thus requiring us to act with the resources available. Canada will never have sufficient defence forces to meet all challenges on its own yet must be prepared to meet some challenges independently. Recent history shows that a naval force capable of carrying out a wide variety of tasks offers the government the greatest range of options and degree of flexibility for decision making. The situations in which Canada may require the use of maritime forces over the next twenty years, fall within five broad categories.

Protection of Canadian Sovereignty/Maritime Resources

Disputes over Canada's sovereign interests are most likely to occur within Canada's EEZ/EFZ or the immediately adjoining waters. While the recent Turbot Crisis was exceptional given Canada's firm tradition of support for international law, the confrontation is a useful example of such a dispute. Under UNCLOS, Canada is exclusively responsible for the exploitation, exploration, management, and conservation of the natural resources of its oceans out to 200 nautical miles from shore. Eventually, Canada could gain jurisdiction over the resources of the seabed out to 350 nautical miles in some parts of the Arctic and Atlantic Oceans. Canada's largely inaccessible Arctic waterways are of particular concern given their disputed international status, their fragile ecology, and the challenge of tangibly demonstrating sovereignty over them.

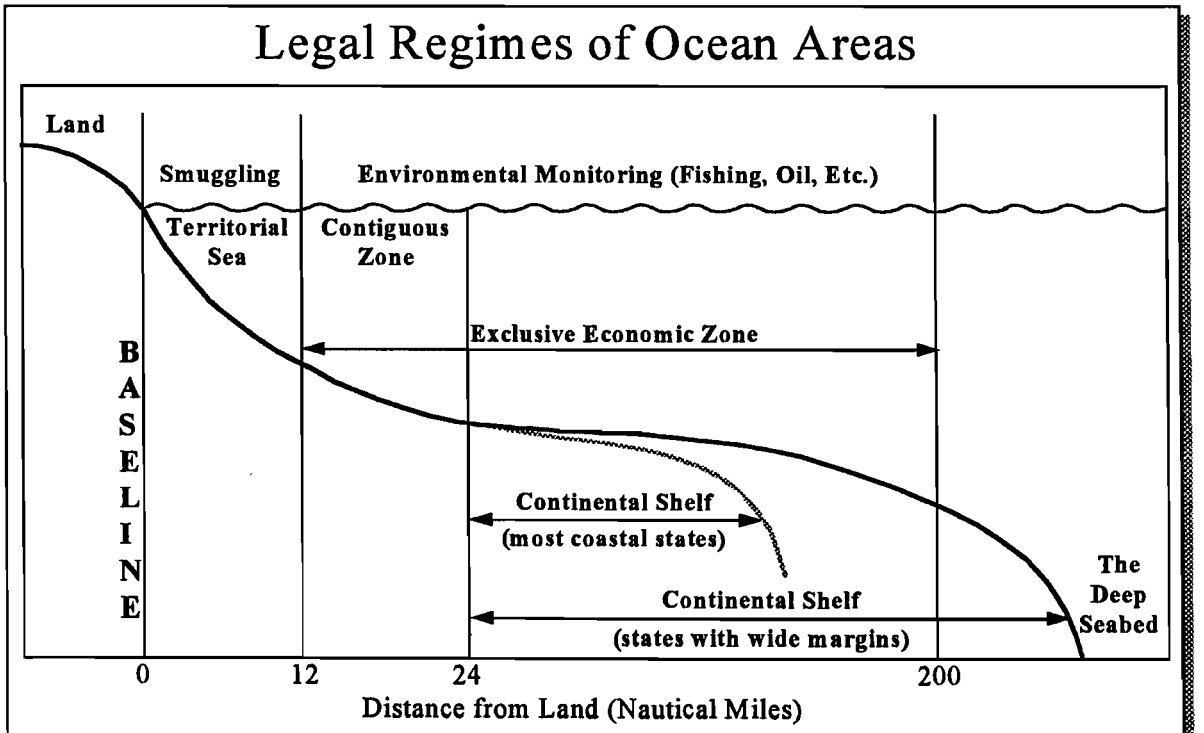

Diagram derived from: Horace B. Robertson Jr., "The 'New' Law of the Sea and The Law of Armed Conflict at Sea", Naval War College, Newport, Rhode Island, Newport Paper #3, October 1992, p.13.

Within the broader concept of sovereignty, Canada's naval forces will be employed in non-military roles such as disaster relief, search and rescue, pollution monitoring, and aid to civil power in Canada's maritime areas and coastal communities. Naval forces also contribute to Canada's sovereignty through assistance to OGDs. This ranges from helping to prevent the entry of illegal drugs and immigrants into Canada to preparing for possible terrorist attacks against ports, oil platforms, ships, and other targets.

The protection of Canadian sovereignty is a national task and Canada can neither expect the active assistance of our allies in the face of most contingencies, nor should it rely on them to protect our responsibilities.

> (T)he right to claim jurisdiction over specific ocean areas is accompanied by the responsibility to ensure that those waters remain free and safe for the lawful use of others. These companion rights and responsibilities exist outside any structure of collective defence agreements, and should be thought of as a sovereign *obligation.*[105]

It is difficult to predict where Canada will be challenged in the future or by whom. As the Turbot Crisis demonstrates, challenges to sovereignty are likely to arise with little warning and would require Canada to use readily available forces with little time for mobilisation.

Promotion of Canadian Interests Abroad

The promotion of Canadian interests abroad is a complementary and strategically important role for Canada's Navy. Canada's naval forces are used regularly to support national and international institutions, uphold the rule of law, assist trade delegations, demonstrate Canadian technology and expertise, promote a positive image of Canada, and project Canadian values and culture.

Naval forces are one of the most flexible assets that a nation can exploit for diplomatic influence. They combine global reach with the capacity to transition rapidly from innocuously loitering offshore, to providing humanitarian relief, to assertively demonstrating the will of the international community. "Naval forces can be intrusive or out of sight, threatening or non-threatening, and easily dispatched but just as easily withdrawn."[106] In effect, naval forces provide policy makers with a wide range of options, rather than commitments.

Adroit use of naval forces in support of national missions can support Canada's efforts to influence global politics. Our history and growing global interdependence suggest there may be an increasing number of occasions when Canada will wish to participate in stability building initiatives. "Nations derive their international influence from the assets at their disposal and their effectiveness in using them; influence is a function both of national assets and of national will."[107] Neither, by itself, is sufficient.

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[105] Emphasis added. Fred W. Crickard, Peter T. Haydon. Why Canada Needs Maritime Forces, (Nepean On: Napier, 1994), p. 10.

[106] Admiral James D. Watkins, USN, "The Maritime Strategy", Special Edition of The US Naval Institute, January, 1986, p.8. A good example was the rapid transition of American Marine and Naval forces returning from the Gulf War to provide humanitarian assistance in Bangladesh following a devastating hurricane.

[107] Canada and the World: Government Statement on Foreign Policy, 1995, p.24.

Collective Defence of North America

The collective defence of North America is among the least likely of contingencies facing the United States and Canada. At present, a direct, sustained attack on North America by another state or states is improbable. However, in the face of any significant military or paramilitary threat to North America, the active cooperation of the United States and Canada can be taken for granted. It is difficult to conceive of a situation arising in the next twenty years which would change the harmonious relationship between Canada and the United States.

Despite the absence of a direct threat to the territory of North America, there are a number of contingencies where the naval forces of the United States and Canada might be required. Regional instability outside of continental North America could easily affect Canadian and American security. Already we have seen regional cooperation to enforce international sanctions against the military regime in Haiti. Similar operations could be required in the future ranging from sanction enforcement, naval peacekeeping, non-combatant evacuation, and surveillance operations.

Action in Response to a Regional Contingency

A regional contingency of concern to Canada is defined as an event which has the potential to cause a significant disruption of global trade or international stability thus directly impacting upon Canada. A wide range of scenarios could create a regional contingency ranging from humanitarian crises, such as a famine, flood, or earthquake, through to internal unrest within a state or open conflict between states.

In response to regional contingencies, Canada's Navy has in the past, and will in the future, be called upon to deliver humanitarian aid, to indicate concern through presence, enforce embargoes or impose sanctions, to act in an advisory role, or support multinational combat operations. As with many other missions, readiness will be vital given that little warning time will be likely.

Support of the Western Community in Face of a Major Regional Threat or War

A major regional threat or war, such as the threat posed by the Warsaw Pact during the Cold War, is the least likely scenario over the next twenty years. While the direct threat to Europe has faded with the end of the Cold War, major regional conflicts remain possible given the number of flash points around the world.

The outbreak of a major regional war involving the Western Community would compel Canada to commit most of its existing naval forces and could also require a significant mobilisation of its defence base to generate additional forces.

Summary of Naval Missions

As can be seen, Canada's Navy must be prepared to take on a wide variety of missions. As it is presently configured, the Navy provides Canada's government with a highly flexible tool, able to take on virtually any task required and do so on a global basis. Much of the Navy's day to day activity is routine and can be planned far in advance. However, the Navy must also be prepared to act a moment's notice. In most crisis scenarios, Canada will be forced to act with the resources it has available. Canada must either preserve the capabilities and readiness inherent in its present naval force structure, or risk losing its present flexibility of action.

Operational Roles for Canada's Maritime Forces

It may be said the primary purpose of naval force in wartime is to control use of a given area of water for friendly forces. How absolute and all-encompassing the degree of control required depends on the nature of the operation. Some operations may only require naval forces to maintain watch over maritime traffic entering and exiting from a particular area. Others, may require the force to totally deny a particular area to all others. Thus, the vaunted term "sea control" is a very relative concept.[108] Navies are able only to control an area in their immediate vicinity, and even then, such control may be subject to dispute by a variety of means.[109]

The missions outlined in the previous section fall into a variety of mission areas. All naval roles, outside of those that are purely diplomatic, involve three elements - surveillance, patrol, and response. Surveillance is the "gathering, collation, and evaluation of information to determine what is happening in a particular ocean area. It is the first step in any operation..." and may be the sole point of a naval operation. Patrolling ships establish presence within a defined area, either in "conjunction with a surveillance task or as part of a graduated political response to an uncertain or deteriorating situation." Response is a direct intervention into an incident, not necessarily involving violence.[110] Surveillance, patrol, and response are building blocks in gaining sea control. Without sufficient capability in all the sub-components, sea control cannot be achieved. While the activities of surveillance and patrol will be common to all naval operational missions, how a ship or group of ships responds to a given incident depends on the type of mission it is executing at the time. Thus, the mission defines a ship or group's purpose, and the role defines how it achieves those goals.

National Operations

Naval Presence: Through their presence at sea, Canada's naval forces are used to bolster legal claims and manifest sovereign interest in local waters. The appropriate level of response will vary, however if the threat encountered involves more than a constabulary ('police style') response or minimal deterrence. More than that, the mission escalates to another level, definitions of which are discussed below.

Naval forces capable of the full range of operations, also have many of the capabilities required to assist in constabulary activities, normally the prime responsibility of OGDs. Canadian naval ships

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[108] Brodie writes: (C)ommand (of the sea) has usually been subject to so many limitations and qualifications that some modern writers have balked at use of the term and have preferred to speak only of "control of communications". ... So long as one bears in mind that "command" is always relative and means simply a marked ascendancy in the contest for control, one might as well continue to use a phrase which has so ancient and honourable a tradition. Bernard Brodie. A Guide to Naval Strategy (Princeton: Princeton University Press, 1944), p. 91.

[109] Quoting Adm. Stansfield Turner (USN Ret'd), Geoffrey Till notes: "The new term 'Sea Control' is intended to connote more realistic control in limited areas and for limited period of time. It is conceivable today to temporarily exert air, submarine and surface control in an area while moving ships into position to project power ashore or to resupply overseas forces. It is no longer conceivable, except in the mos limited sense, to totally deny them to an enemy." Till also notes that navies "even in the 'good old days' could rarely totally control an ocean area. Till. Op Cit,, p. 57.

[110] Peter Haydon. "Naval Peacekeeping: Multinational Considerations", The New Peacekeeping Partnership Alex Morrison (ed.), (Clementsport NS: Canadian Peacekeeping Press, 1995).

and MPA are regularly tasked in support of OGDs to assist in monitoring activities such as fishing in Canadian ocean areas. Naval forces are more than capable for these tasks by virtue of the training they have undergone and the equipment they require for military roles. Canadian naval forces also routinely enforce environmental regulations, and can be called upon to assist in disaster relief. The flexibility inherent in military organisations make these taskings possible even while remaining available for military operations. Presence remains an essential role for Canada's naval forces in defence and exercise of sovereignty. Further, possession of naval forces capable of conducting operations from naval presence through to sea control, provides Canada with the ability to indicate convincingly its sovereign intentions to govern its claimed maritime areas of responsibility. Failure to provide capable forces is an invitation to nations and groups unhappy with the status quo.

Sea Denial: Sea denial is a concept, separate from that of sea control, that is often introduced in naval history texts and other works on strategy. It is a tactic usually reserved for inferior fleets which seek battle with its opponent only when the conditions favour victory.[111] "The objective (of sea denial) is not to use the sea oneself, but to prevent the enemy from doing so."[112] The concept has little relevance for Canadian operations. As a sovereign nation Canada has the obligation to ensure that no nation operates in Canadian territorial waters contrary to national wishes. Thus, Canada seeks to control its own waterspace. There may be occasions where Canada would have to confront nations intent on denying the use of the sea to it, but operations to counter this would be conducted as general sea control efforts.

Sea Control: Sea control is the most demanding role for Canada's naval forces in national waters. Sea control requires sufficient force to ensure the use of an area. It incorporates a wide range of possible situations spanning the spectrum from peacetime operations to armed conflict. It is not limited to the surface of the sea, but encompasses both the airspace above and water column below as well. The conduct of surveillance and patrol operations are fundamental building blocks toward the achievement of sea control, with the degree of effort governed by the volume of area to be monitored and the level of potential opposing activity expected in an area. Low intensity operations are the most likely level in Canadian areas, although some possibility of medium intensity situations should be planned.

International Operations

Naval Diplomacy: In the international context, naval forces give Canada the ability to support initiatives intended to promote peace and stability. This mission encompasses a wide variety of possible situations, including friendly port visits, "showing the flag" by taking part in international relief operations, and participation in alliance exercises. The degree of influence achieved will be closely related to the nature and capability of the naval forces committed to the mission. Small but capable groups of ships have served Canada well in the past, and future opportunities for such employment seem numerous.[113]

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[111] Brodie, Op Cit, p. 94.

[112] Till. Op Cit, p. 57.

[113] A good example are the series of naval visits known as WESTPLOY which are conducted yearly by MARPAC. Alternating between Southeast Asian countries and Northeast Asian countries, these visits have enabled Canada to re-establish its presence in those regions of the world, and are also a useful tool for demonstrating our interests there. Further,

Surveillance is a less significant aspect of naval diplomacy, although general observation of activity in the vicinity of Canadian naval forces is a routine activity. Non or, at most, low intensity levels of conflict are anticipated in presence operations.

Multinational Sea Control: It is difficult to conceive of a situation where Canada would unilaterally undertake a sea control operation outside its own areas of immediate interest and responsibility. Such an operation would most likely be in a multilateral context, either under the auspices of the United Nations or as a fulfilment of an alliance obligation. A good example of this type of mission at the lower end of the spectrum of conflict is sanctions enforcement, such as those conducted in the waters off Haiti in 1994. Canadian naval forces contributed to the international effort to conduct surveillance, identify all merchant shipping passing through a specified area, and prevent prohibited shipping from arriving at embargoed ports.

Multinational sea control requires highly mobile naval forces with effective surveillance, and C^3I systems. A reasonable boarding capability is needed to permit inspection of merchant vessels that may be attempting to circumvent a blockade. Perhaps most significantly, a self-defence combat capability is required in the event of hostilities. This is more fully discussed below.

The multinational nature of these operations will both complicate and ease the challenge of achieving sea control. Complications arise from having to coordinate various national forces, all with different backgrounds, equipment, and training.[114] At the same time different countries bring a variety of capabilities which can all contribute to the achievement of sea control in a designated operating area.[115] Interoperable C^3I systems and a common agreed doctrine are important considerations in ensuring different nationalities can operate together effectively.[116]

In a more serious conflict, sea control off the coast of a strife-torn country may be required to support land forces engaged in peacekeeping or peace enforcement duties ashore.[117] A more robust self-defence capability as well as (at least) a modest ability to engage in anti-air, anti-surface, and anti-

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they are also an opportunity to showcase Canadian technology resident in the City class Frigates. The size of these deployments has been growing, moving from the initial two ship deployments to a full task group comprising an AOR, a 280 DDG, and two FFGs in 1996. Paul T. Mitchell Naval Confidence Building Measures in Southeast Asia: The Canadian Dimension (Ottawa: DFAIT, 1996).

[114] VAdm. P.W. Cairns (RCN). "Maritime Training for Peacekeeping Operations", NATO's Sixteen Nations, Vol. 39, No. 1, 1994, p. 19; Robert H. Thomas. Multinational Naval Cooperation, (Halifax: Centre for Foreign Policy Studies, 1996), pp. 73-76; Cmdre. Maddison notes that in the Adriatic highly restrictive ROE prevented German ships from conducting boardings or firing their weapons save only in self defence. Thus, German ships were tasked with developing the initial maritime picture in the low threat approach areas. G.R. Maddison Cmdre. (CF), "Operations in the Adriatic", Multinational Naval Forces, (Halifax: Centre for Foreign Policy Studies, 1996), pp. 198-199.

[115] Capt. Goode notes that nations with less restrictive ROE can placed in high threat areas. Capt. (N) A.J. Goode (CF Ret'd), "International Naval Cooperation: For Example, See NATO", Multinational Naval Forces, (Halifax: Centre for Foreign Policy Studies, 1996), p. 144.Allegedly, this occurred with Danish ships during Operation *Sharp Guard.*

[116] The problems of coordinating tactical communication is outlined in Cmdre. Duncan Miller (CF), Sharon Hobson. The Persian Excursion: The Canadian Navy in the Gulf War, (Clementsport: Canadian Peacekeeping Press), pp. 113-122. Due to sound planning Canadian ships were outfitted with equipment that allowed them to talk to anyone in the Gulf whereas many of the ships operating there, including American ones, were often limited in the frequencies they could use (115).

[117] See, Capt. (N) R.W. Allen, (CF). "Combined and Joint Operations in Somalia", Multinational Naval Forces, Peter Haydon, Anne Griffiths (eds), (Halifax: Centre for Foreign Policy Studies, 1996).

submarine warfare will be required. The capability of a ship's self defence system often determines its usefulness to the group's commander and, thus, may determine how that ship is employed.[118] A deployable mine clearing capability will also be useful given the growing threat represented by maritime mines.[119]

Multinational Power Projection: This task employs naval forces to directly influence events ashore. Defining the role of Canada's Navy in this mission is important as it is likely that Canada would play a supporting, not leading role. Canadian naval contributions to multinational naval operations at the very least must retain some independence, allowing some control over the operation. A good example is the recent Persian Gulf conflict. This operation both reflected and exploited Canadian capabilities and experience, particularly the ability to operate with the world's major navies as a result of good C^3I equipment and expertise.[120]

A less-violent but still challenging environment where limited power projection may occur is in peacekeeping and peace making operations in developing nations. Here the obstacles may arise less from opposing combat forces than from infrastructure shortfalls, ie poor or non-existent port facilities and roads.[121] In this context the challenge will be in providing ships capable of landing lightly armed ground forces in trying conditions. Our current Canadian naval forces have very limited sealift capacity and are dependant on allied ships or merchant vessels..

By maintaining effective C^3I systems, Canada will continue to be able to operate with other advanced navies throughout the whole spectrum of naval operations. As such Canada will be able to continue to participate in most multinational naval operations. Some naval capabilities will be beyond Canadian efforts: amphibious assault ships and large deck carriers are not essential for the direct defence of Canada and are unaffordable for international roles. When air support is required and no air base can be provided in close proximity, then cooperation with major navies such as the USN might best satisfy this requirement. The success of such a strategy depends critically upon our familiarity with American procedures and our ability to operate interdependently with their communication, sensor, and weapons control systems. Losing this ability would seriously limit Canadian options to participate in international operations.

The range of opposition expected in multinational power projection operations is quite large: anywhere from low to high intensity conflict might be expected.

Unilateral Canadian Operations: There exists a limited requirement for an independent national capability for the removal of Canadian diplomats, citizens, or troops from a foreign country in turmoil. There are also occasions when Canadian naval forces dispatched to assist in humanitarian or UN contingency operations may need to land small groups of sailors or soldiers, as well as supplies.

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[118] LCdr. Richard H. Gimblett, (CF). "Canadian Coordination of the Persian Gulf Combat Logistics Force", Multinational Naval Forces, Peter Haydon, Anne Griffiths (eds), (Halifax: Centre for Foreign Policy Studies, 1995), p. 235.

[119] Damage to the USS Samuel B. Roberts during the Tanker War, and to the USS Princeton during the Gulf War is probably a harbinger of future opposed multinational operations. J.M. Martin Capt. (N) (USNR Ret'd). Op Cit., pp. 64-68.

[120] LCdr R.H. Gimblett, "MIF or MNF?: The Dilemma of the 'Lesser' Navies in the Gulf War Coalition" in This Nation's Navy, M. Hadley, F. Crickard, R. Huebert (ed.), (Kingston-Montreal: McGill-Queen's University Press, 1996).

[121] Allen, Op Cit., pp. 204-205.

Growing global interdependence suggests that there are likely to be few situations where Canada will be involved in such operations alone. Nonetheless, since 1949, at least eight non-combatant evacuation operations have been planned by the Navy to extricate Canadian troops, diplomats, and citizens from strife torn areas as diverse as Haiti, Egypt and Vietnam.[122] The existing capabilities of Canada's AORs greatly facilitated sending aid to Florida in the wake of 1993's Hurricane Andrew, even though these ships were not designed for such a task. The fact that Canadian naval forces might be required to undertake such actions almost anywhere in the world underlines the requirement for ships and a national command and control system all with worldwide capabilities. The anticipated level of conflict in unilateral Canadian power projection operations is low to none.

Summary of Canadian Naval Force Missions and Roles

Table One

National Operations	Anticipated Levels of Conflict
Maritime Presence	Non to Low
Sea Control	Low to Medium

Table Two

International Operations	Anticipated Levels of Conflict
Maritime Presence	Non to Low
Multinational Sea Control	Low to Medium
Multinational Power Projection	Low to High
Unilateral Power Projection	Non to Low

Capabilities Required to Fulfil Canada's Naval Missions

Many factors affect Canada's naval force structure. The three dimensional nature of the maritime environment dictate specific requirements as does the vast areas of Canadian responsibility. Limited fiscal resources lead to the single greatest constraint on maritime defence. Finally, it is difficult to predict with confidence who may challenge Canadian sovereignty in its maritime areas, or its interests abroad. While the possibility of a direct threat is slight today, the future is unpredictable. History has demonstrated that Canada's apparent geographic isolation was not sufficient to prevent intruders, such as German U-boats in both World Wars, from violating Canadian waters and interests. Our growing interdependence ensures that Canadian interests will be engaged on a global scale.[123] International operational requirements also need to be carefully considered.

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[122] Sean Maloney. "Canadian Maritime Contingency Operations, 1945-1996", Unpublished manuscript, 1996.

[123] The Gulf War, the Turbot Crisis, and the Korean War were all "peacetime" uses of the Canadian Forces. Drug smuggling is an international operation as are threats to our off shore resources

Assessing platform capabilities further complicates this exercise. At a minimum, platforms must be capable of safe navigation, communication, and an appropriate measure of self-defence. The infinite combinations of potential missions, operations, and roles, however, require versatile platforms with a variety of capabilities. However, no single one can possibly perform all roles. Changes in technology significantly impact the way in which missions can be accomplished, but the requirement for different systems tailored for various roles will remain. The logical consequence is that naval forces must continue to be 'balanced and multi-purpose'.

Surveillance systems are at the heart of all naval operations. In national waters, surveillance is necessary as a function of sovereignty. Surveillance is needed to monitor activity as well as to enable an efficient and appropriate response.[124] Surveillance performs a vital function in international operations, but has crucial differences. In each case, the general objective will be the same, the creation of a comprehensive picture of activity in order to assist command decision making. In national waters, the surveillance area will be local, large, and familiar. Fixed surveillance systems can ease the burden of monitoring this area. On international deployments, the area of interest will likely be smaller, but rarely as familiar. Such deployments will require versatile and easily deployed systems. Further, overseas naval forces must have access to integral and independent surveillance information to avoid over-dependence on foreign sources. The differences between national and international surveillance requirements emphasises the need for careful consideration of new sensor systems for platforms.

In each case, as a picture is compiled through surveillance, the capability to react develops. This ranges from the ability to positively identify detected units through to the use of force to dissuade or destroy unwanted intruders. The abilities of ships, submarines, and aircraft are conditioned by their inherent characteristics limiting their ability to exclusively patrol the three dimensional maritime environment. Ships move relatively slowly but offer good endurance. Aircraft travel rapidly but have a transitory presence and are most subject to weather considerations. Submarines combine stealth with endurance but achieve speed only at the cost of stealth.[125]

Other considerations include the endless combinations of equipment and its effect on platform size. Smaller generally means cheaper, but also less overall capability and endurance. In the Canadian context, long distances and frequent periods of adverse weather are fundamental factors. These conditions require that platforms be large enough to travel several thousand miles and operate with at least moderate effectiveness in all types of weather. One of the most important variables affecting endurance is crew size; technological trends suggest that reductions in personnel will be possible in the future.

The use of robotic systems in the form of unmanned airborne vehicles (UAVs), unmanned underwater vehicles (UUVs), and remotely operated vehicles (ROVs) may permit smaller systems to

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[124]Crickard & Haydon, Op Cit., p. 13.

[125]Submarines are capable of covering 125,000 km^2 in a 40-50 day patrol, MPA can cover 300,000 km^2 but only for about 10 hours within a 500 mile radius of its base. Further, 4-5 aircraft are required for continuous patrols and they require the cooperation of surface vessels to deal with surface contacts. Single ships are capable of continuous coverage of 32,000 km^2, and double that range through the use of an organic helicopter, for 8-10 days unrefueled. A surface task group equipped with helicopters can cover 192,000 km^2 for thirty days. Ibid, pp. 22-23.

be dispatched into the most dangerous or difficult environments. Miniaturization, advances in machine intelligence, and communications will begin to allow the use of machines in lieu of humans in threatening environments or situations. This will also ease the logistical burden on platforms (ie fewer life support systems). As important as all these developments may eventually be, these types of technology will not fundamentally change the nature of naval warfare by 2015 from what we know today. States will still require navies to use the seas for military and political purposes.

Global roles demand many of the same characteristics of naval platforms as operations in national waters. Good endurance and the ability to operate in adverse weather conditions are still important traits. Effective and flexible C3I systems remain essential. In short, international naval operations will require similar types of platforms as those required for national operations. This is particularly true of the task group concept of operations developed over the last 15 years[126].

Internationally, the most essential requirement will be a capability to interact with coalition partners to the extent that Canadian authorities deem appropriate. This issue is already complex but will become much more so in the future. The level of force and doctrinal integration will need to be addressed carefully at the outset of operations. The level of equipment interoperability necessary for survival in future naval combat operations will likely increase, to the point where sensor and weapon systems aboard different platforms will need to cooperate seamlessly when engaging targets. How best to accommodate this change in order to ensure that Canadian naval forces retain national authority over weapon employment while participating in multinational operations will require careful study. A related concern, already evident in contemporary operations, is the requirement for compatible identification equipment to prevent allies from inadvertently attacking Canadian ships and aircraft, and vice versa.

Determining future naval force structure requirements is always an inherently problematic exercise given the uncertainty surrounding any future projection. However, certain findings can easily be justified. Continued Canadian commitment to a forward multilateral security policy means that Canada must retain the capability to operate with its international partners. Thus, Canadian naval forces must remain up to date in terms of surveillance, communication and weapon systems hardware, if we are not to find ourselves marginalised. Assuming that fiscal limitations on the defence budget remain, technological alternatives which both reduce the risk to naval personnel, as well as reducing crew size would seem to suggest considerable savings and should, therefore, be carefully examined.

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[126] Capt. (N) D.S. MacKay "The Maritime Task Group", Maritime Security Working Papers, Vol. 1. Paul T. Mitchell, "Canada's Navy: Small but Effective", *Vanguard*, Vol. 2, No. 4, 1996.

PART THREE: CONCLUSION

The Future of Canada's Naval Forces

Multi-purpose naval forces allow states a range of choice when making decisions on national security. While a Harpoon missile system may not be of much use on a fisheries patrol, it does allow one to respond if hostile frigates do show up on the doorstep, against all expectations. Further, it allows a wide range of options for participating with other navies in multinational operations. This paper has argued that multi-purpose naval forces will retain their utility in the next century, therefore the question becomes not whether naval forces should be maintained by this country, but what is the best level to maintain them at.

The size and character of naval force structure is ultimately a political decision which the Navy will implement. Nevertheless, the Navy cannot help but have opinions on what is a proper mix of platforms and an appropriate sized fleet given the tasks that are assigned to it. The Defence Development Guidance Plan lists the missions of Maritime Command as national maritime defence, protection of sovereign interests, collective maritime defence, peacekeeping operations, support to Canadian interests abroad, and the exercise of command and control of NATO operations.[127] Projecting that these missions fail to change substantially by 2015, they lead to certain conclusions regarding Canadian naval force structure. Canadian naval forces, if they are to both effectively enforce our sovereign rights, and conduct international operations, particularly in conjunction with multinational units, will have to be maintained at high degree of readiness, and professionalism. To forego these requirements will mean *either* that certain missions must be abandoned, *or*, that these missions will be ineffectively accomplished, possibly placing the lives of Canadian servicemen and women (and maybe those of other nations as well) in jeopardy.

The most important asset in Canada's Navy remains our people, who are without doubt among the best in the world. Professionalism can go a long way to overcoming technical deficiencies. However, factors such as job mobility, family benefits, education, pay, and the general image of the forces within Canadian society will all impact on whether the Navy can continue to attract its current level of fine Canadian individuals. Careful thought will also have to be devoted how best to spend the Navy's portion of the defence budget in the next century. Given the increasing costs of personnel and equipment, will it make more sense to increase the level of automation on board ships, or is there some level beyond which it is simply no longer practical? How will all these issues impinge on the training of the future's naval personnel? However these issues are resolved, it will remain true that maintaining high standards of professionalism must be a critical priority in the future, particularly given the wide range of missions that the Navy is likely to be tasked with.

Today, Canada's naval forces include some of the finest ships and aircraft in the world. Further, a number of aging vessels have been impressively modernised, such as the Iroquois class destroyers. However, beyond this small nucleus of first class, combat capable ships and aircraft, there are several aging platforms that still function today, but are steadily diminishing in their utility. This problem is reminiscent of the 'rust out' that afflicted almost the entire fleet at the end of the 1970's.

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[127] Defence Planning Guidance 1997, Sept. 1996, pp. 4-2 - 4-3.

In the near term, the most serious problem is represented by the aging submarine force. Submarines provide a unique capability that cannot be adequately replaced by other platforms. At its most *basic* level, losing the submarines would seriously jeopardise Canada's ability to train for conventional ASW operations, and thus threaten our ability to deploy into areas where opposing submarines might be encountered. Relying on our allies to protect our underwater interests, as some have suggested,[128] surrenders our sovereign rights as a nation to the uncertain guardianship of foreign governments. After all, the Navy was originally established to banish just this sort of problem. Submarines offer many flexible capabilities which make them highly useful both for national as well as international operations. Losing submarines would mean the loss of the only method of covert surveillance at sea, particularly unfortunate given the growing use of Canada's waters for illegal purposes.[129] It would also mean the loss of an integral part of the naval team, complicating the operations of the remaining parts.[130] Finally, it would mean fundamentally limiting the ability to control the undersea dimension of Canada's waterspace as well as giving up all pretensions to being able to assert our sovereignty in the Arctic ocean.

Sea King helicopters are an integral part of the weapons and sensor systems of their host vessel and provide an increase in effectiveness of several orders of magnitude. The addition of a helicopter effectively doubles the area in any one direction that a single ship can patrol.[131] Helicopters are vital as the ship's ears and eyes, conducting long range surveillance, and weapons targeting. The Navy will be unable to fully exploit the modern ships in its inventory without a replacement to the Sea King. Failing to upgrade this venerable bird in the next century will be as comparable to owning a modern computer system, but relying on a card reader for data entry. As they near the end of their operational lives, a replacement helicopter will become increasingly urgent.

Other assets are also facing critical deadlines. Enormous flexibility in ship operations is afforded by having capable MPA to conduct ocean surveillance. Without the contribution of these aircraft, the task facing the ships of Canada's Navy might be unmanageable given the sheer size of Canada's ocean approaches. This is doubly so for search and rescue purposes. Nevertheless, the sensors onboard these aircraft are in serious need of replacement if they are to continue to be effective members of Canada's naval team. Both the Aurora and Arcturus aircraft are facing increasing difficulties in operating with the more modern systems onboard Canada's other naval assets, not to mention our allies. Modernising these aircraft through the Aurora Life Extension Programme will not only preserve Canada's capability to patrol its vast ocean areas, but also enhance our ability to participate in multinational operations as was recently demonstrated in the Adriatic by the aircraft deployed there.

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[128] Ed Gigg, "Don't Waste Money on Conventional Submarines", Globe and Mail, March 29, 1993, A 19; "The Question of Subs", Globe and Mail, August 3, 1995, p. A16.

[129] All other platforms would require the emission of some sort of radiation in order to effectively perform surveillance tasks. Submarines relying primarily on sound, but also through the use of their periscope can exploit their stealthiness to track targets. For example, HMCS Ojibwa tracked the illegal fishing of American trawlers in the spring of 1993. Halifax Chronical Herald, March 19, 1993, p. A24. Further, the Estai was reportedly trailed by a Canadian sub in 1994. Maloney, Op Cit.

[130] The use of MPA would be complicated and made more difficult without the ability to use the long range passive acoutic information provided by Canadian submarines. Crickard, Op Cit, p. 23.

[131] Ibid, p. 23.

Finally, some consideration will have to be given to replacing Canada's three AORs. Provider is the oldest vessel in this group, although both Protecteur and Preserver are also aging. While an AOR is an absolute necessity to conduct sustained operations off both of Canada's coasts, they are also highly useful in international operations as well. This challenge may provide an opportunity to address a weakness in sea lift in the Canadian Forces As such, serious consideration should be given to the proposed Multi-role Support Vessel, which would combine certain attributes of heavy lift ships with those of conventional AORs. The MRSV would significantly enhance Canada's ability to deploy peacekeeping forces abroad, whether they be naval, land or air oriented.

All of these programmes will be closely scrutinised by both the Canadian public as well as the media. The navy's assessment of what it needs to accomplish its task will not be taken at face value by either of these groups: put simply it will all be a hard sell. Many of the Navy's capabilities may be placed at risk if it fails to get in front of the agenda with an ongoing pro-active media and public education strategy. The debate cannot be left to its loudest critics.

Staff officers and scientists are studying these issues today, as well as how best to incorporate all the many changes discussed throughout this paper into today's naval forces. However, it is clear that Canada is at a critical point in terms of its Navy. At the moment, Canada has finally acquired a balanced fleet. Fortuitously, the balanced, multi-purpose fleet that was designed to face the Soviets in the North Atlantic, has been extremely useful for the management of post Cold War instability. As in the Cold War, Canada's Navy continues to provide this country with stellar service. The Navy today vigilantly protects our coast lines, and in the process assists OGDs, conducts search and rescue, and enforces Canadian regulations in one of the most challenging environments in the world. The Navy carries Canadian interests to the four corners of the globe, and does so in a manner that Canada can be proud of. Canadian ships are regular visitors to the Northeast Pacific, South China Sea, Persian Gulf, Red Sea, the Mediterranean, and the South Atlantic. That the Navy accomplishes these deployments with only 22 ships is a testament to the professionalism and dedication of the men and women who serve both aboard and ashore.

The twenty-first century will present many challenges to this nation, some novel, some traditional. The Navy is preparing for these challenges now so that its stewardship of Canadian waters and interests continues to be second to none.

"READY, AYE READY"

Annex A

Glossary

Note: The source for the definition is given in brackets where applicable.

AAW--Anti-Air Warfare. Operations conducted to destroy or reduce to an acceptable level the enemy air and missile threat.

AOR--Auxiliary Oiler Replenishment Vessel

ASW--Anti-Submarine Warfare. Operations conducted with the intention of denying the enemy the effective use of his submarines. (AAP-6)

ASuW--Anti-Surface Warfare. Operations conducted against an opponent's surface warships or merchant vessels.

C^2W--Command and Control Warfare. The integrated use of operations security, military deception, psychological operations, electronic warfare, and physical destruction, mutually supported by intelligence, to deny information to, influence, degrade, or destroy adversary command and control capabilities, while protecting friendly command and control capabilities against such actions. Command and control warfare applies across the operational continuum and at all levels of conflict. (FM 101-5-1)

C^3I--Command, Control, Communications, and Intelligence. Integrated systems of doctrine, procedures, organizational structures, personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control, through all phases of the operational continuum. (FM 101-5-1)

Constabulary actions/roles--Constabulary application (or use) of force: The use of military force to uphold a national or international law, mandate or regime in a manner in which minimum violence is only used in enforcement as a last resort and after evidence of a breach or intent to defy has been established beyond a reasonable doubt. The level and type of violence that is permitted will frequently be specified in the law, mandate, or regime that is being enforced. Also called policing. (BR 1806)

Deterrence--A possible aggressor is deterred if he fails to act because he assesses that the cost of aggressive action will outweigh any benefits. Deterrence can be general when no specific aggressor or act of aggression is identified, or directed at a specific government to deter specific actions. Deterrence can be enacted through nuclear or conventional forces. (based on BR 1806)

Disaster Relief--Activities undertaken by military forces, in cooperation with civil authorities, to provide aid in the wake of a natural or manmade disaster such as a hurricane, flood, earthquake, forest fire, chemical spill, or nuclear accident.

Doctrine--Fundamental principles by which military forces guide their actions in support of (national) objectives. It is authoritative but requires judgement in application. (AAP-6)

EEZ--Exclusive Economic Zone. Within this zone (which may extend to 200 nautical miles under UNCLOS III), the state has jurisdiction and control over the exploration, exploitation, management, and conservation of the natural resources of the waters, seabed, and subsoil. Ships and aircraft enjoy high seas freedoms of navigation and overflight unless they infringe upon the coastal states's economic rights within the EEZ. Canada has not yet declared an EEZ.

EFZ--Exclusive Fishing Zone. A 200 nautical mile zone surrounding Canada that was declared in 1977. Within this zone, Canada has exclusive jurisdiction and control over all fisheries. Canada's EFZ is a subset of an EEZ. Canada has also enacted legislation extending Canadian jurisdiction over some migratory fish stocks beyond 200 nautical miles.

EU--European Union.

HFSW Radar--High Frequency Surface Wave Radar

Information Warfare--Actions taken to achieve information superiority by affecting adversary information, information-based processes, and information systems, while defending one's own information, information-based processes, and information systems. (CFP 300-1)

Infrastructure--A term generally applicable for all fixed and permanent installations, fabrications, or facilities for the support and control of military forces. (AAP-6) Can also include non-physical aspects such as training and doctrine which act as enabling capabilities.

Interoperability--The condition achieved among systems or items of equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases. (based on Joint Pub 1-02)

LFA Sonar--Low Frequency Active Sonar

Littoral/Littoral Region--The area from the open ocean up to and including the shore area which must be controlled to support operations ashore. (based on BR 1806)

Logistics--The science of planning and carrying out the movement and maintenance of military forces. In its most comprehensive sense, those aspects of military operations which deal with: a. design and development, acquisition, storage, movement, distribution, maintenance, evaluation, and disposition of materiel; b. movement, evacuation, and hospitalization of personnel; c. acquisition or construction, maintenance, operation, and disposition of facilities; and d. acquisition or furnishing of services. (AAP-6; CFP 300-1 notes: "In Canadian operations, the movement, evacuation, and hospitalization of personnel are not logistics functions.")

MAD--Magnetic Anomaly Detection

Maritime Diplomacy--The use of maritime forces in support of diplomacy to support, persuade, deter, or compel. (based on BR 1806)

Maritime Forces--Forces whose primary purpose is to conduct military operations at and from the sea. The expression includes warships and submarines, auxiliaries, organic aircraft, fixed seabed installations, fixed shore installations (such as batteries) for the defence of seaways, shore based maritime aircraft, and other shore based aircraft assigned to maritime tasks. (BR 1806)

Maritime Power Projection--The use of seaborne military forces to influence events on land directly. (BR 1806)

Mine Warfare--The strategic and tactical use of mines and their countermeasures. (JCS Pub 1)

Mobilization--(1) The act of preparing for war or other emergencies through assembling and organizing national resources; (2) the process by which the armed forces or part of them are brought to a state of readiness for war or other national emergency. (AAP 6)

MPA--Maritime Patrol Aircraft

Multinational Operation--A collective term to describe military actions conducted by forces of two or more nations, typically organized within the structure of a coalition or alliance. (Joint Pub 1-02)

NAFTA--North American Free Trade Agreement.

NATO--North Atlantic Treaty Organization.

NORAD--North American Aerospace Defence

Patrol--A detachment of ground, sea, or air forces sent out for the purpose of gathering information or carrying out destructive, harassing, mopping-up, or security mission. (AAP-6)

Peace--A condition that exists in the relations between groups, classes, or states when there is an absence of violence (direct or indirect) or the threat of violence. (Definition proposed in CFP 300-1, taken from the International Peace Academy)

Power Projection--See Maritime Power Projection

Presence--The exercise of naval diplomacy in a general way involving deployments, port visits, exercising, and routine operating in areas of interest to declare interest, reassure friends, and allies and to deter. (BR 1806)

Sea Control--The condition which exists when one has freedom of action to use an area of sea for one's own purposes for a period of time and, if necessary, deny its use to an opponent. Sea control includes the airspace above the surface and the water volume and seabed below. (BR 1806)

Sea Denial--The condition short of full sea control that exists when an opponent is prevented from using an area of sea for his purposes. (BR 1806)

Sealift--The movement of resources between points by carriage in shipping. (BR 1806)

SIGINT--Signals Intelligence.

Sovereignty--A difficult and complex concept, sovereignty comprises both emotional and rational components and is often a matter of perception. It relates to the state's monopoly on the use of force within its territory and is tied to the recognition of a political body as a state. Implicit within the concept of sovereignty is the ability of the state to be aware of and control activity within its borders. In a simple sense, sovereignty stems from the state's position as final authority over matters within its territory. With the rise of international corporations, the emergence of multinational organizations such as the UN and EU, and the continuing importance of transnational forces like religion, ethnicity, and culture, state sovereignty has diminished but remains a significant force in the world.

Support to Operations Ashore--Providing medical, logistic, command, control, communications, and evacuation contingency support to deployed land forces ashore.

Surveillance--The systematic observation of aerospace, surface or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means in order to build up and maintain a comprehensive picture of deployment patterns, movements and/or operational activity at sea. (AAP-6)

UNCLOS--United Nations Convention on the Law of the Sea. UNCLOS III refers specifically to the Convention which was signed in 1982 and which came into force in November 1994.

War--A sustained period during which two or more nations, alliances, coalitions, or factions within nations attempt to achieve mutually exclusive objectives by the use and/or threat of use of military force. Whether or not a state of war exists is very much in the perception of the parties involved. One party may believe that it is at war, for instance a group of insurgents, while the other party, in this case a government, may consider that it faces a problem of civil unrest. (based on BR 1806)

WMD--Weapons of Mass Destruction, weapons that are capable of a high order of destruction and/or being used in such a manner as to destroy large numbers of people. Can be nuclear (*a device which produces an explosive nuclear reaction*), chemical (a chemical substance which is intended for use in military operations to kill, seriously injure, or incapacitate man through its physiological effects), biological (a micro-organism or organic bi-product which causes disease in man, plants, or animals or causes the deterioration of material), or radiological (*a device which causes damage or death through the radiation effects of nuclear material*) weapons, but excludes the means of transporting or propelling the weapons where such means is a separable and divisible part of the weapon. (Joint Pub 1-02, bracketed definitions taken from AAP-6 unless in italics)

WTO--World Trade Organization.