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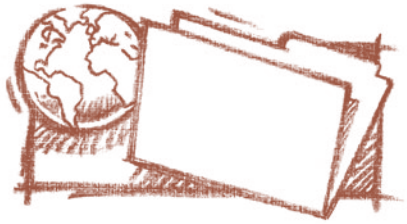

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The Need for Canadian Strategic Lift

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Contents

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Executive Summary

Many studies in recent years have documented the decline of the Canadian Forces (CF). This publication addresses one of the ways by which the CF can be rebuilt: by acquiring what military planners call "strategic lift." Because Canada is isolated by wide oceans from most of the trouble spots of the world and because Canada has no overseas bases, if the CF are to be deployed abroad, whether to fight wars or to engage in humanitarian actions, they must be sent there from home soil. To get where they are needed in theatres overseas, strategic lift is necessary. Tactical lift—mostly by air—refers to the ability to move around in a given theatre. The argument that Canada can rent a strategic lift capability when it is needed is examined and found wanting. It is our position that Crown assets, not rent-a-ship or rent-a plane programs, are needed. A second premise is that existing assets, an aging fleet of aircraft and ships with limited capabilities, will have to be replaced in the near future. If they are not, even if Canada develops the finest infantry in the world or the most lethal frigates ever to sail the seven seas, it will be unable to use them anywhere but at home. Under such circumstances, Canada may well have to relinquish the pretence of a foreign policy since it will have nothing to back it but words.

In this publication, we examine the major options available both for sealift and for airlift. The airlift needs can best be met, we think, by purchasing a mix of C-17 Globemaster III aircraft and C-130J Hercules. The sealift mix is more complex. The recent announcement of a replacement for the auxiliary oiler and replenishment ships (AORs) is a start; but additional ships and decisions regarding the future of the Navy in joint operations with the Army will condition the kind of vessels needed. Our discussion of sealift lays out the options and the implications of specific choices.

Introduction: Policy and Capability

The ability of Canada to conduct military operations abroad is at a crossroads. Funding cutbacks, government neglect, and an increased tempo of operations over the past decade have over-stressed the Canadian Forces (CF) to the point where capability has been significantly degraded (Cooper, Stephenson, and Szeto, 2004). During the 2004 federal election campaign, for example, the Liberal Party promised to increase the CF by 5,000 personnel to create a new "peace-support" brigade. This looks like good news for the CF. However, as the Ottawa correspondent for *Jane's Defence Weekly* reported, the CF "are in no financial or structural shape to absorb" 5,000 troops (Hobson, 2004). Besides, as Jack Granatstein pointed out, such an increase in troop levels would require a 20% increase in the defence budget, which is not about to happen (Granatstein, 2004). What has long been understood as the Achilles' heel of Canadian foreign policy and of Canadian military policy as well—particularly as concerns the force posture of the Army—is an inability to deploy overseas (Pugliese, 2002). As one observer waggishly noted, the CF lack even "basic transportation," namely boots (Wattie, 2005b).

Notwithstanding the reality of the CF, Canadians and their governments have long regarded the military as essential to ensuring both Canada's place in world affairs and its ability to act on the international stage. Moreover, from antiquity to the present, one of the characteristics of the "western way of war" is that military commanders are subject to a political audit (Hanson, 2002: chap. 1). This is the meaning of Clausewitz's famous dictum that "war is the continuation of policy [*Politik*] with an admixture of other means." It has also been an axiom of Canadian defence and foreign policy analysis that Canadian military policy is largely determined by Canadian foreign policy. This too has changed.

According to Lewis MacKenzie, Canada is the only western democracy where, in fact, defence policy determines the limits of foreign policy (MacKenzie, 2003). Moreover, the severe constraints put on the CF have meant that Canadian political leaders have been in the unenviable position of simply announcing a position on many of the problems of the world—sometimes little more than stating how they deplored some especially egregious situation—but being able to do nothing to alleviate it. This is often referred to as the "commitment-capability gap," though perhaps "canyon" is a more apt metaphor. Many analysts are of the view that no fundamental changes in support for the CF can reasonably be expected. On the other hand, public support for the CF is generally speaking quite high (Wattie, 2004b). Our major assumption, therefore, is that undertaking the present analysis of Canadian requirements for strategic lift is not entirely an abstract or utopian exercise.

We make several additional assumptions:

Defence White Paper We do not assume that a new defence White Paper will be delivered in the near future. Accordingly, there is unlikely to be any clear and authoritative policy guidance concerning the appropriate level of operational readiness.

Capital Budgets Capital budgets are likely to remain below the approximately 23% expected by the "Strategy 2020" document (Canada, 1999), which means that any capital acquisition will have to be carefully considered in light of possible future deployments.

Assumptions aside, it seems self-evident that strategic lift is essential if Canada is to undertake any significant international activities. Accordingly, its absence has a direct impact on how the world regards the country. At the same time, however, the CC130 Hercules of the Air Force and the Auxiliary Oiler Replenishment (AOR) vessel fleets of the Navy have already been in service for more than 35 years. These "capability platforms," as the military call them, are close to the end of their opera-

tional lives. More important, decisions to replace these assets have moved at a glacier's pace. Should this trend continue, it will result in yet another loss in capacity to provide meaningful contributions in the service of international peace and security, to say nothing of contributing to continental and even national defence.

Moreover, Canadian defence and security policy statements, from the 1994 White Paper, through the 2004 National Security Policy to the most recent Defence Policy Statement (Canada, 1994, 2004, 2005), have all placed protecting Canada and North America ahead of contributing to international security. Apart from international obligations, therefore, there are three obvious reasons to maintain a modern strategic lift capacity.

Preservation of Arctic Sovereignty Growing international interest in the Northwest Passage as a commercial corridor has already brought Canadian claims of ownership into question. The development of a national presence in this theatre requires the transhipment of personnel, supplies, equipment, building material, and so on to create the required controls and infrastructure to meet any challenges to Canadian claims of sovereignty. Both strategic heavy airlift and tactical airlift are needed, along with sealift, including modest icebreaking capability.

Internal Emergency Responses Should a bio-terrorist attack be launched against Vancouver, the required personnel and supplies would have to be sent from Toronto. An immediate long-range airlift would be required to minimize the adverse consequences. Other domestic emergencies—floods, earthquakes, forest fires, ice storms—also demand of the Canadian Forces that they be able to move quickly from base to the disaster area.

Canadians at Risk Natural or man-made disasters can place Canadians abroad at risk in very short order. Strategic airlift would be required, for example, to extract Canadians from West Africa or Iran should political or natural calamities require evacuation.

Military Deployments Abroad

The most important area for using strategic lift, however, involves military deployments abroad. Accordingly, our main focus is on that issue. There is no indication that the tempo of Canadian international activity will subside in the future. On the contrary: the years following end of the Cold War until the present have been marked by an increase in the number of operations involving Canadian military personnel and equipment overseas. The Canadian policy of international engagement and the strategy of using Canada's "multi-purpose, combat capable" military, to use a famous phrase of the 1994 White Paper, requires strategic lift to ensure that the CF can operate, whether to take part in humanitarian relief, to sustain and provide logistical support to deployed forces, or simply to deploy forces overseas. Unfortunately, thinking about an airlift or sealift capability has become focussed almost entirely on the narrow question of choosing a specific platform—a replacement for the Hercules, for instance—in isolation from the larger strategic context. If airlift and sealift are to be understood as strategic enablers, they must be considered as integral parts of the broad mission and structure of the military and, thus, of Canadian foreign policy as well. Without considering the details of any future Canadian foreign policy, it is enough for present purposes to make the further assumption that, if Canada is to have a foreign policy worthy of the name, it will require strategic lift.

In considering Canada's strategic context, geography plays a crucial factor. Of all the western industrialized nations, Canada is even more distant from the rest of the world than is the United States. Notwithstanding its common border with Canada, the United States is closer to other parts of the world because of its overseas military bases and forces, pre-positioned matériel, and greater lift capability. Comparing Canadian reach to some of the world's hot-spots with that of our European and Australian friends, it is clear that they can deploy forces to Africa, the Middle East, and Asia much more quickly and easily than Canada can. When Canada closed its bases in Germany a decade ago, it lost the ability to deploy and maintain forces abroad from a forward position. Any military force we choose to deploy must now be sent directly from Canada and transit one or more of the oceans of the world.

Current military developments among Canadian allies reveal a trend leaning towards more rapidly deployable forces aimed at a quick cessation of hostilities and crises before such incidents can escalate. The best example is the development by the United States of a medium-weight Interim Brigade Combat Team (IBCT)

that can be sent from North America to anywhere in the world within 96 hours. Lessons learned during Operation Desert Shield in 1990 and later in the former Yugoslavia demonstrated the need for a rapidly deployable force that had both firepower, which was lacking when in 1990 the 82nd Airborne, a light-infantry unit, was sent to "deter" Iraqi armoured divisions from invading Saudi Arabia, and mobility, which was lacking when tanks and infantry fighting vehicles deployed into Bosnia a few years later. This new American formation, called a Stryker Brigade, uses a LAV-III armoured personnel carrier variant—the same chassis built by General Dynamics Land Systems in London, Ontario—and is meant to be deployed with a minimal logistical and lift requirement. One of the specifications for the force was that no piece of equipment could exceed 20 tonnes, which would allow the entire brigade to be loaded on, but not be solely reliant upon, the C-130 Hercules aircraft (Steele, 2001). The Stryker Mobile Gun System will fit on a C-130 but it is overweight, so a larger aircraft is required to transport it overseas (US-GAO, 2004).

Current Canadian defence policy requires (again to use the language of the White Paper) that the military be capable of "fighting alongside the best, against the best." In this context, fighting alongside the best requires having the ability to be in an area of operations on the same schedule as our allies. This cannot at present be done. Moreover, the 2005 Defence Policy Statement acknowledged the necessity of adapting to a new security environment. One response was to advocate the increase of special operations forces and the creation of a "standing contingency task force" (Canada, 2005). Both of these innovations, along with the capability of sustaining a "mission specific task force," require strategic as well as tactical lift.

Beyond the war-fighting and military dimensions, Canadian strategic lift is vital for international humanitarian work. In peace-support operations or during disaster relief, there will always be a need for the lifting of supplies, equipment, and manpower on short notice. According to an airlift industry spokesman, the United Nations received 66 requests for assistance during international crises between January 1998 and February 2001, of which more than 40% required the use of fixed-wing transport aircraft (Hoyle *et al.*, 2002). Canada's Disaster Assistance Response Team (DART) eventually proved its worth providing humanitarian relief during the 1999 Turkish earthquake and the 2004 Southeast Asian tsunami disasters. DART by itself cannot be successful without the necessary lift to get it to where it is needed. Indeed, the tsunami disaster demonstrated clearly the need and importance of airlift and sealift assets to enable disaster relief. In the week following the tsunami, Jan Egeland, the UN Emergency Relief Coordinator, asked member nations to contribute transport aircraft, trucks, helicopters, landing craft and boats, base camps with staff support, fuel stores and handling units, water treatment units, generators, and deployment kits for personnel. He specifically noted a need for more C-17 and C-130 cargo airplanes to fly in heavy earth moving equipment and sea-borne helicopters to be used outside the coasts to lessen the congestion of airfields ashore (Egeland, 2005). None of these assets could Canada supply.

Strategic lift not only provides transportation for military forces abroad but is also vital as a mission's lifeline of support. In this logistical role, aircraft and offshore vessels ensure that other troops in a coalition or deployed on an operation can function for extended periods of time. Supplying a task force with food, water, shelter, equipment, fuel, and ammunition is as important to the success of a mission as the training and equipment of the soldiers who require that support. Canada's military has had a longstanding history of providing such support. In the last decade, Canada has provided CC-130 Hercules aircraft to the United Nations missions in Yugoslavia and Rwanda, as well as the replenishment or AOR vessels HMCS *Preserver* and HMCS *Protecteur* to UN missions in Haiti, Somalia, and East Timor.

Even though these reasons of policy and utility necessitate a Canadian strategic lift capability, as noted above, Canada's current lift assets are rusting out, and no final replacement decisions have been made. We also noted above that deciding on the appropriate mix of lift options will depend on strategic and foreign policy decisions that have been addressed only in a preliminary way. In the meantime, it is still necessary to consider the lift options available to the Government of Canada, the Department of National Defence, and the Canadian Forces. We shall discuss current and possible airlift and sealift capability assets in turn, as well as explore their costs and benefits, and draw a few conclusions.

Airlift

"I have made it crystal clear that the Canadian Forces will not be unilaterally purchasing large transport planes at a cost of some $3 to $5 billion. Only two of our 18 NATO allies, the United States and the United Kingdom, have this capability and their militaries are far larger than ours will ever be."
John McCallum, the Minister of National Defence (Feburary 2003)

When John McCallum, the Minister of National Defence, made this statement to the Conference of Defence Associations in February 2003, he expressed the long-standing sentiments of the Canadian government: there existed more practical and efficient means of delivering Canadian troops and equipment abroad than owning transport planes and using them. McCallum had earlier testified before the Senate Committee on National Security and Defence that, even though Canada has always needed strategic airlift, chartering planes from private companies makes the most efficient use of defence dollars—on average $18 million per year over a period of six years. As a result, both Prime Minister Chrétien and McCallum rejected proposals to acquire strategic lift aircraft. McCallum defied his critics with the statement that "no one has yet been able to give me a single instance where the absence of this capability stopped us or significantly delayed us in moving people or equipment from point A to point B" (McCallum, 2003). Except for the "instances" of East Timor, Afghanistan, Haiti, and Sri Lanka, the Minister's statement is unchallengeable. Moreover, the Department of National Defence (DND) does not keep records of what they have not been able to do. They look for other options.

The delays surrounding Canada's response to the South-east Asian tsunami disaster of December 26, 2004, recently showcased Canadian incapacity. The time necessary to deploy the Disaster Assistance Response Team (DART) to Sri Lanka by chartered aircraft again put Canada's strategic airlift requirements under public scrutiny. In this context, the term "strategic" refers to a capability that enables military forces to be deployed internationally, whether for fighting wars, peacekeeping, or disaster relief. As noted above, with the bulk of the CC-130 Hercules transport aircraft fleet being over 35 years old, they must be replaced (and soon) or Canada will lose a major capability to maintain its place in the international system. On these grounds alone, it is safe to say that, for Canada, strategic airlift is a necessity, not an option.

Current capability

The Canadian Air Force currently has five CC-150 Polaris aircraft, known to civilians as the A310-300 Airbus. They form a part of the Canadian airlift capability, primarily for long-range transport of personnel and equipment. The Polaris is capable of carrying 32,000 kg of cargo but, as a converted airliner, can only move personnel and pallets, not military vehicles or other outsized cargo. Furthermore, the need for specialized loading and unloading equipment, the lack of a loading ramp to permit the rolling cargo on and off, and the need for a prepared hard-surface landing strip make its purpose different, but by no means less important, than that of a purely strategic heavy-lift aircraft.

For long-range or strategic airlift, the Air Force relies on the CC-130 Hercules aircraft as its primary transport vehicle. Even after four decades, these aircraft continue in service in over 60 nations worldwide. The versatility and ruggedness of the Hercules airframe is evident

from the many different missions it can perform: troop, vehicle, and supply carrier; airborne and ground refueller; maritime surveillance; search and rescue; and provider of humanitarian relief or emergency evacuation. It can also be used as an electronics warfare platform and a gunship that can bring enormous firepower to a ground engagement. It is particularly useful as a tactical or in-theatre transport aircraft, which is Canada's main requirement, because it needs little equipment for loading and unloading and requires less room to land and take-off than a conventional aircraft.

Breakdown of CC130 Fleet

- 19 C130E
- 4 C130H73
- 9 other C-130H models as follows:
  - 2 H84 aircraft (acq. 1984)
  - 5 HT tactical tankers (1990)
  - 2 H-30 "stretch" aircraft (1992)

Canada's current fleet numbers 32 aircraft of various models. Nineteen are CC130Es acquired between 1964 and 1967; the remaining 13 CC130Hs began entering service in 1974. Their primary role in Canadian defence has been in the airlift of equipment, personnel, and cargo, in search and rescue operations, and in air-to-air refuelling of fighter aircraft. At present, there is no lull in tasking schedules for the Hercules fleet and they are fully—perhaps more than fully—employed.

The antiquity of the Hercules airframes currently in use is likely to prove a major problem to Canadian Forces operations in the future. Age-related mechanical failure limited the usefulness of the Hercules during the 1999 United Nations mission in East Timor and forced two aircraft to abort their missions after leaving Canada. The amount of maintenance time required for the Hercules fleet already hampers the availability of the aircraft. Readiness, which is the ability to get off the ground at short notice, among the CC130E fleet is approximately 48%, with the H-models being only slightly better at 55% (Defence Associations National Network, 2003b). Between 1990 and 2000, the ratio of total maintenance hours to flying hours for the Hercules fleet has increased 62%, from roughly seven hours to 11 or 12 maintenance hours per hour of flight (Auditor General of Canada, 2001). Even though the Hercules flew 37% fewer hours in 1999 than nine years earlier, its corrective maintenance time increased 26% and the ratio of corrective maintenance to flying hours had doubled. To slow the further degradation of the Hercules fleet, the Canadian Forces reduced its annual flying hours from 21,000 to 16,200. If nothing is done to replace the current Hercules fleet, Canada risks losing its airlift capability entirely. Moreover, using what is primarily a tactical transporter for strategic lift pushes the aircraft to the limits of its capability under the best of circumstances.

Options

As noted above, during their terms in office, both Prime Minister Jean Chrétien and Defence Minister John McCallum stated that Canada's strategic airlift needs could be met by chartering aircraft. Their rationale was that contracting with a private firm would be more cost-effective than purchasing aircraft. In the short term, costs are undeniably lower but, in the long run, expenses may well be higher. Moreover, the issue of short-term costs does not address what for the military is the more important question, namely effectiveness.

The largest privately owned heavy aircraft presently available is the AN-124 Condor, the Russian equivalent to the largest airlifter in the world, the American C-5 Galaxy. About 20 AN-124s operate outside of Russia. They are over 15 years old and have become increasingly unreliable. Even so, Canada and several European nations have used service providers such as Air Foyle HeavyLift, which uses AN-124s, to deliver their forces to far-away places. DND policy, however, now precludes using AN-124s to deploy personnel because of their questionable safety record. This is why, for example, the DART equipment went by Antonov to Sri Lanka but the personnel went by CC-150 Polaris.

Chartering these aircraft is expensive. According to industry estimates, the cost to charter an AN-124 can range anywhere between $13,300 to $16,000 per hour. The cost to deploy the Canadian Forces contingent from Turkey to Kabul, Afghanistan in 2003 was $43.5 million and the 2005 airlift of the DART to tsunami-stricken Sri Lanka was $4.4 million; in both cases, the figures are for one-way trips. Canada has already spent over $77 million on commercial airlift since 1997 and paid the Americans

another $37 million to use their airlift resources during the same time period (Parker, 2004).

According to the Future Strategic Airlift statement of requirements from the project office of the Canadian Air Force, which is the bureau tasked with exploring all options prior to the decision by the government not to purchase large airlifters, a charter company would have to ensure that Canada would have access to two AN-124 aircraft within 48 hours with an additional two planes made available within seven days. It is estimated that 1,000 flying hours per year would meet the nation's foreseeable needs. The cost of such a deal over a 30-year life-cycle would total $8.5 billion (Defence Associations National Network, 2003b), which would equal the cost of owning (i.e., of acquiring and maintaining) 12 Airbus A400M, six C-17, or 20 Ilyushin IL-76 aircraft, all of which are discussed below. Over the long-term, therefore, owning beats renting. Reliability of rented aircraft aside, this is the crux of the cost-benefit issue.

There is, however, yet another complication involved with leasing: even with verbal or written contractual assurances, there is no guarantee that the pool of private-sector heavy-lift aircraft would be available when called upon. European nations and even the Americans are already having to cope with shortfalls in strategic airlift and have needed to hire aircraft to fly troops and equipment to Afghanistan. Should an international crisis arise, there are not enough aircraft to meet the needs of all nations seeking to deploy at the same time. Further, access to planes might become difficult should leasing countries differ with lessors over specific policies for which the aircraft are sought. Russia, for example, may have no problem leasing an AN-124 to take the DART to Sri Lanka but it might be less willing to do so if the plane were used to haul troops and equipment to the Caucasus or Central Asia.

Although chartering heavy-lift aircraft may seem to be cost-efficient in the short-term, operational effectiveness is bound to suffer if this option is chosen and there seems to be no long-term benefit: owning a national strategic airlift capability is of greater value to Canada. Having aircraft at the ready would improve Canada's responsiveness to crises and provide substance to the image of Canada as a genuine humanitarian country. Strategic airlift is desired by the Europeans and the Americans will never have enough to meet their transportation needs (Hoyle et al., 2002). In this light, possessing heavy-lift aircraft and loaning them out would improve Canadian participation in the overall western allied strategy of rapid response. It would show that Canada is a nation capable of acting on its own without being a burden on others by taxing their airlift. The national, allied, and international benefits justify a consideration of the available aircraft, their capabilities, and the most appropriate mix for a range of Canadian requirements. The chief options are discussed below.

Boeing C-17 Globemaster III

The Boeing C-17 is the latest heavy-lift aircraft to enter service with the United States Air Force (USAF). The aircraft can transport roughly twice as much cargo the same distance as its two closest out-size medium aircraft competitors, discussed below. It is unique in having unlimited range by way of air-to-air refuelling. Its ability to carry large, out-sized cargo such as the LAV-III and troops across long distances directly to austere airfields anywhere in the world makes the C-17 a high-demand asset. At the end of 2004, 128 C17s (out of an extended total order of 180) have been delivered to the USAF, while another four are on lease to the Royal Air Force (RAF) in the United Kingdom (Airforce Technology, 2005). Both the USAF and the RAF have fully exploited the strategic and the tactical roles the C-17 can play. However, at a purchase price of $US 202.3 million (FY98) per unit, with maintenance costs added, the C-17 is expensive (USAF, 2004). It remains, however, the first choice of the Canadian Forces.

Airbus A400M

The Airbus A400M is a joint venture between the governments and companies of seven European countries seeking to eliminate their respective airlift shortfalls. In 2001, Belgium, France, Germany, Luxembourg, Portugal, Spain, Turkey and the United Kingdom signed a memorandum of understanding and a contract to procure 196 aircraft. In recent years, the project has suffered funding difficulties because Germany, the principal stakeholder, had revised downward its commitment to the program. The project is well on its way towards production although the first delivery of an A400M aircraft is

not expected until 2007 or 2008. The aircraft itself is capable of carrying 32 tonnes over 2,500 nautical miles, the equivalent of two Apache helicopters, six jeeps plus trailers, or outsized military equipment, not including tanks (Lok, 2003). Although the expected base price of the aircraft is to be 95M Euros, when special low-level flight equipment, spare parts, training, and management costs are added, the price of the A400M jumps to 116M Euros ($US 152 M) (Schwarz, 2002). In some respects, therefore, the A400M is still a work in progress.

Antonov AN-70 (AN-7X Airtruck)

A Russian contender in the heavy-lift aircraft market has comparable characteristics to its American and European counterparts. The Antonov AN-70 aircraft has similar payload and range specifications but did not receive much attention from buyers outside Russia and Ukraine. In 1997, the AN-70 program competed for selection as the NATO/EU future tactical transport aircraft but lost out to the A400M. Although Antonov had German supplier companies as partners and received favourable ratings for the AN-70 from military experts, European countries selected the A400M for reasons of commonality and domestic politics: they wanted to build their own plane. The AN-70 program has also suffered many setbacks as a result of funding interruptions following the break-up of the Soviet Union, the loss of the aircraft's first prototype, and mechanical difficulties during trials. Currently, the Russian Federation and the Ukraine have committed to the production of 164 and 65 aircraft, respectively. It is uncertain whether the Antonov would be certified for the CF nor what its price would be (Flug Revue Online, 2001).

Ilyushin IL-76 Candid

The Ilyushin IL-76 Candid, like the Antonov, is a product of the former Soviet Union. The IL-76 is a genuine strategic airlifter, with ramps and internal cargo-handling machinery, and it is capable of operating from rough or unimproved air fields. It can carry 52 tonnes of cargo over a short haul or 40 tonnes over 5800 km, and was used in 2004 to fly CF equipment to Haiti. The Australians used it to fly to Afghanistan and the Persian Gulf. Ilyushin have recently resumed production not in Moscow but in Tashkent, Uzbekistan. The IL-76 is available with new avionics compatible with the new Hercules models and are equipped with engines more powerful and more fuel-efficient than those installed on the Cold War units. The costs are estimated at about a quarter of that of a C-17, at around $US55M (*Canadian American Strategic Review*, A).

Lockheed Martin C-130J Hercules

The latest Hercules J-model aircraft is the obvious choice for a direct replacement of Canada's ageing CC-130 fleet. The performance of this newer model is improved in many ways over that of its predecessors: a 40% to 46% increase in range, a 13% to 21% higher cruising speed, 36% to 50% reduction in climbing time, and a higher altitude ceiling than E and H models. Additional features allow for greater fuel and maintenance efficiency. The unit cost of a C-130 J-model is about $US 70 million but two leasing options have become available in recent months. The Royal Air Force proposed to DND an offer to lease ten used C-130J "short" model aircraft to the Canadian Air Force. These aircraft were deemed too limited in their carrying capacity, compared to the RAF's C-130J "stretch" model aircraft, which are 5 metres longer (Pugliese, 2005a). Lockheed Martin, the manufacturer of the C-130J, has also approached the Canadian Government with an offer to lease its planes at the same cost currently spent for maintenance (Pugliese, 2005b). Neither deal has been accepted to date (June, 2005).

In spite of the obvious appeal of price and familiarity, part of the hesitation of the government may have resulted from assessments made by defence critics. Unlike previous models, a J-model Hercules is capable of carrying a Canadian Army LAV-III armoured personnel carrier. Criticisms about the procurement of the American "Stryker" variant of the LAV-III were sparked by concerns that the vehicle was too large and that it was too heavy for the aircraft. These concerns were allayed by demonstrations put on by the US Air Force (Ricks, 2004). However, one should take note that the Stryker is a shorter vehicle that has no large turret such as are found on the Canadian variant. Larger aircraft with taller cargo area ceilings would be better equipped and handier to transport large vehicles such as the LAV-III. In any event, CC-130s could be used only in-theatre, that is tactically, to transport LAVs. It could not be used to carry them across any ocean, which is a major limitation (Shadwick, 2003).

Finding the Balance

The choice of strategic lift aircraft for Canada is not simply a matter of comparing specifications and price. The major consideration is: how does Canada intend to use these planes? The basic assumptions can be determined from actual operations undertaken by the CF in recent years in the expectation that actual missions express the genuine fundamentals of Canadian policy. Perhaps even more important, future demands on strategic lift may require enhanced capability. A serious deployment to the Darfur region of Sudan, for example, would require a lift capacity far in excess of what Canada currently possesses.

Even without considering the option of a forced entry into hostile territory, the first and most obvious consideration is that, lacking forward pre-positioning of Canadian Forces personnel and equipment, any military contingent must be deployed across oceans straight from home soil. Second, in any operation involving airlift, the Canadian contingent will be sent only to a previously secured airfield. As in Bosnia, Rwanda, and Afghanistan, the use of Canadian aircraft was made possible only when other forces had taken control of the airport, whether by negotiation or by force. This assumption reduces to some degree the need to prepare combat-ready forces capable of taking and holding airfield objectives via para-drop. Third, any deployed operation will require logistical support that will, in part, also have to come from Canada. Most of the logistics train will be intratheatre or regional but there will always be a need for some home-based support. Finally, with the government's commitment to fast-track the acquisition of a fixed-wing aircraft dedicated to search-and-rescue (and assuming that it will actually act on its commitment), it is likely that the existing and future aircraft fleet will be evaluated solely in terms of providing strategic lift.

On the basis of these assumptions, fulfilling Canada's airlift requirements may well require more than one aircraft type. The C-130J is the appropriate replacement for the existing Hercules fleet. It is in fact a "tactical" transporter, an aircraft charged with the role of air logistic support of in-theatre forces, rather than one capable of strategic lift, that is, a large-capacity, long-range aircraft that can deliver forces internationally from one theatre of operations to another. In fact, many of the medium-oversized airlift aircraft are labelled "stratactical" because of their ability to perform both strategic and tactical airlift roles. In addition, there are pieces of equipment in the CF inventory, in particular a big truck called the Heavy Logistics Vehicle Wheeled, that the CC-130 cannot carry. This does not mean that maintaining a new Hercules fleet is without value. On the contrary, the flexibility of a range of lift capability allows for efficient use of all aircraft. Sending a large aircraft when a smaller one would suffice is obviously not efficient. Accordingly, over the long run, a mix of aircraft would likely prove most beneficial to Canada's requirements.

If Canada does acquire a mixed fleet, it is important to determine how many of which types of aircraft would be optimal. Some aircraft are more versatile and capable than others and can thus reduce the total number of aircraft needed. For example, it has been estimated that six C-17s, each of which can carry the payload of four CC-130s at higher altitudes, faster speeds, and longer range, could replace at least a dozen Hercules, whereas 12 A400Ms could replace about the same number of CC-130s (Bridges, 2002). A well-rounded airlift fleet for Canada, therefore, would entail six to eight C-17s or equivalent numbers of other aircraft to provide strategic airlift needs, and 15 to 20 C-130Js to replace the older model Hercules in the current fleet.

It should be noted as well that purchasing the two options produced by the former Soviet Union (FSU), the AN-70 and the IL-76, may carry significantly more risk than purchasing the C-17 from Boeing. Just as the possibility of leasing aircraft from the FSU may depend on the foreign policy positions of Canada and Russia, so too the provision of spare parts for these two aircraft may depend more on congruence of Russian and Canadian foreign policy. It seems to us that, over the long term, Canada and the United States are more likely to agree than are Canada and Russia. In this context, the Airbus A400M option carries no more risk than does the C-17. It does not, however, meet Canadian aircraft needs as well as the American aircraft.

The question of strategic airlift introduces larger foreign and security policy issues that are beyond our consideration on this occasion. Leaving aside the internal and domestic needs of surveillance and disaster relief, in some places, including such land-locked countries as Afghanistan, it is necessary to have airlift to deliver

and deploy. In others, a Canadian contingent could be transported by sealift, which is slower but more efficient. Other combinations, where part of an expeditionary force could be deployed by air and the rest by sea are also possible, as is the prepositioning of military equipment on pallets or in cargo containers at storage facilities abroad, ready to be transported into theatre and met by personnel flown in from Canada. In short, the question of long-range airlift is but part of the larger strategic picture that still needs to be defined by the Government of Canada and the Canadian Parliament. Eventually the following questions must be answered: how rapidly deployable does Canada want its forces to be? Are, for example, the ambitions of the 1994 White Paper, which contemplated the option of rapid deployability of a 4000-strong "vanguard force" still viable? How have the recent security and foreign-policy statements modified the 1994 position? How much is the government willing to spend to develop such a capability, whether in its 1994 aspiration or in any number of subsequent statements? Will an expanded Tier II special-operations force based on an expanded Joint Task Force 2 (along with supporting helicopter, navy, and army forces) be developed? Will a back-up Standing Contingency Force, as contemplated in the 2005 defence policy statement, be raised? And will it be capable of deployment, as required, on ten days' notice? The answer to these and related questions will depend on what Canadians and their government determine to be the international role of their country. However Canadians decide the issue, one thing is unquestionably true: important decisions must be made soon. When the last antique Hercules is grounded or falls from the sky, Canada will have lost a large measure of its airlift capability. Only Air Canada and the military Airbus fleet will be left. The ability to deploy Canadian Forces to rough airstrips abroad will have disappeared and with it a major component of Canadian ability to have a meaningful presence in the international community.

Sealift

"I am happy to announce today that the Government has approved the project to acquire three new joint support ships for the navy. A $2.1 billion project that will provide Canada with a significantly enhanced maritime capability, both at home and abroad."
Prime Minister Paul Martin, CFB Gagetown (April 14, 2004)

Current Capability

Canada does not currently possess a dedicated sealift capability. Any semblance of Canadian sealift has resulted from the improvised use of other existing vessels or of commercial shipping services.

In recent years, Canada's fleet of Auxiliary Oiler Replenishment (AORs) vessels have been tasked with supporting troops ashore. Although their primary purpose is the replenishment of naval warships at sea, both HMCS *Preserver* and HMCS *Protecteur* have conducted operations involving "logistics over-the-shore" in Haiti, Somalia, Florida, the Bahamas, and East Timor. The difficulty of using these vessels on amphibious operations indicates their limitations and the need to acquire dedicated sealift. First, as noted above, the vessels are long past their prime, having already reached the age of 35. HMCS *Provider*, built in 1963, was decommissioned in 1998 whereas *Protecteur* and *Preserver* continue to serve despite having been built in 1969 and 1970, respectively. They are both scheduled to be retired in 2010 but their service life may be extended if no replacements are available. Second, these vessels were not designed with sealift in mind. While they are capable of transporting supplies and fuel, they do not have the capacity of carrying and deploying heavy equipment or vehicles.

Canada's other method of transporting its heavier equipment, vehicles, and supplies abroad has been to use commercial shipping companies and their ships. This option, despite being the most cost-effective, has its own problems:

- civilian vessels are not built to navy fighting standards, so they are highly vulnerable to enemy action;
- the availability of civilian assets is dependent on speed, autonomy, structural integrity of decks, maintenance, high-demand, and uncontrolled cost increases during times of crisis (AWEU, 2001);
- civilian vessels are subject to civilian business disputes concerning labour conditions, ownership, and the like.

The last problem in particular was a major issue in the summer of 2000 when 508 military vehicles, 500 tons of ammunition, and 390 containers of support equipment valued at $233M being brought home from a mission in the former Yugoslavia were held hostage aboard *GTS Katie* until a contract dispute between the ship's owners and the chartering company was resolved (Gohlish, 2000; Pugliese, 2000). The incident ended only when the Canadian Navy personnel from HMCS *Athabaska* stormed the ship and brought her forcibly into port. Although restitution was later made to the *Katie's* owners, the long-term consequences of a successful military assault on a civilian vessel to resolve a commercial dispute may mean that shipping companies will be more hesitant to deal with the Canadian Forces. Nevertheless, so long as Canada lacks sealift capability, the use of private commercial charters remains the only option. Moreover, even when Crown sealift assets are constructed or acquired and brought into service, chartered transport may be required to supplement any shortfall in capability.

The Search for Sealift

Early in its mandate, the Government of Paul Martin made a firm commitment to acquire three replacement vessels for the Navy's ageing two-ship fleet of AORs. Although this commitment is relatively recent, the need to replace the current fleet replenishment capability as well as to acquire strategic sealift has been pressing for over a decade. These types of ships perform different tasks: AORs refuel and replenish warships at sea. For Canada, these are frigates, destroyers, and submarines, but Canadian AORs have also been crucial to replenishment-at-sea tasks for American, British, and other vessels on coalition operations in the Persian Gulf. AORs allow fighting vessels to project power "over the horizon." Without an AOR capability, Canada would not be able to maintain a "blue-water" navy.

Strategic sealift, on the other hand, properly refers not just to AORs but to ships able to transport troops and equipment to foreign shores. The authors of the 1994 White Paper on Defence realized that sufficient sealift capability had to be maintained. This required retaining the AOR support ship HMCS *Provider* and immediate consideration of replacements for the fleet of replenishment vessels (Canada, 1994).

Joint Support Ship (JSS) project

Work had already started to find replacements for the *Protecteur*-class oilers in 1992. The Afloat Logistics and Sealift Capability (ALSC) project sought to develop vessels that would not only replace but improve the existing sealift and replenishment capabilities. By 2001, the project had been endorsed by the Joint Capability Requirements Board and was seeking approval to enter the Project Definition Phase. According to the project's original schedule, design and construction was to begin in Spring 2004 and the first ship was to be delivered by the end of 2006. However, lack of political momentum and meagre capital funding for defence delayed the start of the project and these replacement vessels have remained entirely conceptual.

It was not until Prime Minister Martin's speech at CFB Gagetown in April 2004 that the government signalled a firm commitment to replace the *Protecteur*-class and acquire a Canadian sealift capability. Plans to move forward with the Joint Support Ship (JSS) project—the former ALSC programme with a new name—was also given government approval in the 2004 budget. By making this commitment, the Canadian Government not only indicated a general interest in enhancing Canadian defence capabilities but showed the specific direction and emphasis it was about to take.

Plans for the Joint Support Ship involve the design and construction of three large vessels capable of performing numerous roles:

Fleet Replenishment The JSS will be capable of supporting a naval task group with fuel, munitions, and supplies so that ships and submarines can operate for extended periods of time away from land. As noted, this is a basic requirement for a blue-water navy.

Sealift The vessel's design includes the capacity to transport 2,500 lane metres of vehicles, heavy equipment and cargo. Loading and unloading will be facilitated by roll-on/roll-off ramps on the vessel's stern and side. In addition, equipment can also be transferred between land and the ship standing offshore using the vessel's sheltered dock as well as landing craft or powered rafts. The JSS can also carry standard cargo containers, loading and unloading them using its own cranes. There is accommodation for 210 combat personnel and their equipment.

Command and Control Space can be configured for a Joint Force Headquarters to use the vessel as the command post for littoral and naval operations.

Medical facilities The JSS will provide medical and dental care to ships and forces ashore, and can be configured to accommodate an afloat modular hospital on the vehicle deck with 60 patient beds, surgical, intensive care, and laboratory units.

Naval aviation Facilities aboard the JSS will allow it to operate maritime and/or army tactical medium-lift helicopters.

Other features of the JSS include a ice-strengthened hull for operations in the Arctic. This is intended to allow the vessel successfully to navigate and operate in first-

year ice up to one meter thick. The entire JSS program includes ship design, construction, system integration, integrated logistics support, project management, in-service support, and guarantees from contractors that the program will be implemented (Smyth, 2004). It is not clear whether Canada is currently capable of completing the JSS program, as we indicate below.

It must also be noted that the JSS is not meant to perform *all* these functions simultaneously. Instead, the JSS can be tailored to a mission in one of three possible configurations:

- Task Group replenishment (liquids) and sealift;
- Task Group replenishment (full), Aviation (four aircraft), and Medical;
- Sealift, Joint Forces Headquarters, Medical, and Aviation (two aircraft).

(Department of National Defence, Assistant Deputy Minister [Matériel], 2005)

As noted above, the JSS project is intended to provide the Navy with three vessels. At least one JSS vessel will be based on each coast because the two fleets are isolated from one another (Department of National Defence, Assistant Deputy Minister [Matériel], 2005). For this reason, it has been argued that four vessels would be better because it would allow one vessel on each coast to operate while another undergoes refits, repairs, and overhauls in accordance with a normal operational rotation. Even four ships will require careful management of their use, especially because their versatility also means specialized configuration, which in turn reduces flexibility. This is why, for example, even though merging the fleet replenishment and sealift capabilities onto one platform is an efficient means to achieve cost savings, other navies have continued to opt for dedicated vessels for each task (Shadwick, 2000). Any future concept of operations must ensure that these assets, however configured, meet the nation's strategic needs and that demand for these vessels does not overstretch their use.

Is JSS the right choice?

Canada's need for strategic sealift is undeniable and the notion of procuring the Joint Support Ship may be a first step towards satisfying that need. However, it does not necessarily follow that the JSS is the right choice. To begin with, Canada's sealift requirements will not be fulfilled quickly. One result of a decade of delay has meant there will be an even longer wait before any replacement is available: the first JSS is not expected to be delivered until 2010/2011. Until then, Canada's ability to operate effectively and jointly, that is to combine military, naval, and air power on the same operation, will continue to be impaired, which will have a direct impact, as demonstrated in recent years, on Canada's place in the world.

An example may illustrate the problem. Canada can, at present, maintain destroyers and frigates at sea using existing AORs but it does not have the capability to base troops at sea or support them ashore from ships. This proved to be a problem when, in 2001/2002, 3rd Battalion, Princess Patricia's Canadian Light Infantry was committed to Afghanistan following the terrorist attack of 9/11. The battle group had to remain in the Edmonton Garrison for two months before their actual mission was determined. The chief problem was transportation. At the same time as the Army was doing nothing, the Navy was given command of a coalition naval force protecting a US Marine Corps Amphibious Ready Group (ARG) afloat off Pakistan, which was later engaged ashore. Had Canada the ships to support the Patricias as an ARG, in roughly the same strength as the Marines whom the Navy was protecting, it would have meant much greater flexibility and influence on both operations and on the strategic prosecution of the Afghanistan campaign. This is the same logic that led to the formation of the Canadian Corps as a national fighting force in both the Great War and World War II. Indeed, it has been retained as part of CF doctrine, which requires "Tactically Self-Sufficient Units" (TSSUs) to be deployed on coalition operations (Canada, 1994: 38–39). Since a single frigate has been defined as a TSSU, compliance by the Navy is rather easier than it is for the Army or Air Force.

Even more fundamental than current incapacities is the uncertainty about whether Canada will be able to produce a vessel such as the JSS through indigenous shipbuilding resources. One of Canada's two largest shipyards experienced in naval shipbuilding, Saint John Shipbuilding Ltd (SJSL), closed in 2003 after sitting idle for three years. This shipyard had been dependent on naval newbuild contracts. Since the completion of the last coastal defence vessel in 1998, there has been no new

construction of military ships in Canada. The closing of SJSL makes building the JSS at home complicated for two reasons. First, there is only one other facility with naval shipbuilding experience capable of building a 35,000 ton vessel, Davie Maritime in Quebec. Theoretically, Davie Maritime could build a JSS, though their record in building frigates is not as accomplished as SJSL. In any event, with only one yard available the date for bringing all ships online would extend far beyond 2011. Two or three shipyards building concurrently would shorten the waiting time for a capability Canada greatly needs (Cairns, 2004).

There is a second problem as well: because of the lack of new naval ship builds and a historic policy of building a major class of warships every 30 years, even if more shipyards than the Davie Maritime were available, the highly trained expertise needed actually to construct such a vessel has disappeared. There are, of course, yards capable of building large civilian vessels on both coasts but warships are more than ferries or freighters with guns on them (Cairns, 2004). A highly specialized skill-set is needed but no longer exists because skilled warship construction crews have retired or gone to work elsewhere. Although the "made in Canada" option may be desired on political grounds, it may be necessary to look overseas to fulfill our strategic sealift needs (Curran, 2005).

There are, however, other options and alternatives available abroad. Since other nations have also realized the increased need for strategic sealift, many have resorted to shipbuilding as well as measures to fulfill their sealift requirements while these new vessels are under construction. The following discussion is not intended simply to be critical of the JSS project but to summarize alternative international developments on this issue in order to see the announced Canadian program in proper context.

Options

The United States

Since the Second World War, the United States' Navy has continued to be the largest and most dominant of all naval expeditionary warfare forces. Even though the last major amphibious assault conducted by the US Navy and Marine Corps occurred at Inchon during the Korean War, expeditionary operations have remained a key component of American power projection abilities.

The USN currently maintains two distinct forces for the purposes of expeditionary warfare: maritime prepositioning and amphibious forces. Maritime prepositioned forces are not meant to be used for forced entry but instead are tasked with providing follow-on troops that deploy to a theatre after assault troops deployed from amphibious warfare ships have secured an area. They require a secure port at which to unload equipment, as well as an airfield where troops can fly in, meet up with the equipment, and assemble into a fighting force. These ships, most of which are leased cargo vessels, are operated by the Navy's Military Sealift Command and formed into three squadrons of five or six ships each. Each squadron carries enough vehicles, equipment, and supplies to equip a Marine expeditionary brigade (14,000 troops) for 30 days (CBO, 2004).

Amphibious warfare forces are centered on littoral assaults onto shore from the sea using helicopters and landing craft based from ships. Depending on their particular role in an amphibious group, different kinds of ships are involved. Large amphibious assault vessels (LHA *Tarawa*-class or LHD *Wasp*-class), also known as helicopter carriers, transport the bulk of an amphibious group. Their ability to accommodate 1,700 to 2,000 marines and 30 or more helicopters, as well as to launch both displacement and air-cushion landing craft and amphibious vehicles from a docking well makes vessels of these classes displacing roughly 40,000 tons a large and valuable asset. A docking well or dock is a basin at the stern of the ship that can be flooded with sea water enabling landing craft to exit and enter. The *Wasp*-class carriers are essentially an improved and slightly larger version of the *Tarawa*-class. They are capital ships and would require a considerable change in the direction of government priorities to be considered as a serious Canadian option.

In contrast, the new amphibious transport dock, LPD *San Antonio*-class, ships are a serious possible option for the Canadian Navy. They are capable of transporting part of the total number of troops, vehicles, and materiel in any given task force but, at 25,000 tons, are smaller than the LHAs and LHDs, and are designed to carry fewer landing craft. They have a fixed helicopter deck that can

provide hangar space but only limited service. Thus their helicopters are usually maintained and supported from the larger carriers. For Canada, this would mean that long-term deployment of a *San Antonio*-class LPD would likely be as part of a coalition operation. As a practical matter, this is not a serious limitation because Canada has historically fought only as part of a coalition and unilateral peace- and disaster-related deployments tend to be shorter. *San Antonio*-class ships are intended to fulfill US Navy and Marine Corps needs in future amphibious warfare. They are designed to provide great operational flexibility for Amphibious Ready Groups such as the Marines that the Canadian Navy helped protect in 2002. They can accommodate up to 800 troops.

The third kind of amphibious vessel are dock landing ships, LSDs. There are several variants in the USN inventory but all are designed to carry and land troops, vehicles, and materiel. These vessels, however, have even larger docking wells than LPDs and are used to supply more landing craft than other vessels. In the past, the USN organized its amphibious warfare ships into 12 Amphibious Ready Groups, typically of three ships (one of each type as described above), with each group carrying one Marine expeditionary unit – the equivalent of an enhanced battalion of about 2,200 troops with vehicles and equipment (CBO, 2004).

There are no indications that this level of amphibious strength will decrease; rather, the USN plans to maintain the same level for the next 30 years through consistent replacement of older vessels with newer ones. The newest amphibious ship class, the LPD-17 *San Antonio*-class noted above, is slated to replace four older LPD classes of amphibious ships. The LPD-17 class will incorporate the latest developments in Marine Corps technologies, which include the Advanced Amphibious Assault Vehicles (AAAVs), air-cushioned landing craft (LCAC), and the MV-22 Osprey tiltrotor aircraft. The LPD-17 will be more than 45% larger than its LPD-4 predecessor, with substantial improvements in terms of lift capacity, personnel accommodations, electronics, and self-defence capabilities. The first of 12 vessels was launched in July 2003 and will be commissioned by mid-2005 (CBO, 2004).

In addition to the continuous cyclic replacement of its amphibious warfare vessels, the USN is pursuing the notion of "sea-basing" for the future fleet. Sea-basing means not only that units ashore will be supported by ships at sea but they will be sustained from the sea as well. That is, instead of relying on supply depots, bases supplied by a host nation, or seized assets, military operations ashore will rely on ships to provide supplies, fuel, and ammunition on an ongoing basis. Such a capability permits not only faster deployment and operations but greater flexibility and responsiveness because the details of the mission can be determined while the force is *en route*. For a force commander, a self-contained base and stand-off logistics support means a reduction in the need to use troops for force and headquarters protection. In effect, the Navy can be tasked with force protection as the Canadian Navy was for the Marine ARG in 2002 (CBO, 2004).

Despite the vulnerability, high cost, and limited ability to sustain such operations on a large scale, which may mean the concept is impracticable, the USN is contemplating building vessels capable of undertaking this mission. It is something that the Canadian Forces would do well to consider.

The Europeans

The largest group of countries actively seeking to develop their sealift are members of the European Union. The goal of the European Rapid Reaction Force is to create an expeditionary force capable of intervening in a crisis with 60,000 troops and their equipment over a distance of 4,000 km, within 60 days, and able to be maintained for a year (AWEU, 2001). To transport such a force, the EU would need to unload a total of 300,000 linear metres, 15,000 20-foot containers, and 40,000 tonnes of general freight in about a month. Since 80% of the force's equipment would be transported by sea, studies found that 160 rotations of ships or 80 ships (civilian and military) carrying out two rotations would be needed to meet the deployment period of 60 days. To meet this objective and to counter the present shortfall in sealift capability, many nations have begun to construct, procure, and sponsor the acquisition of such vessels. Countries so committed include the United Kingdom, the Netherlands, France, Belgium and Luxembourg (jointly), Spain, Germany, Denmark, and Italy.

The most noteworthy among these European nations have been the efforts of the Netherlands. Unlike larger

European partners such as the United Kingdom, France, and Italy, the Dutch did not have an existing sealift capability or amphibious assault fleet. They did, however, recognize the need for sealift earlier than most countries and contracted the first vessel, *Hr Ms Rotterdam* for the Royal Netherlands Navy in 1993. Launched in 1997, *Rotterdam* is a Landing Platform Dock (LPD) ship of 11,000 tons (about half the size of a *San Antonio*-class LPD) and first of the class bearing its name. The ship is capable of accommodating one reduced battalion-strength unit (600+ troops) and its equipment (170 armoured personnel carriers or 33 main battle tanks), and has docking facilities for up to six landing craft. In addition, *Rotterdam*'s aircraft hangar can accommodate 4 to 6 medium-sized helicopters.

Since its launching, *Rotterdam* has been actively serving the Dutch government. In 2000/01, she served as part of the Dutch contribution to the United Nations mission in Ethiopia and Eritrea (UNMEE) and in March 2004 *Rotterdam* provided support to peacekeeping missions in Liberia. Benefiting from her sister ship's operational experience, the second ship of the *Rotterdam* class, the 17,000 ton *Johan de Witt* has received improvements to her design. Slated to enter service in 2007, *Johan de Witt* will be slightly larger, in part to accommodate a coalition joint task-force headquarters and additional communications facilities, as well as to incorporate new high-tech podded propulsor systems rather than traditional propellers (MER, 2002).

The *Rotterdam* LPD class was constructed not solely for the Dutch government but was part of a joint program with Spain. Two sister ships were constructed and delivered to the Spanish Navy in 1998 and 2001. In addition, the ship's builders, Royal Schelde, have an "Enforcer" series of ships, similar to the Dutch LPDs, geared for the export market. Already, there has been interest in the largest of the Enforcer series, which features a 108-metre flight deck and 1,200 lane metres for wheeled and tracked vehicles. The British Royal Fleet Auxiliary has contracted four to be built (MER, 2001).

Australia & New Zealand

Both South Pacific countries have sought to enhance their current sealift capabilities but have sought different routes to fulfill their needs. As part of its US$335.9 million naval spending dubbed "Project Protector," New Zealand will spend at least US$100 million for a multipurpose vessel (New Zealand Navy, 2002). This vessel will be designed to meet New Zealand's needs for tactical sealift, amphibious warfare, replenishment at sea, and disaster-relief operations. Although few details about the ship's specifications have been made public, delivery of the vessel is expected by the end of 2006 (*Sea Power*, 2004).

The Australians, on the other hand, have sought a more cost-effective and innovative method for developing their strategic sealift. Instead of building or buying completely new vessels, the Royal Australian Navy has instead purchased from the United States Navy two of their decommissioned Landing Ship-Tank (LST) vessels. These ships, originally designed to load and transport cargo, vehicles of all types, and troops to a combat area, underwent extensive modifications for their new roles as helicopter-carrying amphibious transports, LPAs. HMAS *Manoora* and HMAS *Kanimbala* are equipped with helicopter hangars to support 2 to4 medium-sized helicopters and operate three helicopters simultaneously from its fore and aft flight decks. When ship-to-shore transport is required, the fore flight deck can instead carry two landing craft. The vessel can carry a contingent of 450 troops and 810 square metres of storage space for vehicles and large-sized equipment. These Australian ships are a practical and comparatively inexpensive approach to developing a sealift capability using used vessels (Royal Australian Navy, 2004).

The Way Ahead

As with airlift, there are many different options available for Canada to recover sealift capability. The chief advantage of a built-in-Canada sealift is that it would involve domestic spending. The chief and possibly fatal disadvantage is that Canada may lack the ability to build either AOR replacements, more sophisticated vessels such as the Joint Support Ship, or a dedicated sealift or amphibious fighting ship such as an LPD. Even if it were possible to build such ships in Canada, it could not be done in a reasonable time. Certainly, there are vessels on the market outside Canada that can meet the same specifications as the JSS and be brought into service faster than can be done by building at home. Canadians know from the experience of the ALSC project, which turned into

the JSS project, that government-induced delays based on changing specifications, design redrafts, domestic political concerns over contract-letting, and so on can postpone delivery indefinitely. In addition, the purchase and refitting of used ships can fulfill our sealift needs without heavy cost. For these reasons, the JSS alone is probably not the best option.

In order to determine which of a wide array of options is best, some highly specific determinations need to be made with respect to the purpose of the Canadian Forces. Some indication of how senior staff at DND are thinking can be found in an oft-repeated speech made early in 2005 by the newly-appointed Chief of the Defence Staff, General Rick Hillier. General Hillier stated unambiguously that his ambition was to overhaul the Canadian Forces and acquire a large amphibious expeditionary warship to serve as flagship of a future Canadian expeditionary force (Wattie, 2005a). This was not a ringing endorsement of the JSS, even though that ship would certainly be better than watching the existing AORs rust out and sink to the bottom. Should another dedicated amphibious warfare ship be acquired in addition to the JSS, the project's designs must ensure that the vessels complement one another's capabilities to avoid duplication and waste. For example, having two vessels designed for accommodating a command-and-control joint naval task-force headquarters would be unnecessary if both ships would be part of the same operation.

For the near-term, the Navy, the Department of National Defence, and the Government of Canada must assess their needs and do so quickly or suffer further delays in acquiring strategic sea-lift. There are many options available. Starting with the JSS as a replacement for *Protecteur*-class AORs, Canada can revitalize its naval vessel production in this country by introducing a consistent procurement program that will ensure a continued Canadian shipbuilding industry. But that is a long-term program and rests on the unlikely assumption that Canadians and their government are genuinely interested in serious and, if necessary, unilateral force-projection.

In the meantime and making the more modest assumption that Canada wishes to have a credible international presence and to contribute to future coalition operations, there are very capable and high-quality allied vessels presently available that have already been improved by knowledge gained through the operational experience of previous generations of ships. There is even an opportunity to acquire American vessels because the US Navy intends to maintain its amphibious projection force level through consistent replacement of older vessels. This is the path taken by Australia. Among other assets, the first *Tarawa*-class LHA would become available in 2007 (CBO, 2004). As noted above, the *San Antonio*-class LPDs are designed to work together with the larger LHAs.

For the long term, Canada can benefit from other sealift possibilities that are still on the conceptual horizon. Canada is blessed by being remote from most international dangers and crises but cursed nearly unto impotence when it seeks to back lofty rhetoric about our allegedly noble "values" with the ability to project sufficient power to back them up. As noted above, Canada's geostrategic position without forward basing means that the country has the longest distance of any industrial power to travel in order to deploy military forces. If Canada is to do so within the same general time frame as its allies, it will need to put in more effort simply to keep pace with them.

Currently, there are technological developments in the field of ship design that may remedy this problem. Research and Development teams in the British Royal Navy and the US Navy are experimenting with new hull designs capable of high speeds. In fact, the Australians were the first operationally to employ a catamaran hull as a sealift vessel. Leased to the Australian Navy for two years, HMAS *Jervis Bay* was used to supply the Australian-led mission to East Timor in 1999. The original catamaran design was for civilian use as a ferry but its specifications were sufficiently impressive to appeal to the military: speeds in excess of 40 knots, a passenger capacity of 500 troops with full kit or 866 passengers, in addition to a vehicle-carrying capacity equivalent to 143 small cars, 16 small trucks, and 4 buses (Incat Australia, 2005). Although the lease expired without renewal (the catamaran was leased to facilitate Australia's sealift while *Manoora* and *Kanimbala* underwent conversion from American LST to Australian LPA), the USN saw the practical uses of the catamaran hull and has since leased two such vessels to study.

In addition to the catamaran, another radical high-speed hull design is currently being studied in England. An English ship-designing firm has been progressing with a sleek, jet-powered, five-hulled "pentamaran" design capable of sustaining an average speed of 38 knots. This hull is considered so stable that it would only lose a couple of knots from its top speed of 41 knots even when operating in rough weather. A concept pentamaran freight ship is currently in the works that can carry 8,000 tonnes and cross the Atlantic in three days. Other uses of the design are being explored, including concepts for a passenger liner and a roll-on/roll-off ferry (BBC, 2001).

Canada's geostrategic position does not allow her to ignore such developments. The ability to deploy military forces abroad from bases on home soil with great speed over great distances has considerable appeal to a country that wishes to renew its presence in world affairs. Canadian strategic thinking should re-examine what the nation requires by way of assets and related technologies that best achieves Canada's present and future interests. The time for such a re-examination is now.

Conclusion

Strategic lift, whether by air or by sea, is a vital capability needed to realize Canadian foreign policy and defend Canadian interests. It enables the Canadian Forces to deploy where they are needed, whether the mission involves combat, peacekeeping, or humanitarian relief. The fact is that in order for Canada to realize its objectives, it must be able to get to wherever those objectives can be achieved. Ultimately, four questions have to be asked concerning the acquisition of both airlift and sealift.

How many and what kinds of operations will the CF be used for?

How much of its armed forces Canada can commit to international operations depends on their availability. Strict limitations must be made on the number of troops contributed to prevent over-stretch of the Canadian Forces as has happened in recent years. This means determining a consistent level and maintaining that level year after year. For specific capabilities, including the strategic enablers discussed here, what has to be determined is how many assets Canada can afford to have operational at any given time, taking into consideration rotations for rest and renewal, as compared to how many are necessary to get the job done. This determination should not be restricted to a consideration of a single asset but involve the armed forces as a whole: for example, how much sealift and airlift is required to deploy and sustain a battlegroup?

How much and what mix of lift is required?

The original ALSC document stated that the total ALSC fleet should be able to provide sufficient lift for an entire Vanguard Battle Group (the size of a brigade, or three battalions with support units), and estimated that 7,500 lane metres (2,500 per vessel) would prove sufficient. Upon further review and examination of other navies, this requirement was reduced to 1,500 lane metres per vessel. However, this calculation does not take into consideration how much of the force would be transported by plane (in the case European Rapid Reaction Force, for example, the split between airlift and sealift is 20% and 80%, respectively). Determining the right mix for Canada requires a thorough re-examination of Canada's military strategy and how the Canadian Forces are expected to perform.

How much flexibility?

A sealift vessel can be designed to incorporate many different roles (sealift, fleet replenishment, joint force headquarters, etc.). To do so may achieve price efficiency but at the cost of lower overall flexibility. Supposing an instance where both sealift and fleet replenishment were required, two-thirds of the entire JSS fleet would need to be used. For airlift, using large airlifters for small cargo loads is inefficient. Rather, it may well be in the interest of the Air Force to have a mixed fleet of large, medium, and small transport aircraft.

Are there other concepts that could meet Canadian needs?

Canada's distance from potential trouble-spots suggest greater effort is necessary to meet rapid-response and logistical needs. Thus, revolutionary concepts such as high-speed hull technology or sea-basing should be considered to meet specifically Canadian problems. Other possibilities may include reintroduction of overseas bases or the construction of "super-bases" at home that would keep airlift, sealift, and ground forces in close proximity and thus reduce deployment time. Any possibility that would allow strategy to serve Canadian interests better deserves consideration.

We have indicated that a mix of C-17s and C-130Js should be considered to meet existing and future airlift needs. If the CF are to adapt to the new kinds of military opera-

tions that seem increasingly likely over the next several years, the likelihood of deployment of battalion-strength units (800–1,000 troops) becomes greater. They will have to be embarked on a ship something like the *San Antonio*-class LPD. An optimal mixture would include a larger LHD as well as dedicated or near-dedicated replacements for the AORs. In this respect, we agree with the recommendations of MacKenzie and his colleagues (MacKenzie et al., 2004).

In the larger context, however, what aircraft to buy or lease, or which ship to build, buy, or convert is secondary to the overarching question of how committed Canada wants to be in the world. Without a firm understanding of the benefits and costs, and of the link between policy and strategy, procurement decisions may result in acquiring too little capability or wasting dollars for too much. It is conceivable that Canada may require only a smaller fleet of large transport planes and a handful of ships but that can be decided only by a consideration of where Canada wants to be in the future. This discussion about airlift and sealift has provided an outline of the options. It is up to Government to show sufficient leadership, courage, and imagination to make the appropriate choices and to explain to Canadians why it is at least as important to be able to project power as to enunciate a lofty vision of international justice.

Appendix 1: Comparison of Aircraft

	Lease	Procurement					Current
	AN-124 Condor	C-17 Globemaster III	A-400M (forecast)	AN-70	IL-76 Candid	C-130J	CC-130H/E
External Dimensions							
Length (m)	69.1	53.04	41.8	40.73	46.6	29.79	29.79
Height (m)	21.08	16.79	14.7	16.38	14.42	11.84	11.73
Wing span (m)	73.3	51.74	42.4	44.06	50.2	40.41	40.41
Internal Dimensions							
Length (m) (incl. ramp)	36.5	26.82	23.1	22.4	n/a	15.44	15.44
Length (m) (excl. ramp)	n/a	20.78	17.7	19.1	20	12.19	12.19
Width (m)	6.4	5.49	4.00	4.0	3.45	3.12	3.12
Height (m)	4.4	3.76	3.85	4.1	3.4	2.74	2.74
Payload							
Payload (tonnes)	150	76	32	47	47	18	17
Range Payload (km@t)	5030@120 10960@40	4445@72.6 8149@18.2	4537@30 6575@20	1350@47 5000@30	3000@47 6100@20	5250@18 with spare fuel tank	2407@16
Maximum LAV3 capacity[1]	6	4 standard, 2 combat-ready	2	2	2	1 combat-ready	N/A
Costs							
Cost per unit (US$)	$250–$270 million (refurb., est.); $13,300–$16,000/hour chartered	$202.3 million (FY98 constant dollars)	$152 million (estimate)	~$70 million (estimate)	~$55 million (estimate)	$48.5 million (FY98 constant dollars)	N/A

Note 1: Estimated; LAV3 dimensions are: length, 6.98m; height, 2.7m; width, 2.7m; weight: 16.95 tonnes (minimum).

Appendix 2: Comparison of Selected Ships

	Selected International Vessels				Proposed	Current
	US Navy Tarawa Class (LHA)	American San Antonio Class (LPD)	Australian Landing Platform Amphibious (LPA)	Rotterdam Class Landing Platform Dock (LPD)	Joint Support Ship	Protecteur Class Auxiliary Oiler Replenishment
Dimensions						
Length (m)	254.2	208.5	159.2	162.2	200	172
Beam (m)	40.2	31.9	21.2	25	28	23
Displacement, full load (t)	39,967	25,000	8,534	12,750	28,000	24,700
Accommodation + Cargo Capacity						
Ship's Crew	925	420	182	124	165	320
Troops	1,713	720	450	613	N/A	N/A
Vehicle lane metres[1]	943.9 (est.; 25,400 sq ft)	929 (est.; 25,00 sq ft)	324 (est.; 810 m2)	360.8 (est.; 902 m2)	1,500	N/A
Roll-on/Roll-off	No	No	Yes	Yes	Yes	No
Well dock	Yes	Yes	No	Yes	Yes	No
Helicopters	30+	6	3-4	2-3	4	1–2
Additional Features	C4I[2] hospital facilities		70 tonne crane 2x landing craft	JTFHQ[3] medical	JTFHQ[3] medical ice strengthened	
Propulsion						
Speed (kt)	24	22+	20	18	21.5	20
Range (naut. mi)	10,000 @ 20kt	N/A	14,000 @ 15kt	6,000 at 12kt	10,800 @ 15kt	7,500 @ 11.5kt
Costs						
Cost per unit (US$):	$1.6 billion for 5 (1970)	$1.2 billion (2004)	$300 million for 2; $150 million each.	$430 million	$2.1 billion for 3 vessels; $700 million each.	N/A

Note 1: One lane metre is the equivalent of an area 2.5m in width by 1m in length.
Note 2: C4I = Command, Control, Communications, Computers, and Intelligence capabilities.
Note 3: JTFHQ = Joint Task Force Headquarters capability; ie., a command centre for a multinational coalition.

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