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EXERCISE/EXERCICE: NEW HORIZONS

Future Naval Logistics Support: From A Distance

By /par: Cdr C.L. Mac Kinnon

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INTRODUCTION

According to Julien Thompson, a noted British military writer and historian, logistics is the lifeblood of war.[1] It is believed that the Assyrians, around 700 BC, were the first to set up a rudimentary logistics structure to supply the necessary arrows for siege operations.[2] However, as the tools of conflict have changed from Assyrian arrows to American Tomahawk missiles, the supporting logistic organizations have adapted in response to the changing complexities of the tools of war. In future military operations, focused and streamlined logistics will remain a critical factor for success across the full spectrum of conflict.

While logistic support at the operational and tactical levels has traditionally been the purview of military units and organizations, strategic level logistics has usually been provided by the civilian economy. What had been a relatively clear separation of military and civilian responsibilities has changed; however, this distinction has blurred as civilians and contractors have become increasingly involved at the front lines of conflict. This has recently been evident in the support to the sophisticated and complex weaponry of the Persian Gulf War and the increased contingent of US civilians

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[1] Julien Thompson *The Lifeblood of War Logistics in Armed Conflict* London: Brassey's, 1991, p.1.

[2] Thompson *The Lifeblood of War*, p.11.

and contractors in Bosnia.[3]

The impetus for this change comes from a variety of factors emerging in the 1990s: a continuing demand for efficiencies and cost reductions in the face of reduced defence budgets; increasingly complex and advanced weapon system technology; and a growing trust in the ability of the private sector contractors to provide assured support (to be there when you need them). For the navy, these change factors will continue to drive a transition from the traditional ship-based logistic support to shore-based organizations consisting of DND civilian and contractor personnel. The impact of the 1990s defence budget reductions will persist as neither financial relief nor military personnel increases can be reasonably expected. This environment will force constant and continuing analysis, not only for greater financial efficiencies, but also to ensure the optimum employment for the limited military personnel resource. New projects, presently under development, will acquire increasingly complex and specialized equipment. The combination of continuous frugal defence budgets and increased complex system technology will amplify the demand for shore-based support.

The DND experience with the Alternative Service Delivery programme has provided a promising base upon which to build for the future. While the lessons already learned have been of great value, there remain some challenges which must be addressed to ensure that the required assured support is available in time of need. For example, it must be recognized that non-military service providers will place additional demands on commanders, including special support and security. In addition, commanders will be called upon to confirm the legal basis

[3] Katherine McIntire Peters 'Civilians at War' *Government Executive* Vol 28 Issue 7, July 1996, p.8. According to Peters, civilians and contractors represented 3 percent of the total work force during the Persian Gulf War; these same groups represented 9 percent of the force deployed to Bosnia.

upon which these non-combatants are authorised to work in the battlespace.[4] Ships, without their organic military staff, will be required to embark shore-based support personnel to perform tasks, while being capable of staying at sea for longer periods.[5]

This paper will demonstrate that current trends and developments will cause future naval logistic support to be increasingly delivered from shore-based organizations. The evolution in military logistics will not only change the structure of logistic organizations, it will also change our approach to warfare, as commanders increasingly turn to shore-based contractors and DND civilians for their services. The Navy must not only maintain an awareness of the current maritime logistics trends, they must 'institutionalize a process for change'[6] to prepare for this future environment. This is essential if the Navy is to be best positioned to continue to supply the vital lifeblood of war to its combatants.

LOGISTICS

> *The command point of view is that logistics itself has no purpose other than to create and to support combat forces which are responsive to the needs of command.*[7]

At this point, it is important to differentiate between the term logistics and the Canadian Forces Logistics Branch. The word logistics comes from the Greek "logistikos" from which the Latin "logisticus" is derived, both meaning calculation and mathematical reasoning.[8] The Canadian Forces has adopted the NATO definition of logistics as the science of planning and carrying out the movement and maintenance of forces.[9] While the personnel of the Logistics Branch do perform many logistics functions,[10] the branch excludes personnel of the maintenance, engineering, and medical branches. Therefore, while members of the CF Logistics Branch perform logistic functions, these functions are not the exclusive responsibility of Logistic Branch personnel. While many examples exist, this is exemplified by the Combat Logistics Force replenishment responsibilities which Capt(N) D. Miller, a Maritime Surface officer, held during the Persian Gulf War.[11] Personnel of the Canadian Forces Logistics Branch are but some of the personnel undertaking logistics functions. Therefore, caution must be exercised when discussing the wider scope of logistics in relation to the Canadian Forces Logistics Branch. For the purpose of this paper, logistics is defined as the science of planning and carrying out the movement and maintenance of forces.[12]

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[8] The members' handbook of the civilian International Society of Logistics uses the referenced definition of logistics. Source: log.dau.mil/alg/ chap02.pdf, p.2-1 (18 Mar 02).

[9] *NATO Logistics Handbook 1997* Brussels: NATO Office of Information and Press, 1999 Ch.1. The exception to the NATO description is that Canada excludes medical responsibilities from logistics. Previously, Canada had used the British term 'administration' to describe the management and execution of all matters not included in tactics and strategy.

[10] The persons of the CF Logistics Branch provide material and personnel management, financial and food services, and postal services. Moreover, personnel performing planning and sustainment in support of operations are often not members of the Logistics Branch.

[11] LCdr Richard Gimblett and Major Jean Morin *Operation Friction The Canadian Forces in the Persian Gulf*, Dundurn Press Toronto 1997, p.182. Capt(N) Miller, a subordinate Warfare Commander in charge of CTG 302.3, was responsible for the multinational replenishment task group. Capt(N) Miller was the only non-USN officer accorded this status.

[12] *NATO Logistics Handbook 1997* Brussels: NATO Office of Information and Press, 1999 Ch.1.

In a military context, it is General Antoine Henri Jomini who is generally credited with the first reference to the art of logistics. In 1838, Jomini defined logistics as the means and arrangements to work out the plans of strategy and tactics.[13] In 1959, Rear Admiral Henry Eccles, a noted logistician and strategist, described logistics as the problem of controlling the means of war as deemed necessary and appropriate by all commanders.[14] RAdm Eccles portrayed logistics equally as an art, a science, and a process. More importantly, he highlighted the critical interdependence of military logistics and the national economy.[15] RAdm Eccles advocated that, as the civilian-produced materiel moved from factories to the battlelines, the process of making these elements available for ultimate consumption was military logistics.[16]

The distinguishing features of military logistics have lessened as the Canadian Forces, and many of her allies, have moved from goods easily identifiable as military materiel to commercial off-the-shelf materiel.[17] While Eccles' interdependence of military and national logistics remains valid today, this shift to commercial products and services has, in turn, opened the door to a greater involvement for civilian and contracted support at the operational and tactical levels.

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[13] Jomini, Baron Antoine Henri *The Art of War*, (1838) Surrey: Biddles Limited, 1992, p.69.

[14] Eccles *Logistics in the National Defense,* p.10.

[15] Eccles 'The Logistic Aspects of Command and Control' *Principles of Logistics 1968-1969,* The George Washington University Logistic Research Project*,* p.53.

[16] Eccles *The Logistic Aspects of Command and Control,* p.97.

[17] Deb Navas 'DoD Logistics New Rules of Engagement' *Industry Insights* August 2001, p.5. There has been a major shift to off-the-shelf products, in lieu of military specifications, for a number of reasons: a shorter design to implementation period, reduced cost, and improved supportability from the commercial sector. This is particularly the case with information technology products although the Maritime Coastal Defence Vessels (MCDVs) and the Griffon helicopter were heavily dependent upon commercial design and support concepts. In the January 2002 draft Concept of Employment document for the proposed Command and Control and Area Air Defence Replacement (CADRE) Project, commercial standards and commercial practices are planned to support the build, maintenance, repair and overhaul of this platform.

Canadian Forces doctrine separates logistic support into strategic, operational, and tactical levels.[18] It is at the strategic level where resources are made available, acquired, and controlled within an established distribution system normally provided from Canada or the country of manufacture. The operational level of logistics provides support to forces in campaigns or within a theatre/area of operations. Primarily a military effort, operational logistics may include augmentation with civil services and infrastructure.[19] Tactical logistics, primarily performed by military personnel, is normally organic to units, such as ships, under the command of the tactical commander. Until recently, maritime logistics has followed this tradition with minimal involvement of DND civilians and contracted personnel at the tactical levels.

MARITIME LOGISTICS

> *While it is undoubtedly an over-simplification, there is some truth in stating that sailing vessels topped up with needed supplies in their home port, replaced or replenished what they could enroute, and returned home when their supplies were exhausted.*[20]

The projection of military force is of minimal value if this force cannot be sustained in the global battlespace. In providing their particular logistic support and resources, the Canadian Navy adheres to NATO logistics doctrine, requiring each contributing nation to deploy and sustain their own forces.[21] Although NATO, or a coalition, may coordinate some force-wide

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[18] *CF Operations Manual* Ottawa: DND, 1996. Ch. 27 p.27-2.

[19] *CF Operations Manual* Chapter 27 p.27-2. The Joint Support Group (JSG), based in Kingston, Ontario, is one of the key CF organisations responsible for operational level logistic coordination and delivery of materiel and services. The CF Operations Manual does not describe tactical logistics except to suggest that tactical logistics is the responsibility of the tactical commander.

[20] *A Handbook on the Canadian Forces Logistics Branch* (update) Ottawa: DND, September 2000, Article 329(2).

[21] *NATO Logistic Handbook* Chapter 13, p.1.

requirements, this is dependent on the availability of agreements[22] in the area of conflict. *Leadmark*, the Navy's long-term strategy document, confirms the importance of maintaining the capability to upgrade, maintain, and provide other logistic support to keep operational units ready.[23] Consistent with NATO doctrine of national responsibility, the Navy must ensure that operational sustainment meets the following objectives: supply fuel, ammunition, and other consumables; act as a logistic coordinator; conduct second line maintenance of organic air assets; and provide appropriate medical and dental support.[24]

The basic NATO maritime logistic organisation structure, at the operational level, consists of Advanced Logistic Support Sites, or ALSS, and Forward Logistic Sites, or FLS. The ALSS, an ad hoc unit formed from designated navy personnel,[25] acts as a static forwarding operating base and holding site for resources in support of task groups and individual ships.[26] The FLS unit, formed similarly to ALSS, is intended to be highly mobile and can relocate to meet the changing needs and location of the supported force. The specific locations of such shore-based organisations will depend on the force requirements and the availability of shore services, including host nation support. It is in the FLS and ALSS shore organisations where we may anticipate a greater role for civilians and contractor personnel.

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[22] Status of Forces Agreements are legal agreements defining the areas of responsibility held by a host country over military personnel stationed within its borders, their dependents, and civilians employed by the military. Unless specifically negotiated, SOFAs do not cover contractors.

[23] *Leadmark The Navy's Strategy for 2020* Ottawa: DND, 2001, p.143.

[24] *Leadmark* p.146.

[25] While the ALSS and FLS positions are designated as such on the Navy organization, there are no formed FLS or ALSS organizations/units waiting to deploy.

[26] Most of the description of the NATO doctrine contained here is derived from two NATO publications: AJP-4A and AJP-4.1 Sup 1 (ALP 11). To note is that, while Canada has deployed a number of FLS to provide support to individual ships and Task Groups (some recent examples are Persian Gulf War, East Timor, Op Apollo, etc), it has not deployed an ALSS. The Canadian bases in Germany, closed in the early 1990s, had fulfilled some of the ALSS forward operating base functions.

The Formation Supply and Fleet Maintenance Facility organizations[27] are key shore organizations responsible for the supply of material as well as the provision of engineering and maintenance services to the ships. In the 1990s, these organizations went through a number of ASD and reengineering initiatives to increase their efficiency.[28] These reviews, while improving efficiencies, have removed any surge capacity for unplanned operational support. Although these organisations allow for mobile teams to deploy in support of ships, the bulk of work is primarily static from their respective naval dockyards. When mobile teams have been formed and deployed, these have been ad hoc type structures and often of a temporary nature. Additionally, the ongoing recruitment and retention difficulties present an additional problem to fill existing logistic positions. This problem has exacerbated the shortage of available shore personnel to backfill behind vacant positions at sea. The Formation shore establishments, while operating at improved efficiency attributable to the ASD programme, have minimal surge or surplus capacity for non-scheduled or unplanned activity.

Naval logistics in conflict is not significantly different from that exercised in peacetime, the principal differences

[27] The Fleet logistics and maintenance organizations, each located in Halifax and Esquimalt, primarily deliver services in and from their respective dockyards. When they do deploy to support ships, it is primarily in an assistance role to ship staff.

[28] The Fleet Maintenance Facilities in both Formations are undergoing a process to achieve the status of 'most efficient organization'. Source: http://www.vcds.dnd.ca/dgsc/asd/tem2_e.asp?doc=page2&sec=3

being ammunition consumption[29] and the threat. Essentially, except for ammunition consumption, the logistic practices exercised in peacetime are those put into practice during conflict.[30] While this statement may be obvious, it nevertheless becomes critical when assessing the increasing participation of civilian and private sector logistic support. It is also important when evaluating the navy's adaptation and response to change.

Prior to analysing the change factors, it is important to consider the traditional naval reaction to change, be it technological or procedural. Peter Haydon, a prolific writer on Canadian naval issues, advocated that all navies follow an evolutionary, rather than revolutionary, approach to change.[31] He attributed this approach to two factors: first, the 15-20 year cycle of technological innovation at sea; and second, a reluctance to discard older technologies until they have fully outlived their usefulness.[32] As a result, navies subject any major changes to technology and procedures, including logistics services, to detailed scrutiny and prolonged analysis prior to implementation.

PRESENT TRENDS

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[29] David Schrady 'Combatant Logistics Command and Control for the Joint Force Commander' *Review* Summer 1999 Source: http://www.nwc.navy.mil/press/Review/1999/summer/art2-su9.htm (12 February 2002) p.7. The author notes that, while the peacetime practices were consistent with the Gulf War experience, the US naval ordnance accounting system had problems in meeting the tactical requirements. The Air Force estimated that it used 20% of the ordnance shipped into theatre; the consumption estimates for the other services were less. This placed an unnecessary stress on the transportation system and the in-theatre force structure. Additionally, the unused ammunition, approximately 2.5 million tons, had to be backloaded to the US or other locations. However, the consumption of ammunition is significantly higher during conflict compared to peacetime. As an example, five British artillery batteries in the Falklands War fired more rounds in a twelve-hour period than an entire regiment would have fired in a 'normal' four-year period. Major Paul Valovcin *Logistics Lessons for the Operational Commander – The Falklands War* Newport: Naval War College, 1992, p.15.

[30] There are differences but these are not solely dependent on spectrum of conflict but more a function of the geographical and environmental implications. As an example, in warm temperatures, the consumption of water and humidity/temperature control for people and equipment become some of the critical items of logistic concern.

[31] Peter Haydon *Sea Power and Maritime Strategy in the 21st Century: A Medium Power Perspective Occasional Paper No.10*, Halifax: Centre of Foreign Policy Studies 2000, p.101.

[32] Peter Haydon *Sea Power and Maritime Strategy,* p.101.

There are three key trends impacting the delivery of future naval logistics support: federal government policy supporting increased involvement of the private sector; dramatic changes in technology; and changes in civilian business practices. These developments have already affected the way we do business and will continue to do so in the future. With fewer people and less funding, in comparison to the 1980s, the Canadian Navy must still accomplish its assigned tasks using more complex equipment, which in turn requires more specialized support. While the effects of these changes have already become evident, the search for greater efficiencies and more effective use of our military and civilian personnel will continue as will the high operational tempo.

The privatisation and outsourcing of services, although always in evidence in Canadian logistic support, has dramatically increased since the early 1990s. Although the source of this surge is multi-faceted, the prime driving force has been the *1994 White Paper on Defence,*[33] in which the Government of Canada charged DND with the responsibility of adopting better business practices to improve the overall efficiency of the Department operations. The government direction included: a greater reliance on a "just-in-time" delivery system; procurement of commercial off-the-shelf commercial technology; the transfer or contracting out of support functions and activities to Canadian industry; and a streamlined, more efficient materiel support process.[34] This direction, combined with a 30% budget reduction and military and civilian personnel reductions,[35] quickly steered DND towards a greater involvement of the

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[33] DND Canada *1994 White Paper on Defence* Ottawa: Communications Group, 1994. The 1994 document, despite opinion to the contrary that it may not be still valid, remains the Government of Canada's defence policy.

[34] These points are summarized in the Highlights to the 1994 White Paper on Defence.

[35] *Defence Planning Guidance 97* Ottawa: DND, 1997, art 202.

private sector to deliver services. Accordingly, activities designated as non-core[36] were targeted for transfer to Canadian industry or shared under partnership arrangements.

DND undertook this task with great zeal, as it appeared to be one way of maintaining military capability while achieving the federally imposed budget reductions. The 1995 DND Alternative Service Delivery (ASD) policy instituted the review of all non-core activities[37] with an intention to transfer those activities to the most cost-effective delivery option, where practical. The resulting DND ASD programme, while suffering some initial problems,[38] has had some positive results, including the development of a continuous improvement programme still in use. This included formulation of a new and workable framework which improved the potential of successfully identifying increased private sector opportunities.[39] While this outsourcing resulting from this ASD programme has not had a direct impact on ship operations, it has increased ship staff interaction with contractor personnel. An indirect advantage of the ASD programme, having significant long-term benefits, has been the greater DND acceptance and appreciation of the private sector skills and capabilities to deliver supply chain services.

In addition to the above-mentioned developments, the delta between civilian and military specification material has become less distinct as the Canadian Forces, and her allies, have moved to commercial off-the-shelf materiel and equipment. This trend further reinforces Eccles'

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[36] *1994 White Paper on Defence* Ottawa: DND, 1994. A clear definition of core or non-core activities was never provided and caused some disagreement as to the classification of a service; many people believed that an important activity equated to one requiring a categorization as a core function. According to Director General Strategic Change staff, the DND coordinator for change management, the terms core and non-core are being eliminated although the ASD process will include an evaluation of the operational capability or public interest.

[37] At the time, the ASD programme defined the Core/Non-core status of an activity using three broad areas of definition: combat and combat-related requirements, essential combat support requirements, and public interest considerations. In simple terms, non-core activities were not directly associated combat operations or those tasks that had to be conducted by military or civilian personnel.

[38] Auditor General of Canada *Report on the Department of National Defence 2001*, p.27-19. As of 1999, the achieved savings of the ASD Programme were approximately 30% of that projected by DND.

concept of logistics being a critical bridge between the economy and the military. More importantly, a reduction of military specification equipment has led to a reduced emphasis on military-specific support. This in turn has opened the door to a greater involvement for civilian and contracted support.

One example where contracted support may venture into the replacement of ship staff is the Supply Chain Project. The Supply Chain Project has, as its task, the exploration of whether private sector expertise, in the area of supply and distribution, could offer significant cost and efficiency advantages to DND and the CF.[40] As part of the implementation phase, the private sector third party logistics provider, in cooperation with DND, will develop an implementation plan for private sector delivery of supply chain services.[41] Should this initiative proceed as planned, it is reasonable to expect that the level of private sector involvement in direct support to operations, most likely at the FLS level, will increase. Although not an immediate task of the Supply Chain Project, the scope may possibly extend to contractor replacement of services presently provided by ship staff.

Given the assumption that the Government of Canada will not substantially increase the Defence budget or the number of military personnel,[42] it is reasonable to expect DND/CF to continue in their streamlining of the logistics process through the pursuit of private sector practices. This includes further exploration of contracted in-theatre support such as that as used

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[39] Auditor General of Canada *Report on the Department of National Defence*, Ottawa: Public Works and Government Services Canada, 2001, P.27-19.

[40] Supply Chain Project website. Source: http://www.dnd.ca/admmat/scp/data_e.asp (dated 20 Mar 02)

[41] Supply Chain Project website. This project will have a direct impact on Formation logistic organizations with an indirect effect on the ships being supported.

[42] There have been two recent Parliamentary reports (House of Commons Standing Committee on Defence and Veterans Affairs (Nov 2001) and the Standing Senate Committee on National Security and Defence (Feb 2002)) which recommended substantial increases to the Defence budget. The Government response has not been favourable to these funding recommendations.

in the Balkans.[43] The Canadian Defence Association has advised that it is not only peacetime civilian practices which should be pursued for efficiencies, but also the necessary robust and expansion capacity required in wartime.[44] This statement reinforces the basic principle that the logistic actions we practice in peacetime are those we will need in conflict. The acquisition of new and more complex equipment will enhance the trend towards greater contractor involvement in the provision of logistic support.

CHANGES IN TECHNOLOGY

New technologies have considerably influenced all navies as advanced societies pass from an industrial base to an information base.[45] With respect to military doctrine and equipment, this transformation, often called the Revolution in Military Affairs (RMA), has affected how we will support our naval forces in future conflicts.[46] To assess how the RMA will impact the logistic support to Canada's naval forces, the following two factors will be discussed: technological innovation including change programmes under consideration by Canada and her allies; and the increasing presence of contractors at the tactical level in areas of conflict.[47]

Information technologies and sensors have rapidly changed both in terms of complexity and capability: circuit cards and chips have replaced nuts and bolts, while computers and sensors have replaced or reduced the need for people. Technological advancements have brought about

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[43] *J4 Log Contractors in Support of Deployed Operations* LOGCAS - Logistics Contractor Augmentation Support web page, DND Canada. Source: http://www.dnd.ca/j4log/logcas_e.htm.

[44] This is a recommendation from the DND report *Canadian Defence Beyond 2010 The Way Ahead An RMA Concept Paper* Ottawa: DND, May 99, Chapter 4 (Materiel Acquisition and Support).

[45] Dr. Thierry Gongora 'The Revolution in Military Affairs: What should the CF do about it?' *National Network News* The Defence Associations National Network, Volume 5 No. 2 - Summer, 1998, p.1.

[46] Gongora 'The Revolution in Military Affairs', p.1.

[47] The term 'contractors on the battlefield' is used to indicate the increasing use of contracted personnel in theatres of conflict.

improvements in equipment reliability and maintainability while reducing the necessary repair time and the demand for maintenance personnel. Continued investments in newer and more complex equipment and

weapon systems will be accompanied by improved reliability. New equipment with increased diagnostic and prognostics capabilities will enhance the ability to provide anticipatory rather than reactionary logistics.[48] These increasingly sophisticated weapons systems will be accompanied by a growing reliance on the use of highly trained and skilled maintenance technicians.[49] Though trying to address this demand, the US military training systems have not been able to train sufficient personnel to meet the need.[50] To resolve these deficiencies, the US military has successfully used contractors to fill short-term personnel gaps. Therefore, contractors have proven to be successful complements to crew reductions or shortfalls, either of a permanent or short-term nature.[51] The combination of complex equipment and a growing dependence on contractor maintenance capability will support an evolution to shore-based support.

Recently acquired ships and equipment have impacted on their respective support techniques by incorporating designs to reduce crew sizes, the single greatest life cycle costs of a ship. This is exemplified by the Maritime Coastal Defence Vessels,[52] where the significant percentage of logistic and maintenance support is provided by an in-service support contractor. In addition, the repair by replacement philosophy, employed by the HALIFAX class of ships, has offloaded some maintenance tasks to shore-based organizations and contractors.[53] As part of the VICTORIA Class acquisition, BAE Systems is responsible for the coordination of repair pasts

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[48] Katherine McIntire Peters Civilians at War Government Executive Vol 28 Issue 7, July 1996.

[49] Katherine McIntire Peters 'Civilians at War' p.7.

[50] Kim Nelson, *Major Contractors on the Battlefield: Force Multipliers or Force Dividers?* Air Command and Staff College, Air University April 2000, p.6.

[51] *J4 Log Contractors in Support of Deployed Operations* LOGCAS - Logistics Contractor Augmentation Support web page, DND Canada. Source: http://www.dnd.ca/j4log/logcas_e.htm.

[52] Ron Rhodenizer 'The Maritime Coastal Defence Vessel Project: From Project Definition to In-Service Support' *National Network News, The Defence Associations National Network*, Volume 5 No. 3 - Winter, 1998.

[53] The repair by replacement maintenance philosophy allows major components to be exchanged in ships to effect necessary repairs. The unserviceable component is then backloaded to shore establishments for repair.

acquisition and maintenance support.[54] In a similar fashion, the maintenance concept for the Maritime Helicopter Project will minimise scheduled aircraft maintenance activities at sea, thereby limiting the need to deploy specialist personnel, special tools/support equipment and spares to sea thus reducing the overall logistic footprint.[55] The US Navy DD(X) destroyer, a project still in its design phase, is leading the way in crew reduction concepts. The project team is endeavouring to man this new platform with approximately 70% fewer people, using a combination of new technology and the reduction of tasks

[54] The VICTORIA submarine equipment that is common to other platforms or in-service equipment will be supported by the existing 'standard' support organizations.

[55] *Maritime Helicopter Project Integrated Logistic Support Concept* (Rev 0 dated 18 Oct 00), paragraph 4.1.

conducted by the crew.[56] It is clear that the by-product of new technology and ship design is a reduced ship crew size and more support from shore-based organisations.

A modern and connected information system is necessary to complement the new equipment and reduced crews. The CF is presently instituting a modernization of end-to-end information systems for logistic support. The Supply System Upgrade (CFSSU) and the Materiel Acquisition and Support Information System (MASIS) projects will eventually permit full logistic connectivity of ships to shore. This connectivity will allow the timely monitoring of equipment indicators and inventory levels from a distance, with appropriate action taken with minimal crew intervention. More importantly, it will permit an institution-wide focus to long and medium-term logistic requirements. These new information systems, with their connectivity, will support a proactive approach to logistic support rather than the present pull approach. This is important, not only to better manage logistic support, but also to get the work done with fewer military people.

It is reasonable to expect that Canada will persist in the pursuit of the US-led application of RMA, subject to financial constraints.[57] The Canadian Forces recognizes and embraces the major change in the nature of warfare brought about by the innovative application of RMA, as well as the alteration of the character and conduct of military operations.[58] The overall impact of new technologies and warship acquisition, from a logistic perspective, will be smaller ship crews, greater reliability of equipment, and supported by enhanced computer systems. This will

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[56] Martha Koopman and Heidi Golding *Optimal Manning and Technological Change* Center for Naval Analysis, Alexandria, Virginia July 1999 p.13. The 95-person goal includes a 21-person air detachment. The tasks performed by the DD(X) crew will be reduced to the absolute minimum; many of these tasks will be performed by civilian or contracted personnel ashore.

[57] In May 1998, Working Groups were formed with broad DND and Industry representation to carry out studies including the holding of a symposium entitled "Canadian Defence Beyond 2010". A concept paper was generated from this symposium entitled Canadian Defence Beyond 2010 The Way Ahead An RMA Concept Paper 31 May 99.

[58] *Beyond 2010 The Way Ahead An RMA Concept Paper*. Chapter 4 Materiel Acquisition and Support.

present an environment where less logistic support will be required in ships. As a result, technology will push existing work performed in ships to shore-based organizations – both in the naval dockyards and the private sector.

CHANGES IN CIVILIAN PRACTICES

In parallel to the revolution in technology, private sector logistic providers have moved from fragmented processes (supply, transportation, procurement, inventory management, etc) to seamless supply chain management[59] and enterprise-wide information systems.[60] As they moved to more commercial off-the-shelf materiel, navies have also taken many of the best commercial practices and applied them in a military environment. The term Revolution in Military Logistics (RML) has been coined in the US to describe the transformation resulting from the integration of force sustainment, force projection, technology application, and new approaches to equipment acquisition.[61] This includes a distribution-based system to decrease the dispersion and number of inventory levels, such as that held in ships, utilising a better management of materiel flow.[62] Using this system, the bulk of materiel is held in reserve, rather than in each ship, and forwarded to the specific location, based on anticipated requirement rather than historical demand. If it is implemented in the navy, the range and depth of repair parts will be reduced in ships; therefore, fewer people would be required in ships to maintain inventories, with more support provided

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[59] John Cochrane *The New Logistics of the New Century* (presentation) Guinness UDV, Dublin 21 November 2001. According to The Management Roundtable, the term Supply Chain Management is the business of optimizing physical inventories and supply logistics for maximum customer service levels at a minimum cost to create and sustain competitive advantage.

[60] Roy Wallace and Dr. Christopher Hardy 'Seamless Logistics *System' Army Logistician* Jan-Feb 99, p.1. Source: http://www.almc.army.mil/alog/ issues/janfeb99/ms362.htm (23 Mar 02)

[61] Mark O'Konski 'Revolution in Military Logistics: An Overview' Army Logistician Jan/Feb 99, Vol 31, Issue 1, p.10.

[62] O'Konski 'Revolution in Military Logistics: An Overview', p.10-12. The concept of distribution-based logistics would require the anticipation of demand and real-time information on materiel requirements and transportation.

from shore-based organizations. The composition of these units will consist mainly of DND civilian and contractor personnel using civilian best practices.

At first view, the many similarities between the military processes and their civilian equivalents would suggest that what works in one area is easily applicable in the other. While recognizing the common procedures and processes between the two worlds, the military logistic needs and priorities are often very different.[63] The primary goal of a military force is readiness and support to government policy, while the crucial driver of a commercial business is profit.[64] Of greater significance is the potential impact of failure – a breakdown of timely military logistic service could have negative consequences of national significance and/or resulting loss of life. Tied to this, and as previously mentioned, military services required in conflict must be practiced in peace. This requires close examination of logistic support in areas of conflict, especially when replacing military personnel with DND civilians and contractors in a shore-based role.

DISCUSSION

Given the trends supporting an increased emphasis on "logistics from ashore", the navy recognises the potential benefits to support mission accomplishment. In addition to the forecasted efficiencies, the contractor's information systems, the depth of their technical expertise, access to their inventories and suppliers, etc will provide a significant in-depth capability. The immediate proximity of these representatives in a ship or a forward operating site (ALSS/FLS) can also reduce processing time to improve the responsiveness for priority

[63] D. Navas 'DoD Logistics' p.2.

[64] D. Navas 'DOD Logistics' p.2.

services.[65] While recognising these benefits, the Canadian navy must also acknowledge the possibility of increased risks to goal accomplishment.

The immediate downside of shore-based support starts with the reduction of military persons under the authority and disposition of the commander, especially for crew-intensive tasks.[66] Some of the other risks may include: loss of organic capability to provide immediate responses in high threat areas; possible denial of civilian and contractor access to the battle space; a greater dependence on a bureaucratic contracting process based heavily on lowest price rather than on assured support;[67] and a reduced pool of trained military personnel. These risks, acting as a counterbalance to the positive benefits of non-organic support, must first be acknowledged to permit resolution and management.

One major concern, obviously not new to militaries, is the absolute criticality of services in the face of hostilities. During the Persian Gulf War, one US contractor withdrew his personnel, fearing missile attacks.[68] The British Army findings of contractor support in the Persian Gulf suggested that contractors, despite their valuable contribution, were less predictable in terms of availability, workrate, and reliability than military personnel.[69] Situations where assured support is not available will remain an unacceptable shortcoming in the minds of commanders. One suggested approach to increase the probability of assured support would

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[65] Lieutenant Commander Stephen Ferris and Lieutenant Commander Charles Rollberg 'Contractors Underway: The Future of Naval Logistics?' *Navy Supply Corps Newsletter* Nov-Dec 1999, p.49-50.

[66] In a ship, a reduction of personnel could have a negative impact of personnel-intensive ship evolutions required for ship survival and sustainment; for example, damage control and replenishments at sea.

[67] The traditional approach to selecting a contractor is prime consideration of the price once certain prerequisites have been met.

[68] Lieutenant Commander S. Ferris and David Keithly 'Outsourcing the Sinews of War: Contractor Logistics' *Military Review* September-October 2001, p.76. Although the authors considered this example as an exception, it highlighted the potential in a high-threat area.

[69] Major General M.S. White *Gulf Logistics Blackadder's War* London: Brassey's 1995, p.246.

systematically integrate contractors into the military peacetime structure.[70] The practice of peacetime integration can promote an enhanced organisation in times of conflict.

Given the shift to "logistics from ashore" supported by improved information connectivity, the day-to-day management of ship and weapon systems will shift from ship's staff to shore based capability.[71] Increased logistic support will be provided via deployable support units while the ship is alongside in homeport, in foreign port, or while deployed. As this transition occurs, the existing shore infrastructure, already stressed due to personnel downsizing and reduced funding, risks becoming incapable of meeting the increased requirement. These shore organisations will require augmentation in personnel or funding to either execute the additional taskings and/or to procure contracted services.

Recognising the inevitability of increased involvement of civilians and contractors, a long-term logistics strategy must

[70] Ferris and Keithly 'Outsourcing the Sinews of War' p.76.

[71] There is a growing reliance on ship connectivity to corporate information systems – some examples are HR (PeopleSoft), finance (FMAS), supply (CFSS Upgrade), and maintenance (MASIS). The capability of these systems to communicate back to Canada is often limited or shut down by operational reasons.

be developed. The Canadian navy's long-term strategy document, *Leadmark: The Navy's Strategy for 2020*, has already identified sustainment as a basic competency component.[72] While this requirement to outline a long-term logistics strategic plan (or blueprint) has long been recognized,[73] such a document has not been promulgated or implemented. This blueprint would not only set a course for logistic support and sustainment, it would also identify and allow mitigation of risks. For example, this document would not only identify the core competencies required of military logistic organizations, but also the necessary knowledge and skill sets required at ship and shore organizations. This would establish the building block upon which the future logistic support concept would be based.

A long-term strategy must also evaluate the ability of industry to support the increased privatization of services. Canadian industry does not now have the base to provide the vast range of logistic services required by our navy. Nor, given its small size, can the Canadian Navy sustain a large industrial base. The strategy should furthermore address the degree to which international support of our military equipment is acceptable.[74] The Director General of International and Industry Programs expects DND to increasingly meet its capital, service, and assured support needs from a more internationalized industry base.[75] As an example of the issues to be addressed, if a Canadian ship required contractor support during a port visit to Cuba, American contracted support would not be available due to US political and legal considerations. Sustainability can no longer be thought of as the stores carried in a ship or in the supporting

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[72] *Leadmark*, p.126.

[73] In the Canadian navy's business plan, *Maritime Capability Plan 2000*, a goal was established to implement the new Naval Materiel Support Plan (NMSP). While some work had been done on this document, there is no recent indication that this document has been completed or implemented.

[74] The majority of weapons systems, sensors, and propulsion systems in the HALIFAX and IROQUOIS ships are from non-Canadian sources – US, UK, Netherlands, Italy, Sweden, etc.

[75] *Defence Industry Policy and International Relations with Industry* Ottawa: ADM(Mat), 1998, p.4.

AOR. It is, even more so than previously, a combined all-encompassing responsibility of the navy, our national defence industry, and a multitude of global industries. As a result, the navy must be concurrently concerned with the preparedness of Canada's defence industry and that of our allies. This dependence will continue to increase as the contracted logistic support becomes more organic to our ships, task groups, and ALSS/FLS organizations. While a strategic issue, this issue can directly impact access to our ships when deployed across the globe and therefore must be given appropriate reflection.

Related to assured support is the issue of the legal status of DND civilians and contractors. The CF must actively pursue the institution and/or amendment to Status of Forces Agreements, in particularly with countries where the navy participates in exercises and operations. Once established, DND civilians and contractors will have easy and fast access to countries and defence establishments in times of conflict. This is part of the integration of contractors during operations in times of peace. This will help build up the mutual trust, contributing to a long-term relationship. These steps would also help to formally recognize the navy's commitment that contractors are an essential part of the logistics support team.

The shift to more private sector involvement will cause a change to the application of skill-sets required for all logistic staff – both ship borne and personnel ashore. Although military logistics staff will require approximately the same range of skill-sets, the emphasis will change. Military personnel in ships will still require expertise in the areas of planning, inventory management, technical maintenance duties, food services and administration. Although some of these duties may be shared with DND civilian and/or contracted personnel, the ship's company must be ready to perform these functions when deployed. With the increased level of contracted services, however, logistic staff will require increased management or coordinator skills. As the

provision of DND civilian and contractor services will increase, ship staff must be qualified to coordinate the service providers, in terms of identifying the requirement and timing. It is feasible that the ship staff responsibilities would compare

closely to a general contractor[76] more associated with work coordination rather than the actual 'doing' of the work.

As part of this shift in task focus, the navy will need to train all affected personnel – military, civilian, and contractors alike. As well, the training must identify the degree of military responsibility for the protection of civilian and military personnel while deployed in the battlespace. Prior to deployment in ships, civilian and contracted personnel will require some basic environmental training, as a minimum, for their own personal protection and that of the ship.

For ship staff, this training must include an increasing emphasis on contracting for services as well as the coordination of work. Military personnel must maintain the capability to perform core tasks. This includes the planning short and long term logistic support, the provision of close support to operations including rapid reaction capability, and the delivery of organic support to naval task forces and vanguard units. While this is important, what is equally critical is the retention of traditional skills such as leadership and a core military ethos.

CONCLUSION

Logistics will continue to be a critical bridge between the civilian economy and the military. The continuation of current trends in ship design, crew size, technological advancements, and improved connectivity will significantly impact naval logistic support. With fewer people in ships and a greater reliance on contracted and civilian support for operations, ships in the Canadian navy will be primarily supported from ashore. Civilian staff and

[76] In the construction industry, the general contractor is responsible for the coordination of the project including the work planning, quality, and completion, inclusive of all sub-contractor work. Outside of this coordination function, the degree of work actually performed by the general contractor often depends on their core expertise.

contractors will assume support roles, once the exclusive prerogative of military logistics personnel.

While the DND Alternative Service Delivery programme has already civilianized or privatized many 'base' responsibilities, it is expected that this trend will continue and expand to include forward-deployed naval activities. As weapons systems continue to increase in complexity, the presence of contractors in the battle space, already a common occurrence, will become the standard. It is not a great stretch to suggest that the presence of field service representatives onboard ships during the Persian Gulf War will become an accepted everyday practice even in a conflict environment, if it is not already so.[77]

Given the trends of reduced military personnel in ships, the navy must prepare itself by taking active steps to address some

also be fully integrated into the naval support team, be it deployed or in a shore-based support role.

The new model for naval logistics support is gradually evolving as the old approach is influenced by a combination of global, national, and military trends. The resulting outcome of these factors will create a streamlined ship crew with a greater dependence on shore-based logistic organizations. A proactive approach to meeting this evolution will best position Canada's navy to best continue the required high standard of logistic support in the future.

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