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A SUPPORT OPTION FOR THE VICTORIA CLASS

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ABSTRACT

This paper recommends that Alternative Service Delivery in the form of an In-Service Support Contract (ISSC) with industry be used to maintain the newly acquired VICTORIA Class submarines. The ISSC offers significant advantages over that currently provided in-house by the DND and CF. The Canadian defence industry can provide the support to the Navy to maintain the Class and that long-term contracts with industry via an ISSC, over the service life of the submarines, will provide the incentive to the defence industry to generate and maintain expertise to support them. An ISSC can be used to provide a full range of support including all project management activities and Second and Third Line maintenance for the submarines. The Fleet Maintenance Facilities are resource strained to maintain both the surface and sub-surface fleets and the project management staffs in headquarters are not adequately manned to support the submarines. An ISSC via commercial industry can provide the required manpower without the need for DND to hire the personnel directly, and will ensure that the VICTORIA Class submarines are available to meet their assigned missions.

In 1998, the Canadian Navy acquired four UPHOLDER Class submarines from the Royal Navy and renamed them the VICTORIA Class. The UPHOLDERs (Type 2400) were originally launched and commissioned in the Royal Navy (RN) from 1986 to 1993. The UPHOLDERs provided limited service to the RN prior to being laid up in extended readiness in 1994. This was due the RN's decision to abandon the conventionally powered fleet in favour of a nuclear powered one. The acquisition of the submarines by Canada involves a reactivation period at Vickers Shipbuilding and Engineering Limited (VSEL) in Barrow, UK, and a 'Canadianization' Work Period (CWP) in the Fleet Maintenance Facilities (FMFs) in Canada. The CWP includes the installation of a new Mk 48 torpedo compatible fire control system, and new electronic surveillance measures and communication equipment.

The acquisition and introduction of the submarines to the Canadian Navy has not been without difficulty. The reactivation of the submarines has taken longer than expected due to the lengthy lay-up period and some significant technical problems that were left uncorrected during its brief service with the RN. The CWPs in FMF Cape Scott have resulted in cost and schedules overruns. The CWPs and the ongoing maintenance of the submarines have strained the FMF's resources to the point that the FMF cannot adequately meet all the demands of the surface fleet. Even with the completion of the CWPs, it is forecasted that the FMFs on both coasts will be hard pressed to satisfy the maintenance requirements of both the sub-surface and surface fleets. Additionally, coastal and national headquarters staffs have been challenged to provide the necessary material program management support for the submarines, and these requirements are not expected to diminish after the submarines have entered operational service. Clearly, some alternative method of support is required to meet these support challenges.

Over the past decade, the Canadian Forces (CF) has undergone a major transformation in the way it maintains and supports some of its major equipment and systems. Through the Alternative Service Delivery (ASD) method, the Department of National Defence (DND) has streamlined its support mechanisms, formed major partnerships with industry, and uses these relationships to help maintain its combat capability. ASD can also offer personnel savings and it was this factor that made it highly desirable in view of the austere budgets and deficit reduction measures implemented by the Federal Government in the early to mid-nineties. Even though the present Federal Government has eliminated its deficits, the DND still faces a restricted funding envelope. As such, there is the continuing challenge to reduce the support structure, and to maximize combat capability. ASD is seen as the response to meet this challenge.

ASD generally takes the form of contracting out services to private industry that are normally provided from within government – also referred to as outsourcing. Once the acquisition of military equipments/systems occurs, the in-service phase begins, and it is here where ASD can be most beneficial. The in-service support of equipments/systems by private industry is accomplished via In-Service Support Contracts (ISSCs). These types of contracts can provide various levels of support, ranging from a full service provider whereby all program management and most maintenance services are performed, to a partial service provider whereby only a select service or limited range of support is carried out.

They are several examples of major equipment and systems in the CF that are supported via ISSCs. The CH 149, Cormorant Canadian Search and Rescue Helicopter, with its stringent technical airworthiness standards and high yearly flying rates use a full service ISSC. The soon to be announced Maritime Helicopter Project will also use the same type of ISSC. ISSCs are also being used for specialized support functions such as software and engineering support for

the combat systems of the IROQUOIS and HALIFAX Classes. ISSCs no longer applies solely to management, maintenance, and logistic functions; the Air Force has outsourced its pilot training to industry, and is looking to do the same with its technician training. Canada is not alone in adopting the ISSC philosophy. Militaries from other countries have applied the ISSC philosophy to more complex systems, including submarines.

While the coastal and national headquarters' staffs and the FMFs struggle to come to grips with the VICTORIA Class support challenges, it is timely to look at the issue of an ISSC for the VICTORIA Class. The thesis of this paper is that a full service ISSC would be a superior method to maintain the VICTORIA Class submarines than the current support method in place within DND.

To support this proposition, a review of the ASD objectives of the 1994 Defence White Paper will be presented, and then followed by a brief explanation of the various ASD options to support CF equipment. One option, the ISSC, will be defined and examined in greater detail, along with the different levels and lines of maintenance. Examples of naval platforms that are currently supported using in-service support contracts will be introduced, including the modern, highly advanced Royal Australian Navy (RAN) COLLINS Class Submarine. These platforms will be analysed in-depth, and comments and experiences from the project and business managers in the CF, DND, Public Works and Government Services Canada (PWGSC) and the RAN associated with these platforms will be drawn upon. The conclusions made will clearly identify that a full service ISSC offers significant advantages over maintaining the VICTORIA Class submarines in-house.

The 1994 Defence White Paper announced that, given the financial condition of the country, the DND could no longer conduct business as usual. The Paper made it clear that

defence spending had to be reduced, while at the same time, the CF had to maintain essential combat capabilities. The DND set out to shrink headquarters and support activities, and to divert resources saved from these activities towards combat forces. The White Paper specifically stated that, "where business-case evaluations demonstrate potential for increased cost effectiveness, support activities currently conducted 'in house' will be transferred completely to Canadian industry."[1] The Department had to search for innovative ways to support operational forces.

The home page of the Director General Strategic Change website states that "the goal is to invest in combat capability".[2] One of the ways to meet this challenge is by the ASD policy and program. ASD is one of many ongoing improvement tools that the DND/CF can utilize to modernize its business practices, so that they can obtain maximum value for each Defence dollar.[3]

ASD is a non-traditional service delivery method that can replace extant delivery service systems within the Department, and can offer more capability than that within the DND/CF.[4] ASD can serve to strengthen the defence industrial base; assist in maintaining the CF in combat; provide improved services or reduced personnel requirements – which is particularly important

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[1] Department of National Defence, *1994 Defence White Paper* (Ottawa: Canada Communications Group, 1994), 42. One year later in the 1995 Budget Speech, the Honourable Paul Martin, Minister of Finance, reinforced this directive in the White Paper by declaring for all government activities: "if government doesn't need to run something it shouldn't. And in the future, it won't."

[2] Department of National Defence, *About ASD*; available from http://vcds.mil.ca/dgsc/asd/tem2_e.asp?sec=1; DWAN; accessed 29 February 2004.

[3] Ibid.

[4] Department of National Defence, *DND Policy on Alternative Service Delivery - January 2003*; available from http://vcds.mil.ca/dgsc/asd; DWAN; accessed 29 February 2004, 2.

given the manpower ceiling of 60,000 Regular Force personnel imposed by the 1994 White Paper.[5]

There are two categories of ASD: one that provides service within the Federal Government machinery, such as Agencies or Crown Corporations, and the other where service delivery takes place outside the Federal Government framework, namely, contracting out. This paper will focus on contracting out, since it involves the least amount of bureaucracy, is less complex in scope, and is a more efficient method of delivery support for the purpose of supporting CF equipment and systems.[6] In particular, the contracting out category has frequently taken the form of ISSCs. These contracts can provide support that ranges from all aspects of program management of material, to conducting certain specific areas of maintenance. There are several support combinations that can be used to maintain an equipment/system. Certain portions of an equipment/system can be maintained in-house, with the rest contracted out to industry via one ISSC or several ISSCs, or it can be contracted all out to industry, again using either one ISSC or several ISSCs.

Generally, for the DND and CF, manpower constraints are the main driver, and efforts to reduce the support infrastructure and maintain or improve combat capability are the preferred option. As a general rule of thumb, the more ISSCs that are used to support a given equipment/system, the greater number of government personnel are needed to oversee all the contracts. With just one ISSC, government personnel overseeing the ISSC are minimised and they can focus their efforts more easily by monitoring the one ISSC and holding that contractor responsible for all contracted activities. Not only are project management staff minimised, but

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[5] Department of National Defence, *1994 Defence White Paper* …, 45.

[6] Hobson, Sharon. "DND Looks To Contract Out Non-Core Business." *Jane's Defence Weekly*, Volume 033, Issue 005, 2 February 2000. 34-35.

also the numbers of in-house maintenance personnel are reduced. A brief look at maintenance policy is required before proceeding further.

In general, CF maintenance policy, and in particular, Naval maintenance policy is founded on three lines and levels of maintenance.[7] The lines of maintenance refer to the organization (e.g. a ship or a FMF) that will carry out maintenance regardless of the level of maintenance. The levels pertain to maintenance activity, i.e. type and resources required. A unit that uses its own resources, e.g., a ship, performs the first level of maintenance. The second level of maintenance is beyond the unit's capability and is conducted at a Depot or in a Naval context, at a FMF. The third level of maintenance is carried out using resources from National Defence Headquarters (NDHQ), and is either contracted out to industry, or performed in a Depot, or a FMF.

There are notable examples of CF equipment maintained by the use of ISSCs. In 1991, the Canadian Navy began using an ISSC to maintain its two minesweeping auxiliaries (MSA), HMCS ANTICOSTI and HMCS MORESBY.[8] The MSAs began life as offshore oil rig tenders before being brought into service by the Navy. The MSAs were maintained to commercial standards by using commercial suppliers. After several years of successful performance using this method of support for the MSAs, the in-service support concept was validated. Building on this success, DGMEPM used the same full service support option for the Maritime Coastal Defence Vessels (MCDV). The MCDVs are also built to commercial standards, and are

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[7] Department of National Defence, *Naval Maintenance Management System (NaMMS) Volume 1*; available from http://dgmepm.ottawa-hull.mil.ca/dmms3/documents/RefNaMMS.asp; DWAN; accessed 5 March 2004, 2-1.

[8] RJ. Rhodenizer, "The Maritime Coastal Defence Vessel Project: From Project Definition to In-Service Support," *The Defence Associations National Network* Volume 5 No.3 (Winter 1998). [Journal on-line]; available from http://www.sfu.ca/dann/Backiss/ MCID 15 BDC /CS0 Tj10.02 0 0 10.02 426.760nl

maintained to the same standards.[9] The MCDV crews perform Level One maintenance only. This includes minor preventive maintenance, and corrective maintenance for safety and 'get-home' (return to port) requirements. The In-Service Support (ISS) Contractor is tasked to conduct all Level Two and Three preventive and corrective maintenance.

The MCDV ISSC statement of work requires that on an annual basis, except for two-three week and two-four week maintenance periods (each to be followed by two days of test and trials), all vessels will be fully mission capable. To date, the ISS Contractor has met this requirement.[10] In addition to the maintenance requirements of the contract, the ISS Contractor is tasked to provide project and quality management; documentation; logistic and engineering support.

The effect of the MCDV full service ISSC on the Navy has been significant. A small project management team is required to oversee the performance of the contract. The team consists of two people from DMCM MWS/AUX, one from each of the Coastal Technical Authorities and the Coastal Quality Assurance Work Centres, one from DMMS 5, and one from PWGSC.[11] The vessels need little support from the FMFs on both coasts, thereby allowing them

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[9] Public Works and Government Services Canada, *Contract Overview: Minor Warship & Auxiliary Vessel In-Service Support Contract (MWS & AV ISSC*) (Ottawa: power point presentation prepared by Bryan Mason. February 2003). Mr. Mason is a retired engineering Lieutenant Commander in the Canadian Navy. He worked in the DMCM MWS/AUX Class Desk as the Project Manager overseeing the ISSC for the MSAs/MCDVs. He now works for PWGSC as the Contracting Officer for the same contract. Permission was granted to the author to use his report via email from Mr. Jacque Cardinal, DMMS 5. The author worked in the MCDV project office, PMO MCDV, as the In-Service Transition Officer overseeing the delivery of the MCDVs to the MWS/AUX Class Desk.

[10] Ibid.

[11] Ibid. DMCM MWS/AUX is Director Maritime Class Management for Minor Warships and Auxiliary vessels. It is the technical authority for the MCDV ISS Contract. The coastal technical authorities are Maritime Operations Group Five Above Water Group Technical Officer, MOG 5 AWGTO, and Canadian Fleet Pacific F44, CANFLTPAC F44. They represent DMCM MWS/AUX as the on-site technical authorities. The coastal quality assurance authorities are from the Director General Equipment Program Support/Director of Quality Assurance, DGEPS/DQA. They ensure that the ISSC performs the work in accordance with the ISO 9000 quality assurance standards laid out in the contract. DMMS 5, Director Maritime Management Support is the financial authority

to focus on sustaining the major warships, the HALIFAX, IROQUOIS and PROTECTEUR Classes.

The ISSC reduces the requirement for the FMFs to maintain skilled staffs that are only hired to maintain unique MCDV only equipment. This in turn keeps the overhead down in the FMFs when the specific skill sets are not required. Furthermore, the ISSC allows the MCDVs to be crewed with minimal maintenance personnel onboard. This permits ship staff to focus on operations, and to meet operational requirements.[12] Therefore, this type of full service support option not only affects the personnel requirements of the vessels, but also the personnel in the FMFs, and on headquarters staffs.

Mr. R.J. Rhodenizer states that the "ISSC has been a tremendous success… it is perhaps a classic example of 'Alternative Service Delivery'."[13] Both PWGSC[14] and DGMEPM[15] are in agreement with the success of this support option, and are considering 73 other minor warships and auxiliary vessels that could be included in the contract. Furthermore, DGMEPM is contemplating the use of an ISSC for other naval platforms, including the Joint Support Ship - once that capital project is approved to proceed.[16]

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responsible for the release of funds for work performed by the ISSC. The representative from PWGSC, Public Works, Goods and Services Canada, is the contractual authority, and is responsible for ensuring the contractual obligations of the contract are met.

[12] Rhodenizer, "The Maritime Coastal Defence Vessel Project: From Project Definition to In-Service Support," *The Defence Associations National Network …*, 6.

[13] Ibid, 6.

[14] Public Works and Government Services Canada, *Contract Overview: Minor Warship & Auxiliary Vessel In-Service Support Contract (MWS & AV ISSC)….*

[15] Commodore Roger Westwood, interviewed by author, 4 March 2004. Commodore Westwood was the Project Manager for the Maritime Coastal Defence Vessel. He is currently serving as DGMEPM.

[16] Ibid.

In comparison with other naval ships such as frigates and destroyers, the MCDVs are relatively simple platforms to support. However, the complexity of the platform is not a determinative factor as to whether an ISSC should or can be used to sustain naval combatants. The submarine is arguably one of the most complex naval platforms to support. To illustrate how and why the In-Service Support option is viable for submarines, the RAN COLLINS Class submarine serves as an example of a state of the art submarine that is currently maintained by ISSCs.

In June 1987, the Australian Government contracted the Australian Submarine Corporation (ASC) to build six COLLINS Class submarines for the RAN from 1990 to 2003.[17] The submarines "…represent a major advance in submarine technology, particularly in the area of combat systems, submarine monitoring, and control systems."[18] They are designed to sail in a wide variety of ocean conditions; to patrol Australia's 23,000 km coastal boundary to perform independent operations up to 70 days in length; and to conduct missions, including reconnaissance and surveillance, maritime strike and anti-submarine operations, mining and infiltration.[19]

The RAN determined that the most efficient and timely way to support the submarines was to use the same Contractor and Sub-Contractors who built them. There was also strong support from the Australian government to support the defence industrial base, in particular, the shipyard that was used to construct the submarines.[20] The alternative was to fully support the

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[17] Fred T. Jane, *Jane's Fighting Ships*. 106th ed. Ed. Commodore Stephen Saunders RN (Surrey: Jane's Information Group Inc, 2003), 24.

[18] Department of Defense, *Audit Report – New Submarine Project*, (Canberra: Australian National Audit Office, 1997), 15.

[19] Ibid, 15.

submarines in-house, where it would take time to build up resources and expertise in the existing RAN engineering and maintenance facilities.[21] Therefore, the option to use contractors to provide in-service support was a logical choice.

The ISSC option, coupled with long-term contracts, has the added benefit of allowing the RAN to employ a relatively small program management team to oversee in-service support of the submarines.[22] The RAN Director General Submarines (DGSM) is responsible for program management of the submarines. DGSM exercises the sustainment responsibility through a Directorate of Submarine Sustainment (DSMS).[23] The DSMS Strategic Plan states that, "DSMS possesses neither an organic capability nor a remit to carry out direct maintenance activities on submarines."[24] Therefore, in order to carry out this function, DSMS places long term engineering and maintenance ISSCs with key contractors in the following disciplines: combat systems, software systems support, and platform systems support.[25] DSMS is also responsible for overseeing the performance of the ISSCs. DSMS uses RAN technical authorities at each of the submarine bases to assist in monitoring the maintenance conducted by the ISSCs.[26]

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[20] Australian Defence Report, "Multi Million Submarine Refit." *Australian Defence Report*, (16 October 2003). Available from http://www.newsaustralia.com/Royal_Aust…RAN/multi_million_submarine_refit.htm; Internet; accessed 25 February 2004.

[21] Cdr Marcel Halle, interviewed by author, 3 March 2004. Cdr Halle is a qualified submariner and was the MSEO of HMCS OJIBWA. He has served as the MOG5 Under Water Group Technical Officer. During the past two years he was on an exchange tour with the RAN where he served as the Quality System Manager for the Director of Submarine Sustainment. This was the Royal Australian Navy Project Management Office overseeing the ISSCs.

[22] Ibid.

[23] Department of Defence, *Directorate of Submarine Sustainment: Strategic Plan 2002-2007*, (Canberra: prepared for Gairey, Mark, Director General Submarines, Defence Materiel Organization, November 2002), 5. DGSM is the approximate equivalent to DGMEPM in the Canadian Navy except that it manages only submarines. DSMS is similar to DMCM Submarines in the DGMEPM organization.

[24] Ibid, 32.

[25] Ibid, 32.

The COLLINS Class ISS concept is a slightly different variation than that employed in the Canadian MCDVs. Rather than using one single ISS Contractor to perform all support activities, DSMS uses multiple ISS Contractors to achieve this requirement. Therefore, the RAN variation still accomplishes the goal of a full service ISSC. The only difference is that DSMS plays a larger project management role, and employs more government personnel, on a comparative basis to DMCM MWS/AUX, in overseeing all the contracts.

It is also important to note that while DSMS uses multiple ISSCs; however, the primary, and the largest ISSC, is with the submarine builder, ASC. ASC is responsible for all engineering and maintenance on the pressure hull, and as such, it is the submarine systems integrator. Recently, ASC was awarded another ISSC of up to $3.5 billion over 25 years to refit the Class.[27] This type of long-term contract is an incentive for industry to make an investment in people and resources to support the RAN, and to ensure that the submarines will be fully operational to meet their mission requirements.

RAN maintenance policy is similar to that of the Canadian Navy in that there are three levels of maintenance. The maintenance performed by all the ISSCs fall into the Level Two and Three categories, which leaves the submarine crews to conduct first level preventive and corrective maintenance. To date, this maintenance concept of operations has generally worked out well in meeting operational availability. To conduct higher-level maintenance, the statement of requirements for the primary ISSC with ASC is "… to assist the submarines achieve their

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[26] Department of Defence, *Directorate of Submarine Sustainment: Business Plan 2002-2003* (Canberra: prepared by Idrus, Captain Toff, Director Submarine Sustainment, 22 November 2002), 4.

[27] Australian Defence Report, "Multi Million Submarine Refit." *Australian Defence Report….* ASC has an ISSC to provide Second Level maintenance for the COLLINS Class. This particular ISSC award now gives them the refit responsibility too.

operational availability specifications efficiently and effectively. The contract specifies that each submarine shall achieve availability for sea of 80 per cent over its whole-of-life."[28]

According to Cdr Marcel Halle, the submarines have not yet achieved the 80 percent availability rate.[29] He adds, however, that this is not the fault of the primary ISS Contractor, the Australia Submarine Corporation. As the submarines entered service, they experienced mechanical and electrical problems[30] that are considered design related, and not uncommon for first of class naval combatants, or platforms that incorporate new technologies.[31] Cdr Halle further adds that the DSMS is confident that once the design problems are corrected, the primary ISS Contractor will be able to achieve the 80 percent availability rates.[32] Therefore, these submarines, which are "widely regarded as the most capable conventional submarines of their kind in the world,"[33] are well on their way to prove that the ISSC concept is valid for such a complex weapon system, and offers significant advantages over maintaining them in-house.

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[28] Department of Defense, *Audit Report – New Submarine Project*, (Canberra: Australian National Audit Office, 1997), 82.

[29] Cdr Marcel Halle, interviewed by author, 3 March 2004. The In-Service Support Contractor, Australia Submarine Corporation, was the same Contractor that built the Collins-Class submarines. This is analogous to the Canadian Maritime Coastal Defence Vessel, whereby, the builder Fenco MaClaren Inc., also won the Contract to provide In-Service Support to the MCDVs once they entered service.

[30] Jane, *Jane's Fighting Ships*…, 24. These problems have been well publicized in the press; they have focused around: the propeller, the hydraulics system, engine and battery reliability, noise signature, and the Command and Control System.

[31] The author has experienced this personally during new construction and pre-commissioning trials on more than one class of vessel, in particular the Halifax Class Frigate and the Kingston Class MCDV during his tenure at PMO CPF (in the three shipyards where the CPFs were built) and PMO MCDV.

[32] Cdr Marcel Halle, interviewed by author, 3 March 2004.

[33] "Submarine Refit Contract Signed Today," *Australian Defence Report*, (8 December 2003); available from http://www.newsaustralia.com/Royal_Aust…RAN/submarine_refit_contract_signed.htm; Internet; accessed 25 February 2004.

The achievements of the MCDV and COLLINS Class ISSC models can be applied successfully to the VICTORIA Class. BAE Systems, the parent of VSEL, is the Contractor responsible for transitioning VICTORIA Class submarines from their extended lay-up to safe-to-dive status and initial operational service via the Engineering and Supply Management (ESM) contract, which expires in August 2004.[34] BAE provides a full range of services to the submarines including, technical and engineering support, project management, configuration management, and material support - the contractor is responsible for management of all spares unique to the Class.[35]

DGMEPM is considering amending the contract to extend the terms by up to three individual one-year periods.[36] This would permit the remaining two submarines to complete their re-activation and 'Canadianization' periods. At the same time, they will continue to support the first two submarines that have already completed these activities and have become fully operational. This contract is in effect a type of ISSC, and if extended, will become even more like existing ISSCs.

The follow-up to these ESM extended contracts is currently under review. DGMEPM is interested in pursuing a phased transition to long term ISS by industry. Mr. Cardinal, DMMS 5, states that his office is studying a range of alternatives including, a full service ISSC (e.g. MCDV Class ISSC), individual ISSCs with a prime as the lead Contractor (e.g. COLLINS Class

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[34] Captain(N) R.W. Greenwood, *FY 2000/2001 Victoria Class – Class Plan*. (file 32549-128-2 (DMCM SUBS 4-2)), August 2000, 35. Available from http://dgmepm.ottawa-hull.mil.ca/dmcmsub/level3main/plan.asp; DWAN; accessed 5 March 04.

[35] Ibid, 42.

[36] Mr. Jacque Cardinal, telephone/email conversation with author, 11 February 2004. Mr. Cardinal is the Director Maritime Management and Support 5 within DGMEPM. He is the section head of acquisition management for all MEPM contracts. This is for all platforms including submarines. As such he has extensive experience with in-

ISSC), or an ISSC with individual contracts for certain equipment, coupled with FMF interaction.[37] Mr. Cardinal however, is quite adamant in his belief: "I absolutely believe that an ISSC will be the right contract vehicle to handle a large portion of work activities associated with the new [sic] class submarines."[38]

From a headquarters point of view, the staffs in DGMEPM are quickly realizing that they do not have the resources to perform the management of this class. Mr. Cardinal succinctly points out: "It is clear, to me at least, that we do not have the manpower (Life Cycle Materiel Managers (LCMMs), Project Manager's, Procurement Officers) nor the resources to handle in a stovepipe the materiel management aspect of this requirement."[39] The DND and CF are not likely to reverse the decision to reduce headquarters' staff; therefore, they have no choice but to turn to industry to provide the personnel to perform the project management functions. This resource problem is not only limited to headquarters' staff, but also the FMFs on both coasts.

The maintenance policy in the VICTORIA Class Plan directs that Level One maintenance to be conducted by the submarine's crew; Level Two to be performed by the FMFs; and, Level Three by the FMFs, and/or contractor(s) or Original Equipment Manufacturers (OEMs).[40] Due to Operation APOLLO[41], the FMFs are finding it difficult to support both the Class and the

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service support contracts. Also, he was the former DMCM MWS/AUX and has first-hand experience overseeing the MCDV ISSC.

[37] Ibid.

[38] Ibid.

[39] Ibid.

[40] Captain(N) R.W. Greenwood, *FY 2000/2001 Victoria Class – Class Plan*…, 36.

[41] Commodore Roger Westwood, interviewed by author, 4 March 2004. Operation APOLLO was Canada's military contribution to the campaign against terrorism as a result of terrorist attacks of September 11, 2001. Canada was the first coalition nation after the U.S. to deploy a naval task group into the U.S. Central Command area of responsibility. From September 2001 to December 2003, 15 Canadian warships participated in the Operation

concurrent re-constitution of the Surface Fleet. However, once the backlog of work from Operation APOLLO disappears, it does not necessarily mean that the FMFs will be able to adequately support both the surface and sub-surface fleets. This is because the Docking Work Periods (DWPs) for the VICTORIA Class are scheduled to commence soon after the 'Canadianization' periods. The DWPs are resource intensive and will occupy a significant portion of the workforce of the FMFs. The FMFs will still be challenged to meet the maintenance needs of the surface fleet and the increased workload of the submarine DWPs. Also, there is no guarantee that there will not be another high intensity operation for the surface fleet, which would only exacerbate the FMF resource problem. The FMFs have no choice but to significantly expand their workforces; however, this is unlikely, again due to the DND and CF policy to minimise the personnel support structure within government. To relieve the pressure on the FMFs is yet another incentive to use an ISSC with industry.

The VICTORIA Class was designed using maintenance concepts that are widely used in industry. The redundancy and automation of systems in the VICTORIA Class allow the use of a relatively small crew, and there is less reliance on conducting repairs at sea compared to older generation submarines.[42] The technology of the VICTORIA Class is from the same era as the HALIFAX Class and the maintenance philosophies of Repair by Replacement (RxR), and Maintenance by Exchange (MxE) are incorporated into the submarine's design.[43] RxR and MxE are used extensively in the MCDVs and significantly enhance repair turn around time. In

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(over 80% of the surface fleet). As a result of the high operational tempo, the Fleet must now undergo an extensive maintenance period before it can deploy again. The re-constitution of the Fleet, i.e. the carrying out of the long overdue preventive and corrective maintenance has overwhelmed the resource capability of the FMFs.

[42] This is similar to the COLLINS Class submarines.

[43] Captain(N) R.W. Greenwood, *FY 2000/2001 Victoria Class – Class Plan*…, 35. RxR is mainly used for corrective maintenance and MxE is employed to accomplish preventive maintenance.

addition, the design minimises the Repair and Overhaul (R&O) of equipment, either on board, or at Second Line facilities. Instead, this function is transferred to OEM facilities where the expertise and resources are located.[44] As is the case for the MCDVs, the R&O activity can easily be coordinated by an ISSC. Finally, Field Service Representatives (FSRs) can provide any on-site technical expertise that is required – similar to the MCDV and COLLINS Class ISSCs.

Opponents of a potential VICTORIA Class ISSC argue that the contractor who builds the platform, or at least the prime contractor, in the case of where the prime is not the shipbuilder, should be the same contractor who maintains it.[45] In other words, contractor personnel and technical expertise that is resident in the build contract should be used for the ISSC. This is the ideal scenario for in-service support, and it is for this very reason that the award of the ESM contract to BAE Systems, the parent of the leadyard shipbuilder, VSEL, was put in place. BAE Systems "was linked to the acquisition of these submarines and is best able at this time to deliver services."[46]

Also, if a VICTORIA Class ISSC Request For Proposal (RFP) was announced today, there is nothing to stop BAE Systems, or any other qualified contractor for that matter, from bidding on the ISSC using commercial industry/yards here in Canada with selected managers, engineers, technicians who were involved in the original build. It is quite often the norm that the Statement of Requirements contains minimum standards for personnel qualifications and

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[44] Ibid, 35.

[45] The Australia Submarine Corporation built the COLLINS Class submarines and is now the main ISS provider for the Class. However, in the case of the MCDVs, Fenco MacLaren Inc. was the prime contractor for the build contract, but not the shipbuilder that built them. HSL (formerly HDIL) was the shipbuilder.

[46] Mr. Jacque Cardinal, telephone/email conversation with author, 11 February 2004. When Mr. Cardinal is referring to the acquisition of these submarines, it is with respect to the original acquisition by the RN of the UPHOLDERs.

experience, and that these are identified in the RFP to ensure that contractors can indeed meet the obligations of the contract.[47]

Furthermore, technically qualified personnel in the Canadian defence industry are being developed as they become more familiar with the VICTORIA Class. Several Canadian companies have been awarded significant contracts for various systems and support for the VICTORIA Class. Captain (N) Mike Williamson states that, "the potential benefits to Canadian industry are only going to get larger as time goes on… as their own expertise grows and they become familiar with these submarines, they're going to get more and more contracts."[48] This is a positive sign that industry is quickly adapting to provide support to the Class, and that it is becoming lucrative to do so.

However, it would be much more efficient to have an over-arching prime contractor to tie all the individual contracts together and to manage them as a whole for DMCM Submarines. In comparing the RAN DSMS to that of the CF DMCM Submarines, the later would not have the personnel to manage all the ISSCs that DSMS has to oversee. Therefore, the full service ISSC option would reduce the number of government personnel needed to oversee not only the present in-house support method as referred to by Mr. Cardinal, but also multiple ISSCs. Mr. Cardinal further adds: "it would be more cost effective to give this to an ISSC to develop/establish strategic alliances with industry rather than for us to proceed in a piece-meal fashion that will

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[47] There are several examples of this in current ISSCs: MCDV, HALIFAX, IROQUOIS, CH 149 Cormorant, and in the RFP for the MHP.

[48] Jeremy Sales, "Submarine Project Progressing Despite Reactivation Delays" *Canada's Navy: News & Information*; available from http://www.navy.forces.gc/mspa_news/news_e.asp?id=3; DWAN; accessed 17 October 2003. Captain (N) Mike Williamson is the Project Manager for the Victoria Class Submarine Class Life Extension (SCLE) project.

likely be challenged and stand the risk of not having the services available to meet operational requirements [sic]."[49]

Another compelling reason for industry to take over support of the Class is the potential longevity of the Class, and its guaranteed long-term income stream to industry. Based on original RN operations and maintenance concepts, the submarines have a projected design life of 30 years.[50] The Class life-plan forecasts that the submarines are scheduled for decommission in the 2022-25 time frame. A submarine's life is comprised of two commissions, with each commission made up of four, and three 3.5-year operational periods, respectively. A chain of 17 week cycles with a four week Short Work Period (SWP) will form an operational period. A ninety-week mid-life refit separates the two commission periods.[51] Given this operational profile, a relatively consistent flow of Second Level and Third Level maintenance work could be provided to industry. A 20-year service life for submarines is ideal for striking long-term contracts with industry to support the submarines as exemplified by the COLLINS Class ISSCs.

Sustaining the VICTORIA Class represents a significant challenge, given the minimal indigenous submarine expertise and experience in the Canadian defence industry. However, expertise is growing and industry is starting to show that it can provide support to the Navy to maintain the Class. DND ASD policy requires that wherever there is a more effective, efficient form of delivery support, particularly from commercial industry, it should be used.

The commercial ISSC with industry is one such vehicle. The ISSC has achieved noteworthy success in the Navy - most prominently with the MCDV Class. The MCDV ISS

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[49] Mr. Jacque Cardinal, telephone/email conversation with author, 11 February 2004.

[50] Captain(N) R.W. Greenwood, *FY 2000/2001 Victoria Class – Class Plan*…, 7.

[51] Ibid, 37.

Contractor provides a full range of services to the DMCM MWS/AUX Class Desk. It has reduced the manning requirements in NDHQ, and on both coasts, and requires virtually no support from the over-stretched FMFs. Furthermore, the ISS Contractor has provided the Navy on both coasts and in the Great Lakes with a fully available platform to carry out its missions.

Other nations have used the ISSC model on far more complex, weapon platforms. The RAN with its recently acquired COLLINS Class submarines is now being supported by ISSCs. The RAN is leveraging the experience and technical expertise gained during construction, and focusing these advantages to the long-term support of the Class. Long-term support in the way of multi-year contracts that extend out to the end of the service life of the Class provide the RAN with mission available submarines, and contribute to a viable, sustainable defence industry. The RAN is reaping the same benefits that are being achieved with the MCDV ISSC.

There are a number of similarities between the COLLINS Class and VICTORIA Class. They are comparable in design, complexity, crew size, and operational and maintenance philosophies. These attributes favour the use of an ISSC that includes maximizing RxR and MxE maintenance methods, R&O at the OEM facilities, and use of on-site FSRs.

The FMFs are finding it difficult to cope with the concurrent re-constitution of the surface fleet and the CWPs and maintenance of the VICTORIA Class. Once the maintenance backlog of the surface fleet disappears and the CWPs of VICTORIA Class are completed, the FMFs will then have to support the DWPs of VICTORIA Class and still meet the maintenance requirements of a surface fleet that is in a normal operational tempo. The later is still expected to place FMFs resources at a premium, and if the operational tempo of the surface fleet increases, it will strain the FMF resources even further. An ISSC via commercial industry is the best solution to take the load off of the FMFs without the FMFs having to expand their workforces.

The project management staffs in the headquarters are not manned to adequately support the Class in-house. The DND and the CF are not inclined to expand the FMFs' workforces or headquarters' staffs to support the Class. The only choice is to use industry to support the Class and hire the personnel required. The present ESM contract can be the genesis of an ISSC for the VICTORIA Class. To extend the contract and expand its mandate to a full service ISSC will allow the Navy to generate personnel savings that are currently enjoyed by the respective government project offices for the MCDV and COLLINS Class.

Long-term contracts with industry via an ISSC, over the service life of submarines will provide the incentive to the defence industry to generate and maintain expertise to support the submarines. They can recruit and hire the expertise here in Canada, or find it abroad. A full service ISS Contractor is better positioned to develop partnerships with other contractors, OEMs and their FSRs, to make sure that all systems on board are specification compliant, safe, reliable, and ultimately to ensure that the VICTORIA Class submarines are available to meet their assigned missions. In summary, a full service ISSC provides a superior means to maintain the VICTORIA Class submarines than the current in-house support method. As a result, it is recommended that this support option be used for the VICTORIA Class.

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