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SEABED INTERVENTION – REQUIREMENT FOR A DEDICATED MILITARY SEABED OPERATIONS VESSEL

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Abstract

Canada, a maritime nation, has maintained the requirement to protect its maritime environment and that of its seabed. This requirement has been recognized by the Government and assigned to the navy through Defence White Papers from 1964. The navy initially was limited in its ability to meet the role of seabed intervention until the commissioning of HMCS CORMORANT in 1978. During CORMORANT's nineteen years of service the value of a dedicated platform was demonstrated time and time again, as CORMORANT supported military and Other Government Department operations. When this capability fell to cost cutting measures the Navy looked towards new technology, and a flexible containerized approach was developed. The key to the success of this new concept of operations was the availability of a suitable platform from which to operate. The past five years have shown that the operational readiness of the seabed intervention capability has suffered and its reduced readiness is linked to the lack of a dedicated seabed operations vessel.[1]

On the second of September 1998, at approximately 2218 hours, Swiss Air Flight 111 crashed into Canadian territorial waters.[2] The scope of this major maritime disaster severely challenged the Canadian Government's response capability and intergovernmental working arrangements. After the initial search and rescue response, it became clear that the navy would be extensively involved in a comprehensive search, localization and recovery of victims and aircraft wreckage. This operation, known as OPERATION PERSISTENCE, required the mobilization of the Canadian Navy's seabed intervention capability in the form of divers, search equipment, remotely operated vehicles and support vessels.

[1] Canada, National Defence, Post SMASHEX 1/99 –1/00 report, MARL:3385-0 (N34 DCOS OP READ) April 2001, 8.
[2] Swiss jet crashes near Peggy's Cove, <http://www.herald.ns.ca/swissair/stories/swisstry1.html> sourced 24 March 2002.

Within days of the start of the operation it became clear the Canadian Navy did not have the capability necessary to conduct an extended seabed operation of this nature. As such, the assistance of the United States Navy was requested. With the arrival of USS GRAPPLE, a rescue and salvage ship, on the 11 September 1998, it was apparent that Canada did not have the capability to conduct sustained seabed operations.

Canada's ability to conduct surveillance, protect, control and respond to events in its maritime regions is a reflection on its ability to maintain national sovereignty. The ability to conduct undersea operations is part of the sovereignty protection task that was assigned to the navy in the 1994 Defence White Paper.[3] The navy's inability to meet the task requirements in the Swiss Air disaster suggests that its seabed intervention capability is inadequate with respect to all of the sovereignty requirements in Canada's territorial waters, her economic exclusion zone and the continental shelves under the three oceans. The focus of this paper therefore will be to show that Canada requires a dedicated military seabed operations vessel to protect and exercise control over its maritime seabed interests.

To develop the argument for a military seabed operations vessel, this essay will first provide a basic description of what seabed intervention means. It will then discuss Canada's requirement for such a capability, to include sovereignty, Government and navy direction, navy requirements, support to Other Government Departments (OGDs) and the Arctic. Having established the requirement for military involvement, the paper will review the navy's past and present capabilities. The paper will then identify the benefits and challenges in the present system and provide solutions. To better understand this process it is necessary

[3] Canada, National Defence, Leadmark, (Ottawa, Canada, 18 June 2001) 72.

that the reader understand seabed intervention.

Seabed intervention involves the ability to work below the water's surface to accomplish assigned tasks and to collect information on the marine environment and resources.[4] It includes the means to search, detect, inspect, and recover items of interest which are located on the seabed or anywhere within the sea's water column. Seabed intervention capability allows nations to collect data and monitor; environmental change, pollution control measures, and undersea mineral resources.[5] The associated tasks include, scientific research, geological survey, fisheries research, aircraft crash investigation and submarine rescue. These tasks are generally accomplished through the use of a surface vessel that can deploy equipment such as manned submersibles, remotely operated vehicles, a side scan sonar, and manned diving systems. New technologies, such as autonomous underwater vehicles, are also demonstrating an ability to play a future role in seabed operations.[6] To build on this understanding of seabed intervention it is appropriate to next review the Canadian requirement.

Canadians have a land-centric view of their country.[7] Canada remains one of the world's major maritime nations whose prosperity, security, and autonomy are significantly af ected by its maritime dimension.[8] This argument is reinforced by the physical boundaries on which our maritime interests rest, namely, the Pacific, Atlantic and Arctic oceans. Canada has the world's largest coastline, measuring over 200,000

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[4] United States, National Research Council, Undersea Vehicles and National Needs, (National Academy Press, Washington, D.C. 1996) 47.
[5] Ibid, vii.
[6] Kevin R. Schexnayder et al., "New Generation AUVs Enter Navy Operations Arena" Sea Technology, December 2000: 35.
[7] B.F. Grebenc, A Maritime Policy for Canada, Naval Officers Association of Canada, (Ottawa, Canada, April 1989) 39.
[8] Fred Crickard and Glen Herbert, "Oceans Strategy, Maritime Security and Enforcement: An Analytical Approach" Canada's Three Oceans: Strategy for Maritime Enforcement, (1998): 43.

kilometres, and the second largest continental shelf, covering 6.5 million square kilometres.[9] As well, there is the St Lawrence Seaway system, which joins and supports the Great Lakes region of Canada. Mr Arnold Malone, M.P., Chairman of the Standing Committee on Defence, stated, in his article on Maritime Sovereignty, "Any nation that cannot enforce the sovereignty and security needs of its boundaries is as weak as a nation without a police force".[10] Sovereignty relates to a state's ability to use force within its territory and this is linked to the recognition of a political body as a state. Implicit within this concept is the ability of the state to be aware of and control activity within its borders.[11] Vice-Admiral G.L. Garnett, former Chief of the Maritime Staff, in a speech to the Naval Officer's Association of Canada, reaffirmed the requirement to have the generic capabilities of surveillance, patrol and ability to protect Canada's maritime sovereignty. Garnett said,

> "It is what allows the government to know what is happening on, above and below our waters not just in terms of human activity, but also in terms of geography, the environment, aquatic and animal life, the location of seabed resources, the movement of icebergs, weather patterns and so on. If it does not have this information at its disposal, the government is simply groping in the dark where oceans management and the enforcement of our sovereignty are concerned."[12]

One of these generic capabilities is seabed intervention. With this in mind, it is important to understand the Government's direction to its military and how the navy has interpreted this direction.

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[9] Fred W. Crickard and Peter Haydon, Why Canada Needs Maritime Forces, (Napier Publishing Inc., 1994) vii.
[10] Arnold Malone M.P., "Maritime Sovereignty" Niobe Papers, Vol. 3 (1991): 14.
[11] Canada, National Defence, Adjusting Course: A Naval Strategy for Canada, (Ottawa, Canada April 1997): 43.
[12] VAdm G.L. Garnett, "The Navy's Role in the Protection of National Sovereignty" The Niobe Papers, Vol 9 (1998): 3.

Since the 1964 Defence White Paper, the Government has repeatedly identified a requirement for the navy to maintain surveillance in territorial waters and the ability to deal with incidents in the oceans area off the Canadian coasts as a critical capability.[13] The 1970 Defence White Paper recognized Canada as a maritime nation and stated that Canadian interests in the waters close to our shores and on the seabed extending from our coasts must be protected.[14] The 1970 Defence White Paper directly referred to Canada's seabed intervention capability and the important role submersibles can play in research, plus continental shelf and seabed surveillance.[15] The themes of sovereignty protection, environmental surveillance and disaster response continued through the 1987 and 1994 Defence White Papers.[16] Thus, it is in Canada's sovereign interest to ensure a capability that works effectively under the water as well as on and above the sea.

The navy has reaffirmed its commitment to this seabed operations requirement in its annual Defence Planning Guidance and Maritime Commander's Planning Guidance documents. As Martin Shadwick, former editor of the Canadian Military Journal, pointed out in his review of the 1993 Naval Vision document, "A seabed intervention capability will become progressively more important as the seabed is exploited for resources, and as new technology extends activity further out along the continental shelf."[17] In 2002, the Chief of Maritime Staff continued to confirm the capability of seabed operations and the navy's ability to conduct seabed intervention operations within Canada's maritime areas of

[13] Canada, National Defence, 1964 White Paper on Defence, (Ottawa, Canada, 1964): 13.
[14] Canada, National Defence, 1970 White Paper on Defence, (Ottawa, Canada, 1970): 8.
[15] Ibid, 18.
[16] Canada, National Defence, 1994 White Paper on Defence, (Ottawa, Canada, 1994): Chapter 4.
[17] Martin Shadwick, "Naval Visions," Canadian Defence Quarterly, Autumn 1994: 30.

jurisdiction.[18] For the navy, there is a greater requirement for a seabed intervention capability and that relates to submarine rescue support.

With the introduction of the *Victoria*-class submarine into the Canadian fleet in October 2000, the necessity for submarine rescue support was reinstated. The Submarine Escape and Rescue manual dictates there is a requirement to assist in submarine rescue by performing tasks such as site survey or the delivery of emergency life support stores. [19] Emergency life support stores include medical supplies, food, water or blankets that could be essential to sustaining life in the stricken submarine. In the event of submariners escaping from a distressed submarine there is also the requirement to treat those submariners who develop life threatening decompression sickness or gas embolisms.[20] In addition to submarine rescue the navy is committed to assist OGDs.

Canada's Oceans Act, which came into force on January 31,1997, is the guiding legislation on the jurisdiction and management of Canada's oceans.[21] Under the lead of the Department of Fisheries and Oceans (DFO), and in collaboration with other ministries of the Government of Canada, this Act directs the development and implementation of a National strategy for the management of estuarine, coastal and marine ecosystems in waters that form part of Canada or in which Canada has sovereign rights under international law.[22] The DFO document strategy points out that there are 23 Government departments or agencies with ocean related activities, all playing a role in the coordination and management

[18] Canada, National Defence, Maritime Commander's Planning Guidance 2002, (Ottawa, Canada, 12 June 2001): B1-1/3.
[19] Canada, National Defence, C-23-SUB-002/MS-001, Submarine Escape and Rescue Manual, (Ottawa, Canada, 15 March 2002): ii.
[20] Ibid, 1-3.
[21] Canada, Fisheries and Oceans Canada, Canada's Oceans Act, (Ottawa, Canada 31 January 1997): 1.
[22] Ibid, 18.

of Federal policies and programmes.[23] The role of the navy in this regard is to help civil authorities protect and sustain national interests, and assisting in national emergencies.[24] The Act goes on to highlight that peacetime surveillance and control of Canada's oceans is the day-to-day mandate of Canada's maritime forces and that a capability used by these maritime forces consists of diving support and a seabed operations vessel.[25] The Maritime Commander's Planning Guidance, 2002, confirms the navy's capability to provide support to OGDs is areas such as fisheries protection, drug interdiction and environmental protection.[26] A final concern for the Government would be its ability to conduct seabed intervention in the Arctic, as this region may become increasingly important as accessibility increases.

A long-standing challenge to Canada's sovereignty has been its ability to monitor and demonstrate control in the Arctic. As expressed by Colin Gray, author of Canadian Defence Priorities: A Question of Relevance, the full extent of Canadian sovereignty includes the Arctic, where there are many potential disputes over matters of maritime jurisdiction.[27] Canada has made the claim of sovereignty in the Arctic, but seems unwilling to enforce this claim.[28] Canadians should be increasingly concerned considering the phenomenon of global warming and its affect on the Arctic climate. The Meteorological Service of Canada indicates that the extent and thickness of Arctic sea ice is decreasing,

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[23] Ibid, 2.
[24] Canada, Fisheries and Oceans Canada, The Role of the Federal Government in the Oceans Sector, (Ottawa, Canada, 1997): 13.
[25] Ibid, 13.
[26] Canada, National Defence, Maritime Commander's Planning Guidance 2002, (Ottawa, Canada, 12 June 2001): B1-1/3.
[27] Colin S. Gray, Canadian Defence Priorities: A Question of Relevance, (Toronto, Clarke, Irwin & Co. Ltd., 1972) 131.
[28] Dr. W. Harriet Critchley, "The Challenge of Canada's Arctic and its Place in Canada's Future", The Niobe Papers, Vol 1 (1990) 9.

which will increase accessibility of the Arctic and make the region susceptible to foreign intrusion.[29] The Northwest Passage is already of interest to several nations for scientific, military and commercial purposes.[30] The Government will be under increasing pressure to demonstrate visible presence and a capability to monitor and protect ocean resources in the north. The military's seabed intervention capability can play an important role in this regard. Having established that the Canadian Government has specified a requirement for naval seabed intervention in support of surveillance and sovereignty protection since 1964, that the navy has the additional submarine rescue task, and support to OGDs, the next section will focus on how the navy has met that requirement.

Prior to 1978, Canada's seabed intervention capability was limited to the conventional diving techniques of self-contained and surface supplied diving. The navy maintained small diving tenders which were restricted to coastal areas, they had an operational diving limit of 100 metres of seawater (MSW), and they could only deploy divers in benign environmental conditions. The protection of Canada's maritime resources and the ability to support submarine rescue was limited to putting a man on the seabed.[31] The 1970 Defence White Paper directed the Forces, in cooperation with civil agencies, to develop an undersea programme of National benefit.[32] Subsequently, it took the navy eight years to develop and commission the seabed operations vessel HMCS CORMORANT.

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[29] John C. Falkingham, Sea Ice in the Canadian Arctic in the 21st Century, <www.taiga.net/nce/seaice.html> sourced 25 March 2001.
[30] Barrie Maxwell, Atmospheric and Climate Change in the Canadian Arctic, <http://www.carc.org/pubs/v15no5/2.html> sourced 25 March 2001.
[31] LCdr R.W. Bowers, "The Canadian Forces Diver on the Continental Shelf – A Case for the Atmospheric Diving System," New Horizons, Canadian Forces College (Toronto, 1984), 3.
[32] Canada, National Defence, 1970 White Paper on Defence, (Ottawa, Canada, 1970): 18.

This dedicated seabed operations vessel gave Canada a truly credible seabed intervention capability. CORMORANT was able to conduct operations throughout the entire accessible maritime regions of Canada. She was capable of underwater operations using a one-atmosphere, untethered diving submersible. This mini-submarine, known as the submersible diver lockout (SDL-1), could operate down to a depth of 610 MSW. A submersible is a vehicle powered by an onboard power supply, it can manoeuvre in three dimensions, and it is able to operate for relatively long periods of time underwater.[33] Additional assets included a remotely operated vehicle (ROV) rated to depths of 300 MSW, a surface supplied diving capability to a depth of 100 MSW, the ability to deploy a side scan sonar system and a limited lift capability. As Vice-Admiral G.L. Garnett pointed out in his 1998 speech to the Naval Officers Association of Canada, CORMORANT was part of the broad based surveillance commitment entailing support to oceans research similar to the Navy's Defence Research Establishments and Oceanographic research vessels.[34] For the first time, with the CORMORANT the Government had a flexible capability that could work in Canada's underwater regions, conduct search and recovery operations, and protect Canada's maritime seabed interests.

An additional benefit of CORMORANT to the Canadian navy was an increased capability in support of submarine rescue. The ship also became an excellent training platform to maintain operational readiness in submersible, manned diving, and side scan sonar operations as both the operators and maintainers were members of the ship's crew. The support provided to OGDs proved invaluable in research and development and the Government's ability to monitor and protect Canadian waters. This was particularly

[33] Busby, Undersea Vehicles Directory 1990-91, (Arlington VA, February 1990): 3.
[34] VAdm G.L. Garnett, 9.

evident when CORMORANT was deployed off Prince Edward Island to survey and seal hatches on the sunken oil barge the "IRVING WHALE".[35] This work was imperative to the prevention of possible oil contamination of the Province's beaches and fishing habitat. CORMORANT also played a major role in drug recovery operations and aircraft crash investigations. Of particular note was her assistance to the RCMP in recovery of drugs in Trepassey Bay, Newfoundland in 1991 and 1993 and again at Sheet Harbour, Nova Scotia in 1995.[36] In 1990, CORMORANT recovered the flight data recorder from a CF- 18 "Hornet" fighter aircraft which crashed off the coast of Vancouver Island.[37] This particular operation demonstrated CORMORANT's versatility as the ship had to rapidly deploy to Canada's west coast to complete this sensitive military operation.

Through these and other activities in support of OGDs, CORMORANT developed a positive reputation for the Canadian navy and the Government of Canada in the protection of its maritime resources. The positive aspect of this work was that the crew and equipment were maintained at a high level of trained proficiency and operational readiness. The Canadian navy was seen to be meeting the requirements of the Defence White Paper and by working in a cooperative manner with OGDs to enhance our knowledge and understanding of the marine environment.[38] The public relations value of this support to OGDs proved instrumental in developing and projecting a positive image of military resources being used for the betterment of the national interest.

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[35] Canada, Maritime Command, The Naval Vision, (Halifax, NS 1994): 8.
[36] LCdr R. Gwalchmai, Officer Commanding, Experimental Diving Unit, personal interview, 19 April 2002.
[37] LCdr W. Laing, Director of Diving Safety, NDHQ Ottawa, personal interview, 19 April 2002.
[38] Gordon F. Osbaldeston, All the Ship's that Sail, A Study of Canada's Fleets, (Ottawa, Canada, 15 October 1990): 41.

The capability of seabed intervention became a national asset, which resided in the navy's inventory.

In the early 1990's, reduced financial resources and increased budgetary pressures across the Canadian Forces, led to the navy calling for a pan-navy review to ensure its assets met core capability requirements. For seabed intervention, the result was the Naval Diving Review which was completed in May 1993. This report recognized the importance of a seabed operations vessel and recommended that a replacement vessel for the aging CORMORANT be defined.[39] However, the 1994 White Paper on Defence directed a further review of military assets and called for a streamlined approach to reflect a war fighting force.[40] This led to a second study in the seabed intervention area, the Cost and Capability Study, to determine the minimum resources necessary to support diving and seabed support activities.[41] The Study supported many of the findings of the Naval Diving Review; however, its recommendation with regards to seabed intervention was that CORMORANT and the submersible programme could be replaced by a remotely operated vehicle system deployed from a vessel of opportunity.[42] Therefore, even though CORMORANT with its seabed intervention capability was performing an important role for the Canadian navy, its days were numbered. In 1997 CORMORANT was decommissioned but, as noted by Vice-Admiral Garnett, CORMORANT had fallen victim to Government budget cutting rather than there being no requirement for this capability.[43] This opinion was reinforced by the ironic fact that in recognition of her

[39] Canada, National Defence, Naval Diving Review, MARC:3150-1 (N02-COS) 23 Feb 94.
[40] Canada, National Defence, The 1994 White Paper on Defence, (Ottawa, Canada, 1994): 40.
[41] Canada, National Defence, Naval Diving Cost and Capability Study, MARC:3150-1 (N02 COS) 23 Feb 94.
[42] LCdr J. Hewitt, Director of Maritime Requirements Sea 5-4, personal interview, 19 April 2002.
[43] V-Adm G.L. Garnett, 9.

outstanding contributions in support of naval and maritime interests CORMORANT, in 1997, was awarded the prestigious Navy League of Canada, J.J. Kinley Award.[44] This award, however, was to be the final recognition of her remarkable capability. The next step would be to determine the concept of operations for this new seabed intervention capability and the implementation of new systems into potential vessels of opportunity.

The Future of Naval Diving-Master Implementation Plan, of 31 March 1995, became the guiding document with respect to seabed operations. The new concept was based on a triad of containerized systems with the primary capability utilizing a remotely operated vehicle (ROV) called the Deep Seabed Intervention System (DSIS). It was felt that the DSIS could provide the level of performance required for any future seabed intervention missions. It was also believed that a containerized ROV would provide flexibility in meeting all operational seabed intervention requirements at relatively short notice and without the need to provide a dedicated sea-going ship as the operational platform.[45] To meet the surface-supplied diving requirements, it was decided that a containerized diving system would provide the navy with the flexibility to complete the range of required operational surface supplied diving tasks, again without having to maintain a dedicated sea-going ship.[46] Finally, the third side of the seabed intervention triad, that of underwater search using side scan sonar equipment, would become part of the mine countermeasures tasks being conducted on the new Maritime Coastal Defence Vessels (MCDV). The Canadian navy's future in seabed intervention was now seen to lay in a series of containerized systems that would operate from vessels of opportunity.

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[44] V-Adm G.L. Garnett, 9.
[45] Canada, National Defence, Future of Naval Diving – Master Implementation Plan, MARC: 3150 (N00 COMD) 19 April 1995, chap 4: 4-1.
[46] Ibid, chap 8: C8-1.

But like any new system there were both benefits and challenges in this concept of operations.

The containerization of the navy's seabed intervention capability meant the navy would continue to meet its requirement for seabed intervention. In light of cost cutting measures across the military, it was felt that the navy would see savings without the loss of the capability. As the seabed operations vessel is the most costly portion of the system the logic to pursue a containerized method of operation was reinforced. Other forecast benefits included, the ability to transport systems to either coast in support of underwater operations and the potential to operate simultaneously in different areas. The Canadian navy had now embarked on its new concept for seabed intervention through containerized systems. But the concept and reality of five years of operations were quite different.

At the same time that these new containerized systems were introduced, the MCDV concept of operations was being developed. Although the main roles of this versatile and capable vessel were coastal surveillance and mine countermeasure operations, it was decided that the MCDV would also become the primary platform for seabed operations tasks.[47] Under this concept the DSIS or the surface supplied diving system would be deployed from an MCDV on an as-required basis. In lieu of the dedicated, self-contained and multi-tasked seabed operations vessel of the past, the new concept of operations required that the Fleet Diving Units maintain and operate the containerized systems. Operational readiness would be maintained by using available MCDVs to complete training and underwater operations. Canada's seabed intervention capability would thus depend upon its successful integration into the MCDVs.

[47] Canada, National Defence, Kingston Class – Concept of Operations, CCFL: 11900-MCDV-1 (Comd), 24 November 1997, 105.

The introduction of the DSIS into the MCDV has encountered several technical challenges. These problems have decreased the system's level of operational readiness to conduct seabed intervention.[48] Problems have developed with regards to MCDV and DSIS compatibility, maintenance, training and MCDV station keeping capability.[49] For example, the electronic components, computer hardware and software of the DSIS are dependent on a clean and stable power source.[50] This stable power requirement cannot be met by any of the MCDVs and this has resulted in numerous and costly failures of the system. The permanent fix to this problem will be to have all vessels fitted with a stand-alone generator and associated cabling and physical interface connections.

A second problem concerns the fact that the MCDV does not have the ability to maintain a steady position over the dive site as it lacks a dynamic positioning capability.[51] Dynamic positioning involves the use of underwater ship's thrusters which, through a global positioning feed, are able to keep the ship within metres of a specific position on the ocean. This capability is considered critical when operating these types of systems in less than benign conditions.

A third challenge relates to the existing maintenance service level agreement for in-service support of the DSIS as it requires the presence of a field service representative.[52] This maintenance concept has proven to be difficult to coordinate as the issue of responsibility for work was unclear and sufficient spare parts not held by the

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[48] Latus LCdr AB@CMS DMOPR@Ottawa-Hull, 07 March 2002.
[49] Canada, National Defence, Service Paper Deep Seabed Intervention System, FDU(A) 14220-3 dated 13 Sep 2000, 1.
[50] Ibid, 5.
[51] Canada, National Defence, Kingston Class Concept of Operations (Draft), 2002, 10.
[52] Canada, National Defence, Service Level Agreement, Maritime Atlantic and Director Maritime Management & Support, August 1999.

operators.[53] An example of these maintenance difficulties occurred between 1 – 13 February 1999, during which a total of 1,450 maintenance man-hours were expended to achieve only 28 hours of dive time.[54] Operating from a dedicated seabed operations vessel would eliminate the requirement for a field services representative, as dedicated maintenance personnel could maintain these systems.

As can be imagined, a high level of training is required for the DSIS crew to remain proficient. Training requirements must be developed, formalized and practiced if the DSIS is to be considered fully operational.[55] Currently, the time officially allocated for DSIS training is three five-day periods per year. This is insufficient to develop and maintain pilot proficiency.[56] In reality, however, the Coastal Commander responsible for the MCDVs has found it difficult to meet even this small commitment because of the increased operational tempo for his vessels.[57] The Fleet Diving Unit (Atlantic) (FDU(A)) noted that in the last year an MCDV was available for only two of the three periods allocated.[58] To offset this deficiency FDU(A) has submitted a proposal to purchase a Virtual Remotely Operated Vehicle simulator.[59] While this will assist in maintaining pilot proficiency it will not replace the requirement for in-water training. As well, there is another basic problem with the present concept of operations.

The MCDV cannot embark the DSIS, the side scan sonar, and surface supplied diving systems at the same time. Any major operation, then, such as submarine rescue,

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[53] Canada, National Defence, Service Paper Deep Seabed Intervention System, FDU(A) 14220-3 dated 13 Sep 2000, 6.
[54] Ibid, 3.
[55] Ibid, 1.
[56] Canada, National Defence, Statement of Capability Deficiency and Operational Requirement – Virtual Remotely Operated Vehicle, FDU(A): 3500-1 dated 15 November 2000.
[57] Canada, National Defence, Kingston Class Concept of Operations (Draft), 2002, 22.
[58] Lt(N) R. Kline, Executive Officer, Fleet Diving Unit (Atlantic), personal interview, 18 March 2002.
[59] VROV Virtual Remotely Operated Vehicle, Geo-Resources Inc., St. John's, Nfld, 13 September 2000.

would require the dedicated support of another vessel to conduct underwater search operations plus a third vessel for surface supplied diving operations. Thus, three vessels will be required to support the tasks completed by only one vessel in the past. The lack of a dedicated seabed operations vessel has meant technical difficulties and deficiencies in maintenance, training, pilot proficiency and ultimately operational readiness. The total effect of these deficiencies is that the navy is not meeting the Nation's requirement for an operationally ready seabed intervention capability.

While the concept of containerized systems has proven to be a logical step in maintaining the military's commitment to seabed intervention the Maritime Coastal Defence Vessel, is not a suitable platform to assign the task of seabed operations. The demands imposed by minesweeping, route survey and surveillance operations alone make the completion of other tasks difficult.[60] Although designed as a multi purpose vessel, its primary role of coastal defence and mine countermeasure operations have not allowed for the proper configuration to embark the seabed intervention systems. With the pending introduction of a new Remote Mine Hunting System (RMHS), the MCDV fleet will see increased activity in its primary role of mine countermeasures.[61] The RMHS will be a complex system requiring the complete dedication of the MCDV crews to master and maintain it at an operational ready state. The advancement of our mine countermeasures operational capability for the MCDVs must remain the priority. Given the potential offensive use of mines to deny port facilities, their ease of deployment and growing sophistication, Canadian mine countermeasure capabilities must continue to be

[60] Canada, National Defence, Kingston Class Concept of Operations (Draft), 2001, 22.
[61] Canada, National Defence, The Canadian Navy's Mine Warfare Blueprint to 2010 (draft), 12 June 2001, 22.

developed.[62] If the MCDV is not the seabed operations vessel of choice, it is time to review some of the possible solutions to this problem.

As previously noted, the basic equipment of the DSIS, sonar search equipment, and manned diving systems are already in service. What is now needed is a dedicated seabed operations vessel, which could incorporate all of the above systems. Such a vessel, if designed with a limited ice rating capability, could effectively operate within the full range of Canadian waters. Possible solutions include building a specifically designed vessel, purchasing an existing commercial vessel or converting a Government vessel. Regardless of the option chosen, either solution will have some cost associated with it. With the 1995 estimated replacement cost, of a seabed operations vessel, at 100 million dollars, a purpose built ship would be expensive but it would meet all the requirements. The next option of purchasing an existing commercial ship would be less expensive and there is potential for available offshore support ships that could meet the requirements to support the seabed intervention capability. The third option offers a few attractive features. With the Government cutting back on its Coast Guard and Fisheries fleets there may be available vessels that could be converted for this task. This would reduce the overall cost and perhaps a cooperative cost sharing arrangement could be developed with DFO that would allow a synergistic partnership to be created.

The cost to procure a dedicated seabed operations vessel must be weighed against the consequences of the inefficiencies in our present system. Not having this capability in the event of a submarine or maritime disaster will have serious consequences far outweighing the cost. Our current inability to keep seabed intervention assets at a high

[62] Canada, National Defence, Adjusting Course: A Naval Strategy for Canada, (Ottawa, Canada, April 1977): 19.

operational readiness level is not acceptable. As stated by LCdr Latus, Directorate of Maritime Policy and Operational Readiness, Mine Warfare and Diving,

> "The Swiss Air crash is a working example that there is no warning time for this capability and the readiness level cannot be established by a traditional security or threat rationale. The Canadian Government owns no equivalent resource and rightfully expects the Department of National Defence to be at the ready."[63]

The advantages of a dedicated seabed operations vessel are numerous. The present problems of containerized configuration can be resolved. Power requirements, integration, and operations problems can be overcome. Maintenance can now transfer to a dedicated crew of operators and technicians, thus alleviating the requirement for an on site field service representative. Operator training proficiency levels can be maintained, as this vessel would be dedicated to operations and exercises designed to work up the crew and seabed intervention capabilities. With added operational usage the operators and maintainers will become more familiar with components and can more readily detect problems and institute corrective action. Retaining the containerized concept keeps the flexibility of the current capability. Either system could easily be transported between coasts if required and used from a vessel of opportunity. The transformation from the shipboard to the containerized configuration can be easily accomplished as operator and maintenance crews now have an intimate working knowledge of each system.

An additional benefit of a seabed operations vessel would be its ability to easily embrace new technologies. For example, emerging technologies, such as autonomous underwater vehicles and deployable sonar array systems, will require a surface support vessel from which to operate. These new underwater capabilities would further enhance

[63] Latus LCdr AB@CMS DMOPR@Ottawa-Hull, 07 March 2002.

the Government's ability to conduct surveillance and information gathering, especially in Canada's Arctic waters.

After five years of operations, the navy's containerized seabed intervention capability has not realized its full potential. Events like the Swiss Air disaster have demonstrated that the requirement to rapidly deploy below the surface of the water continues to be real and that Canada requires an operationally ready seabed intervention capability. The MCDV fleet is ambitious, with ships working at a high operational tempo. This has afforded the diving community little time to work with and gain the necessary proficiency in operating the DSIS vehicle. With the introduction of the remote mine hunting system these assets will have even less time to dedicate to seabed operations.

The concept of operations for the employment of seabed intervention assets needs to be revisited. Canada must reacquire a self-sustaining seabed operations vessel that is capable of performing deep ROV operations, search and recovery, and diving operations. These underwater capabilities need to be housed in a single vessel with a specialized crew to maintain and operate. To be effective in the most probable scenarios, a ship capable of carrying all equipment and of positioning itself in all depths of water is required.[64] This vessel can either be purpose built, taken up from trade or converted in a partnership with DFO. Through this concept, the navy will be able to maintain the necessary equipment in an operationally ready state to meet our military requirements as

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[64] Canada, National Defence, Post SMASHEX 1/99 –1/00 report, MARL:3385-0 (N34 DCOS OP READ) April 2001, 5.

well as those for marine emergency and research.

This capability would ensure a dedicated response for sovereignty support and submarine rescue missions. The vessel would also provide surface support to treat escaping submariners and the ability to deposit emergency lifesaving equipment into the stricken submarine. This vessel will also prove to be an excellent vehicle to support OGDs and research requirements, just as CORMORANT did. Such a solution would also be amenable to the addition of new technologies. With the growing requirement to work in the Arctic, an ice capable vessel would greatly enhance Canada's ability to monitor and protect our underwater regions in all three oceans.

A seabed operations vessel would meet the requirement to deploy specific equipment operated by specially trained personnel. The navy would have the operational readiness level required to meet any undersea tasking by its Commander. What is required is a decision to move forward to a dedicated seabed operations vessel that can effectively employ existing and new systems. Two questions remain to be answered. Will seabed intervention continue to be a tasking for the navy and how can the navy effectively meet that requirement? Every indication has demonstrated that the answer to the first question will continue to be an emphatic yes. Therefore, the answer to the second question lies in a dedicated seabed operations vessel equipped, manned and trained to meet the challenges ahead.

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