National Defence | Défense nationale

Maritime Engineering Journal

January 1992

Crisis in the Gulf

Making Operation Friction Happen

Canada

Looking Back: DEMS at War!

The real enemies were boredom, cold, wet, fear and fatigue.

...page **22**

Maritime Engineering Journal

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OUR COVER
The Phalanx anti-missile gatling gun was the major weapon upgrade for Canadian warships sailing to the Gulf. With its radar-controlled 3,000-rounds-per-minute rate of fire, the Phalanx offered reliable close-in defence for the task group. *(Base Halifax photo HSC 90-1069-572)*

January 1992

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The Maritime Engineering Journal (ISSN 0713-0058) is an authorized, unofficial publication of the maritime engineers of the Canadian Forces, published four times a year by the Director General Maritime Engineering and Maintenance. Views expressed are those of the writers and do not necessarily reflect official opinion or policy. Correspondence can be addressed to: **The Editor, Maritime Engineering Journal, DMEE, National Defence Headquarters, MGen George R. Pearkes Building, Ottawa, Ontario, Canada K1A 0K2.** The editor reserves the right to reject or edit any editorial material, and while every effort is made to return artwork and photos in good condition the Journal can assume no responsibility for this. Unless otherwise stated, Journal articles may be reprinted with proper credit.

Editor's Notes

Operation Friction: It was teamwork that won the day

By Captain(N) David W. Riis, OMM, CD
Director of Marine and Electrical Engineering

From a Canadian naval engineering perspective, Operation Friction will long be remembered as an outstanding success story of determination, resourcefulness and co-operation. In just two weeks, with the threat of war hanging over the Persian Gulf, two destroyers, a supply ship and five helicopters were outfitted for operations with the UN-sanctioned multinational force. In the words of **Commodore Ken Summers** (who we are delighted to welcome to the Commodore's Corner in this issue) it was "the finest example of Canadian engineering excellence."

Operation Friction was a great opportunity for we engineers to hone our skills at clarifying the requirement, analyzing the options and then designing and implementing change. For me it once more underlined how important it is for engineers to understand the operator's requirement, to understand how the operator thinks. As every Maritime Engineer officer knows, the engineer at sea must understand how the Captain thinks and what the Captain needs to know under each situation to allow the ship to work as a team. This is why time spent on the bridge and in the ops room is always time well spent by an engineer. The same requirement exists ashore in the support organization in order to establish the communication that makes teamwork possible. Operation Friction, I believe, was a true success story of the navy working as a team.

In our cover story, **LCdr Imran Mirza** chronicles the events behind the incredible undertaking of making Operation Friction "Phase One" happen from a DGMEM perspective. As the DGMEM co-ordinator for Op Friction, LCdr Mirza was in a good position to observe and abet the excellent teamwork between the operations, engineering and logistics worlds. We will also follow the remarkable story of *Athabaskan*'s AIM 7M missile upgrade during her deployment. In upcoming issues of the *Journal* we expect to bring you more of the stories and the engineering lessons learned from Canada's naval contribution to the United Nations effort in the Gulf.

And we've got something new for you. Starting with this issue we are opening up a little bit of greenspace in the pages of our branch magazine. When we ran our full-edition *Journal* on maritime environmental protection a year ago, we didn't want to produce a "one-hit wonder" and then wash our hands of the subject. The navy is committed to becoming an environmentally friendly force in our nation, and in that regard there is a veritable host of activity on the naval engineering scene. "Greenspace" will be a permanent feature of the *Journal* where we can showcase our environmental activities and concerns.

Finally, I want to take a couple of lines to express the appreciation I know we all have for the efforts of **LCdr Brian McCullough**, our production editor. Over the past seven years Brian has laboured hard under often difficult conditions to develop the *Maritime Engineering Journal* into the high-quality publication it is today. It is indeed a journal all MAREs can be truly proud of. Brian, you've heard this before, but it's time you heard it again — thank you for your enthusiasm, your professionalism and especially for the personal interest you continue to bring to our *Journal.*

HMCS *Protecteur* entering Halifax Harbour upon her return from the Gulf last April. *(Photo by Karen Blais)*

Maritime Engineering Journal Objectives

- To promote professionalism among maritime engineers and technicians.
- To provide an open forum where topics of interest to the maritime engineering community can be presented and discussed, even if they might be controversial.
- To present practical maritime engineering articles.
- To present historical perspectives on current programs, situations and events.
- To provide announcements of programs concerning maritime engineering personnel.
- To provide personnel news not covered by official publications.

Writer's Guide

The *Journal* welcomes **unclassified** submissions, in English or French, on subjects that meet any of the stated objectives. To avoid duplication of effort and to ensure suitability of subject matter, prospective contributors are strongly advised to contact the Editor, Maritime Engineering Journal, DMEE, National Defence Headquarters, Ottawa, Ontario, K1A 0K2, Tel. (819) 997-9355, before submitting material. Final selection of articles for publication is made by the *Journal*'s editorial committee.

As a general rule, article submissions should not exceed 12 double-spaced pages of text. The preferred format is WordPerfect on five-and-a-quarter-inch diskette, accompanied by one copy of the typescript. The author's name, title, address and telephone number should appear on the first page. The last page should contain complete figure captions for all photographs and illustrations accompanying the article. Photos and other artwork should not be incorporated with the typescript, but should be protected and inserted loose in the mailing envelope. A photograph of the author would be appreciated.

Letters of any length are always welcome, but only signed correspondence will be considered for publication.

Letters

Who best to do software programming?

Having just read Cdr Cyr's article on software in the October '91 *Journal*, I have concerns with his view that programming and analysis should be left to civilian programmers in the department or civilian contractors. This view is short-sighted in that it fails to take into account the experience and skills which the military programmer brings to the problem.

Although it would appear at first that civilian programmers are the most cost-efficient method of developing and maintaining software, it does not take into account the learning curve required to understand naval systems and the milieu in which the systems will be employed. The military programmer has attained the experience from background training and previous military employment. This experience would prevent programming errors and helps in the on-site analysis of programs as they are developed, which prevents extra cost being incurred when errors have to be removed from the program (or, in the worst case, from the system) after the fact.

Thus the best method for the Canadian Forces, and the navy in particular, to develop and maintain its software is to have a mix of civilian contractors with departmental civilian and military programmers. The military programmers should be on-site, both at the contractor's office and the Fleet Software Support Centre, and should be present at all levels of software production. Cdr Cyr's ideal of only utilizing civilian programmers and analysts is not the most cost-effective method for the Service as has been evident in the TRUMP and CPF projects cited in his article. — **LCdr I.C.D. Moffat, Software Manager(4), Canadian Patrol Frigate Project, Ottawa.**

In any system, there is a need for people who have experience in the use of that system. That is, people with experience in the end-use of that system are needed to define the requirements for the system and to test the system to ensure that its performance is acceptable.

For example, with the space shuttle, astronauts are consulted when the shuttle system requirements are defined and when the systems are tested. However, astronauts are not used to program the system. This technical function is left to programmers. Similarly, for naval systems, the end-users (naval officers) are needed to define the requirements of these systems and to test the systems to validate the performance of these systems. They are not needed as programmers. This is a technical function that is best performed by technicians trained in programming. — **Cdr Roger Cyr, DIAC(4), Ottawa.**

Commodore's Corner

By Commodore K.J. Summers, OMM, CD

I very much appreciate the invitation to write the Commodore's Corner as I understand it represents the first time a MARS officer has been invited to do so. My father, a former CERA, would be pleased for I'm sure he had a tinge of regret when I chose to join the "Dibby Dab" branch rather than be a naval engineering officer.

This opportunity is welcomed for it permits me to focus on one of the most important reasons why *Protecteur, Athabaskan, Terra Nova* and *Huron* were able to play such a prominent part in the multinational effort in the Gulf. Simply stated, we would not have been able to enter the Arabian Gulf or remain there save for the extraordinary effort by our maritime engineering community (both military and civilian) and the strong engineering support provided those ships by CANMARLOGDET during their eleven-month deployment.

What occurred in Halifax from August 10 to 24, 1990 in the vicinity of the new SRU(A) building defies description. Immediately following the prime minister's announcement to deploy three ships to the Gulf, under the strong leadership of Capt(N) Roger Chiasson, dockyard engineers, technicians and workers began chalking out areas on board the ships to fit the borrowed CPF and TRUMP sensor and weapon systems that would be flown in from across Canada and the United States. The work went on 24 hours a day for two weeks. Engineering drawings were produced overnight (the principles of common sense and KISS being very much in evidence), arc-welding and steel cutting turned night into day, and dockyard workers crawled all over those ships checking, fixing and fine-tuning all systems.

The equivalent of a six-month ship refit (100,000 person-hours) was expended during that two-week period and the results speak for themselves. Not only were the SATCOM, CIWS, Harpoon, 3"50 gun (for *Protecteur*), SHIELD decoy, .50-calibre and 40-mm guns and all the other systems fitted and checked out, but they all functioned correctly on sailing. With minor exceptions, they would remain on line throughout the entire deployment.

It has to be the finest example of Canadian engineering excellence — from the skills of our welders and electricians through to the competence and professionalism of our highly qualified civilian and military engineers. To their credit they completed a major upgrading of combat capability which made those three ships young and modern in defiance of their hull ages. Similar feats were performed by aeronautical engineers and technicians in Shearwater to provide our ships with five Sea King helicopters specifically modified for Gulf operations. Provided with the capability, the naval task group soon mastered the equipment and excelled in the allied surface surveillance and interdiction roles.

If the challenge was there to upgrade our ships and helicopters, then it was an equally daunting task to maintain them in operation throughout the eleven months they were deployed in the Gulf. The small engineering staff within CANMARLOGDET, led by LCdr Clyde Hillier and LCdr Kevin Woodhouse, operated in a war zone where supplies and materials were limited, the capabilities of the local shipyards and handlers unknown. All this was further complicated by language and cultural barriers. Major undertakings included the complete changeout of a CIWS mount and the installation of a reverse osmosis desalinator. The minor undertakings were legion. Of course SRU and FMG support were provided when required, and the combined efforts were superb as the team continually evolved innovative and unusual solutions using resources and sources born of necessity.

I must, as well, compliment the rest of CANMARLOGDET under Cdr Dave Banks for their uncanny ability to organize critical spares, more than 600,000 lbs of stores, and over 50 tons of mail. The "can do" attitude of CANMARLOGDET was fundamental to being able to sustain a very high tempo of operations prior to and during the conflict.

In summary, the Gulf conflict saw the entire maritime military and civilian family become truly focused on one important national naval operational mission and, in my opinion, it was this focus by all that was responsible for the success attained by the naval task group in the Arabian Gulf. I salute each and every one involved.

It is amazing what we can do when it is necessary.

In August 1990 Commodore Ken Summers assumed command of the Canadian naval task group ordered to the Arabian Gulf, and in early October of that year was appointed Commander, Canadian Forces Middle East. Commodore Summers is now the Chief of Staff, Maritime Forces Pacific in Esquimalt.

Crisis in the Gulf
Making Operation Friction happen

By LCdr Imran Mirza

Photographs by LCdr Richard B. Houseman, except where noted.

When the Canadian naval task group sailed for the Persian Gulf in late August 1990, a new chapter opened in the history of Canadian Forces operations. For the first time since the Korean conflict, Canadian warships were being dispatched to a potential war zone.

The departure of the three ships along with 934 sailors, soldiers, air personnel and civilian engineering support staff was momentous for another reason, too. It marked the culmination of a remarkable "front and centre" story of commitment, teamwork and pride. "Miracle" might seem too strong a word to use, but that is virtually what the civilian and military members of the Department of National Defence and a group of dedicated field service representatives achieved last August. In just 14 days they prepared three warships, five Sea King helicopters and their crews for operations in the Persian Gulf in support of Canada's commitment to the United Nations.

How did these dedicated men and women accomplish so much in such a short time? Let's start with a summary of key events as they unfolded in August 1990.

On Thursday the 2nd of August, Iraq invaded Kuwait. The United Nations Security Council reacted quickly with Resolution 660, demanding that Iraq withdraw immediately. When Saddam Hussein failed to respond, the Security Council passed Resolution 661 on August 6th, initiating economic sanctions against Iraq.

There was now a real possibility that the international community, including Canada, would need some means of enforcing the sanctions. Anticipating a government decision to react to the situation in the Gulf, Chief of the Defence Staff General de Chastelain directed his staff to consider military options which would aid in a multinational effort to enforce economic sanctions and prevent further Iraqi aggression in the area.

PHOTO: LCDR R.B. HOUSEMAN

Logistics cells from across Canada, the United States and Europe filled more than 7,000 individual materiel demands. Dockyard crews wasted no time getting the equipment on board the ships. In the case of the Phalanx CIWS, four complete systems were installed and tested in just fourteen days — a record in anybody's books.

At ten o'clock in the morning of August 6th, the same day as sanctions were imposed by the UN, Cmdre M.T. Saker, Director General Maritime Engineering and Maintenance, and Capt(N) K.A. Nason, Director of Naval Requirements, were called into an emergency meeting with Cmdre L.E. Murray, Director General Maritime Doctrine and Operations. Their discussion would focus on two issues — how the navy could contribute to a multinational operation, and what the impact would be on Canadian maritime resources if the government decided to commit naval forces to the Gulf.

At the meeting DGMEM and DNR were tasked to analyze the feasibility of Canadian naval participation in the Persian Gulf. For the remainder of that day, and on into August 7th they quickly, but quietly, went about determining the engineering requirements for a Gulf operation. Warships and helicopters, it was felt, would be the most effective means of enforcing sanctions as most of Iraq's trade was by sea. They concluded that our ships and aircraft would require fairly extensive upgrading, but that Canada could likely dispatch the destroyer HMCS *Athabaskan*, the supply ship *Protecteur* and five Sea King helicopters on fairly short notice.

On August 8th, key personnel from MARCOM and NDHQ got together in Ottawa, and it was at this meeting that the CPF and TRUMP offices were brought into the picture. They would play a major role in the supply and engineering of modern weapon systems and other equipment from their own projects to help outfit any ships slated for the Gulf. During the next 48 hours, as NDHQ refined its lists of requirements and resources, Maritime Command got busy planning and preparing for an influx of new weapon systems, stores, instructors — in short, for everything they would have to deal with should a deployment be announced.

Two days later, at 2 p.m. on August 10th, the prime minister announced Canada's participation in support of the multinational effort in the Gulf. Implementation of the previous four days' planning could now begin in earnest — and then some. The original plan had called only for *Athabaskan* and *Protecteur* to be made ready for sea in seven days. However, the prime minister had announced that the Canadian task group would also include the Improved Restigouche-class destroyer *Terra Nova* — a late addition. The navy now had *three* ships to ready for sea by the original deadline of the 17th.

Refits on the Run

The task was daunting. Our ships and helicopters are equipped primarily for anti-submarine warfare in the North Atlantic, their crews are trained ASW operators. But apart from the airborne sand and heat of the Gulf, the primary threat would be from aircraft and missiles. The destroyers *Athabaskan* and *Terra Nova* had minimal air-defence capability, *Protecteur* had none. The crews, ships and helicopters of the task group would thus have to be transformed to handle the challenging environment, the sensitive role of economic blockade and the new primary threat from the air.

The major weapon system installed in all three ships was the Phalanx anti-missile defence system. To provide further air-defence capabilities, 40-millimetre Bofors anti-aircraft guns were also added to the now crowded upper-deck spaces. (Contrary to certain media reports, the 40-millimetre guns were *not* museum pieces. Although some older models are displayed in museums, those fitted in the task group were updated versions destined for new application in our coastal defence vessels. It is interesting to note that during the Falklands crisis, the Royal Navy fitted similar 40-millimetre guns in its ships).

Fifty-calibre machine guns were installed to assist in the blockade role, while *Terra Nova* was fitted with a Harpoon surface-to-surface missile system to defend against missile-carrying Iraqi patrol boats. (For the Harpoon system to operate correctly, an inertial navigation system had to be installed!) In addition, all the ships' electronic support and countermeasures were upgraded and, in some cases new systems were installed. Mine-avoidance sonar was installed in each ship, and numerous changes were made to the ships' boats, search lights, communications and control systems to facilitate the boarding of commercial ships.

Simultaneously, the Maritime Air Group at CFB Shearwater was preparing six Sea King helicopters, five of which would deploy with the ships in surface surveillance and co-ordination roles. The sixth would remain in Shearwater for engineering support and training. All told, more than 600 pounds of ASW equipment would be removed from each helicopter to make room for the new equipment.

PHOTO: LCDR R.B. HOUSEMAN

***Protecteur*'s newly installed SATCOM complete with a new pedestal. Dockyard crews often had only rough sketches, or less, to work from when manufacturing and installing equipment support structures.**

It was no small undertaking. Whereas the navy had engineering and production facilities already in place in Halifax, the Maritime Air Group had no such capability in Shearwater. It fell to the Director General Aerospace Engineering and Maintenance to take an active role in leading the Shearwater implementation team. The Aerospace Maintenance Development Unit at CFB Trenton, and the Aerospace Engineering Test Establishment at CFB Cold Lake were called in to assist. Personnel from bases Greenwood and Summerside, along with civilian personnel from IMP Aerospace, reinforced the shop teams at Shearwater.

The helicopter upgrades included armoured seats for the crew, a laser warning receiver, a fitted light machine gun, and a capability to detect ships

PHOTO: LCDR R.B. HOUSEMAN

More than three tons of welding rod were used by SRUA to support Operation Friction. Here, welders finish up the foundation for the Phalanx system on board *Terra Nova*, left, and the SHIELD seatings on *Athabaskan*, right.

at night with the help of a forward-looking infra-red device. (This infra-red detector subsequently proved to be extremely useful in the search for merchant ships in the Gulf, for it was a key ingredient in the success enjoyed by the Canadian task group in the theatre of operations. By mid-December the Canadian task group would account for 25 percent of the 1,760 interceptions and 22 boardings eventually made by the coalition up to the time hostilities commenced on January 16th.)

Implementation plans for re-equipping the ships were developed between Maritime Command Headquarters in Halifax and National Defence Headquarters in Ottawa. Maritime Command would be responsible for implementing the necessary changes and training the crews, with the headquarters in Ottawa and industry at large playing an essential supporting role.

The success of the entire operation hinged upon extremely close co-operation among operations, training, engineering and logistics staffs. MARCOM staff would research and identify the operational requirements, NEUA would transform these requirements into rough technical drawings and specifications, and SRUA would turn these outlines into reality. Meanwhile, the logistics cells in Maritime Command would co-ordinate the acquisition and marshalling of equipment and materiel necessary to execute the plan.

The work went well, but by August 16th it became clear the deadline of the 17th could not be met. However, to maintain the incredible momentum of the workforce at SRUA and NEUA, the official deadline was not changed until the next day when it was extended across the weekend to Monday, August 20th, at which time the destroyers would sail for sea trials.

In the majority of cases there was no time for the customary rigour of engineering drawings; moreover, there were few manufacturing drawings for the parts needed to support and fit the equipment in the ships. Working closely with the staff of the Naval Engineering Unit, Ship Repair Unit personnel frequently had only conceptual or "back of the envelope" drawings with which to work — or sometimes none.

"It was like magic," said one life-cycle material manager upon his return to Ottawa soon after the task group

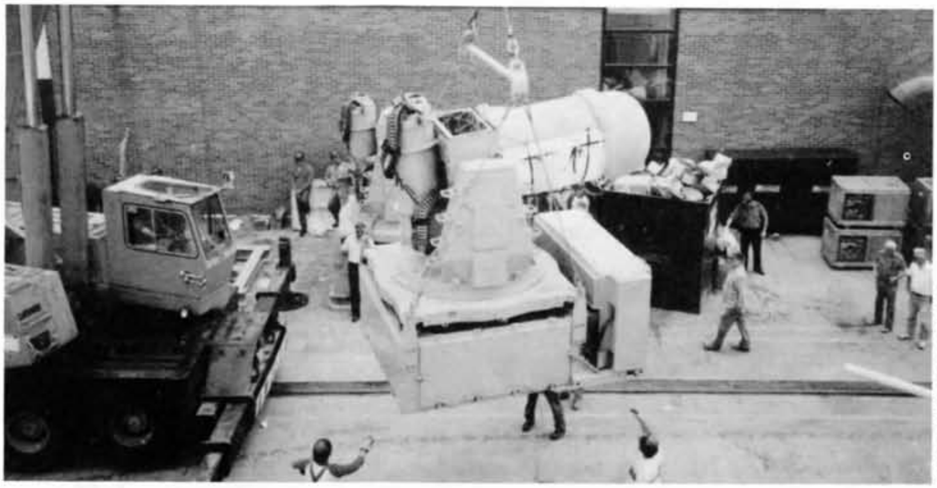


PHOTO: LCDR R.B. HOUSEMAN

The Operation Friction refits got a running start when equipment and weapons earmarked for CPF and TRUMP, such as these Phalanx systems, were diverted to the task group ships in Halifax.

sailed. "This hunk of steel would go into the welding shop, and eight hours later this beautifully crafted mast would come out — and all this without any kind of drawings."

The teamwork produced marvellous results. The previous record for getting a Phalanx close-in weapon system up and running in a ship was held by the U.S. Navy — they once did it in two weeks. During the preparations for Operation Friction, four complete Phalanx systems were installed, set to work and trialled in the same amount of time.

The materiel control and distribution aspects of the operation were of similar magnitude. Logistics staffs at the receiving end were severely taxed in dealing with the dozens of truckloads of materiel that rolled through the dockyard gates on a daily basis. More than 7000 individual demands for items ranging from nuts and bolts to a Harpoon missile system were satisfied by the logistic cells across the country and, in some instances, from Europe and the United States. Meeting the many deadlines often called for priority airlifts. The Maritime Air Group's Aurora and T-33 aircraft, and Air Transport Group's heavy-lift C-130 Hercules aircraft flew hundreds of hours of support missions.

A tremendous amount of good judgment and superb initiative were exercised at all levels to minimize the bureaucracy and administration that would normally be required. Staff officers from the NDHQ Directorate of Naval Requirements, in consultation with Maritime Command, identified the requirements and often the initial source for the equipment as well. Life-cycle material managers then verified the source and availability of the equipment to meet the requirement. The process was not clear cut, however, and discussions on the run became the order of the day. In some cases there was no time to wait for a clear confirmation of the requirements, and LCMMs took it upon themselves to start the procurement process. This initiative was absolutely critical in achieving the short turnarounds required for the many installations.

The process in DGMEM was geared toward identification, procurement, technical assistance through the life-cycle material managers and company field service representatives, and co-ordination of effort. The logistics job was made easier with the Director of Procurement and Supply Maritime as DGMEM's single point of contact for procurement.

Training personnel in the operation and maintenance of the new equipment was another major achievement during the first phase of Operation Friction. Fortunately, there was a solid foundation of individual trade training already held by the sailors, soldiers and air personnel who would be sailing with the task group.

Ship and helicopter crews averaged 18 to 20 hours a day of work and training, receiving instructions and advice from a multitude of formal and informal sources. Much of the training for the new equipment was provided through a combination of field service

Terra Nova*'s new Harpoon launchers are plainly visible as she and *Athabaskan* refuel from *Protecteur* during Operation Friction. By mid-December 1990 the Canadian task group had accounted for a quarter of the nearly 1,800 interceptions and boardings eventually made by coalition forces up until the commencement of hostilities on January 16th. *(CF photo HSC 90-1069-70)

representatives from industry, and civilian and military instructors from the navy's fleet school in Halifax. In some cases maintenance instructions were provided to the ships' maintainers during installation of the equipment. Civilian research and development staff were instrumental in not only assessing the operational effectiveness of much of the new equipment, but also in developing new operating procedures to maximize the system capabilities.

Naval crew training came from a variety of sources. Army instructors from CFB Gagetown instructed them in the operation of the 40-mm anti-aircraft guns; the crews received chemical warfare training from the navy's own specialists. Throughout, experienced crew members worked with newer members at honing the skills required to produce combat ready teams in all areas of the ship.

The work in support of Operation Friction quickly became number one priority, displacing all other work. Twenty-four hours a day, there was nowhere on the ships, on the jetties or in the shops where a person could stand without being affected by the movement of cranes, people or materiel. Members of one high-ranking delegation, observing the progress, paused momentarily in a normally quiet corridor and found themselves under foot as a long electrical cable was laid out, measured, cut and rolled away at their feet!

The urgency of the task was infectious. For example, the requisition for the mine-avoidance sonar system specified "a complete system with manuals, spares and trainers." And this is precisely how it was delivered. When the truck carrying the system arrived in Halifax, out stepped the instructors looking for their students!

And when an urgent request for an operating room fan for HMCS *Protecteur* went out to the president of a Mississauga company in the middle of the night, he immediately drove to his warehouse, located the fan and dispatched it to Halifax by the first available flight.

The Sûreté du Quebec was contacted in Lauzon for assistance in clearing the way for the road transport of one of the Phalanx gun mounts. To the truck driver's amazement, successive detachments of Sûreté, and later RCMP, maintained ten miles of clear road ahead of the truck as it sped from Lauzon to Halifax.

From a strategic perspective, the ships could not have been deployed as rapidly as they were without the substantial "fleet in being" investment in people, infrastructure and projects. This includes the Canadian Forces' substantial in-house engineering and production capability. Eighty percent of the estimated one hundred thousand person-hours needed to prepare the ships for the Gulf were spent by the Ship Repair Unit. We were fortunate too that our resource base of installation expertise and materiel was at its peak because of the Canadian Patrol Frigate and Tribal Class Update projects. Much of the equipment, including the vital Phalanx close-in-weapon system, had already been purchased and delivered for these projects. For some other equipment where a purchase was in process or in planning, the challenge then became one of changing delivery dates from a few months or even years hence, to "immediate." The efforts included many examples of co-operation on an international scale with foreign defence agencies and private industry.

Operation Friction has been an historic event in Canadian Forces operations. The preparation phase of Operation Friction owes its success to the extraordinary drive, resourcefulness and teamwork of the individual men and women who overcame all manner of odds to *make it happen.* The remarkable feat is a refreshing reminder of what people can do when the need arises and the urgency is understood. The spirit of the men and women throughout the Department of National Defence who successfully met the challenge of Operation Friction is truly captured in the Maritime Command motto — *Ready, Aye Ready.*

Acknowledgment

A number of people assisted me by reviewing the original version of this paper and providing me with useful comments. They are: Cmdre M.T. Saker, *DGMEM;* Capt(N) Thomas F. Brown, *DMCS;* Capt(N) R.E. Chiasson, *CO SRUA;* Cdr D.V. Jacobson, *DMCS(3);* Cdr J. O'Connor, *DP Sup M(3);* Maj Bob Britton, *National Defence Logistics Co-ordination Centre;* Cdr D.R. Cooper, *DMOPR(3);* Cdr C.D. Gunn, *DNR(5);* and Cdr J.D. Peacocke, *DCOS Readiness Staff, MARCOM HQ.* To them I owe a debt of gratitude.

Lieutenant Commander Mirza was the Operation Friction co-ordinator for DGMEM. He is the DMCS 8 Computer and Software Engineering Support Services officer at NDHQ.

Flight of the Golden Bird — *Athabaskan*'s AIM 7M Missile Upgrade

By LCdr "Rogie" Vachon

The Plan

In the fall of 1990, in preparation for imminent hostilities in the Gulf, Canada saw the need to increase the reliability and performance of the Seasparrow missile system in HMCS *Athabaskan.* It was not a decision to be taken lightly since, with *Athabaskan* already deployed in the Gulf, such an objective would carry with it many technical risks and scheduling problems. As the Canadian NATO Seasparrow "Single Point of Contact," both the risks and the problems would become my part ship.

On November 15th the Director of Naval Requirements (DNR) turned to the Director of Maritime Combat Systems (DMCS) to determine the feasibility of upgrading *Athabaskan*'s RIM 7E Seasparrow missile fit with the newer, more effective version of the Raytheon Sparrow missile procured for the CPF project — the RIM 7M. I received the tasking, and for the next two weeks conducted a feasibility study in HMCS *Huron* on the West Coast. On December 6th the recommendation was made to DNR: go ahead with the upgrade, but use the more compatible *AIM* 7M (air-to-air) configuration of the Sparrow missile currently in service with CF-18 fighter aircraft.

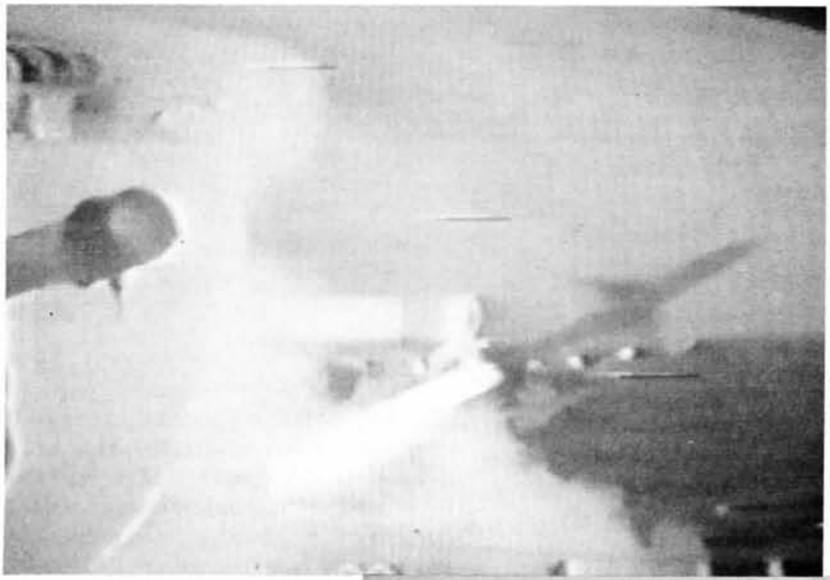
The Deputy Chief of the Defence Staff approved the upgrade program on December 18th, and I went to work pulling together a team of three technicians from NEU(A) and SRUA, a Raytheon engineer from the company Seasparrow program office, a missile telemetry operator and an analyst to accompany the Golden Bird test missile essential to the program. We didn't have a lot of time. *Athabaskan*'s missile system had to be changed-out prior to the UN's January 15th deadline for Iraq to withdraw from Kuwait. The deadline was only four weeks away and we had a lot of work to do.

The plan was to retrieve spare electronic and mechanical equipment from the supply system, modify it, bench-test it and prototype it in *Huron*. Already designated as *Athabaskan*'s relief, *Huron* was scheduled to sail for Halifax on January 4th. Arrangements were quickly made. Before the ship sailed, one AIM 7M warshot and four telemetered missiles from CFB Cold Lake would be delivered for the trial. Also, the USN's Pacific Missile Test Range would be made available from January 8-10 for *Huron* to test the AIM 7M system modifications. A complex missile firing program produced by MARCOM would confirm the engineering design changes and verify correct implementation of modifications. If all went well, we would be ready to join *Athabaskan* in the Gulf should the order be given to proceed.

AIM 7M Integration

The scope of the integration program was vast. Before we could start work in *Huron*, system interfaces had to be defined which in part would determine the electrical-mechanical design. Spare parts had to be identified and procured to effect the extensive equipment modifications to two fire-control logic units, eight Klystron tuning circuit cards and fifty missile rails. Then there was the fabrication of assemblies, the installation and check-out of the shipboard modifications and all the scheduling and logistical requirements to attend to. On top of all this we had to consider the system and personnel safety factors of an implementation program forced by severe time constraints. It's no wonder our time-line was viewed by many to be extremely optimistic.

HMCS *Athabaskan* returning home from the Gulf. In mid-deployment, between January 12 and 15, 1991, the ship's Seasparrow missile system was completely upgraded. *(Photo by Karen Blais)*



(A)

***Huron*'s last firing sequence consisted of two shots. The first was a warshot (A) to verify correct functioning of the fuse and the cross-side port launcher with the starboard illuminator. A telemetry round immediately followed to confirm that, with two missiles in flight, the second missile would lock onto the designated frequency by using the new waveguide blanking switches. The telemetry round functioned correctly up to the moment the target was destroyed (B) by the warshot, then began guiding onto the larger debris (C) from the missile and target.**

(B)

(C)

Fortunately, the AIM 7M employs a manual rocket-motor arming mechanism, as does the older RIM 7E. Thus, by using the air-launched missile rather than the naval RIM 7M missile with its remote arming feature, fewer electrical and mechanical changes to the umbilical and rails were necessary, thereby saving us valuable time. However, electronic units, test sets, missile clamps and umbilical plugs all had to be modified for compatibility, and waveguide switches had to be designed, fabricated and fitted to ensure the missile fired locked-on to the correct illuminator.

For the first tests in *Huron* we would use the "Golden Bird" static test missile provided by the USN through our NATO Seasparrow program office in Washington, DC. The test missile never leaves the launch rail and requires only line-of-sight contact with the target aircraft for guidance to provide an estimated 97-percent level of confidence assessment of system operation. Subsequently, however, live missile firings would be essential to test all aspects of the M-22 fire-control system, confirming our engineering design and the modifications as implemented. The outcome of *Huron*'s trials would be critical since live missile firings could not be conducted by *Athabaskan* in the Gulf.

With equipment modifications and logistical requirements complete, we boarded our aircraft and flew to Esquimalt, B.C. The date was December 20th.

All Systems Are Go

Upon arrival in *Huron*, SRUP was busy removing the seized lower missile-holding clamps. We mustered our equipment, special tools, test sets and missiles, then began the task of installation. Preliminary system checks were completed on December 29th — just in time for one NEU(A) team member to return to Halifax for his own wedding!

The ship sailed on January 4th, and two days later at sea we ran a successful system check-out against target aircraft. The success of the system check-out was certainly a relief and gave us more confidence in our engineering modifications and ultimate success of our task. However, the Golden Bird trial had failed. We suspected (correctly, as it turned out) that the fault was resident with the test missile and not due to the modifications made to the system. The recommendation to proceed with the live firings was accepted by *Huron*'s commanding officer and the DCOS NET (New Equipment Trials) team ashore at the Pacific Missile Test Range.

On January 8th *Huron* moved onto the range. We now had three days of reserved range time in which to complete an ambitious trials program. As it turned out, we didn't even need one full day. By early afternoon the ship had successfully fired four telemetry missiles and one warshot. We had completed the test in record time and there was even a bit of "icing on the cake." The firing plan, remember, was designed to be an engineering trial, not a tactical exercise to assess operator capability or missile effectiveness. Yet to the cheers of the ship's company, the telemetry missiles scored "direct hits" and the warshot was assessed as a "hard kill." Astounded, the American range personnel hailed the results as a first.

The next morning the team and equipment were lifted off *Huron* by helicopter and flown to Point Mugu, California. There we would wait either for orders to return home, or for final clearance to proceed to the Middle East. Our Challenger jet arrived the next day, January 10th, and we were on our way — to Dubai! In view of the overwhelming success of the 7M missile integration and firings in *Huron*, the Canadian Task Group Commander in the Gulf and the Maritime Commander in Halifax had decided to proceed with the upgrade in *Athabaskan*.

***Huron*'s trials on the Pacific Missile Test Range complete, a U.S. Navy helicopter begins transferring personnel and equipment to Point Mugu, California where a Challenger jet will pick them up to begin their long journey to the Gulf.**

As we settled in for the first leg of our flight to Dubai in the United Arab Emirates, there was guarded optimism for the difficult task that lay ahead. But we wondered. Four aircraft ferrying personnel and equipment were heading from three different locations for Dubai. What were the chances we would all arrive there more or less at the same time so that we could start work immediately? Everything had to happen like clockwork, yet there had already been a hitch with our Challenger flight. The weight distribution of four passengers and our crated electronic equipment and modified clamps for *Athabaskan* had been unacceptable. Before we could take off we had to uncrate everything and redistribute the weight.

In the end it all came together — the C-130 carrying the Golden Bird from Point Mugu, the C-130 from Trenton carrying our two SRUA technicians and the majority of the modified missile stowage clamps we'd need for the change-out, the aircraft from CFB Bagotville with the load of AIM 7M missiles, and our own Challenger jet — just like clockwork. Forty-two hours after departing North America, via Iceland, Germany and Cyprus, we were on the ground in Dubai. It was six o'clock in the morning of January 12th.

Now with only three days to modify bottom loader clamps, remove and replace hardware, test, load-out the new missiles and finish up with the Golden Bird trial, time was critical. Two hours after arriving we commenced the installation in *Athabaskan*. The work went well, and 43 hours later — at 0300 on the 14th — the installation was complete. Then began the long process of loading-out the magazine and checking each 7M missile on its rails with the MK-567 Missile Test Set.

At 0800 the next day, January 15th, *Athabaskan* sailed into the Gulf waters to conduct Golden Bird trials against six CF-18 aircraft assigned to us. By 1600 the trial was successfully completed and I reported to the commanding officer that the AIM 7M missile integration was complete. The surface-to-air missile system was now fully operational. At 1730 the team, the Golden Bird and the telemetry equipment were flown ashore and *Athabaskan* proceeded to her area of operations.

Conclusion

Depending on your perspective, the 7M missile upgrade could not have been more timely...or more untimely. While the change-out in this instance was necessary and completed in the nick of time, it can be argued quite reasonably that, had the surface-to-air missile system been subjected to improvements through an evolutionary process throughout its service life, a change-out under the severe conditions described here might possibly have been avoided. However, further discussion on such a topic is clearly beyond the scope of this article.

The results of this extraordinary missile upgrade program were extremely gratifying, both to the team members and to the crews of *Athabaskan* and *Huron*. Considering that *Athabaskan*'s missile upgrade was but one of many significant projects in the overall effort to prepare our ships for duty in the Gulf, much can be said for the effectiveness of our navy's developed, in-depth engineering capabilities that can be called upon at a moment's notice.

But perhaps it was Raytheon, home of the Patriot and Sparrow missiles, that summed it up best. "Canada executed a remarkable program by which they systematically and effectively prototyped and trialled *Huron*, then changed out *Athabaskan*'s missile system and complete missile inventory under extremely difficult conditions in an unprecedented 46 days and nights; a program that should have taken 18 months to complete."

Postscript

All good things come to an end. However, for us the story didn't end when we flew off *Athabaskan* on the afternoon of the 15th. We had returned to our hotel, hoping for a hot shower and our first good night's sleep in more than a fortnight, only to be told by support staff that we had 20 minutes to check out of the hotel and report to Port Rashid authorities for passes to exit the country "legally!"

Having arrived in-theatre by military flight, and expecting to leave by the same means, we had had no cause to have our passports stamped on the way in. But now we were in a bind. All military passenger flights out were cancelled. We would have to travel by commercial airline — a sticky prospect without the necessary entry stamps in our passports. What followed was nothing short of unbelievable. After checking out of our hotel, three white stretch passenger cars chauffeured by locals whisked us away. As we sped through the streets of Dubai we felt ill at ease with the situation, but we were in no position to question the arrangements.

After some minutes the vehicles pulled up in a dark side street outside the entrance to Port Rashid. We were told to get out and remove our luggage from the cars. The situation was getting tense. As we piled our bags onto the curb we began to wonder if everything was on the up and up. Then, while one local watched over the bags, we were directed back into the cars and driven to the port authority. There we filled out papers indicating we had arrived from sea (which in a sense we had, having just come ashore from *Athabaskan*), then got back into our cars and headed for the airport, stopping on the way to pick up our bags.

When we arrived, the airport was in chaos. People were scrambling to get out of the country, away from the Gulf. Without ceremony we were steered past the check-in counters, around security and placed on a British Airways flight to London. It was the last scheduled commercial flight out of Dubai. Twenty-six hours later we were home, back at our respective units in Canada and the United States. Only then, as life returned to normal, did we acknowledge that our mission was over.

Acknowledgment

To Bob Keddy and Peter Smedley of NEU(A), and to Bruce Poole of SRUA: your resounding support and tireless efforts toward this project contributed significantly to its success.

LCdr Vachon is the DMCS 2 project officer for the NATO Seasparrow missile system.

The CFR CSE — An Endangered Species

By Cdr Roger Cyr, OMM, CD, P.Eng.

Introduction

For a time during the early 1980s the Maritime Engineering (MARE) classification experienced some fairly hefty shortages of officers. Thanks to stepped up recruiting and a number of other initiatives under the MARE Get Well Program the shortages today are nowhere as severe as they once were. But shortfalls do remain, particularly in the numbers of Combat Systems Engineers (CSEs).

In its search for MARE officers over the years the navy has neglected to take full advantage of its Commissioning From the Ranks (CFR) program, especially as it applies to the CSE subclassification. The CFR program has produced some very capable and dedicated maritime engineers, but in the last ten years CFRs have made up only eight percent of the total MAREs recruited. Compare this to the 19 percent *(see figure)* recruited by the aerospace engineering (AERE) and communications and electronics engineering (CELE) classifications through their own CFR entry programs. And yet, naval technicians receive more in-depth engineering training than do their counterparts in the other classifications.

This article looks at how the CFR program for CSEs could be made more productive.

Why So Few CSE CFRs?

One of the reasons most often cited for there being so few CFR CSEs is the shortage of technicians in the four Naval Electronic Technician (NET) feeder occupations. The problem is being addressed, but it still doesn't explain why the CSE subclassification recruiters have not turned to the feeder occupation first as a matter of course. Surely it makes better sense to draw upon this pool of experience and engineering talent, and step up recruiting for technicians, than to recruit CSEs from square one. NETs have a proven record of engineering education, training and leadership, and yet serving officers from other classifications are brought in to serve as CSEs even though they often have no formal engineering background and frequently do not even undertake the basic CSE training. There appears to be some reluctance on the part of the CSE community to accept the CFR officer among their number.

Having said that, I believe the primary reason for there being so few CFR CSEs is that naval technicians are not really interested in commissioning under the MARE CFR program as it stands today. The program fails to consider the combat systems engineering training and experience the NETs possess, and there are perceived career limitations for CSEs who commission from the ranks.

Officer Entry Programs for Engineering Classifications (1981 to 1991)*

	DEO	ROTP	CFR	TOTAL	% CFR
AERE	58	444	118	620	19
CELE	89	363	105	557	19
MARE	116	373	41	530	8

** Source DPIS*

The CFR CSE Program Today

The technician-candidate who enters the CFR CSE program today must undertake an intensive four-year program of study, the first three years of which are spent qualifying as an electronics technologist (CFR CSEs do not work toward engineering degrees). Yet this same candidate has already completed the navy's QL5 (technician level) and 6A (technology level) courses, and was only four credits shy of full certification as an electronics technologist before ever setting foot in the CFR program. Having to spend three years working on a diploma that could have been obtained in four months might explain in part why NETs aren't falling all over themselves to sign up for the CFR program.

The last part of the program includes a four-month basic engineering preparatory course and an eight-month course at the Technical University of Nova Scotia covering the basic elements of electrical engineering (followed by an eight-month application phase at Fleet School Halifax.) All told, it's a very laborious four years of academics since for the most part it is a repeat of what was learned in the QL5 and QL6A courses. Four years with no real gain in academic qualification to the student. Still lacking the basic education requirement of the MARE classification — an engineering degree — the CFR CSE faces a limited career as a MARE officer.

Although the CFR CSE possesses much more experience in combat system engineering maintenance and management than does a graduate engineer new to the navy, it does not seem to count for much with the MARE community. (For example, at present, no CFR officer in the MARE classification holds a rank higher than commander.) Given the apparent mind set of the community there is only one way in which career limitations (real or perceived) can be alleviated, and that is to make the CFR a graduate engineer.

A Proposed Program

A viable CFR CSE program must in essence be a degree-oriented university training program that builds on the CFR technician's training and experience. It is therefore proposed that a new program be established for CFRs that is similar to the present University Training Plan Officers (UTPO) plan. This new "University Training Plan for CFRs," or UTPCFR, would consist primarily of taking naval technicians at their present level, i.e. four credits short of a technology diploma, and academically upgrading them to electrical engineers. Candidates would do the third and fourth years of the regular Electrical Engineering program at the Royal Military College in Kingston, and graduate with a Bachelor's degree in Electrical Engineering.

Given the background, training and experience of today's naval technicians, a UTPCFR program could be completed in two years. CFR CSE candidates would go to RMC in May and undertake a three-month intensive refresher course in mathematics and pure sciences. If successful they would simply join the commencement of third-year electrical engineering classes in September. The summer break between years three and four could be set aside for extra academic upgrading if required. On receipt of their B.Eng., CFRs would proceed directly to ships to begin the MARE Phase VI Afloat OJT package. (In recognition of the CFR's broad experience in equipment engineering and maintenance applications, the present eight-month fleet school application phase would be foregone.)

Conclusion

In its present state the CFR CSE program remains unchallenging and unrewarding. Under the UTPCFR proposed here, CFR training for CSEs would not only become much more attractive and challenging to the naval technician, but would also take less time to complete.

CFR CSE candidates have proven that they can successfully undertake a demanding program of academic study — they have already completed two such programs in the QL5 and QL6A courses. Having been selected for CFR also shows that they have the determination, maturity and leadership qualities that will virtually ensure successful completion of an electrical engineering degree program. Perhaps then the CFR CSE would become an equal member of the Maritime Engineering community.

Cdr Cyr was commissioned from the ranks as a MARS officer in 1971, and has been a CSE since 1973.

Project Update: The Canadian Patrol Frigate

By LCdr Leo Mosley

The delivery of HMCS *Halifax* (FFH-330) on June 28, 1991 signified the beginning of a long overdue technological boost for the navy. Ever since the lead ship of the CPF project began building in 1986, anticipation for this state-of-the-art vessel, the navy's first new ship in twenty years, has been running high. Much of the anticipation has centred around the contractual arrangement (new for the navy) by which Saint John Shipbuilding Limited (SJSL) was given total systems responsibility for the new frigates. As prime contractor, SJSL is carrying the can for the design, construction, integrated logistics support, trial and delivery of 12 City-class frigates.

Nine of the frigates are being built by SJSL in Saint John, and three are being built under subcontract by Marine Industries Limited (MIL) at Lauzon, Quebec. The design, integration and delivery of the combat systems have been subcontracted to Paramax Electronics in Montreal. As such, the economic and regional benefits of the Canadian patrol frigate project are significant: approximately 70 percent of the CPF contract — some 50,000 person-years of work — involves work done directly in Canada.

In addition to eventually providing the navy with modern, capable vessels, the CPF project has already revived Canada's industrial capability for large-scale naval warship construction. The learning curve for government and industry has been steep, but each has successfully risen to the challenge.

For example, a significant next step to the modular construction approach has been taken by Saint John Shipbuilding. Starting with CPF 07 (HMCS *Montreal*), unit joining in the drydock will be done in nine "megamodules" as opposed to 26 erection units. Megamodule construction offers significant cost savings as it allows increased pre-outfitting of machinery, piping, electrical systems, minor bulkheads, etc. in the controlled environment of the assembly hall. A new dockside crane and larger unit transporters at SJSL will be used to load-out the megamodules and position them in the dock.

The Trials Process

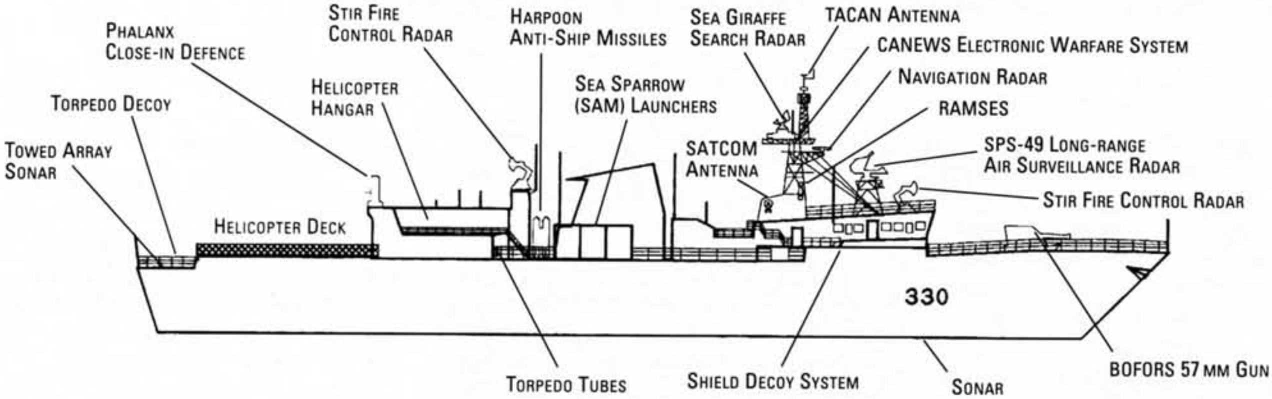
The trials process, including preparing trials agenda, scheduling and conducting trials, and submitting trial reports, has proven to be a monumental task. Hundreds of alongside equipment installation verification checks, stand-alone equipment tests and system performance trials must be completed prior to each ship delivery.

The CPF lead-ship trials process has not been easy, but considering the learning curve with the new technology this isn't surprising. Long and sometimes frustrating, the process has proven to be extremely valuable in exposing areas where improvements to systems are required. A fix at this point (one ship versus twelve) is clearly cost-effective.

Sea trials of *Halifax* got under way in August 1990, and from then until June 1991 the ship was under the control of the contractor's master and crew, with a contingent of about 35 naval personnel from *Halifax* ship's company on board as augmentees. Since June 28, 1991, HMCS *Halifax* has been operating with a complete navy crew.

To date, all aspects of the propulsion system have been trialled (e.g. full power and engine changeovers) to demonstrate various propulsion modes, and the electrical system has been put through its paces to demonstrate automatic paralleling of generators, load-shedding and blackout capability. Trials have also been conducted on the auxiliary systems, including steering, air conditioning, domestic systems and damage control systems. Anchoring and boat handling trials have also been conducted. On the combat side, sensors, computers, navigation and communication equipment have all been tested, and the fully integrated system operability of the command and control system has been confirmed.

The Canadian Patrol Frigate



Displacement: 4750 tonnes

Length Overall: 134.1 m

Beam: 16.4 m

Draft (Midships/Propeller): 5.0 m/7.1 m

Complement: 225

Machinery: Combined Diesel or Gas (CODOG) system incorporating two GE LM2500 gas turbines and Pielstick 20-cylinder cruise diesel. Prime movers drive controllable pitch propellers through a cross-connect gearbox, allowing maximum flexibility in drive mode selection. Electrical power is provided by four 850-kW diesel generators.

A Canadian-designed integrated machinery control system controls and monitors all platform system functions; colour video display units provide the operator-machine interface.

Weapons/Sensors: (as illustrated) A Canadian-designed command and control system (CCS) provides operator-machine interfacing and central control of combat systems for AAW, SSW and ASW tactical operations. The CCS performs such functions as navigation, target detection, acquisition, tracking, classification, localization and engagement, and will be capable of automatic threat response up to and including weapon firing.

Halifax is now in the post-delivery trials phase. During this period the remaining trials are being conducted; such as live weapon firings, replenishment-at-sea trials, tropical and arctic operation trials, shock trials and others as necessary to prove performance in a multi-threat environment. Although these trials are being carried out by naval personnel, their successful completion remains the responsibility of the shipbuilder.

Project Status

At Saint John, CPF 02 (HMCS *Vancouver*) and CPF 04 (HMCS *Toronto*) are both in the water. *Vancouver* will soon commence sea trials and is scheduled to be delivered later this spring. *Toronto* should start sea trials by the end of the year. CPF 07 (*Montreal*) is almost half finished and will be floated-up this year. CPF 08 (*Fredericton*) and 09 (*Winnipeg*) are both well under way.

At Lauzon, Quebec CPF 03 (*Ville de Quebec*) was launched in May, 1991 and is scheduled to start sea trials late this year or in early 1993. CPF 05 (*Regina*) was launched in October, 1991 and is scheduled for delivery in December, 1993. Units of CPF 06 (*Calgary*) have been erected and she will be launched next year.

LCdr Leo Mosley was the CPF Marine Systems Quality Assurance Officer at the lead yard in Saint John until his posting to CFFS Esquimalt last August.

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11. M. Beaulne and G. Walker, "AAW Computer Modelling of CPF and TRUMP," *MEJ*, July 1990, p.13.

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Forum

MARE Professionalism: *MAREs — naval officers first, engineers second*

By R.G. Weaver, P.Eng., Cdr (ret'd)

I read LCdr Garon's article on MARE professionalism (MEJ: April 1991) with interest. I recall wondering at Staff School many years ago during lectures on the subject, why the military found it necessary to go to such lengths to persuade us that we were really members of a profession. Graduating engineers receive no such indoctrination nor, one suspects, do doctors or lawyers. Still, with only moderate prompting, most in today's society would accept the existence of a military/naval profession.

Perhaps inadvertently the article suggests that MARE officers are also "professionals" simply by virtue of their classification, and here I would disagree. Most professions, engineering included, require a significant level of post-secondary education which some of our MAREs do not have. It could be argued that such education is not a prerequisite for an engineering professional, but then many of our technical trade CPOs, with the same body of knowledge as many MAREs and subject to the same assumed code of ethics, are surely just as much engineering professionals. The point is simply that the MARE classification is not a profession in itself.

"The MARE classification is not a profession in itself."

The paper counsels MAREs to aim for excellence "not as engineers, but as engineering officers." Perhaps they would do better to aim for excellence as both: naval officers and engineers. (Engineering credibility is just as important to a MARE as to a civilian engineer, and not many reach high rank without it.) Nevertheless, an important area where LCdr Garon is very right is that MAREs must be naval officers first and engineers second; I know this can be hard for young MAREs to accept.

Finally, the article takes pains to point out the differences between military/naval engineers and civilian engineers. Having seen both sides in DND it seems to me that, if they do their job well and with dedication, the two are not really all that different at all.

Bob Weaver is the DMEE 3 section head for marine systems integration at NDHQ.

MARE Professionalism: *Look to the commissioning scroll for a code of ethics*

By Lt(N) Patrick A. Warner

As a long-time reader of the *Maritime Engineering Journal*, I generally look forward to reading the next issue in leisure moments — however few and far between those moments may be in these hectic times. So, it was with great anticipation that I picked up the April 1991 edition.

LCdr Serge Garon's article, "MARE Professionalism in Today's World," caused me to pause to reflect on being an officer in the Canadian Forces. LCdr Garon has made a powerful argument for the profession of engineering within the profession of arms. I disagree with his contention that we as officers do not have a code of ethics. His parenthetic remark about the officer's commission being a one-way commitment is off target. The foundations of our officers' code of ethics is found in the wording of the commission. Her Majesty holds us in high esteem and sets out in the text the ethics we are expected to uphold. The reason we do not recognize this as our code of ethics is because it is incorporated into our commission as officers. It is all too simplistic to ignore the basic document which empowers us as officers and search elsewhere for a code of ethics when it stares us in the face. The text of the commissioning scroll is worth re-reading from time to time.

"It is all too simplistic to ...search elsewhere for a code of ethics when it stares us in the face."

The first line of the text of the commissioning scroll states Her Majesty holds us, her officers, in a special regard. She places her "trust and confidence" in our "loyalty, courage and integrity." This is the foundation of our code of ethics. These qualities may not be unique to military officers, but they are expected of us.

Because of this belief in our good character, Her Majesty empowers us to carry out her orders as commander in chief. She uses the words "carefully and diligently" in commanding us to carry out her orders, so "care and diligence" become part of our code of ethics. In return, Her Majesty holds us in high esteem and grants us a rank at the time she commissions us as officers.

In the next line we are instructed to "exercise and well discipline" the officers and men serving under our command. Her Majesty instructs us to keep them in "good order and discipline." In return, she orders our subordinates to obey our orders as their superior officer. This is where we obtain our legal authority to give orders and to expect those orders to be obeyed. Our code of ethics therefore includes the concept of good order and discipline.

We are further commanded to observe and follow such orders and directions that we receive from our own superiors and from Her Majesty. Our code of ethics includes the concept of obedience. The commission specifically makes the point these orders must be in accordance with the law. This incorporates the concept of the "rule of law" where no one is above the law; not us and not our superiors. We must exercise prudence in formulating our orders and obey all orders except those that are manifestly unlawful. The Geneva Convention reinforces this point, especially with respect to the protection of the human rights of civilians and prisoners of war. (The Laws of War should be required reading for all junior officers as part of their professional development.)

The final phrase is a repetition of the recognition in the first line: "in pursuance of the trust hereby reposed in you." This recurring concept of trust is of obvious importance to us as officers in describing our code of ethics.

To recap, our code of ethics as officers includes the concepts of trust, confidence, loyalty, courage, integrity, prudence, diligence, good order and discipline, obedience and the rule of law.

The words written on our commissioning scrolls define and expand upon the meaning of the profession of arms and on being a commissioned officer in Her Majesty's Canadian Armed Forces. This is our code of ethics. We would do well to remember the first orders we received as officers. Engineers in the service of Her Majesty are officers first, engineers second.

Patrick Warner is a naval reserve officer with HMCS Carleton. *In civilian life he is a marine engineer with the Canadian Coast Guard in Ottawa.*

MARE Professionalism: *Views of a foreign duty officer*

By Cdr G.L. Trueman, CD

Greetings from New Zealand!

I was delighted to see in the April 1991 edition of the *Maritime Engineering Journal* editorial comment on our engineering profession and LCdr Serge Garon's article on the MARE profession. Given that the first objective of the *Journal* is to promote professionalism among engineers and technicians in the MARE community and that the subject is one of particular interest to me, I would like to offer some additional thoughts in that regard.

The Concise Oxford Dictionary defines a profession as being a vocation or calling, especially one that involves some branch of advanced learning or science, and a professional as either a person belonging to a profession or calling or a person performing for monetary reward. (One could ostensibly question the professional motivation of uniformed personnel who would profess to being professional engineers as opposed to being members of an engineering profession).

"After listening to countless junior officer views on sea time getting in the way of engineering aspirations, I concluded that either recruiting indoctrination wasn't getting the message right, or that we weren't utilizing sea time to best advantage."

Our profession requires personnel with advanced learning in engineering sciences that culminates in the Calling of an Engineer ceremony during which an oath is taken to uphold the canons of engineering ethics. Over the years I have discovered that some of these canons are at odds with military ethos and the notion of "unlimited liability" mentioned by LCdr Garon. For MARE officers who hold engineering degrees there is a personal moral issue to be resolved: Which is the higher calling — professional service to the defence of the country or professional service to the public good? Hopefully, the two would be mutually compatible, but perhaps they are not always.

From time to time corollaries need to be addressed. Should uniformed engineering professionals be devoting time, talent and public funds on the development and perfection of weapon systems, or on environmental protection technology? Is the engineering of some weapon systems in the best interests of the public good? I believe each of us must personally face such a philosophical issue during our careers, much as do padres or military doctors. I would be interested in hearing opinions on this.

The editorial comments on the need for sea experience as a mandatory requirement for professional development were very welcome and, I might add, sorely needed. After two years as SSO TECH in Training Group Pacific, listening to countless junior officer wardroom views on sea time getting in the way of engineering aspirations, I concluded that either recruiting indoctrination wasn't getting the message right or that we weren't utilizing limited individual sea time to best advantage, particularly during the classification training phases.

Hopefully, the revised classification training schemes will help to address these concerns. However, I maintain that we need to be more imaginative in our methods of acquiring sea experience so that all MARE officers can attain a threshold level of appropriate experience to fully understand the principles of maritime engineering and leadership.

I believe we are standing into danger by developing individual training methodologies that are founded upon the psychology associated with Canadian navy bunk limitations. Head of Department experience in a warship is indeed the best sea experience for a blossoming MARE. But rather than offer no meaningful sea experience at all, as could be the case for some MAREs, why not second MSEs to the Canadian Coast Guard or Department of Fisheries for equivalent engineering sea experience, and send CSEs to vacant seagoing billets in other allied navies?

Last Christmas I placed a newly qualified (44B equivalent) RNZN MSE officer in a U.S. Coast Guard ship for a two-month deployment to the Antarctic. As Second Engineer he gained some very unique seagoing experience that he might not otherwise have attained, and the ship was delighted to have his talents and navy engineering experience on board. The experience provided significant personal motivation to that particular officer.

Your editorial also discussed the thorny issue of licensing or registration of military and civilian engineers in DND. I noted that LCdr Garon chose not to delve into that subject. While I agree with the notion of self-regulation, I view registration as a fundamental procedure for the upholding of our engineering profession standards. It would provide senior MARE officers a quantifiable measurement of a particular individual's professional engineering capabilities, as well as a ready inventory listing of individuals deemed suitable to review and accept designs produced by other professional, registered engineers. It is interesting to note that the 1983 MARE Study recommended that uniformed engineer officers register with an association or order of professional engineers as one element of a continuing MARE professional development program.

The subject of continuing development is one that distresses me most as a member of our engineering profession. Since the 1983 study, a significant amount of attention and effort has been given to the redevelopment of classification qualification training, and continuing attention has been paid to our development as members of the military profession (eg. staff courses). However, with a moral obligation to ensure all members remain current with engineering developments, management and contracting practices, industrial organizations and practices, etc., I believe our profession has much work to do.

"While I agree with the notion of self-regulation, I view registration as a fundamental procedure for the upholding of our engineering profession standards."

Continuing development is very much dependent upon personal initiative and exposure to particular working environments, such as major projects, shipyard overseeing and exchanges. However, I feel that the more senior levels of the MARE classification require a more formalized updating process. For example, how many MARE officers are currently aware of the details of the restructuring that has taken place at the technical level at Foxhill in Bath (CASE), or the number and nature of naval information exchange or technical co-operative agreements that the Canadian navy is currently a participant, or the problems encountered with the commercialization of the RAN Garden Island Dockyard in Sydney, Australia (now ADI-NED)?

I realize that a viable, formalized, mid-career professional update program is neither easy to establish nor easy to implement, given all of the other pressures on the classification, but I am also of the opinion that the risk of not undertaking something in this regard is equally undesirable. Hence, we should be actively researching existing opportunities to alleviate some of the development workload.

The U.K. Engineering Council has recognized the need for such a program in its development of PICKUP (Professional Industrial and Commercial Updating). The Institute of Professional Engineers of New Zealand intends to follow suit. Perhaps there may be opportunities or ideas in this initiative that would be of use to the MARE classification. Alternatively, the Canadian Engineering Council could be approached for similar type developments in Canada.

I would also suggest that the *Journal* could play a role in this regard. Not all officers have continuous access to other maritime engineering, industrial or foreign navy technical publications, many of which contain articles which would be of direct interest to the continuing professional development of the MARE at large. The *Journal* could serve as a vehicle for the injection of new engineering, management and industrial practice ideas from outside our own engineering profession by reprinting selected articles or soliciting articles from other related associations and societies.

Having aired my personal concerns for our chosen profession, I would say that we have much to be proud of as naval officers and engineering professionals. As the sole Canadian naval officer and MARE in this part of the world, I was extremely proud to disseminate articles on Canadian navy and Canadian naval engineering achievements during the Gulf crisis to my contemporaries in Wellington and Auckland. However, as in any profession, we should not rest on our laurels; we should continue to strive to improve our engineering profession.

Cdr G.L. Trueman is on assignment with the Naval Staff of the New Zealand Defence Force in Wellington.

Greenspace
An Interim Blackwater System for HMCS *Huron*

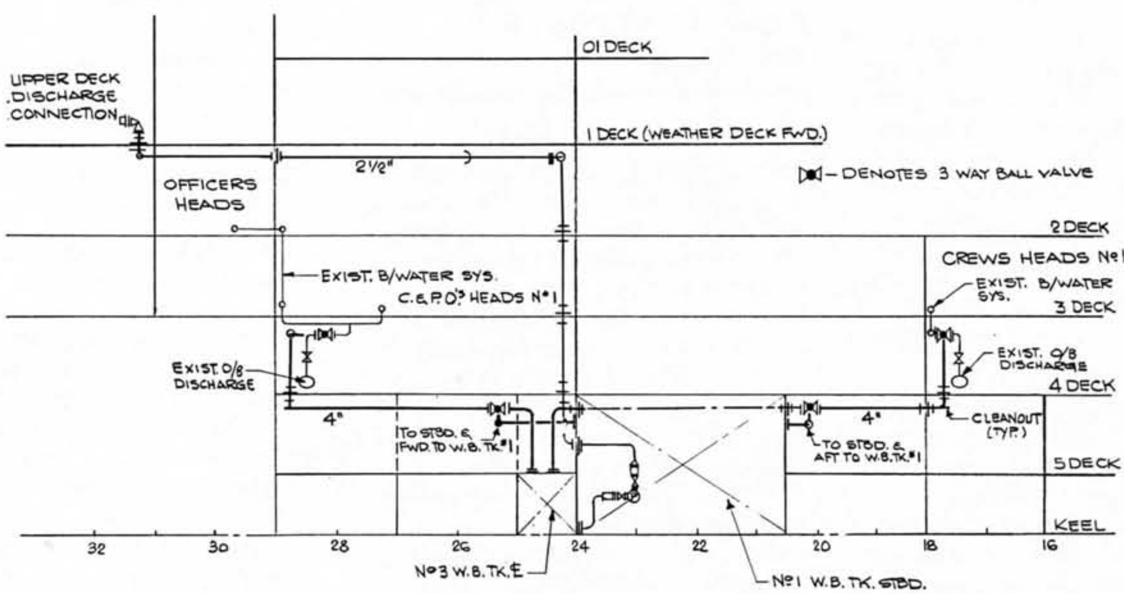
By LCdr Richard B. Houseman

Local environmental regulations can and do place severe restrictions on vessels, including warships, seeking access to ports around the world. The major concern centres around the control of blackwater (sewage) discharge, and ships not fitted with blackwater systems must resort to portable toilet facilities located on board ship, on the jetty, or both, or else risk being denied access to the port. Apart from their expense, portable toilets are at best an inconvenience and a degrading alternative to fitted BW systems, especially for ships showing the flag in foreign ports.

The Canadian navy's Ship Pollution Abatement Project has made great strides in resolving the blackwater dilemma for naval vessels. As the ships come due for refit, so they are fitted with vacuum collection, holding and transfer (VCHT) BW systems. One exception, however, was HMCS *Huron*. Although next in line for TRUMP refit in the summer of 1990, delays in the project meant maintaining the ship on the West Coast for at least one more year. The question was then asked: Could an interim blackwater system be installed economically and within an extended work period (EWP) scheduled for late summer 1990?

In early February, 1990, the Ship Repair Unit Pacific (SRUP) forwarded a Suggestion Award to the Naval Engineering Unit Pacific (NEUP) outlining a simple gravity system which used existing lines and saltwater ballast tanks. NEUP and DCOS EM assessed the proposal and determined that such a modification was feasible and realistic in terms of the time and resources available for the EWP. The next step was to submit a shipalt to NDHQ for approval, however time was running out as all work to be conducted during the EWP had to be defined as soon as possible.

NEUP received approval to develop on the 8th of March at the 77th Naval Modification Review Board, based on 2,000 person-hours to install and $45,000 for materials. An additional 1,000 person-hours were allocated for removal of the system prior to TRUMP. NEUP commenced detailed design of the sewage system, forwarded the shipalt package to DMEE 5 on the 7th of June and subsequently received approval in principle on the 25th of July. This particular modification is an example of how the "system" can work when given the proper attention and priority.



Side Elevation
INTERIM BLACKWATER INSTALLATION

Blackwater System Design

Cost and person-hours to implement were primary considerations for the system design. Because of the DDH-280's configuration, the most obvious choice for the gravity system was to use the existing saltwater ballast tanks located forward as holding tanks. These tanks (SWB tanks Nos.1, 2 and 3) are essentially located below the Officers', Chiefs and POs', and forward crew's heads and washplaces; hence, a complete representation of the ship's complement when alongside. The next step was to determine which tanks to use.

A significant departure from a VCHT system is the volume of water, in this case salt water, that would be used with the gravity system. In essence, heads would flush to the ballast tanks vice overboard. The least expensive solution involved dumping black water into No.1 SWB tank and then using the eductor system to discharge overboard when at sea. This option carried a certain degree of risk, the most significant being the blockage of eductors. Approximately four days' holding capacity would be available, but there would be no capability to discharge while alongside. This option was eventually dropped.

In the end a decision was made to go with No.3 SWB tank *(see figure)*. It had a much smaller holding capacity (one day), but with a separate pump fitted to discharge to an upper-deck connection for transfer to shore facilities it provided more flexibility with minimal risk. An emergency cross-connection to No.1 SWB tank was included to handle overflow, but as the name implies this was to be reserved for emergencies as the only provision for pumping it out was by the bilge suction main.

The gravity system chosen was a relatively straightforward design with the following features:

a. three-way ball valves at existing overboard discharges, to redirect blackwater to holding tanks. Ball valves ensure blackwater does not accumulate in lines when not in use;

b. maximum grades to ensure satisfactory operation of the gravity system, coupled with several clean-out points in the event of blockage;

c. float switches for pump activation and deactivation, and a high-level alarm should the pump fail to activate. A high-level alarm was also fitted in No.1 SWB tank. Saltwater washdowns for the floats were also incorporated;

d. a spray/flush system using salt water from the fire-main to wash down the tank; and

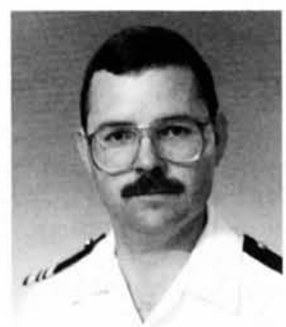
e. a discharge pump fitted with a macerator cutter head to discharge to a standard IMO flange on the upper deck.

Installation and Trials

With 2,000 person-hours allocated for installation and only seven weeks available to complete the job, work commenced immediately the ship was drydocked. Nr. Neale Backhouse of NEUP and Mr. Dave Helliwell of SRUP worked together to ensure the success of the installation, dealing with everything from material substitutions to design changes as problems were encountered. On the 24th of October, 1990, trials were successfully conducted on the system utilizing salt water.

Conclusion

The implementation of an interim blackwater system in *Huron* prior to TRUMP is proof-positive of the navy's commitment to meet environmental protection requirements. The interim fit was also considered a cost benefit, bearing in mind the $2,000-per-day rental fees for portable toilets. *Huron*'s interim blackwater system has been successfully used now, and clearly demonstrates our ability as engineers to respond to changing requirements.



LCdr Houseman is the Naval Architecture Officer at NEUP.

Looking Back:
DEMS at War!

Defensively Equipped Merchant Ships — For the 2,000 young Canadian naval reservists who served as gunners, signalmen and telegraphists in Allied merchant ships during the Second World War, the real enemies were boredom, cold, wet, fear and fatigue.

Condensed from the book by Captain(N) Max Reid, RCN Ret'd

At its peak in early 1945, there were some 570 Canadian DEMS personnel at sea in every theatre of the war. Most of these served in the 220 armed ships of Canada's ocean-going, nationally owned merchant marine. Others served in Canadian-owned/foreign-registered and Allied merchantmen. Signalmen and telegraphists sailed in the larger ships of the convoy on the staff of the convoy commodore.

The gunners manned any ship that could carry a gun, whether in convoy or sailing independently. The gun crews varied from a single DEMS gunner with a "stripped" Lewis gun (World War I vintage) to a Canadian Park ship more heavily armed than a naval frigate. Each DEMS rating was issued an extra sea bag which contained a duffel coat, long underwear and toque for the Arctic, plus shorts and pith helmet for the tropics.

A layperson's first thought of DEMS would probably envisage this small group of Canadian sailors constantly under fire from an unforgiving enemy; however the real enemies of DEMS were boredom, cold, wet, fear and the deprivation of sleep.

While actual attacks on shipping caused losses, it was the incessant fear of attack which plagued sailors throughout the war, particularly in independently routed ships. For example, on the twenty-day passage of the SS *Beaton Park* with a load of coal from Durban to Montevideo in early 1944, the ship was in a constant state of readiness and on the look-out for German surface raiders — unaware that the last one had left that area nearly two years before.

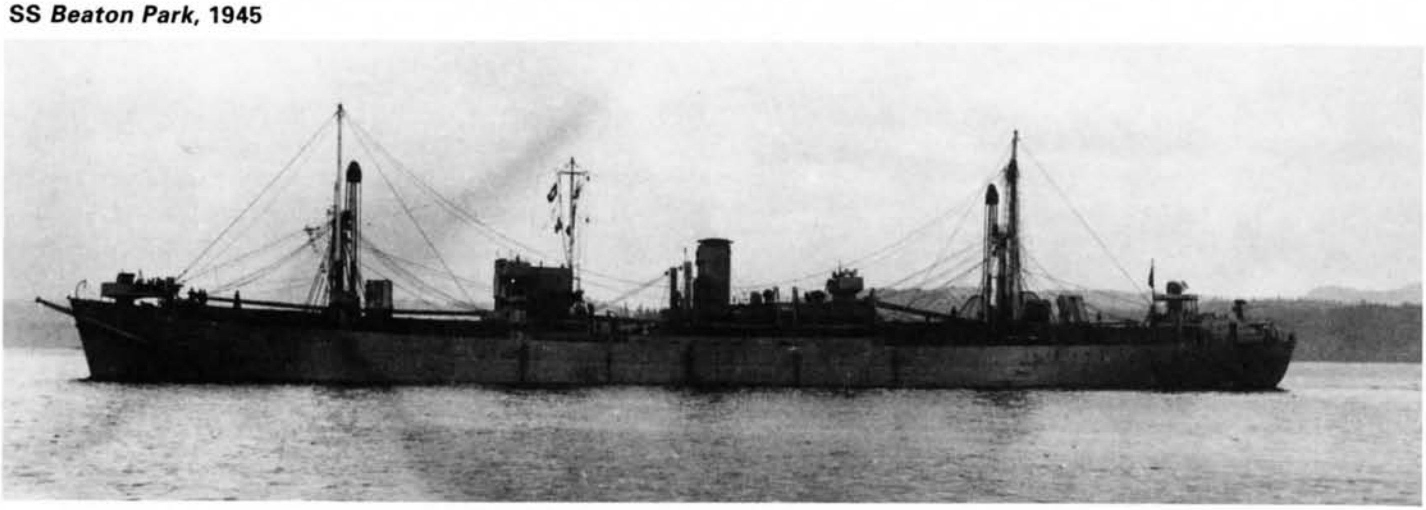
Not all trips were so uneventful. Alf Emerson, one of the DEMS gun crew in the Canadian iron ore carrier SS *Rose Castle,* wrote many years later of his experiences during the loss of the ship by enemy action during the early hours of November 2, 1942:

We picked up our full load and proceeded out into the bay and dropped our hook for the night. Joe Tavenor, the gunlayer from Winnipeg, and I settled down to sleep in our cabin in shorts with a life jacket for a pillow, Bill (the third gunner) was on watch. The first torpedo struck her at approximately ten past two in the morning with a violent explosion that threw us out of our bunks with a hell of a smell of burning cordite. We donned our life jackets and got out of the door and started up the ladder to the gun deck. Just at that time the second fish hit her and she started to settle fast.

At that time the "Old Man" set off rockets to light things up as it was pitch black out. She was broken up very badly and we could hardly stand on deck. We made our way to the stern rail to jump. Her screw was right out of the water when we jumped. We hit the water together with just our shorts and life jackets. I have never been so cold in all my life. The suction from the vortex of the ship pulled us both under and there was a heavy explosion, I presume from the boilers going up. This upheaval threw us back to the surface, then we went around in circles like a whirlpool until things were still.

What seemed like hours later getting towards dawn, we were frozen to the point that we had almost given up, a lifeboat approached. They reached down for our hands, but we were that cold we couldn't grasp their hands, then they pulled us on board.

SS *Beaton Park,* 1945



AB Max Reid, SS *Beaton Park*, 1943

With the rapidly expanding fleet and a growing demand on manpower for the services and war industries, shortages of merchant seamen could be severe. In crewing up the *Dunlop Park* with a load of steel rails and landing craft for the British 14th Army in Burma, the shortage of volunteers resulted in assistance from the prison system. The small group (of inmates) turned out to be excellent shipmates. They were industrious and practised personal cleanliness to the extreme, including providing "direction" to those other merchant seamen who may have been a little untidy after leaving the washroom. This was a happy ship.

Most of the specialized weapons carried by DEMS were designed to counter the low-level bombing and strafing attacks; all were rocket propelled and were as frightening to the firer as they were supposed to be to the Luftwaffe pilot. There was always the feeling that when you fired these things you would be caught up in a bight of the wire and taken skyward behind the deafening rocket blast and the swish of hundreds of feet of wire being yanked from its container in a few seconds. Or in the case of the Pillar Box, there was the fear that 10 to 20 rockets would hang up on the rails and fry you on the spot.

Pay was one of the more contentious issues between the merchant seamen on board and the naval personnel, the latter making less than half that of the merchant seamen. (An RCNVR able seaman in 1943 received $48.00 per month.) Nor could the navy personnel draw overtime or extra pay when the ship was in a danger zone or carrying hazardous cargo.

Probably the most serious deficiency on board a merchant ship was medical care. Generally, it was a first-aid kit and medical book. One of the ship's officers, or apprentice[s], assumed the responsibility for first-aid. However, things could "turn sour," such as in the SS *Dunlop Park* when three of the crew, including two gunners, came down with a mixture of typhus and malaria. By the time the diseases had immobilized the three, the ship was heading across the South Atlantic bound for Baltimore with a cargo of chrome ore from East Africa. The merchant seaman improved but the two gunners lay critical with high fever in the ship's hospital/sick bay.

The captain altered course for the nearest port, Bahia, Brazil. Unfortunately, Able Seaman Kalmon K. King, RCNVR of Wallaceburg, Ontario, didn't make it. He was buried at sea. The other gunner, Able Seaman Max Reid, RCNVR of North Bay, Ontario, was landed to the Portuguese Hospital in Bahia. After 45 days he was released for rehabilitation and within two weeks caught another Allied ship.

Max Reid joined the RCNVR in 1943 and served as a seaman gunner (DEMS) until the end of the war when he transferred to the regular navy. He was commissioned from the rank of petty officer in 1949 and rose to command HMC ships Lanark *and* Terra Nova. *He retired in 1974, but remained in the naval reserve as a Convoy Commodore. He is currently a foreign service officer and Counsellor, Defence Programs at the Canadian embassy in Washington, DC.*

DEMS Ratings, SS *Lakeside Park*

Book Review

By LCdr R.J. Summers

Max Reid. **DEMS at War! Defensively Equipped Merchant Ships and the Battle of the Atlantic 1939-1945.** Ottawa: Commoners' Publishing Society Inc., 1990. 100 pp., 33 photographs, 11 illustrations, references, annexes; $12.95, paper. ISBN 0-88970-079-6.

The Second World War began over half a century ago and, as Max Reid himself notes, the number of surviving veterans from that conflict is dwindling. Thus many historians are attempting to gather first-hand accounts while this is still possible. In Max Reid's case it is a very personal task as he recounts the events that opened his long and distinguished naval career.

Perhaps because their work was less glamorous than the rest of the navy's, or perhaps because their organization included few senior officers, the story of the Defensively Equipped Merchant Ships remains largely unknown by either naval personnel or professional historians. Yet some 2,000 sailors served in the Canadian DEMS and, given that some 62 Canadian-owned or -registered vessels were lost, their losses must have been significant.

Reid's book sets out to give a comprehensive overview of all aspects of the DEMS. In the course of 100 pages he touches on such disparate topics as the history of the use of naval vessels against merchantmen, the development of a Canadian defence industrial base during the Second World War, naval weapons, RCN ratings badges, and the prospect for the use of DEMS in future conflicts. While there are many points of interest in this broad survey approach, much of it will not be new to the naval reader.

The most interesting parts of this book are the accounts of life as a DEMS sailor. My father served as a DEMS in the Royal Navy and I was struck by the similarity between his experiences during the war and those of the RCN DEMS. However, perhaps because many of the memories are Reid's own, the stories are told with a self-consciousness that sometimes belies the obvious humour in the faces of the young men in the accompanying photographs.

Reid's discussion of the results and demise of the DEMS seems out of place in what is essentially an historical account. I have difficulty agreeing with his conclusion that a 21st-century DEMS should be part of our emergency preparedness, even if the resupply of Europe were part of some future armed conflict.

Given the dearth of information available on the DEMS, *DEMS at War!* is worthy of attention by the naval reader. It is hoped that Captain Reid's book will lead to further research on this subject, and to a more comprehensive collection of first-hand accounts from DEMS veterans.

LCdr R.J. Summers is the marine systems officer in PMO CPF in Ottawa.

News Briefs

Update: Torpedo and Ship Ranging Vessels (TSRV)

CFAV *Sechelt:* one of four new torpedo and ship ranging vessels that entered service at CFMETR last year. *(CF photo by Cpl Michael Jefferies, Base Photo Esquimalt)*

It's thumbs up for CFMETR's four new torpedo and ship ranging vessels. Delivered last year to the Canadian Forces Maritime Experimental and Test Ranges at Nanoose, BC, the CFAVs *Sechelt, Sikanni, Sooke* and *Stikine* have so far proven out well, meeting or exceeding their operational requirements.

The 33-metre, steel-hulled support vessels are being used at CFMETR for testing underwater weapons, sonobuoys and other equipment. A modular van (payload container) carried between the funnels is fitted with state-of-the-art acoustic monitoring and processing equipment, and can be configured for varying research roles. Built in Vancouver by West Coast Manly Shipyard, the TSRVs also feature sound "cocooning" of the generators for quiet operation on the ranges.

DND Merit Award!

Congratulations go out to DMEE 5 senior engineering support technologist **Joe Meban** who received the DND Merit Award last November. Meban was cited for his "exceptional performance in the technical field over 34 years of service." Listed among his achievements were his work on naval hydraulic systems, acquisition of the launch and recovery system for HMCS *Cormorant*'s submersible, and his contribution to the 1990 EG occupational group classification review and conversion. *(CF photo by Cpl John Etherington, Base Ottawa(N))*

MARE captures ASNE Brand Award

Congratulations go out to **Lt(N) David Peer** who completed his MARE 44E Nav Arch training in style — with a perfect grade-point average in the two-year Naval Construction and Engineering program at the Massachusetts Institute of Technology. Lt(N) Peer's grades placed him first in his class and won him the prestigious Brand Award presented by the American Society of Naval Engineers. The award was last won by a Canadian in 1961.

Lt(N) Peer, who now works as a structural project officer in DNASE 3 at NDHQ, received two graduate degrees while attending MIT: a Master of Science degree in Naval Architecture and Marine Engineering, and a degree in Ocean Engineering. The post-graduate training at MIT marked the completion of his MARE 44E training program which began in 1987.

First in his class!

Lt(N) David B. Peer receives the 1991 ASNE Brand Award from Captain Randolph M. Brooks, USN, Naval Construction and Engineering Officer at MIT.

Desert Shield award for Canadian naval EW effort

The DMCS 9 naval electronic warfare section in DGMEM has been recognized "for outstanding contributions in electronic combat" during the Gulf conflict. The international Association of Old Crows, formed in 1964 to promote the efforts of defence and industry EW professionals, presented DMCS 9 with a Desert Shield – Desert Storm Award during the AOC's annual EW technical symposium in Washington, DC last October.

According to the AOC, "electronic warfare and related equipment...contributed significantly to the ability of the coalition forces to accomplish their missions effectively with minimum losses of equipment and people." DMCS 9 was recognized for spearheading the work of outfitting and upgrading the EW suites of HMC ships *Protecteur, Athabaskan, Terra Nova, Huron* and *Restigouche* in preparation for their deployment to the Gulf. The Canadian ships were fitted with a number of EW systems, including SHIELD decoy launchers, Super Rapid Blooming Offboard Chaff and state-of-the-art ESM equipment.

DMCS 9 section head **George Brown** told the *Journal* that, while the AOC award was an "EW award," the task of outfitting the ships' EW suites was a co-operative team effort. "This (award) is a recognition of the total Canadian effort," Brown said. DMCS and other NDHQ directorates, Supply and Services Canada, the SRUs, NEUs, the staffs of MARCOM and MARPAC as well as industry all played major roles, he added.

"Everyone pitched in," Brown said. "This sort of effort only occurs when everyone puts aside their differences and their personal priorities, no matter how important, and works with a common goal in mind. It was a co-ordinated effort and everyone busted their behinds."

Of the 49 Desert Shield/Storm unit awards announced in the October 1991 issue of the AOC's *Journal of Electronic Defense,* only seven went to non-American units. Apart from DMCS 9, NDHQ's DASP 3 (avionics, simulators and photography), four British units and one NATO unit also received awards.

RAdm Julian S. Lake, USN (Ret) ***(left)*** **was president of the Association of Old Crows last October when he presented the AOC's Desert Shield Award to DMCS 9 section head George Brown.**

Later, Brown joined section personnel for a celebratory photograph ***(below). (Presentation photo courtesy AOC; CF photo by Cpl Cindy Trevorrow, CFB Ottawa(N))***

U.S. honours CF Gulf commander

U.S. Ambassador Edward Ney awarded the Bronze Star to Commodore Ken Summers during Fourth of July festivities in Ottawa last year. ***(CF photo by Sgt. Gerry Fairbrother)***

The United States remembered the Canadian Forces during Fourth of July festivities in Ottawa last year when U.S. Ambassador Edward Ney awarded the Bronze Star to **Commodore Ken Summers.** The Bronze Star is awarded for "courageous or meritorious service" in time of war, and it is considered unusual for the U.S. honour to be given to a member of another country's military. Commodore Summers commanded the Canadian Forces throughout Operation Friction and the Gulf War.

Naval units receive commendations for Gulf war

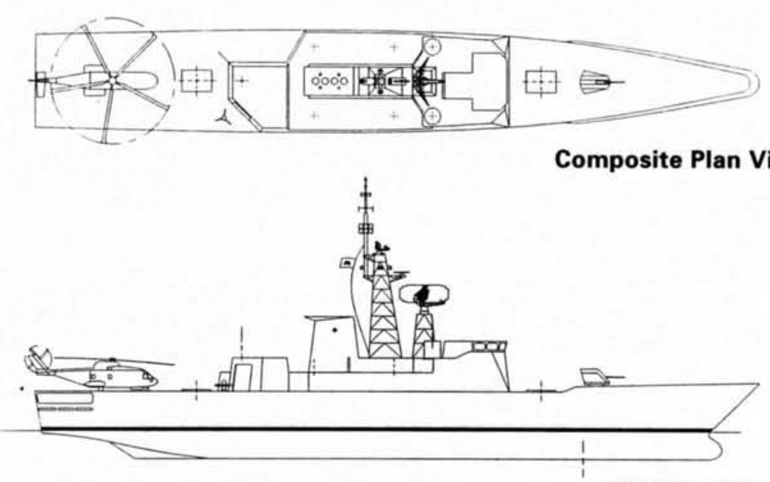
Ship Repair Unit Atlantic, Naval Engineering Unit Atlantic and 423 Helicopter Anti-Submarine Squadron have been awarded Canadian Forces Unit Commendations for their part in Canada's efforts during the Gulf war. SRUA and NEUA were commended for their role in supporting operations; 423 Helicopter Anti-Submarine Squadron (CFB Shearwater) for its role in mine detection and interdiction of shipping. Five other CF units also received commendations which were announced in November.

The first units deployed to the Gulf, including HMCS *Protecteur,* HMCS *Athabaskan* and HMCS *Terra Nova,* were awarded the CF Unit Commendation in January 1991.

Sovereignty enforcement vessel

A so-called Canadian surveillance and sovereignty enforcement vessel (CASSEV) is now in the early design stages in the DNASE(2) Future Ships Concepts section of DGMEM. Up to six of the "corvette" type ships, designed to conduct jurisdictional operations in national waters, could join the fleet around the end of the decade.

Specific design requirements have yet to be established, but the current concept calls for a ship that is something between an MCDV and a patrol frigate. Armament and facilities could include a medium-calibre gun, extended-range surface surveillance sensors, state-of-the-art C3I, aviation facilities and torpedoes for self-defence. DNASE(2) is pursuing several design options for the cost-capped CASSEV, which goes to project definition in 1994.



CASSEV: Still in the early design stages, up to six of these "corvette" type sovereignty enforcement vessels could be in service around the year 2000.

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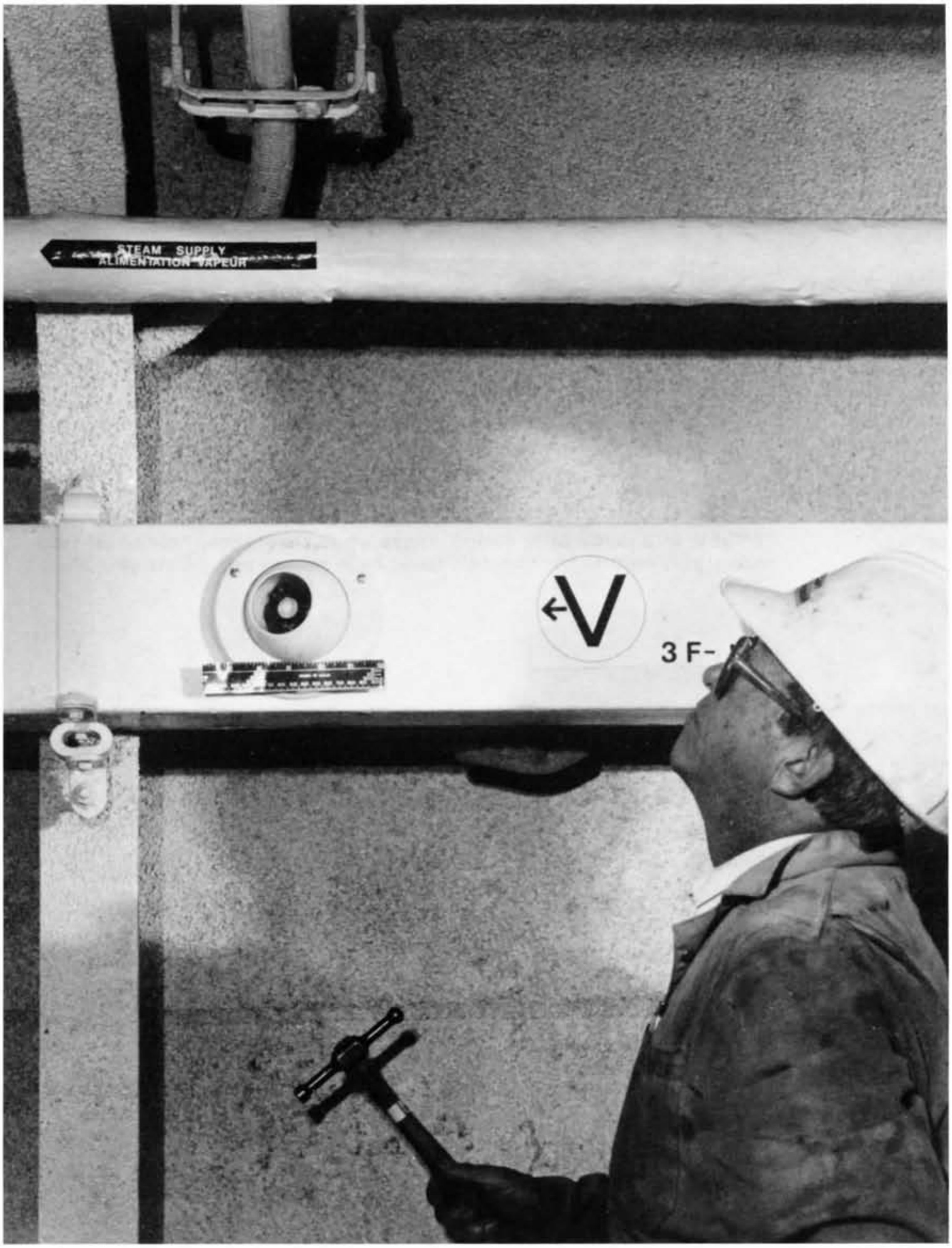

Structural Maintenance

Coming up in our next issue