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Maritime Engineering Journal

62

Since 1982

CANADA'S NAVAL TECHNICAL FORUM

Summer/Fall 2007

CNTHA News

10th Anniversary Issue

In this Issue:

- **Naval technical training at Newfoundland's Marine Institute**
- **Six Sigma — Best practice applied in naval engineering management**
- **Historian W.A.B. Douglas looks back at the 1942 battle of the St. Lawrence**

Canada

Maritime Engineering Journal

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Maritime Equipment Program Management
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DEPARTMENTS

FEATURES

BOOK REVIEWS

Twenty-five years in publication!

Thank you to all our contributors.

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Commodore's Corner

The *Journal* at 25

By Commodore Richard W. Greenwood, OMM, CD
Director General Maritime Equipment Program Management

This is a very significant issue of the *Maritime Engineering Journal*, marking as it does 25 years of continuous publication. Conceived and inaugurated as part of the "MARE Get Well" program in 1982, we have seen our branch periodical evolve and mature from a fledgling pamphlet almost, to a first-class technical journal with outstanding editorial and production values. Its strength, as if there were any doubt, rests in the hands of a wide-ranging authorship that continues to cover the full gamut of naval engineering branch issues and concerns.

This 25th anniversary edition of the *Journal* — our 62nd issue — illustrates this point well. The following pages represent input from across the rank and trade spectrum of the naval engineering branch, with articles covering a range of topics from the current to the historical. I am most pleased to note in particular the contribution of **Commodore (RCN ret.) John Doull,** who at a vigorous 91 years of age this past August has sent us a vignette from his own wartime experience. We are thrilled and honoured to have this spontaneous contribution from such a distinguished reader and navy alumnus. His tale of "A Challenging Repair" underscores the degree to which success in our business, and the success of the support we provide to the navy, is absolutely dependent on the best blend of standard and non-standard (or improvised) solutions we can bring to the challenges that arise.

It is not for nothing that the practice of jury-rigging is a time-honoured naval skill, recognizing the inevitability of situations that do not lend themselves to predetermined solutions. Innovation is an intrinsic, if not the prime characteristic of our naval technical support endeavours. We see this in all corners of our business — in the ships, in the fleet maintenance facilities, in our matrix support activities, and in the major projects themselves. Everywhere we work, we are constantly having to improvise ways around the constraints in money, people, time and other resources.

The *Maritime Engineering Journal* itself has been a particularly durable innovation, and has gone from strength to strength in responding to the needs of our naval technical community. It has benefited tremendously from the wide community participation in authorship, and I warmly encourage you all to make your own contribution to the professional discussion in these pages as we embark on the second quarter century of publication.

A Senior Contributor

Commodore John McGregor Doull, RCN (ret.) was born in New Glasgow, Nova Scotia on August 20, 1916, and educated at Dalhousie University, Halifax (Science and Engineering), and McGill University, Montreal (Electrical Engineering). He entered the Royal Canadian Naval Volunteer Reserve on February 26, 1941, and served "on loan" to the Royal Navy throughout the war. He transferred to the RCN in 1946, serving in key engineering positions in Halifax Dockyard and Naval Headquarters Ottawa. Cmdre Doull retired from the navy in 1966 as Director General Support Facilities on the staff of the Chief of Naval Technical Services.

John M. Doull
Commodore RCN (ret.)

Forum

Sir — I am writing to thank you for continuing to send me the *Maritime Engineering Journal* which I enjoy very much.

As I reached my 91st birthday last August, I wanted to let you know that I am still alive and still in good health. After my retirement I was employed for 23 years as project manager in the construction of a number of large buildings on the Halifax waterfront.

I can look back at a very interesting career in the navy, starting with 4½ years on loan to the Royal Navy, mostly in the Far East. My first ship was HMS *Ramilles*, a WWI battleship, and the second was HMS *Howe*, the newest RN battleship [at the time]. Both commissions were in the Indian and Pacific oceans. Returning to Canada in 1945, I joined the permanent RCN. In the following 21 years I had eight interesting and varied appointments.

I look back on my service with the navy with much pleasure. Yours sincerely **— John M. Doull, Commodore, RCN (ret.)**

[Commodore Doull also wrote that Bob Steeb's gearbox repair article in our Spring 2007 issue reminded him of one of his own challenging repair efforts. We have chosen to byline the following anecdote for indexing purposes. **— Editor**]

A Challenging Repair

By Commodore John M. Doull, RCN (ret.)

In the spring of 1945 HMS *Howe* was with Task Force 57 south of Okinawa. The Kamikazes were very active and large ships were taking turns at radar watch. We had the only 277 radar at that time and it was very efficient at detecting low-flying aircraft. The radar was connected to the antenna with a copper waveguide about 2 x 5 inches in size. It was important to keep it free from moisture, which was done by a dehumidifier. From time to time the waveguide was dried with hot air.

One morning when I appeared on watch the leading seaman reported that the radar had ceased to work. After some investigation I discovered that someone had pulled the wrong lever on the dehumidifier and the waveguide was now coated with a layer of something that looked like oxide. As the waveguide went all the way up the mast covered by a steel shield, we would need a dockyard to get at it. HMS *Howe* was due to take over the radar watch soon and something had to be done. But what?

In desperation I took a short section of waveguide out, got some hydrochloric acid and did some experimenting. I discovered that a dilute acid cleaned the waveguide quite well. I didn't look forward to filling the entire 50-ft waveguide with acid, but it had to be done. Fortunately, we had lots of hydrochloric acid. I took out a small section at the top and my boys carefully filled the waveguide with acid. I had discovered that it didn't take long to work, so after a half hour we drained it and washed it with water. I began to wonder what would happen to me if it didn't work. Fortunately, and to my great relief, the radar worked normally again.

Gunnery and Radar officers and NCOs on the quarterdeck of HMS *Howe* in May 1944. Senior Radar Officer Lieut. John Doull is second from the left in the front row. *(Photos courtesy the author.)*

Is this *YOUR* ship?

Article by CPO2 Grant Heddon — Staff Officer Hull Systems,
Maritime Forces Atlantic Fleet Technical Authority

(with Brian McCullough)

In the Spring 2007 issue of the *Journal*, CPO1 Jeff Morrison wrote an article underlining the importance of controlling shipboard configuration in the fleet. In the lead installment of "Is this *YOUR* ship?" he addressed many of the issues that the navy's technical agencies are dealing with to have unauthorized and oftentimes dangerous modifications corrected. Now that I have taken over from Jeff, it falls to me to conduct the configuration inspections on board the ships and submarines of Canada's East Coast naval fleet.

In a perfect world we would have no need for a magazine column such as this. All ships of a class would be conforming to the same approved script for compartment arrangement and portable equipment stowage, and would be free of easily avoidable physical and electrical hazards and fire risks. Unfortunately, we still have a very long way to go to achieve this. Perhaps by using this column as an educational tool we can work together to bring the fleet's configuration management and associated safety issues under better control.

(Photo by CPO2 C.G. Heddon)

It doesn't take an expert to spot the problems with the creature comforts that have been introduced to this operational space. Unauthorized modifications such as the fridge, the television set and the shelf for the laptop can present obvious safety hazards in terms of safe stowage or proper electrical routing. What may not be so obvious is that undocumented "improvements" such as these pose serious and costly access and safety problems for dockyard crews coming in to conduct approved engineering work.

One such unauthorized fit-up can be seen in the accompanying photo of a ship's Fire Control Equipment Room No. 3. This is clearly not a lounge, yet the presence of the mini-fridge and television set might make someone think otherwise. The make-shift shelf supporting the laptop computer is, shall we say, hardly specification. When I questioned why this equipment was in the compartment, the best of all the bad answers I got were: "It gives us a place to put stuff and watch TV," and "The TV and fridge are secure."

Their idea of "secure" must mean something different from what I learned about safe stowage for sea. It's probably a good thing the first aid kit is located where it is.

I know only too well that the creature comforts are important when a ship is away from home port. But while it may be the little things that can make a huge difference to a crew's morale, it is still up to the senior staff on board to make the hard (and correct) decision to ensure any "comforts" meet authorized configuration controls. It doesn't do much for anyone's morale when the nifty little fits come crashing loose just at the wrong moment, damaging equipment and injuring the very sailors you are trying to keep happy.

If you have ideas for modifications you truly believe will make your ship a better platform — and we all know the "Good Ideas Club" never rests — put in the paperwork. Share your innovative ideas with the rest of the fleet. It takes time to get changes approved, too long many would say, but in the end it is the properly engineered improvements that make our ships better places to work and to live during those long trips away from home.

Six Sigma — An Example of Best Practice Applied in Naval Engineering Management

Article by LCdr (ret.) Chris Tingle

Jack Welch, a mercurial and larger-than-life corporate mandarin, served as General Electric's chief executive officer for an astonishing 20 years, from 1981 to 2000. What is even more astounding is that during Welch's tenure GE's value increased from $12B (USD) to $500B. While GE today is world renowned for its technological prowess in servicing its product lines in such wide-ranging sectors as energy, transportation, entertainment, health care and even financial services — and yes they still make light bulbs — Jack Welch is more often recognized for his acumen as a leader and manager who capitalized on *human* prowess as a change driver.

One of the programs Welch was most closely associated with is Six Sigma, a process improvement methodology designed to eliminate defects, focus on customer requirements and measure the capability of any process. While the name "Six Sigma" has its roots in statistical theory, it should not be read as "6σ," the statistical measure of six standard deviations representing 99.9% of a population normally distributed around the mean. Welch didn't invent Six Sigma, but he did an excellent job of popularizing it and making it intrinsic to GE's "genetic code" of business practice.

The real credit for developing and launching Six Sigma goes to Motorola Corporation which dominated the world's electronics market in the early 1970s. When Panasonic bought out Motorola's line of Quasar televisions in 1974 they set about making drastic changes to the way the factory operated. Under Japanese management the factory was soon producing TV sets with only five percent of the defects that were produced under Motorola's management. What is most impressive is that Panasonic achieved this remarkable turnaround using the same design, the same technology and the same workforce, and all at lower cost.[1]

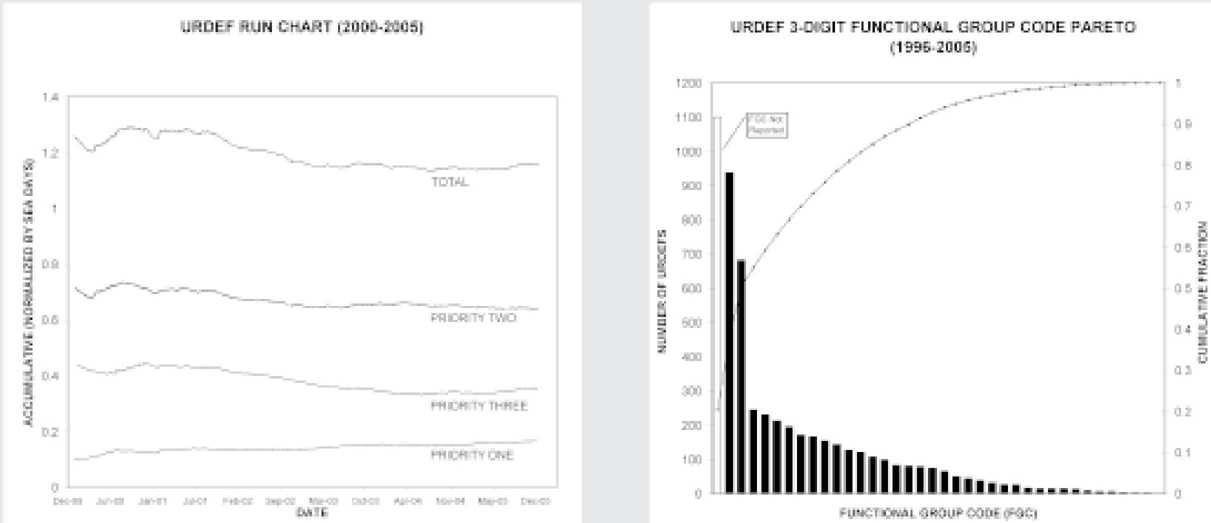
HMAS *Dechaineux* in Sydney Harbour. As explained in the text, a 2006 "Six Sigma" historical analysis of *Collins*-class urgent defects shed new light on how a lack of planned maintenance was affecting the overall availability of submarines. *(Photo courtesy Royal Australian Navy)*

Desiring to shore up its global position, Motorola announced in 1979 it would improve quality ten-fold within five years. In 1985 a Motorola quality engineer by the name of Bill Smith promulgated a report which correlated how well a product did in its field life with how much rework had been required during the manufacturing process. He also found that products built with the fewest non-conformities performed the best. Motorola implemented Smith's findings by devising a four-stage problem-solving approach: *Measure*, *Analyze*, *Improve*, *Control*. Later on, "*Define*" was added to create DMAIC, the five-stage process now associated with Six Sigma.

The subsequent growth of their original Six Sigma program launched in 1985 has been nothing short of profound, and similar programs can now be found at other major players such as Allied Signal, Ford, General Motors, BAE, Raytheon, Dow, Caterpillar, Sony and Dupont, and at countless smaller private sector companies. Although Motorola's Six Sigma program was groundbreaking, elements of it were far from new. Six Sigma was actually building on a series of evolutionary steps in quality management that can be traced back to the inception of statistical process control by Joseph Juran and Walter Shewart at Bell Telephone Laboratories in the 1920s.

By 1987 Six Sigma (trademarked by Motorola in 1993) was instituted as a metric for measuring defects and improving quality, and as a methodology for reducing defect levels below 3.4 defects per million opportunities. This became the gold standard for Six Sigma, and the program would lead Motorola to win the Malcolm

Fig. 1. *Collins* Class Urgent Defect Trend Analysis



In 2005 the Australian Defence Materiel Organisation's *Collins* Class Systems Program Office conducted a Six Sigma-inspired investigation into urgent defects (URDEFs) reported by the *Collins* submarines over the previous ten years. A six-year trend run chart that was produced (*Fig. 1a*) became an important overall measure of submarine performance. The data were normalized to compare similar defects across the class, and to ensure the trend was accurate regardless of how many boats were operating at any one time.

The Pareto chart at right depicts the relative significance of various (unidentified in *Fig. 1b*) *Collins*-class systems in terms of the percentage of URDEFs that were reported for them. The tall white bar at left indicates the percentage of URDEFs submitted with no functional group code identifier, thus preventing further analysis. In addition to producing this valuable defect trend data, the *Collins* Six Sigma study revealed weaknesses in the defect report system that were immediately targeted for improvement. *(Charts courtesy the author)*

Baldridge National Quality Award the very next year.

That's all very well and good in a manufacturing process environment, but what, if anything, does a manufacturing process improvement methodology like Six Sigma have to offer a non-manufacturing enterprise like the navy? Quite a lot, as it turns out. The fundamental elements of how these companies make their widgets and how we provide naval engineering and technical support to the fleet are surprisingly similar. If the drive to improve a product or service is there, Six Sigma offers a framework, process, tools and mentoring to achieve it.

Six Sigma Simplified

Cost, quality and schedule are the three fundamental axioms in business, and stressing one over the other two can seriously jeopardize a company's success. The logic is simple: lowering cost at the expense of schedule or quality might realize short-term gains, but won't win any points with customers in the long run. The trick is to achieve some Zen balance among the three, and this is precisely what Six Sigma is all about.

In his highly respected *Six Sigma Handbook*[2], Tom Pyzdek states that non-manufacturing processes (naval technical support could be considered as such) typically operate at only about 70-percent efficiency, leaving a significant area for immediate improvement. And while this gets a bit fuzzy in more human-interactive processes such as the service industries, understanding how a process works, what its inputs are, and what the nature of the output is are key to beginning process improvement. Results-oriented organizations often lose sight of this basic formula. All too often their focus on managing results comes at the expense of understanding the process and its causative factors, which only serves to increase costs through rework, tests and inspections.

As mentioned, Six Sigma methodology for process improvement normally follows the convention of Define, Measure, Analyze, Improve and Control — or, simply, DMAIC. *Table 1* describes these elements in some detail, but it all boils down to some very basic tenets:

***Define* —** Sort out what the problem is and which processes are involved, determine who the stakeholders are, and establish a project charter to define the customer's expectations, project boundaries and resources.

***Measure* —** Use appropriate equipment and techniques to collect and measure performance data.

***Analyze* —** Analyze the data and the processes to establish root causes of problems and to identify opportunities for improvement.

***Improve* —** Design innovative solutions, reduce variation within processes, and prevent problems from recurring.

***Control* —** Sustain gains through documentation, monitoring, and assignment of accountability.

The US Navy recently inaugurated its own "Lean Six Sigma" business transformation initiative aimed at eliminating defects and identifying and removing non-value-added activities from its processes. South of the equator, the Australian Defence Materiel Organisation's *Collins* Class Systems Program Office (COLSPO) in Perth, Western Australia conducted its own investigation into the utility of employing Six Sigma methodology to its own processes. Between 2004 and 2006 while the author was serving there on exchange, the COLSPO turned to Six Sigma as a way to optimize their engineering management of submarines. Some of the findings from this initiative are presented here.

Six Sigma Down Under — The *Collins* Class Experience

The six *Collins*-class submarines listed with the Royal Australian Navy are the largest conventional submarines in the world. With a submerged displacement of 3,350 tonnes and measuring 79 metres in length, they are roughly one third larger than our navy's *Victoria*-class submarines.

Table 1. DMAIC — The Six Stages of Six Sigma

DEFINE

- The ***Customer*** — who they are, what their requirements are for products and services, and what their expectations are, especially regarding their Critical to Quality (CTQ) issues. This is also known as the Voice of the Customer (VOC).
- The ***Process***(es) involved and ***Product***(s).
- The ***Problem,*** which could be identified by stakeholder feedback and/or process feedback. Stakeholder feedback can be passive, such as a complaint (formal or otherwise) or active, such as Focus Groups, Customer Satisfaction Surveys, Supplier Audits. Process Feedback can be performance measures, process mapping, cause and effect diagrams, tree diagrams.
- The ***Project Boundaries*** including the scope, goals, deliverables, authority and resources (normally in a Project Charter).
- ***Suggested Tools***: As-Is Process Mapping, Inspections/Audits/Investigations, X-Functional Process Map, DPMO, GANTT Chart, Performance Measurement, PERT Chart, Quality Function Deployment, Rolled Throughput Yield, SIPOC, Stakeholder Analysis.

MEASURE

- The ***Performance*** of the Process(es) involved using appropriate (valid and reliable) metrics.
- ***Data*** from many sources according to a data collection plan to determine types of defects and metrics.
- ***Process Capability*** using Run or Control Charts.
- ***Suggested Tools***: Data Collection Plan, Design of Experiments, FMEA/FMECA, Histogram, Kano Analysis, GAGE RxR, Pareto Chart, Performance Measurement, Prioritization Matrix, Process Capability, Stratification, Value Stream Mapping.

ANALYZE

- The ***Data*** and the ***Process Map*** to establish the key process inputs that affect process outputs. In other words, identify the root causes for the behaviour of the measures and opportunities for improvement.
- ***Process Statistics*** by determining the mean, standard deviation, specification limits and control limits.
- The relative contribution of defects by ***Pareto Chart***.
- ***Suggested Tools***: Affinity Diagrams, ANOVA, Brainstorming, Cause and Effect, Control Chart, Cost-Benefit Analysis, Design of Experiments, Statistics, Event/Fault Tree Analysis, Force Field Diagram, HAZOP, Histogram, Hypothesis Testing, MORT, Pareto Chart, Regression Analysis, Scatter Plot, Stratification, Value Stream Mapping.

IMPROVE

- By designing and implementing innovative solutions that will ***Eliminate Causes of the Problems***.
- By ***Reducing Variation*** in the process.
- By ***Preventing the Problem*** from recurring.
- ***Suggested tools***: Brainstorming, CBA, FMEA/FMECA, Pilot Testing, Prioritization Matrix, Process Capability, Value Stream Map.

CONTROL

- **The solution** by *Documenting*, *Monitoring* and *Assigning Accountability* **for sustaining the gains made by the improvement.**
- *Suggested Tools*: **Control Chart, X-Functional Process Map, DPMO, Hypothesis Testing, Performance Measurement.**

Supporting these submarines is the *Collins* Systems Program Office which, together with *Collins* class builder-maintainer ASC PTY Ltd. (Australian Submarine Corporation), serves to maintain a viable undersea capability for Australia. The COLSPO is a business unit within the Maritime Systems division of the Defence Materiel Organisation, the largest public entity in Australia. With an annual budget of $9B (AUD) and a workforce numbering 7,000 the DMO provides acquisition and sustainment services to the Australian Defence Force.

As the COLSPO's quality systems manager, the author was responsible for identifying commercial risks, auditing and measuring supplier performance and customer satisfaction, and maintaining the SPO's management system. One aspect of this role entailed overseeing the *Collins* continuous improvement program. When research into the issue indicated that Six Sigma would probably offer the greatest degree of guidance for constructing and running such a program, the *Collins* office took a decision to launch three Six Sigma projects:

• An improved audit management system, which generated a more robust statement of requirement for the new version of the Maritime Systems division's Contract Quality Assurance System;

• A *Collins*-class submarine defect analysis pilot project in 2005, which explored the efficacy of applying the principles of DMAIC toward improving the quality of the submarines by analyzing urgent defect (URDEF) reports (*see Fig. 1*); and

• An updated *Collins*-class submarine defect analysis in 2006, which expanded considerably on the pilot project of a year earlier.

At the same time as these projects were running, the COLSPO staff underwent Six Sigma introductory training, and a continuous improvement benchmarking study was conducted with ASC Pty Ltd.

The findings of the two defect analyses were enlightening. The 2006 report provided the new director with an appreciation for the quality state of the platform and of the logistical engineering analysis support being provided by the COLSPO and ASC. The defect analysis report also identified trends in the reliability and availability of the submarines. It was determined through the course of the analyses that ASC's integrated logistics support section had conducted a similar exercise two years prior, but for some reason their results had not been explicitly considered in subsequent ILS efforts. The 2006 report served to confirm ASC's findings.

Following the 2006 report, improvements were made to the method for reporting defects and in overseeing URDEF activities, especially in:

• Identifying equipment codes — Approximately 20 percent of the URDEFs since 1996 contained no functional group code annotation, which meant that the defective equipment was not identified specifically enough to allow further analysis. Having highlighted the importance of the URDEF report as a crucial first step in logistical support analysis, it was recommended that URDEF messages be policed to ensure their proper completion, and reviewed to ensure the accuracy of the data.

• Objectively assigning the criticality of URDEFs — With four to five submarines vying for limited resources, it wasn't surprising that some URDEF priorities were being inflated. It was recommended that URDEF priority designations be reviewed against objective criteria to ensure accuracy in the priority reporting system.

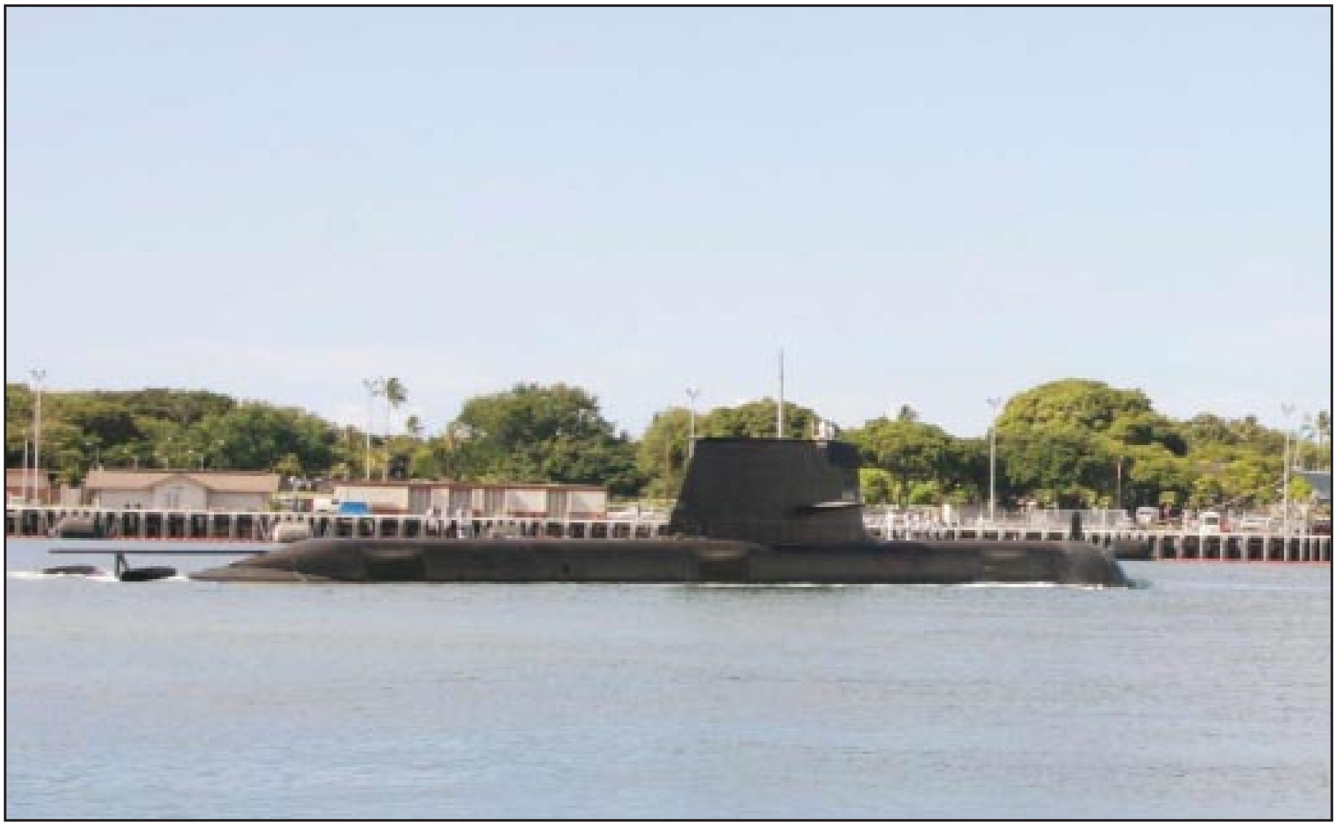
• Introducing a system of categorizing defects (as suggested in MIL-STD-785A) to allow for better subsequent analyses into root causes of defects.

The 2006 report validated the necessity of the majority of platform upgrades that were ongoing and provided substantiating evidence to restart those that had stalled. The report was able to point out how the lack of planned maintenance for any particular group of equipment was affecting the overall availability of the submarines. This became especially important as certain equipment groups were being managed by a separate systems program office. With such a clearly presented record of across-the-board defects and their impact on submarine operations, managers would have a valuable resource at their fingertips when seeking additional maintenance resources.

Finally, the study provided useful background information for the COLSPO's technical risk management plan by laying out the groundwork for reinvigorating certain logistical support analysis tools. For example, the study highlighted the importance of having a loss-of-submarine fault tree diagram showing the effect of individual equipment failures on the availability of submarines. Another analysis tool that was suggested was a "loss distribution" curve which could be used to model the aggregate risk associated with defects. The curve is also useful in determining when it is more cost-effective to upgrade defective equipment rather than continue to sustain it.

Six Sigma as "Best Practice"

There is no denying that Six Sigma has been pivotal in popularizing quality management, even though it is more than just about quality. To understand the level of popularity, look no further than *amazon.com* where no fewer than 3,350 books are available with "Six Sigma" in the title. Six Sigma certainly has its detractors, but they are likely more disgruntled over the program's packaging rather than by its content.



HMAS *Rankin* in Pearl Harbor. With the help of a Canadian naval exchange officer, Australia's Defence Materiel Organization turned to "Six Sigma" process improvement methodology to optimize their engineering management of the *Collins*-class submarines. *(Photo by C. Colbert, COMSUBPAC Public Affairs)*

Truth be told, Six Sigma represents a simple philosophy of balanced process improvement. As has been demonstrated by the *Collins* submarine example, Six Sigma methodology has proven itself to be an example of "best practice" for naval engineering management of continuous process improvement.

The success of the author's Six Sigma study of the *Collins*-class URDEF situation is now being applied to our own submarines. A similar study of *Victoria*-class operational deficiency (OPDEF) reports should, by all indications, offer better insight to the overall reliability and availability of Canada's four submarines.

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2. Pyzdek, T. *The Six Sigma Handbook*, McGraw-Hill, Toronto, 2003.

LCdr Tingle retired at the end of August as the DMEPM (SM5) Victoria-class in-service manager at National Defence Headquarters in Ottawa. From 2003 to 2006 he served on exchange with the Australian Defence Materiel Organisation's Collins Systems Program Office in Perth.

Submissions to the *Journal*

The *Journal* welcomes **unclassified** submissions in English or French. To avoid duplication of effort and ensure suitability of subject matter, contributors are strongly advised to first contact **The Editor, Maritime Engineering Journal, DMMS, National Defence H.Q., Ottawa, Ont., K1A 0K2, Tel. (819) 997-9355**. Final selection of articles for publication is made by the *Journal*'s editorial committee. Letters of any length are always welcome, but only signed correspondence will be considered for publication.

The Naval Technician Training Plan — Rock Solid Education at Newfoundland's Marine Institute

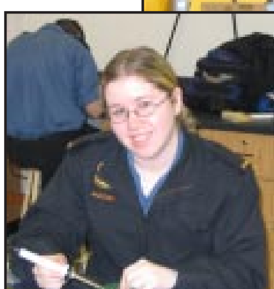
Article by PO1 Gordon Jobe

The navy has seen many changes over the years, including the introduction of new classes of ships and a corresponding shift in the advanced technology that drives them. Riding the crest of this wave of technological change today are the men and women graduates of the Naval Technician Training Plan (NTTP).

Since the inception of a specialized technician training plan in 1981, the NTTPs have been working alongside the navy's more traditionally trained engineering technicians to meet the navy's demanding challenges. In an environment of integrated control systems and reduced numbers in the engineering departments, the education and skillsets of the NTTPs make a perfect complement to the hands-on experience of their more conventionally trained counterparts.

It wasn't always so warm a relationship. In the early days of the NTTP's forerunner program — the Marine Engineering Technician Training Plan — the METTP graduates were sent to the fleet as master seamen, much to the disgust of the senior watchkeepers. The general feeling in the navy at the time was that the young grads had not put in the time on the deckplates to have earned the respect normally associated with the rank. It was a long time coming, but as the technology in the fleet advanced, and as the NTTP program was fine-tuned, attitudes began to change. The NTTP graduates still didn't have the same level of hands-on knowledge, but everyone began to realize that they were certainly bringing something valuable to the table.

In 1992 a Naval Combat Systems Technician Training Plan (NCSTTP) was introduced and combined with the METTP program to form the Naval Technician Training Plan (NTTP). In many ways the early NCSTTP mirrored the growing pains of the METTP program, but the playing field soon levelled out as the navy began to rely more heavily on the NTTP's certificated graduates to meet the technological changes that were forthcoming. Over the years the navy's strategy of having the NTTPs work side by side with more traditionally trained technicians paid off handsomely. The naval technical trades have now evolved into the best possible fit for meeting the challenges of operating and maintaining Canada's modern naval fleet.



History

The Marine Engineering Technician Training Plan was commissioned in 1981 to supplement fleet numbers and provide academically and militarily qualified personnel with a fully subsidized three-year technologist level course of studies. The first contract to conduct the METTP training was let to St. Lawrence College in Cornwall, Ontario, and ran from 1981 to 1994, graduating up to 15 students annually. A complementary French-language program ran from 1982 to 2001 at L'Institut maritime du Québec in Rimouski.

In 1994, after reviewing its requirements, the navy re-established the technical training for the METTP as an 18-month program, delivering graduates to the fleet as leading seamen. The Marine Institute of Memorial University in St. John's, Newfoundland was successful in obtaining the first contract under the new requirements, and ran its first course in 1997. Now on their second contract, the Marine Institute will deliver METTP training for up to 24 new marine engineering technician recruits each year through to the end of 2009.

In 1992 recruiting shortfalls led to a requirement for a similar style NCSTTP program for naval combat systems technicians. The Marine Institute is now also contracted to deliver 23-month technician-level programs for up to 60 new students in electronics engineering technology (Naval Electronics Techs) and 24 new students in electro-mechanical engineering technology (Naval Weapons Techs) each year. A francophone version of this program ran from 1992 to 1998 at Cégep de Rimouski, a community college on the south shore of the St. Lawrence northeast of Québec City, but attempts to re-establish the francophone contracts in 2002 and 2004 were unsuccessful. All METTP and NCSTTP programs are now delivered concurrently in English only by Memorial University's Marine Institute under the umbrella classification of the Naval Technician Training Plan. Since 1997 the Marine Institute has trained 525 NTTP graduates, comprising 136 METTP students and 389 NCSTTPs.

Graduates of the NTTP programs have been very successful and are valued members of the naval engineering community. They fill a myriad of challenging technical and supervisory positions on board ship and at the navy's repair and support facilities, and also serve as well-qualified and motivated fleet school instructors and naval occupation advisers. Others have used their academic background as a stepping stone to assume positions of greater responsibility throughout the Canadian Forces. Increasingly, graduates are seeking higher education as commissioned officers, with many returning to the fleet as marine and combat systems engineers.

Life at the Marine Institute

The Marine Institute is located in the heart of St. John's, Newfoundland and is Canada's most comprehensive and respected centre for education, training, applied research and industrial support for the ocean industries. As part of Memorial University of Newfoundland — Atlantic Canada's largest university — the Marine Institute offers bachelor and masters degrees, two- and three-year diploma programs, as well as certificate programs and vocational training.

The Naval Technician Training Plan is delivered by the Marine Institute on behalf of the Canadian Forces Directorate of Maritime Training and Education. The program is administered as a naval course, and is fully supported by a detachment of the Canadian Forces Naval Engineering School (CFNES). The CFNES detachment, which is co-located with the Marine Institute, has a staff of seven and provides divisional and administrative support for up to 216 students. As a lodger unit of CFS St. John's, staff liaise directly with station personnel, and with senior Marine Institute staff and instructors to co-ordinate all administrative and logistical requirements.

The NTTP course curricula and military requirements are very demanding and leave students with extremely full days. Fortunately, students attend all of their classes under one roof, with access to a vast library, computer services, fitness facilities and a full-service cafeteria. Student life is made easier with decent pay, vacation time, free medical and dental, and subsidized off-campus accommodation (see page 13, "What's in it for the students?").

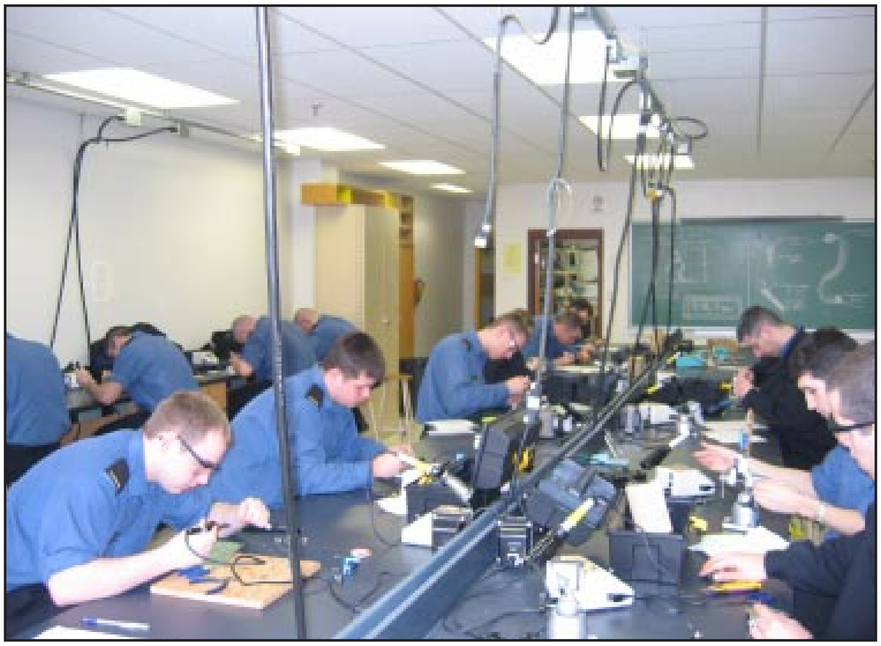
In their first four-month term students are for the most part reintroduced to an academic environment. For some of them it may have been anywhere up to ten years since they last sat in a classroom or lab. As the first term is designed to lay the groundwork for the remainder of the course, students are given entry level courses in the applicable sciences, and given an opportunity to shake off the cobwebs in preparation for their upcoming terms.

Over the course of their training students will undertake a combination of core academics and development of hands-on skills, depending upon their specific program requirements. Each term builds upon previous work and becomes increasingly involved. On completion of their third academic term students are sent on a four-month work term to gain experience in a naval environment. For students who joined the NTTP "off the street" through a recruiting centre, the first work term between first and second year academics is normally spent attaining Basic Military Qualification (BMQ) and completing the Naval Environmental Training Program (NETP). At the end of their first work term students have the option of withdrawing from the NTTP program without penalty.

Generally speaking, the days are long for the NTTPs. Their classes and labs sometimes go until 6:00 p.m., with many morning physical training activities scheduled prior to mornings classes. Evenings are usually spent preparing for academic and military requirements.

Extracurricular activities

An important aspect of the NTTP training at the Marine Institute involves instilling in students a sense of military bearing. They attend classes in military uniform, and are expected to maintain a high standard of dress and deportment at all times. From the onset of the program students are taught leadership, ethics and individual responsibility through formal coursing, duty watches and various leadership appointments. Participation in numerous extracurricular activities is a key element of this, and teamwork is stressed at all times. Students are made to understand early on that embracing this philosophy will be as much a factor in their success at the Marine Institute as their studies, and will serve them well throughout their naval careers.



In addition to their academics, students participate in physical training, drill and other activities. At least two mornings per week will find the entire detachment involved in circuit training or running Quidi-Vidi Lake at dawn. St. John's has a long history of close association with navies from around the world, and the NTTP students at the Marine Institute make up a large portion of the local naval community. Here in St. John's they are an important and welcome addition to community events and activities that warrant a military presence.

Each year, the NTTP students and members of the naval detachment take part in Remembrance Day ceremonies, ceremonial guards, merchant marine ceremonies and numerous other events with local Legion branches. The students also participate in the annual Regatta Days, entering teams for the rowing competitions (which are taken very seriously in this city). They regularly volunteer to assist with charitable causes such as the Children's Hospital Telethon, Ride For Sight, and Run For The Cure fundraisers.

As part of their team-building and leadership program, students frequently participate in intramural sports and other activities sponsored by the Marine Institute. As well, naval detachment staff in St. John's regularly organize unit sports days, mess dinners, Christmas dinner and other activities that add to the enjoyment of life. Some students find the pace overly strenuous at first, but with the assistance and guidance of their divisional staff most students adjust well to their studies and professional military development.

The Marine Institute supports the NTTP program in every respect, and ensures that students' needs both academically and outside of class are foremost in their approach. The accessibility of staff and instructors, and a low student-to-staff ratio are the envy of most institutions. Without a doubt, the close co-operation and support between the naval detachment and the Marine Institute continues to be the key to producing naval technicians of the highest calibre.

Joining the NTTP

Serving regular force non-commisioned members may apply through their units for an occupational transfer to join the NTTP. Course loading for reserve and civilian applicants to the NTTP is handled through Canadian Forces Recruiting Group Borden (Ontario), the governing body until they successfully complete their program and join the fleet. Civilian candidates can apply directly to the Marine Institute, or through a CF recruiting centre, and must submit original high school and post-secondary transcripts with their application. Reservists would actually apply for an occupational transfer through their unit to a recruiting centre.

One of our major challenges has been the arrival on course of students who are unable to complete their Basic Military Qualification or Naval Environmental Training Program before the first academic term begins in January. In an effort to fill as many available course seats as possible, the NTTP is adapting to accept recruits who arrive directly from the recruiting centres with their long hair and ballcaps, and without any military preparation whatsoever. If there is time before the start of classes these recruits will be put through a two-week military indoctrination course to set them up with ID cards, haircuts, uniforms, and teach them the basics regarding the military ethos, the chain of command, teamwork, leadership and discipline. Students who join too late even for this will have to follow the indoctrination course on evenings and weekends during the first six weeks of their initial term. As mentioned, late recruits will then have to complete their BMQ/NETP qualifications between first and second year.

Serving military members joining the NTTP undergo an occupational transfer, and must sign a letter of understanding stating they will complete six years of compulsory service following completion of their program. The consequence of not completing this contract is the return to the Crown of all educational costs, along with other pro-rated expenses such as for subsidized accommodation. Students who decide to discontinue their program after the *second-term* work period must undergo a training review board which will make recommendations regarding their return to unit, retention in the Canadian Forces in a non-technical trade, or release from the service.

What's in it for the students?

Benefits of life in the NTTP program are many. Students are provided with a fully subsidized education at a world-class institution, and receive a salary and subsidized housing while attending course. In addition to a two-year technician's diploma, students receive:

- Annual salary (as of Oct, 2006):
  1st year (in school) – $29,600
  2nd year (in school) – $38,500
  Upon graduation (after two-year program) – $51,000
- Promotion to acting leading seaman upon graduation;
- Subsidized, fully furnished off-base accommodation close to the Marine Institute (e.g. two-bedroom apartment for $82 per month);
- 20 paid days of vacation per year (starting);
- Full medical and dental benefits; and
- Six-year contract, with offer for extension.

Getting the word out

There are NTTP billets enough at the Marine Institute for as many as 216 students when we are at full capacity. Unfortunately, many of the available billets remain unfilled.

Putting word of the program out into the military and civilian communities has become a major priority, and staff have been travelling all over Canada to meet with recruiters, students and other interested parties. Staff have participated in conferences, job and career fairs and anything else we can think of to promote the NTTP program and its benefits. We have been accepting calls directly from recruiters, regular military units, high school guidance counsellors and communities, and following up with information mailouts. We have also been in close contact with military reserve units across the country to encourage them to promote our program.

The message we have for people is always the same. Students who join the Naval Technician Training Program at the Marine Institute will be in for a life-changing experience. The program is as rewarding as it is intense, and students discover in themselves a real sense of accomplishment. When they graduate, they leave here as team players and leaders ready to join the fleet as valued members of the naval technical community.

As they go forward with their careers, the young men and women graduates of the NTTP are secure in the knowledge that the education and training they have received during their time at the Marine Institute has prepared them well for whatever challenges the navy can throw their way. The navy's technology may be constantly advancing, but the NTTPs will be riding the crest of that wave as leaders and ennablers — technicians at the top of their game.

Petty Officer First Class Gordon Jobe is the divisional petty officer for the Marine Engineering Technician Training Plan at CFS St. John's, Newfoundland and Labrador.

Looking Back

On Canada's Doorstep — The 1942 Battle of the Gulf and River St. Lawrence

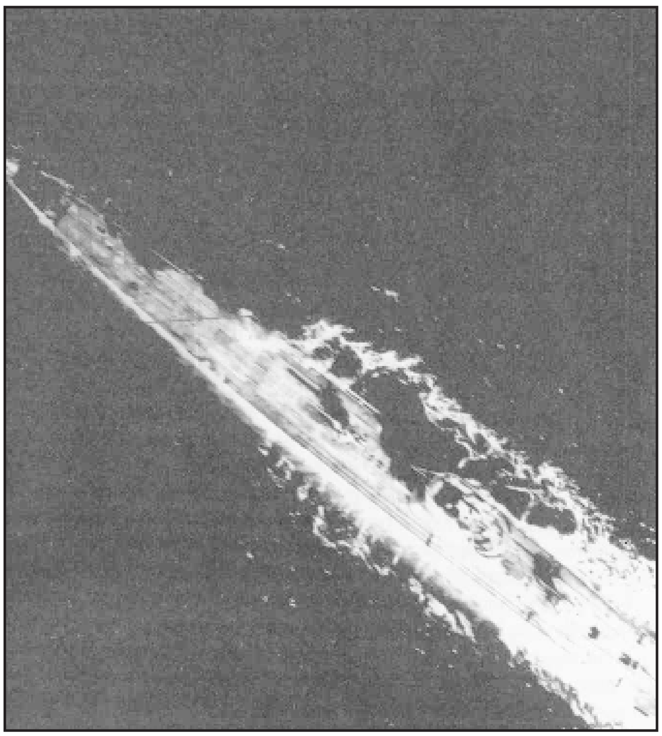
Article by Dr. W.A.B. Douglas

(Illustrations courtesy Dr. Richard Gimblett, Directorate of History and Heritage, Ottawa)

In October 1942 Édouard Laurent, a close associate of Maurice Duplessis, Quebec's premier from 1936 to 1939 and a staunch critic of Canada's involvement in the war, wrote a series of three deeply critical articles in *L'Action Catholique* entitled, "*Ce qui se passe en Gaspésie.*" Claiming a series of apparently incompetent actions by Canadian armed forces, Laurent captured the "*atmosphère de malaise et d'angoisse*" in the Gaspé region following the shocking appearance of enemy submarines on the country's doorstep earlier that year.

As far back as the 1938 Munich Agreement signed by the Allies in response to the crisis in the Czech Sudetenland, the Joint Staff Committee in Ottawa recognized the vulnerability of Gulf shipping to possible submarine attack. They envisaged air bases at Gaspé and Anticosti Island to guard the western part of the Gulf, and a seaplane base and aerodrome at Sydney, Nova Scotia to guard the eastern approaches. Captain, later Rear Admiral, Leonard Murray, while Deputy Chief of Naval Staff from August 1939 to October 1940 addressed himself to the problem of defending the Gulf, a problem he had tackled as a very junior officer during the First Word War. In March 1940 the navy made Fort Ramsay at Gaspé its headquarters, commissioning the site on May 1 as HMCS *Fort Ramsay* with the redoubtable Commander P.B. German in command.

The naval plan was to work in co-operation with the Royal Canadian Air Force, using aircraft to locate German U-boats and keep them submerged until a naval hunting group could join the action. Captain Murray urged naval planners not to panic if some ships were sunk: "There may be one, perhaps two and at the very most three submarines, all of which must leave for Germany at an early date." Although in 1942 dozens of U-boats would be prowling Canadian and Newfoundland waters, there were in fact never more than one or two in the Gulf of St. Lawrence at one time.



Eberhard Hoffman's Type IXC *U-165*.

When the U-boats arrived on the east coast of North America they began sinking thousands of tons of shipping from Newfoundland to the Caribbean. They were helped by a "blackout" in Allied intercepts of German Enigma signals, and by tactical mistakes on the part of the Allies, in particular their delay in instituting a convoy routing system along the eastern seaboard of the United States. From December 1941 to April 1942 some 13 or 14 U-boats were patrolling off Nova Scotia, with many more off Newfoundland. Under Operation *Paukenschlag* (Drumroll) in 1942, Grand Admiral Karl Dönitz, the *Befehlshaber der U-boote*, had given U-boats patrolling Nova Scotia waters freedom to enter the Gulf if they could not find enough targets elsewhere, and a number of these either took advantage of the roving commission or were ordered into the Gulf of St. Lawrence.

Three of the U-boats operating here at this time were 750-ton Type VIIs, which had an operational range of about 6,500 nautical miles and carried 14 torpedoes. Six others were the larger 1000-ton Type IXs (11,000 nautical miles), armed with 22 torpedoes. The ships and aircraft available to the RCN and RCAF to meet this threat were a very mixed bag. The navy was operating vessels ranging from armed yachts to destroyers, while the air force was flying everything from Fairey Battles to Hudsons and Cansos.

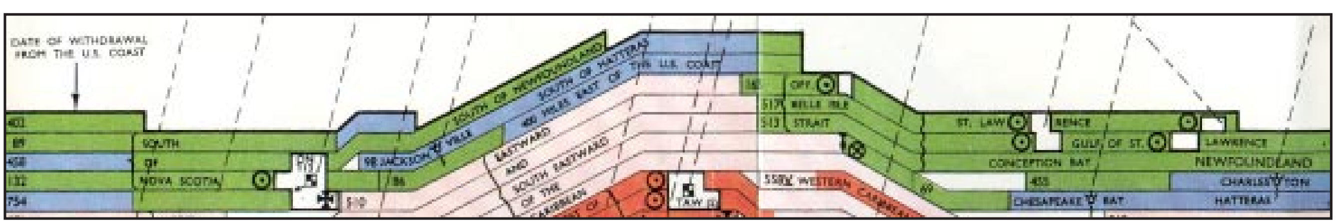
The critical period of the battle ran from August 28 to September 16, when U-boats sank 17 of the 26 ships lost in the Gulf of St. Lawrence and the Cabot and Belle Isle straits. All but two of the 17 Allied vessels were the victim of two Type IXC boats commanded by very competent captains — Korvkpt. Eberhard Hoffman (*U-165*) and Oblt. Paul Härtwig (*U-517*). Their combined record of 16 sinkings over a four-week period in their one and only fighting patrol suggests they would have been among a handful of U-boat aces had they survived longer than they did. For over a month between July 20 and August 28 there had been no sinkings at all, and in the last three weeks of Härtwig's patrol he failed to sink any more ships. The four U-boats present between October 5 and 27 only managed to sink two ships in the Gulf and two in Wabana Bay, Newfoundland. One boat assigned to the Gulf, the Type IXC *U-183*, did not even venture in to the area. Evidently, it was no longer considered easy pickings.

Although the decision taken on September 9 to redirect shipping from the Gulf to Atlantic coast ports was in itself the most effective defensive measure (despite the fact that convoys had to be continued from Quebec to Sydney, Sydney to Port aux Basques, and from Quebec to Labrador for the rest of the season), ships and aircraft of the RCN and RCAF made life much more difficult for the U-boats than either they or shore authorities realized. As planned, the moment the U-boats announced their presence, convoys were instituted and aircraft sorties were ordered from Nova Scotia, Newfoundland and the Gaspé.

Eastern Air Command HQ Halifax: operations plot.

Intelligence throughout was spotty, as was the case concerning the detection of *U-553*. Canadian shore-based high-frequency direction finding (HF/DF) failed to locate the submarine, which was picked up and attacked on May 10 by an American B-17 flying out of Argentia, Newfoundland. The attack was unsuccessful, and to make matters worse the pilot mistakenly identified the target as a destroyer. The United States Air Force commander in Newfoundland, who was at odds with Air Commodore "Black Mike" McEwen, failed to pass the information on to No. 1 Group RCAF, and the intelligence did not reach Halifax until late the next day.

Generally speaking, the RCAF dug deep to provide extensive air coverage using both operational and training aircraft, including the small twin-engine Avro Anson trainers which were fitted with racks to carry up to 500 pounds of bombs. While aircrews helped keep the U-boats down in the Gulf of St. Lawrence, USAF squadrons helped to fill the gaps in anti-submarine coverage created in the Bay of Fundy.

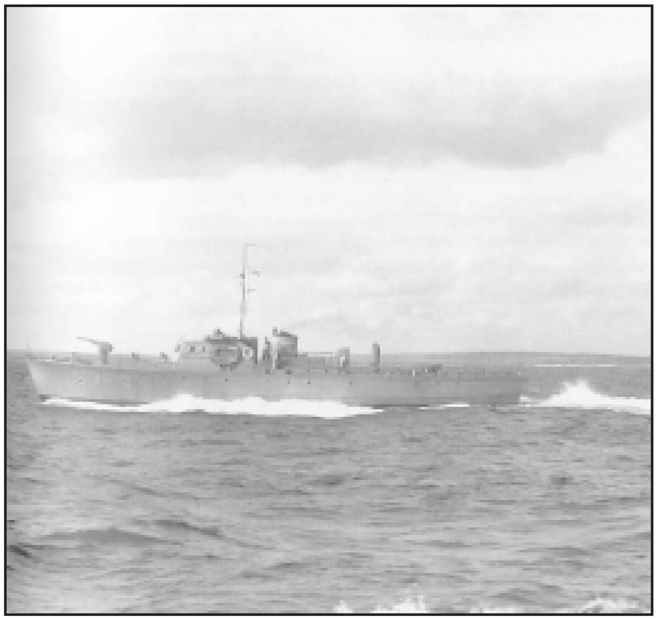


Detail from a U-boat disposition chart (July - December 1942) prepared after the war for the Admiralty by Gunther Hessler, Dönitz' son-in-law.

There were nine air attacks on U-boats in 1942, including one that was likely more alarming than destructive. On September 29 a Lockheed Hudson from 113 Bomber Reconnaissance Squadron (Torbay, Newfoundland) attacked Härtwig's *U-517*. Härtwig escaped, but on surfacing later found an unexploded depth bomb lodged on the foredeck of his submarine. The bomb, which was set to explode at a greater depth than what the U-boat was running at when it landed on the casing, was rolled over the side, whereupon it detonated automatically as soon as it reached its preset depth.

Mention must be made of the Air Detection Corps and of other civilians who often sighted U-boats and reported them by telephone. They did yeoman service, but considering the state of telephone service in the Gaspé in 1942 it comes as no surprise there were delays in passing this intelligence on. On September 11 (two weeks before *U-517*'s close call with the unexploded bomb) observers at Cap Chat sighted *U-517* minutes before Härtwig torpedoed HMCS *Charlottetown*. The U-boat had long gone by the time aircraft arrived on the scene.

Surface escort of convoys was less effective than air cover, not only because the ships' crews had limited experience and the ships themselves lacked adequate armament for the circumstances, but because asdic conditions favoured the U-boats. Enemy submarine commanders quickly learned to make use of the extensive temperature layers in the Gulf and River St. Lawrence despite their tendency to play havoc with a boat's stability. Such was the case when Kptlt. Ernst Vogelsang attempted to dive his *U-132* deep to escape an attack by HMCS *Drummondville* off the Gaspé coast on July 6. Vogelsgang and his crew were lucky to escape with only limited damage to their boat after it had difficulty diving deep through the temperature layers and nearly capsized.



Fairmile Motor Launch: Inadequately equipped for anti-submarine warfare, but a useful escort vessel nevertheless.

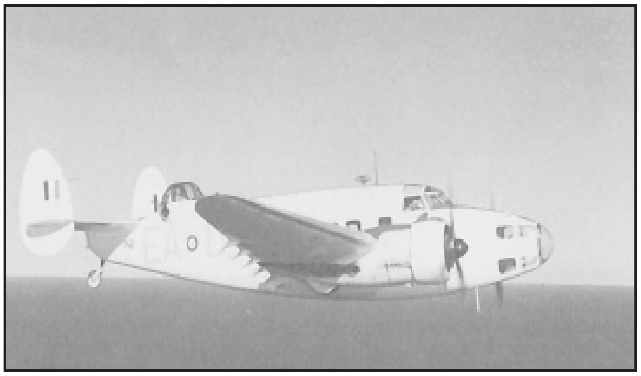
Tragedy had struck the RCAF the night before as they sortied against *U-132*. The first thing Fort Gaspé heard of *U-132*'s activities was when Halifax telephoned to order the two Canso flying boats on detachment from Sydney to take off. Fog kept them grounded, so a telephone call from the naval detachment at Rimouski prompted the nearby detachment of 130 Squadron at Mont-Joli to send four P-40 Kittyhawk fighters off into the darkness. This sortie was also unsuccessful, sighting nothing. The mission ended badly with the disappearance of Squadron Leader J.A.J. Chevrier who is believed to have crashed his Kittyhawk into the sea near Cap Chat. You have to admire the brave efforts of these airmen who flew sometimes without radio equipment on board, and knowing their engines were not always dependable.

One of the most tragic events of the Battle of the St. Lawrence occurred in the early morning hours of Oct. 14 when the Sydney to Port aux Basques passenger ferry, the *S.S. Caribou*, was torpedoed in the Cabot Strait by *U-69*. At the time the ferry was being escorted by the Bangor minesweeper HMCS *Grandmère*, which carried no radar. On a night when visibility was so bad the escort could not even see the *Caribou* belching black smoke 2,500 yards away, it is not surprising they failed to see the slim silhouette of *U-69* as it shadowed the ships. *Caribou* was torpedoed around 3:30 a.m. and sank in less than five minutes with the loss of 136 men, women and children of the vessel's 237 passengers and crew. *Grandmère*'s commanding officer, Lt. James Cuthbert, attempted to ram the submarine and then dropped depth charges before breaking off to rescue survivors. Kptlt. Ulrich Gräf's *U-69* managed to slip away, but a year later the boat would be lost with all hands east of Newfoundland.

When the British asked for Canadian escort vessels to assist in Operation Torch, the November invasion of North Africa, the navy had no hesitation in reducing naval escorts in the Gulf. There was some difference of opinion between the navy and the air force on this, the air force not sharing naval optimism that reducing shipping in the Gulf would encourage U-boats to seek targets elsewhere. I have detected some complaints in the documents suggesting that air force planners thought the RCAF was being overloaded, but so far as I know this did not find its way to the high command. In total, the RCAF, quite apart from all the training flights, flew 1,590 operational flights over the Gulf in 1942, nearly a third of all flying operations by Eastern Air Command. "If the defence of the St Lawrence was a commitment the navy did not want," we wrote in the official air force history, "then the air force, to an important extent, stood in for the senior service."

None of the U-boats that were involved in the 1942 Battle of the St. Lawrence survived the war. For example, only six weeks after leaving the Gulf in October, Paul Härtwig's *U-517* was sunk southwest of Ireland, with one dead and 52 survivors (including Härtwig, who after the war became commander-in-chief of the West German fleet). Kptlt. Karl Thurmann's *U-553*, which had survived the attack from the B-17, was lost in the North Atlantic in January 1943. Kptlt. Friedrich-Wilhelm Wissman's Type IXC *U-518*, which had sunk two ships at anchor in Wabana Bay on October 27 and reentered the Gulf November 6-9 to land the agent Werner von Janowski, was itself sunk northwest of the Azores on April 22, 1945, just weeks before the war's end. All hands were lost.

Perhaps the most ironic footnote belongs to Kptlt. Ernst Vogelsang's *U-132* which had escaped *Drummondville*'s attack in July. After leaving the Gulf on August 2, *U-132* joined a wolfpack of a dozen or more U-boats ranged against the 42-ship slow convoy SC-107 in the opening days of November. This convoy, which was under the escort command of LCdr Desmond Piers in HMCS *Restigouche*, sustained some of the worst losses in the entire Battle of the Atlantic. Fifteen of the 42 ships in convoy were lost. During the action, on November 4, *U-132* torpedoed the ammunition ship *Hatimura* with disastrous results. When the ammo ship exploded, the U-boat was "hoist by his own petard" and sank with all hands.



Lockheed Hudson: the most effective anti-submarine aircraft in Eastern Air Command in 1942.

For 'tis the sport to have the engineer
Hoist with his own petard; and 't shall go hard
But I will delve one yard below their mines
And blow them at the moon: O, 'tis most sweet,
When in one line two crafts directly meet.

— **Hamlet**, *William Shakespeare*

Even though they were at the height of their success, the U-boats involved in the Battle of the St. Lawrence suffered an eventual exchange rate of one U-boat and crew for about every three ships they sank. It was a terrible price to pay. In the final analysis, the German tonnage war — finding the soft spots in Allied defences to allow maximum destruction of shipping with the least risk — was doomed to failure. The destruction simply could not keep up with Allied shipbuilding.

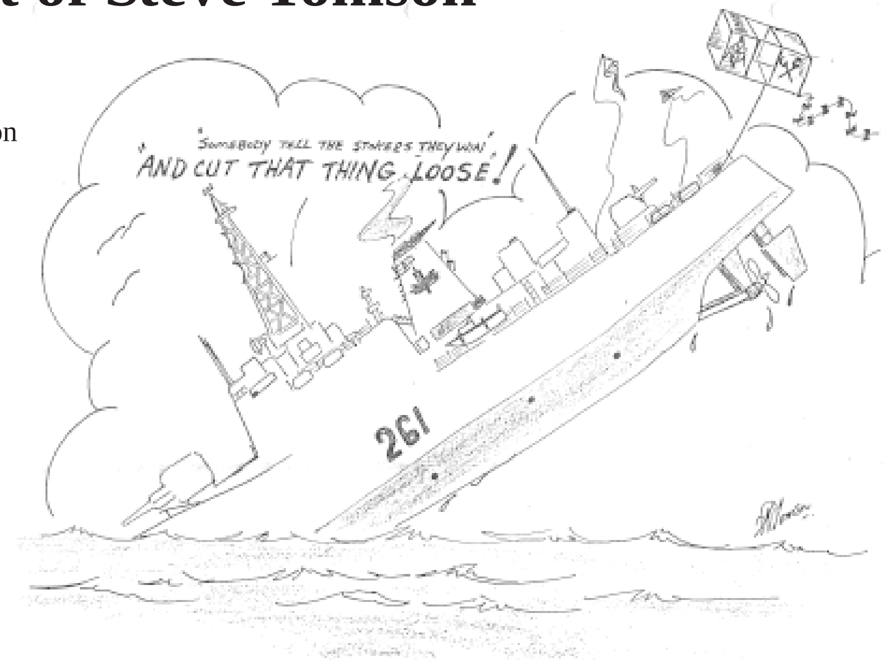
The Battle of the St. Lawrence may not have been one of the decisive battles of the Second World War, but it demonstrated the importance of maintaining effective communications and close civil-military co-operation in such an endeavour. Like so many other Canadian experiences in the Second World War this battle, which saw the loss of so many lives in the Gulf and River St. Lawrence and in the approaches to these waters, demonstrated the Canadian ability to learn from early mistakes. In the end it spoke volumes about the soundness of keeping the focus on the main theatre of war, and the perils of allowing an enemy the freedom to approach Canada's doorstep and to leave unpunished.

Alec Douglas is a naval historian and former Director of History for the Department of National Defence. This article is based on Dr. Douglas' keynote address made at the Canadian War Museum on January 30, 2007 for the opening of a special exhibit on the Battle of the St. Lawrence (Maritime Engineering Journal, Spring 2007, p. 20).

Mac's Best — The Cartoon Art of Steve Tomson

By Brian McCullough

Artwork copyright 2007 Steve Tomson

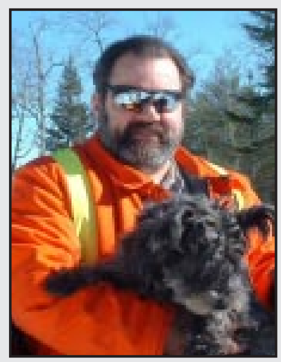


Every once in a while something unusual comes our way. Such is the case with the cartoon art of CPO1 (ret.) Steve Tomson. As a petty officer second class marine engineering technician serving in HMCS *Mackenzie* in the 1980s, Steve captured in his drawings the spirit of life on board the Mighty Mac — lead ship of the Fourth Canadian Training Squadron based in Esquimalt, BC. His cartoons, which appeared in *Mackenzie*'s daily Routine Orders, usually depicted the humorous side of life aboard ship.

HMCS *Mackenzie* (DDE-261) was in service for nearly 31 years before being decommissioned in 1993. In 1995 the ship was sold to the Artificial Reef Society of British Columbia, and on Sept. 16, 1995 was sunk as an artificial reef near Sidney, BC. The ship's after 3"50 gun mount was spared, and is now in the Naval Museum of Alberta in Calgary (*see Maritime Engineering Journal, Fall 2005*).

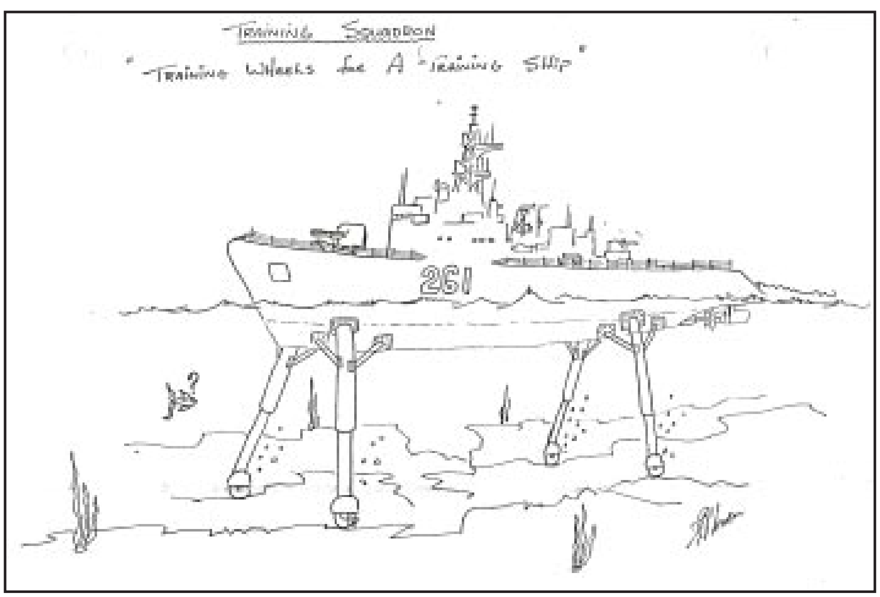
Steve Tomson retired from the navy in 2004 with 28 years of service, and lives in Halifax with his wife Gail. She, it must be told, cheerfully helped us pull this material together while Steve was away working in the BC interior in his new career as a water treatment technologist with Sepratech Corporation.

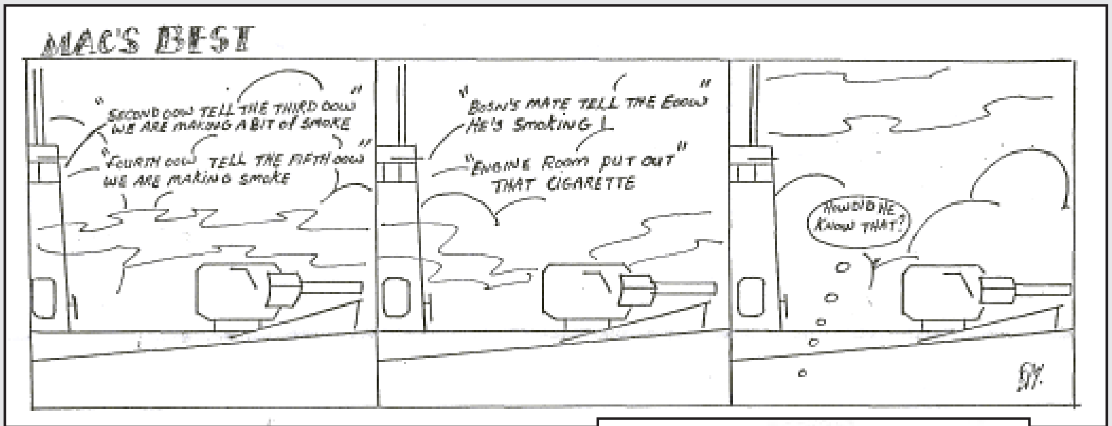
Our thanks also to CPO2 (ret.) Marc Noel, a former shipmate of Steve's in *Mackenzie*, for hooking us up with the cartoon art of Steve Tomson.

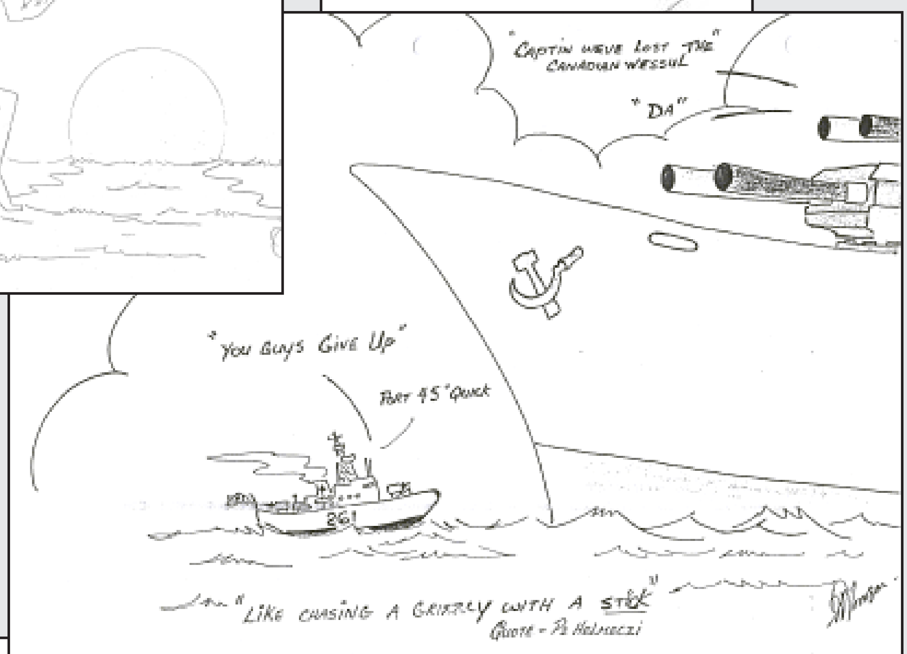



The cartoonist then...

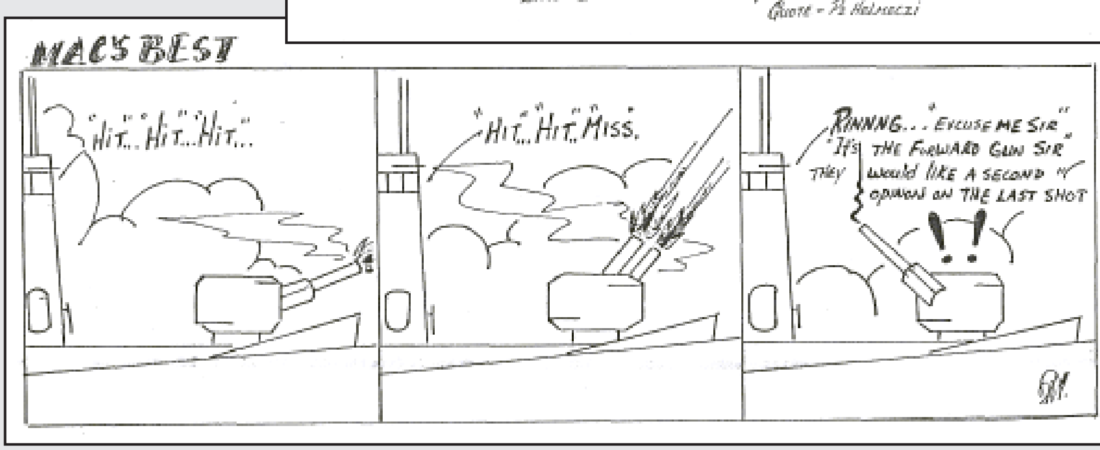
...and now







© 2007 Steve Tomson



Book Review

Fighting Sail on Lake Huron and Georgian Bay

Reviewed by Mike Belcher

Fighting Sail on Lake Huron and Georgian Bay
by Barry Gough
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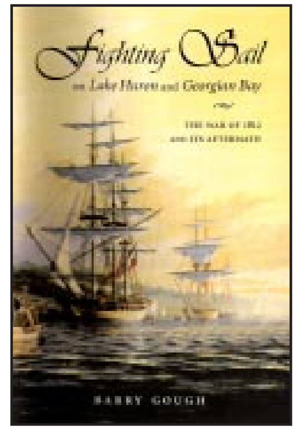


Several years ago I wrote a short travelogue about Discovery Harbour, a partially restored 19th-century Royal Navy base near Penetanguishene, Ontario *(Maritime Engineering Journal, October 1997)*. My understanding of the history behind this establishment was a bit vague at the time I visited, but author Barry Gough's *Fighting Sail* finally fills in the missing pieces. It also provides an excellent review of the naval aspects of the War of 1812, at least west of Lake Ontario. The title may be a bit deceptive because the only major naval battle took place at Put-in Bay on Lake Erie, with naval actions in the upper lakes limited to amphibious assaults and shore bombardments. However, the coverage of the Battle of Lake Erie in which the British fleet was completely defeated is quite complete.

As a history buff I rate a book worthwhile if I learn something from it, and this book definitely gets my nod on that count. *Fighting Sail on Lake Huron and Georgian Bay* covers in depth a portion of the War of 1812 that is relatively unknown, including a good description of the events leading up to the war. In fact, *Fighting Sail* is not strictly a military book because it touches on economics (the fur trade and the opening of the West), politics and even logistics. Much of the western part of the war was governed by difficulties in providing ships, troops and supplies to lakes Erie, Huron and Superior. These days as you negotiate all the transports on Highway 401 south of Toronto it is hard to believe that Detroit was once at the edge of an empire and supplied mostly by water. The capture of forts along the St. Clair River by the Americans was enough to rout British forces from what is now southwestern Ontario.

As a proud Canadian I was raised with the idea that "we" won the War of 1812. This book shows that in such a broad-ranging conflict there were local victories on both sides. Certainly in the western lakes the American forces emerged victorious, and there are even quotes from British commanders who questioned the viability of British possessions west of Kingston. Another interesting revelation was the role of native groups in this war. It appears the big losers in this conflict were the Indians. They had supported the British side with hopes that a British victory would result in the establishment of an Indian territory in what is now Michigan and Wisconsin. That hope died with Tecumseh at the Battle of the Thames in 1813, and was buried with the signing of the Treaty of Ghent, which formally ended the war.

And what of Discovery Harbour? At the conclusion of the conflict British forces were denied free access to the upper lakes via the St. Clair River. Surveyors went looking for a defensible position in which to concentrate the remaining British forces on Lake Huron, with possible expansion to include a shipyard if necessary. The harbour near Penetang was identified as the best location in which to store the British ships following the war, and the site was maintained by a small garrison. As described in this book, the disarmament of the Great Lakes and the reduction in tension between Britain and the United States led to the withering of this small outpost. The ships that had once been so carefully stored there eventually rotted and sank.

In summary, *Fighting Sail* is a well-written and informative work that would appeal both to fans of naval and military history and to those interested in the early history of our country.

Mike Belcher is a survivability analyst in the DMSS 2 Ship Systems Engineering section of DGMEPM in Ottawa.

Paper ships — Build your own MCDV!

Article by Bridget Madill

Here's your chance to turn your kitchen into a shipyard and build your very own 30-cm model of a maritime coastal defence vessel — complete with crew. Thanks to the navy's website you can now download PDF materials to construct a simple or a more advanced 1:200 scale paper model of HMCS *Kingston*. Both have five pages of cut-out parts, but the advanced version has more 3-D details and even some optional parts for expert builders. A paper model of a *Halifax*-class frigate may also be in the works, but for now you'll find everything you need for your paper MCDV in the youth section at www.navy.gc.ca.

The instructions recommend printing the parts sheets onto 28-32 lb paper, but I used some 67-lb cardstock that I had on hand. I appreciated using the heavier paper when it came time to assemble the larger (read floppy) sections. The ship is mostly grey, but printing everything out in colour produces smoother tones. And besides, the little red maple leaf on the side of the ship adds a nice touch of colour to the finished model.

I decided to breeze through the simple version first, thinking the two-to-three-hour construction estimate was overly generous. However, after more than an hour of careful work using scissors and a craft knife just to cut everything out (the two-piece mast was the trickiest part), I began to think that the three-hour estimate might be a tad on the ambitious side.

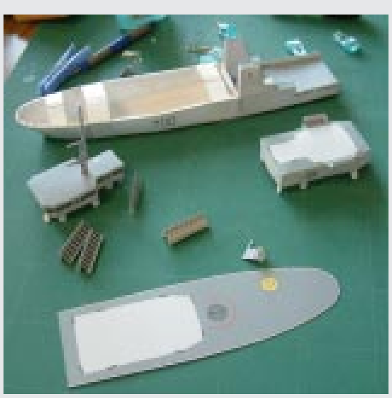
(Photos by Bridget Madill and Brian McCullough)

Paper plans, a spot of glue and a bit of patience are the main ingredients in this latest addition to the navy's fleet.

The assembly instructions consist mainly of illustrations, with very few word explanations. While most of the diagrams are clear, a few sections were quite puzzling. For example it took several dry fittings to figure out exactly how to fit the stern to the vessel's bottom, a critical step since everything else lines up with this. The diagram indicated that something had to be flipped, but what? A more detailed illustration or a few more words of explanation would have made things much easier. The hull's side and bow pieces have to be assembled to the ship's bottom from stern to bow or it just won't work. I found that pinching the bottom of the bow made it fit more easily onto the point of the bottom piece.

"I snipped and glued, and generally had fun playing with my paper dolls."

For the final hull assembly I used tape on the inside of the model to hold all of the little tabs in place while the glue dried. You'll want to experiment with clothes pins, paper-



Modular construction methods work just fine for paper ships, too!

clips, tiny toothless alligator clips, tape — whatever — to see what works best for you. Sometimes nothing substitutes for fingers.

Constructing the gundeck with its superstructure quarterdeck and bridge subassemblies was easier, doing small sections at a time. The curved tabs on the mast slid easily into the top of the bridge, and the bridge and quarterdeck slotted nicely into the gundeck. Once the gun itself was attached, the last step was to glue the entire superstructure assembly onto the hull. It is important to fit the back of the gundeck in place first to avoid leaving a hole in front of the funnels. (What's with all this stern-to-bow assembly order?)

In the end everything fit very well, and after about three hours I had only to march my crew on board. There were no directions on how to assemble or position the sailors, so I winged it. I snipped and glued, and generally had fun playing with my paper dolls. It's hard to say who ended up wearing more glue — me or the model — but it was a satisfying project to complete. All I have to do now is figure out how to squeeze my bateau into a bottle!

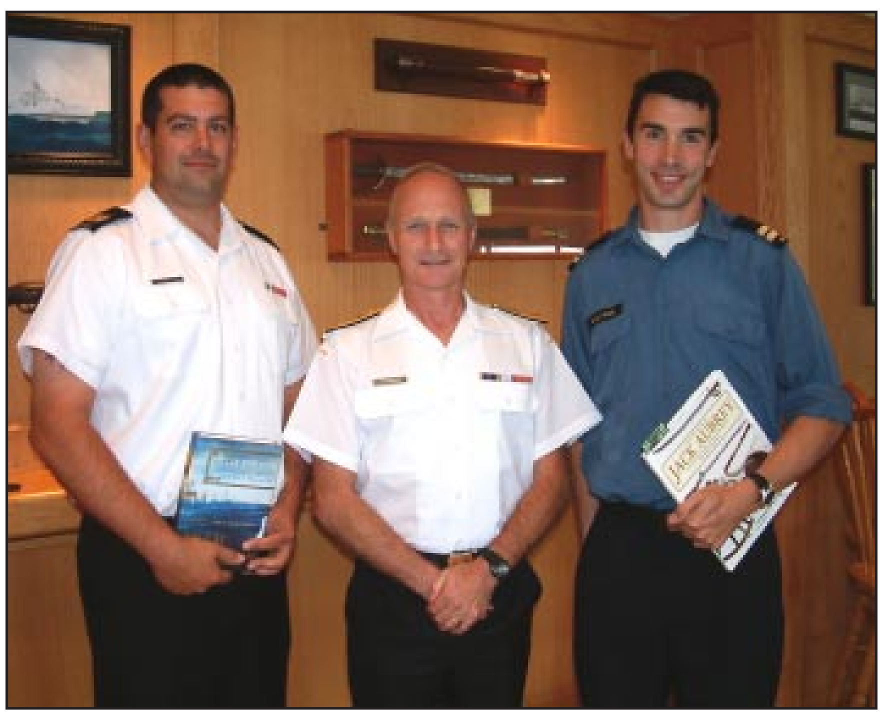
What's next? My 16-year-old son Nathan was suitably impressed with my nautical handicraft and wants to tackle the more advanced MCDV model with me. His Sea Cadet seamanship skills will come in handy at our kitchen table shipyard, and I have no doubt that we will produce a fine model together. To be honest, though, it is the prospect of having several hours of quiet family time that I am most looking forward to — something I'd be hard-pressed to find in a commercial shipbuilder's yard.

Bridget Madill is Associate Editor of the Maritime Engineering Journal.

News Briefs

A Maritime Engineering Journal 25th anniversary "Nine-minute writing challenge"

CPO2 Steve Govenlock (CFNES Halifax) and Lt(N) Dan Salvage (MSEO HMCS *Vancouver*) were co-winners of an "on-the-spot" writing challenge at the MARPAC naval engineering seminar held in Victoria, Sept. 26-27. The challenge was part of a *Journal* 25th anniversary presentation. Seen here displaying their book prizes with Commodore Richard Greenwood (DGMEPM), the two engineers were among 50 people who wrote about a favourite navy related memory. The imposed nine-minute time limit may have kept the writings short, but in no way stifled people's thoughtfulness or elegance with the written word. We will publish all (well, okay, *almost* all) of the stories in our next issue. ***— Brian McCullough, Production Editor***



(Photo: Brian McCullough)

Deputy Minister commendations

Photo: Cpl Morin

Mario Gingras, DMEPM (SM) 4-4-2

Mr. Mario Gingras has made a significant contribution as the lead engineer in the multi-agency recertification requirements for the nickel-aluminum-bronze valve castings fitted to *Victoria*-class submarines, which were vital in increasing the operational availability of HMCS *Corner Brook*. His superior technical expertise, thoroughness and professionalism were crucial to the successful resolution of these investigations, and provided an opportunity for the DND/CF to make a significant contribution to a crucial information exchange agreement with the United Kingdom Ministry of Defence. Mr. Gingras' dedication, knowledge and analytical abilities have brought great international credit to the DND/CF and to Canada.

Photo: Cpl Doucet

Crista-lynn Harding, DMEPM (SM) 5-4-2

Through her leadership and tireless efforts, Ms. Crista-lynn Harding has made an exceptional contribution to the third-level support of *Victoria*-class submarines and of the submarine program in general. She made vital contributions to several major submarine certification extensions, which were critical for continued submarine operations; further, she played a key role in overseeing the development of submarine specifications, and established unprecedented co-operation between the fleet maintenance facilities. Ms. Harding possesses an intricate knowledge of the *Victoria* class that is unparalleled, and she is a dedicated mentor. She frequently takes on high-profile projects, whereby she demonstrates outstanding dedication and commitment.

Management of Human Resources Award

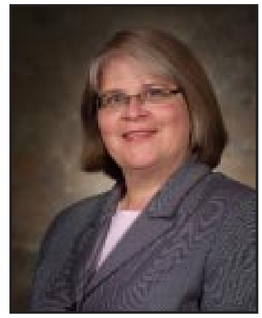


Photo: Cpl Morin

Susan Dickout, DMSS 2-4

Ms. Susan Dickout has been an outstanding leader in personnel recruitment and development throughout her career, and is recognized throughout the DND/CF for her integrity and her commitment to Public Service values. She consistently demonstrates innovation and foresight in succession planning, and in developing and executing visionary training plans. Among her exceptional achievements is the development of a recruitment and training program for technologists, which will ensure the future availability of this key expertise within the DND/CF. As a direct result of Ms. Dickout's leadership and dedication, the DND/CF will be well prepared to meet its current and future recruitment challenges.

Objectives of the Maritime Engineering Journal

- 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.

Orcas to reduce bottleneck in junior officer training berths

The Canadian navy has now officially accepted the first four *Orca*-class patrol craft training vessels into the fleet. First-of-class *Orca* (PCT-55) was accepted from Victoria Shipyards in November 2006, with *Raven* (PCT-56) joining on March 15, 2007, *Caribou* (PCT-57) following on July 31 and *Renard* (PCT-58) on September 13. Four more vessels of the class will be delivered over the next year to replace the aged-out Yard Auxiliary General (YAG) vessels that were used for junior officer sea training for almost 50 years.

Introduction of the new 33-metre, 210-tonne *Orca*-class vessels will reduce the current bottleneck of training berths for junior officers in the navy's primary surface fleet of *Halifax*-class frigates and *Kingston*-class maritime coastal defence vessels. With their modern navigation electronics, global positioning system and improved accommodations, the *Orca* vessels closely reflect the outfits found in the rest of the fleet. While the bridge platform replicates those found on the navy's frigates and MCDVs (and in the navigation and bridge simulator at the Naval Officer Training Centre in Esquimalt) the *Orca* bridge is oversized to accommodate duplicate training stations and numerous students. The *Orca*s carry 24 berths and are designed to accommodate a single bow-mounted heavy machine gun.

The remainder of the class — *Wolf* (PCT-59), *Grizzly* (PCT-60), *Cougar* (PCT-61) and *Moose* (PCT-62) — could be delivered ahead of schedule, with the last arriving in the fall of 2008. Other than *Orca* and *Raven*, the vessels' names derive from the names of Canada's armed yachts during the Second World War. *Orca*-class vessels will not be commissioned and will not hold battle honours. *(Cont'd next page...)*

(Photo: LCdr John MacLean)

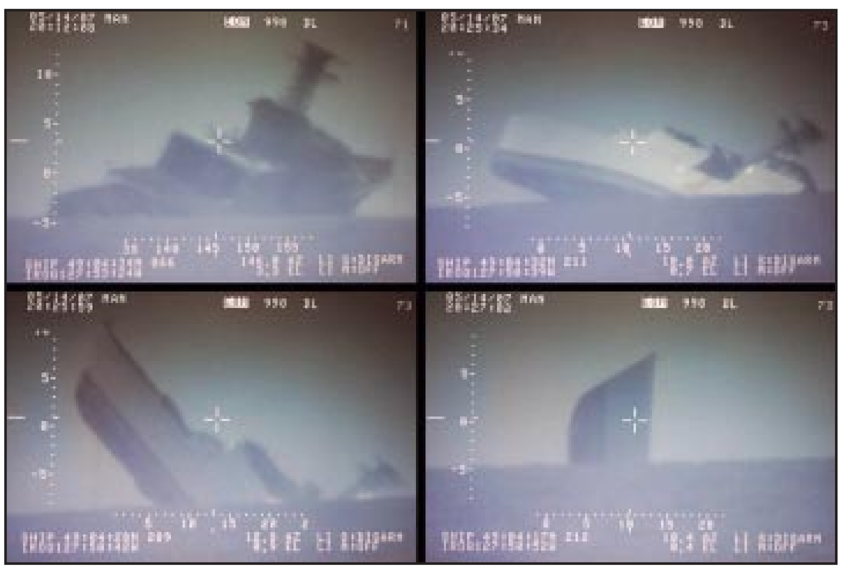
Victoria Shipyards Senior Project Manager Bill Van Dinther, a retired Canadian Forces naval architect, points out features in *Wolf*'s engine-room. When these photos were taken on Oct. 27, the shipyard was full of activity with follow-on vessels at various stages of construction.

(Shipyard photographs by Brian McCullough)

All *Orca*-class vessels will be based at Esquimalt, British Columbia and used for junior officer sea training. It is unlikely they will carry permanent crews. The *Orca*s have a top speed in excess of 18 knots, at least three knots faster than *Kingston*-class ships, and their 660+ nautical mile (1,220 kilometre) range will allow them to provide a secondary inshore patrol capability.

SINKEX — **Huron***'s final mission*

A series of images from HMCS *Algonquin*'s shipboard electro-optical surveillance system captured the former HMCS *Huron*'s final mission for the Canadian navy. In her last deployment at sea during Exercise Trident Fury 07 conducted in the West Coast Firing Area approximately 60 km west of Vancouver Island, the ship completed her service by providing valuable training for the next generation of naval ships and sailors. The exercise marked the culmination of almost two years of effort to prepare the ship for sinking and was indeed an honourable way for *Huron* to contribute one last time to the future of the navy.



Last images of *Huron*. (Canadian Forces Combat Camera photos)

During the SINKEX portion of the exercise on May 14, a barrage of naval gunfire from Canadian and United States naval ships pierced the hulk below the waterline. She gradually began listing to starboard and then started to sink by the stern as CF-18 Hornets commenced their strafing runs. *Huron* finally went vertical, with the bow rising some 40 metres above the ocean's surface, paused for a moment and then slipped gracefully beneath the waves at 1:27 p.m. As the proud old ship began the descent to her final resting place in 1,800 metres of water, a resounding "three cheers" rose from the crew of HMCS *Algonquin*, *Huron*'s former sister ship, whose guns had delivered the final salvo.

The Tribal-class destroyer was paid off March 30, 2005 after 34 years of service. In the recent past, Canadian warships that have come to the end of their service life have been disposed of by being sold for scrap, or sunk as artificial reefs. Given the operational tempo of the navy in recent years, however, using *Huron* as a target during a large-scale naval exercise would provide a relatively rare "home-grown" opportunity for realistic operational training against a ship-like target. While much can be achieved through computer simulation, important elements such as personnel training and combat system performance can only be fully evaluated under live-fire conditions controlled by range safety regulations.

Preparing *Huron* to be used as a live-fire target in a SINKEX was a long and exacting process. Thousands of pieces of serviceable equipment were carefully removed and returned to the Supply System to support the three remaining ships of her class. At the same time, all potentially deleterious material including oil, grease, hydraulic fluid and hydronics were removed, processed and accounted for to meet the tough Environment Canada standard for disposing a vessel at sea. Components such as chemical storage containers, positively buoyant material, radiation devices, mercury gauges, heat sensors, refrigerant containers — all were removed and environmentally processed. Loose paint and flaking rust were removed, and fuel tanks and fuel lines were removed or cleaned to a "no oil to the touch" standard. In all phases of the disposal process, up to and including the final sweep of the SINKEX position for floating debris, navy environmental staff worked closely with Environment Canada to ensure the *Huron* sinking met all applicable laws and regulations. ***— LCdr Garry Hansen, OIC West Coast detachment, Canadian Forces Maritime Warfare Centre.***

50th engine for NETE diesel test cell

The Naval Engineering Test Establishment in Montréal, Québec celebrated an important milestone for its diesel test cell on April 19, 2007 with the successful testing of its fiftieth overhauled MWM diesel engine. Four MWM diesels are installed on board each of Canada's 12 *Halifax*-class patrol frigates.

The NETE diesel test cell was commissioned in June 1998, and tested its first overhauled engine the following September. Testing includes a run-in program using specially formulated lube oil, a performance test under different loads and up to ten percent overload, followed by a preservation run for the engine's primary cooling water and fuel systems.

Testing overhauled engines at NETE prior to installing them on board ship means that minor defects or leaks can be identified and repaired, and engine components and operational settings can be fine-tuned before the engine leaves the facility. Establishing an engine's baseline operating parameters in the controlled environment of the diesel test cell is extremely useful for later comparison with shipboard operating performance data.


(Photo by Brian McCoy – NETE)

(*Left to right*): NETE site manager Serge Lamirande, task leader Nabil Shehata, Wartsila Canada (Montréal) general manager Dieter Hohoff, Bruce Blodgett (DMSS 3-4-3), NETE commanding officer Cdr Joel Parent, and Brian Cox (DMSS 3-4) celebrate the successful completion of the 50th overhauled MWM diesel engine at NETE's diesel test cell.

The NETE diesel test cell also functions as a land-based facility for testing and trialling various engine modifications to ensure their suitability for shipboard implementation. For example, the one-circuit cooling water system electronic thermostat was tested at NETE prior to its shipboard trial, and test runs were conducted on MWM engines fitted with third-generation low-load injector nozzles.


(Photo by George Csukly – NETE)

NETE instrumentation technician Bill Hannah (left) and Wartsila Canada diesel mechanic Herbert Volk prepare an overhauled MWM engine for performance testing.

Although the NETE diesel test cell has been used to test only MWM engines, it could be reconfigured to test other diesel engines within the capacity of its hydraulic dynamometer. The bidirectional dynamometer installed in the test cell is capable of absorbing power as high as 2100 kW at a maximum speed of 4,000 rpm. At present, NETE is conducting an engineering study to establish the feasibility of reconfiguring the test cell to accommodate the Paxman diesel engines used in the *Victoria*-class submarines. — ***Nabil Shehata, MBA, Eng.***

[Nabil Shehata is a mechanical engineer in the Marine Systems section of NETE. He led the team entrusted with the design, construction, commissioning and operation of the diesel test cell, and is now leading the current reconfiguration feasibility study.]

NATO submarine escape equipment panel

From May 7-9 NETE hosted the annual meeting of the NATO Submarine Escape Equipment Panel, a technical working group of the NATO Submarine Escape and Rescue Committee. This was the first time the panel has ever met outside the United Kingdom. NETE's Montréal site was chosen for the meeting to allow the navy's engineering test establishment to demonstrate its capability relating to submarine escape and rescue.

Approximately 30 participants from eight countries attended the three-day meeting, representing Australia, Canada, France, Germany, India, the Netherlands, the United Kingdom and the United States. The panel discussed lessons learned during the U.S. Navy's ESCAPEX 06, capabilities of the NETE Submarine Escape System (SES) test bed, survivability, and improvements to equipment used for submarine escape and rescue. A comprehensive tour of the Naval Engineering Test Establishment was also included to show the level of technical support the facility provides to the Canadian navy.

NETE's submarine escape system test bed is currently in the construction design phase and is expected to complete commissioning by early 2008. The test bed will be capable of meeting the navy's requirement to independently validate and verify the emergency built-in breathing system (BIBS) fitted on board *Victoria*-class submarines. The test bed will run unmanned crew escape cycles in a safe, controlled environment, replicating the entire hooded escape procedure, including tower flood, compression, equalization and ascent at raised compartment pressures from escape depths reaching 350 metres (seawater). — ***Augusto Resera, Manager, Marine Systems, Naval Engineering Test Establishment.***

(Photos courtesy NETE Montréal)

NETE's Submarine Escape System test bed (shown here during assembly) will be used for independent validation and verification of the emergency built-in breathing system fitted on board *Victoria*-class submarines.

NATO's Submarine Escape Equipment Panel Working Group met at NETE (Montréal) in May.

National Defence Défense nationale

SUMMER/FALL 2007

News

CANADIAN NAVAL TECHNICAL HISTORY ASSOCIATION

Ten years of *CNTHA News*!

Since its beginnings ten years ago, the Canadian Naval Technical History Association newsletter *CNTHA News* has served as the CNTHA's flagship communication vehicle for spreading the word on our efforts to preserve Canada's naval technical history. At the same time, the newsletter has given you the opportunity to respond to our various enterprises and contribute in a meaningful way. And respond you have, with your letters and historical documents, with your suggestions for key people to interview, and with your most welcome offers to assist our core team of directors, researchers and interviewers.

Today the CNTHA's Canadian Naval Defence Industrial Base project is at the forefront of our historical preservation effort. Under the chairmanship of Tony Thatcher, CANDIB has made enormous progress in capturing the industrial perspective on naval ship construction and naval equipment development in this country. In this regard the newsletter has played a key role in keeping the momentum up by charting the significant progress of this activity for those who care to follow it.

On this note, a word of thanks to Commodore Richard Greenwood, Director General for Maritime Equipment Program Management at National Defence Headquarters in Ottawa. Shortly after *CNTHA News* was launched, his office made us the very generous offer to bundle our newsletter as a regular insert in the navy's engineering branch publication, the *Maritime Engineering Journal* (itself now 25 years old). More than anything else, this synergistic publishing opportunity has widened our horizon in terms of getting our message "out there," especially to the serving naval community.

As Capt(N) Roger Westwood wrote in his editorial when we joined the *Journal* in 1998, *CNTHA News* serves as a "reminder to everyone serving in Canada's naval technical support community that the present soon becomes the past." It was his way of asking that people in the naval technical community do their best to maintain an accurate historical record of their work "to ensure that the story of Canada's ongoing naval technical effort will be faithfully preserved for generations to come."

We couldn't wish for better than that. So thank you to everyone who continues to support *CNTHA News* because, ultimately, it makes the task of our volunteer organization a world easier. **— RAdm (ret.) Mike Saker, Chairman, Canadian Naval Technical History Association.**

CNTHA News *Est. 1997*

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RAdm (ret.) M.T. Saker

CANDIB Committee Chairman
Tony Thatcher

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HMCS *Huron* Farewell Gathering

by Don Wilson

Approximately 30 stalwarts assembled in the HMCS *Bytown* Naval Officers Mess in Ottawa on Monday, May 14 to bid farewell to a ship many of us had come to know and love. On that day the decommissioned Tribal-class destroyer HMCS *Huron* (DDH-281) was sunk off the west coast of Vancouver Island during a live-fire naval event as part of Exercise Trident Fury 2007. (*See the News Briefs in this issue of the Maritime Engineering Journal.*) The *Bytown* gathering was organized by former *Huron* CSE Grant Ralph, who was commended for bringing us together on this day.

With us were, among others, *Huron*'s commissioning executive officer — Cdr (ret.) Jim Sine, the commissioning engineering officer — Capt(N) (ret.) Don Wilson, and Gordon Smith — the marine engineer contracted by Marine Industries Ltd. to be responsible for contractor's set-to-work and sea trials for both *Iroquois* (DDH-280, lead ship of the four-vessel class) and *Huron*. We also had with us many other officers who had been part of *Huron*'s ship's company at different times in the life of that great ship.

Huron **key turnover from Gordon Smith of Marine Industries to Don Wilson, the commissioning engineering officer.**

In raising a glass to our old ship, we also paid tribute to the late Capt(N) (ret.) Dick Hitesman, the commissioning commanding officer of *Huron* in 1972. Dick had dedicated much of his naval career to the new Tribal-class DDHs, and we shared many recollections of his association with the ship, including this one: *Huron* was at sea off St. Margaret's Bay conducting first-of-class helicopter trials. During the trial, *Huron* had two Sea Kings in her hangar and took a third on board to demonstrate the ship's ability to provide an emergency landing pad for a helicopter in distress. Dick was said to have sent a message to MARCOM which read, "My cup runneth over." With all that top weight, we were all pleased to have calm seas that day.

The Tribal DDHs made their mark as effective platforms for a variety of important deployments and trials over the years. *Huron*, for example, conducted the first at-sea vertical launch firings of the NATO Seasparrow missile. Unfortunately, in later years the ship fell victim to crew shortages and funding considerations and was decommissioned in 2005, having served the navy well for more than 34 years. *Huron*'s motto was "Ready the Brave," a code she lived up to right until the moment she slipped stern first below the surface of the Pacific Ocean at 1:27 p.m. on May 14, 2007. At HMCS *Bytown* that afternoon, those of us present bid our own quiet farewell to our *Huron*.

CANDIB Oral History Project — Background and Project Update

by Douglas Hearnshaw,
CANDIB Oral History Project Manager

In 2004 a group of CANDIB volunteers began voice-recording people's reminiscences of the historical effects of Canadian naval contracting activity on the Canadian industrial base. The group benefited initially from a small contractual arrangement with the Directorate of History and Heritage which funded the purchase of recording equipment and other start-up expenses. CANDIB used the Oral History Program developed by the Canadian War Museum as a model in developing its own techniques for interviewing and managing an oral history project.

The project's first recorded interview was conducted in 2004 with Tom Bennett, a former member of the navy's hydrofoil vessel design team. The original audio tape, with its transcription and synopsis of Tom's commentary relating to the design development and contractual activity associated with building and testing HMCS *Bras d'Or*, now resides in the Directorate of History and Heritage archives and is readily available to any researcher seeking details of this remarkable naval innovation. Subsequent interviews with high-ranking members of the navy and Canadian industry have related to the concept, design development, building and trialling of the DDH steam destroyers, the Canadian Patrol Frigate program, and particular aspects of naval contracting activity such as quality control, contract management and refit activity. All are on file at the Directorate of History and Heritage, with transcriptions of certain interviews also appearing in the CANDIB section of the CNTHA website at www.cntha.ca.

Outstanding achievements have included interviews with retired naval officers Admiral Bob Welland, Rear Admiral Bill Christie, Rear Admiral Jock Allan, Commodore Bill Broughton, Captain(N) Roger Chiasson and Commander Bob Mustard. Highlights of industrially based interviewees include Donald Kerr of Halifax Shipyard and Joseph Struthers of Saint John Shipbuilding Ltd.

Fifteen interviews have so far been recorded. While the continuity of the program is assured by the active participation of volunteer interviewers in Ottawa and on our east and west coasts, we are always on the lookout for new interviewers and interviewees. Anyone interested in taking part in the Oral History Project should contact CANDIB Chairman Tony Thatcher at (613) 567-7004 (tthatcher@snclavalinprofac.com), or CANDIB Oral History Project Manager Douglas Hearnshaw at (613) 824-7521 (dhearnshaw@trytel.com).

"*A Century of Achievement*" — A technical history writing project

A project to write the 1910-2010 history of engineering and technical innovation in the Canadian navy, including the parallel development of Canada's related defence industries, is well underway. Mike Young spent much of last winter in Library and Archives Canada, the archives at DND's Directorate of History and Heritage, and the Canadian War Museum conducting research and discovering some fascinating information. He is now writing the draft of the pre-World War II history. The target is to publish in 2010, the navy's centennial year.

The working title is "A Century of Achievement," and represents the logical progression of the work of the CNTHA in identifying, gathering and assembling key technical historical documentation — especially the Hal Smith documents — and of the activity being conducted by the CANDIB subcommittee. The book project developed from an article written in 2000 by Mike Young and Pat Barnhouse for *Maritime Affairs*, the journal of the Naval Officers Association of Canada ("A Timeline of Canadian Achievement in Naval Technology," *Maritime Affairs, Spring/Summer 2000*).

No publishing arrangement is yet in place, but future updates will be posted on the CNTHA web site.