June 2021, An IT Legacy Article for the VIP Club

Tribute to


VIP Club

A Legacy Project Document
By Glen Johnson

Our Winnipeg Story

The original plant (about 12,500 sq. ft.) opened in 1977 at 311 Sadlteaux Crescent on the northwest end of Winnipeg. The facility was built as an offset commitment to Lockheed Corporation in Burbank, CA, for Sperry Univac's portion of the CP-140 Aurora program. Univac had the contract for all the computers that went aboard all of the aircraft. Winnipeg was chosen as the plant location because of its proximity to St. Paul and the fact that Air Command Headquarters of the Canadian Military was located in Winnipeg. In fact, the airport/base bordered the facilities property. Three people from St Paul moved to Winnipeg to start the plant. Gerald (Jerry) Smith was the Director; Mike Teawalt, Production Control; and Jim Corcoran, Finance. Bill Corbett came from Salt Lake City to be the Quality Manager. The first Canadian employee was Judy Thomson, who was responsible for everything from personnel to payroll to secretarial to guide to interpreter to introductions to the key people in Manitoba. The first assembly folks were hired in 1976, and the original product was 15-pin printed-circuit boards as used in various peripheral equipments and shipboard computers. Peter Suzuk was the first engineer hired; he was responsible for Production Engineering. Ed Pogorzelec was hired as the Quality Control Engineer, and Al Hayden was hired as the first Production Manager. In addition to 15-pin cards, we also built CP-140 power supplies and various other CP-140 hardware sub-assemblies as part of the offset requirement. By 1979 there were about 35 people working at the facility. I, Glen Johnson, had left Plant 1 in St. Paul in 1977 and transferred to International Program Management to take over the Canadian programs.

In late 1979 or early 1980 Sperry Great Neck won the Canadian Patrol Frigate (CPF) program. In addition to the CP-140 offset program, I was also responsible for the AN/UYK 502 development and the SHINPADS serial data bus programs. After Great Neck won the CPF Program, I moved to Winnipeg in 1980 to manage all the Canadian programs. As part of the CPF contract, all manufacturing, hardware and software engineering, and product support had to be done in Winnipeg as part of the proposal submitted by Great Neck. This allowed Winnipeg to start hiring engineering staff as well as more manufacturing people. The first design engineer hired was Ken Buechler, and the first software engineer hired was Neil Williams. Most of the new engineering people spent several months training in St Paul to take advantage of the knowledge base there and to make sure that any development mistakes made in St Paul were not

[1] See CP-140 summary on page 7

©2009, VIP Club Page 1 of 7 Printed December 28, 2009

PARAMAX
A Unisys Company

LORAL
Defense Systems

LOCKHEED MARTIN

WINNIPEG OPERATIONS

SPERRY UNIVAC

SPERRY

UNISYS
Unisys Defense Systems, Inc.

1977 - 2000

Acknowledgements

A special thank you for the following colleagues for their valued contribution….

* Glen E Johnson, posthumously
* Dr Witold Kinsner (UofM)
* Chris Krasey
* Mike Kushliak
* Peter Munn
* Peter Soszek
* Kevin D Walker
* Tom Wilson

First Winnipeg Location

* 311 Saulteaux Crescent
* 40,000 sq ft
* Manufacturing Facility
* ~100 Employees
* Opened 1977

Trivia

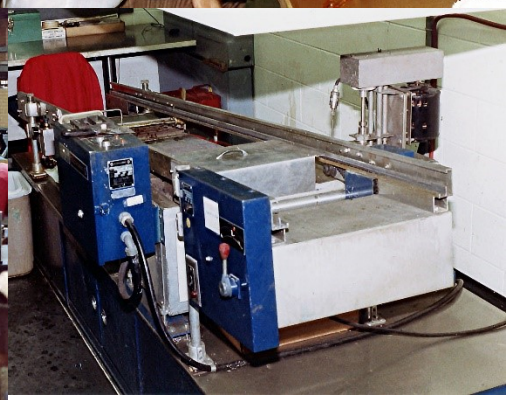
* What was the first company logo?

* What does UNIVAC stand for?
  * **UNIV**ersal **A**utomatic **C**omputer

Trivia

* Who were the original staff?
  * G. R. (Gerry) Smith, St. Paul, MN, Plant Manager
  * Jim Corcoran, Eagan, MN, Controller
  * Mike Teawalt, Eagan, MN, Production Control
  * Bill Corbett, Salt Lake City, UT, Manufacturing
  * Jerry Hernandez, St. Paul, MN, Quality Assurance
  * Judy Thomson, Administration
* Who was the first Winnipeg employee?
  * Judy Thomson
* Who was the first Winnipeg engineer hired?
  * Peter Soszek

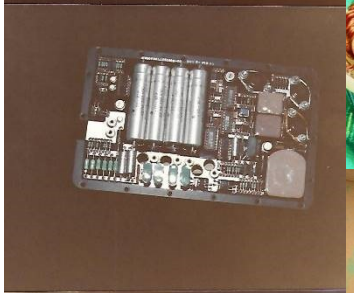
311 Saulteaux Crescent



Second Location

* 200 Saulteaux Crescent
* 150,000 sq ft
* Product Development and Manufacturing
* ~800 Employees
* Opened 1981

200 Saulteaux Cres. Cont'd



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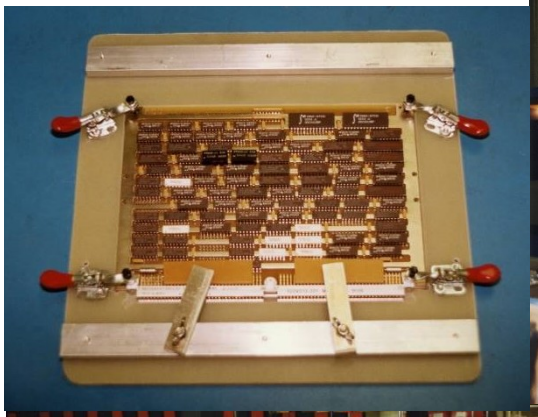

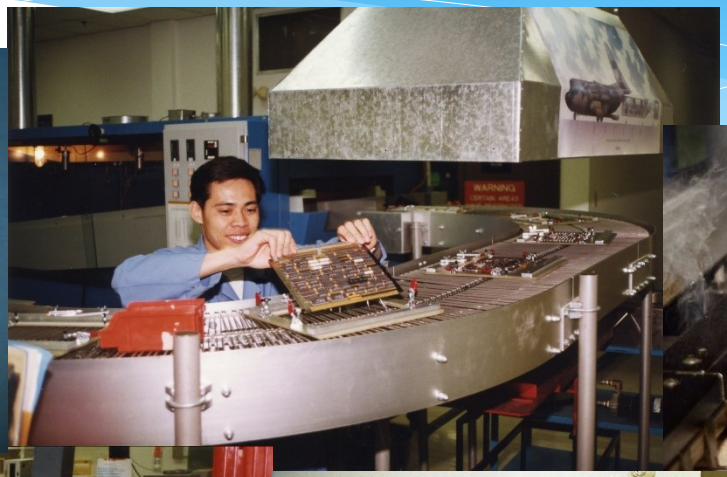

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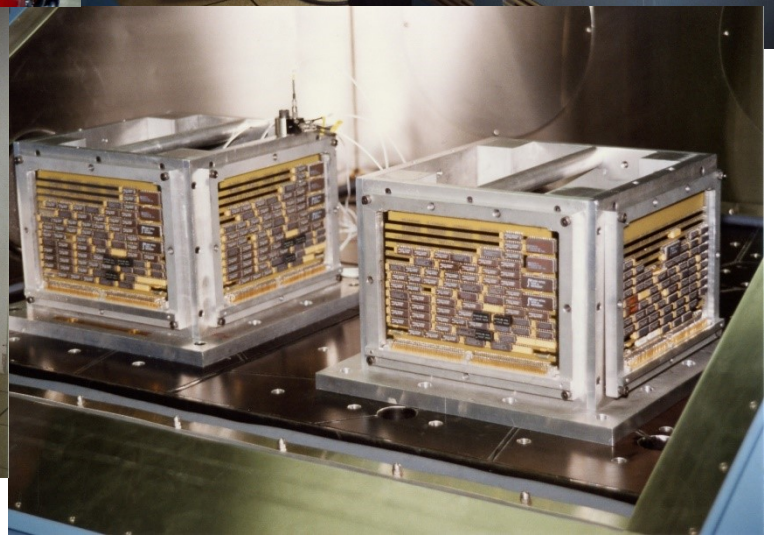

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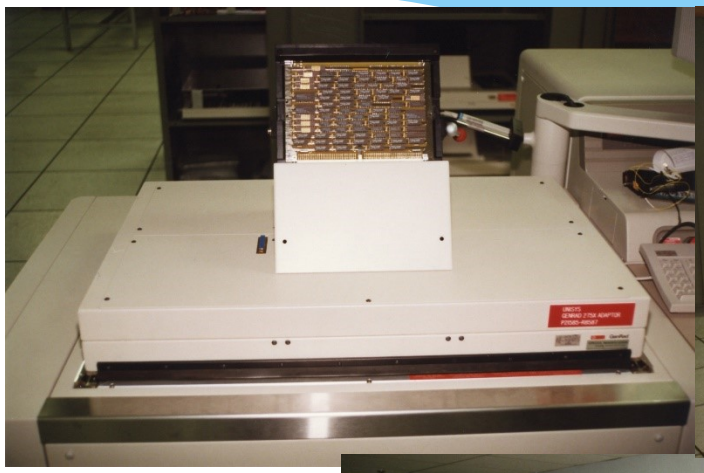


Hi-Tech Recognition

Business *Toronto, Vancouver stock prices/29* *Money, gold, metals — closing prices/30*

Sperry plugged into military work

By Greg Bannister

A Doobie Brothers rock'n roll tune from the early 1970's floats lazily through the air on the busy assembly floor at Sperry Inc.'s plant in Winnipeg's west-end Murray Industrial Park.

Dozens of pairs of tiny hands belonging to a predominantly female workforce are manipulating hair-like strands of wire and hot soldering irons underneath powerful microscopes.

Everywhere hang red and white signs warning of the unseen dangers of static electricity which can quickly and silently destroy hours of delicate work.

The finished products resulting from much of this time-consuming labor are not much larger than your average 24-inch portable television set.

They even look, to the layman, a little like a new microwave oven when the front hatch swings open.

Key components

But, the powder-grey cabinets of circuit boards, wires and switches are actually one of the key components in Ottawa's attempt to float a modern, state-of-the-art navy off the country's coastlines.

Known as the UYK-502 microprocessor computer and the UYK-501 data bus, a total of 35 machines will be installed on board each of six new frigates to be built in St. John, N.B. at a total cost of $3.2 billion.

The 4,200-tonne ships, which were commissioned by Ottawa in 1983, are scheduled to come into service between 1989 and 1992.

"It's really a general purpose computer," said Glen E. Johnson, director of operations of the defence products group at Winnipeg's Sperry plant.

"Anything they want it to do, it will do. It can be used for navigation, machinery control, communications, weapons fire control and anything else," he added in a recent interview.

The big difference between Sperry's military computer and other computers available on the commercial market, Johnson explained, is its rugged nature.

Compatible system

"It has to be environmentally tough. It must be able to tolerate humidity, moisture, salt spray and some tough knocks," he adds, explaining one durability test involves dropping a 50-pound sledgehammer on the finished product.

The computer is a modified version of a Sperry computer developed for the U.S. military, but which is now the property of the Canadian government.

"It's a little smaller, less expensive. It's compatible with all other NATO systems," said Johnson, noting also that the Canadian version is versatile and can be expanded in a variety of ways.

While it is not a true high-speed computer, in comparision to others available, it is much faster than some existing 16 to 20-year-old systems on board Canadian ships today.

"Speed isn't everything," adds Johnson. "IO (input-output) capability is much more important in this instance."

Sperry, under a second military contract announced last month, will also be building similar computer systems for four Canadian Tribal Class destroyers under a massive modernization program.

That $1.2 billion federal government upgrading contract was awarded by Ottawa in May to Litton Systems Canada Ltd. of Toronto to which subcontracted the computer work to Sperry Inc.

Ottawa decided to modernize the four vessels, which will be used in conjunction with the six new frigates within Canada's 100-nautical mile sovereignty zone, following the 1982 Falklands war.

Naval officials, at the time, said the destroyers were built in the early 1970's to track and fight submarines but need to be modernized to defend themselves against missile and air attack.

Together, the two military computer contracts are worth about about $35 million to the Winnipeg Sperry plant and will keep its expanding workforce, which now stands at 425, employed for the next decade, according to plant officials.

So successful and so confident about its future is Sperry's defence products group, the company is on the verge of a major expansion of its west-end facility.

"We'd like to add another 30,000 to 34,000 square feet of floor space this summer," said Johnson.

The plant is about 45,000 square feet in size now.

"I've got about 60 engineers in another building on Murray Park Road and some others in a couple of trailers out back. . We'd like to get everyone back under one roof," added Johnson.

He said the expansion needs only one final level of corporate approval which could come as soon as next month.

Special obligations

If approved, the expansion would be the culmination of several years of growth for Sperry in Winnipeg.

"We've almost doubled in size in the past couple of years," said Johnson, noting the plant now does about $40 million of business a year.

The Winnipeg facility, built in 1981 at a cost of $3.3 million, is one of three Sperry operations in Canada owned by the U.S. computer giant Sperry Rand Corp. of New York.

As recently as July, 1983 the defence products group of Sperry in Winnipeg employed fewer than 200 people.

Created to fufil offset contract requirements imposed on Sperry by the Canadian government when it purchased the U.S.-built Aurora long-range patrol aircraft, Sperry's Winnipeg division is still predominantly involved in military computer work.

Working for the military places special obligations on the company, Johnson explains. "You have to keep all your records for the next 800 years," he joked.

The records section of the plant is off limits to all but special personnel. "Nothing in here is highly classified. It's the software the government will use in the computers which is secured," he adds, noting Sperry has little involvement with the software development.

All of Sperry's engineers and other professionals have government security clearance and access to the plant is controlled. The plant also has constant 24-hour security staff on patrol.

Recently it received the go-ahead to begin work on a new upgraded memory for the computers used in the Aurora's and their counterpart employed by the U.S. Navy.

Johnson estimated that work, which is being jointly-funded by the U.S. and Canadian governments, would last five or six years and be worth between $40 and $50 million to the Winnipeg plant.

All of the actual research and development work for the new memory is being done in the Winnipeg plant, said Johnson, noting that unlike many branch plants Sperry Inc. keeps its more than 70 engineers constantly involved in research.

That effort also involves trying to diversify its market for its "ruggedized" computers.

Seeking new customers

"We're looking for new customers, in particular, in the transportation sector," said Johnson, citing trucks, buses and planes as target areas.

"In Canada, you can't live solely off the defence business. . .We see many other uses for our computers. Take a train travelling across Canada for instance. It has to travel through all sorts of environmental conditions from -40 degrees, to snow and rain to extreme heat in the summer. A computer could be quite useful in the operation of the vehicle."

DAVE JOHNSON/WINNIPEG FREE PRESS

Sperry employees use powerful microscopes as general manager Glen Johnson checks their work.

Recognition

Winnipeg Free Press
Saturday, August 21, 1982
Pages 35-48

Prairie farmers growing wheat in the winter/38

CAREERS

Computers control the world

By Teri Cathro

It's not generally known that the complex microcomputers of today descended from the simple abacus in use 5,000 years ago in the Orient.

And it's difficult to imagine that the latest video game components probably employ newer electronic technology than computers used for national defence purposes.

In this age of advanced technology, we have computerized drafting, exercise bikes, automobiles, microwave ovens, televisions, computerized home security systems, and even coin-operated computers. Computers can be found in virtually any field, from medicine to military.

Walter Czyrnyj is a senior engineer at Bristol Aerospace Limited, which manufactures everything from propellant and electronic data instruments for rockets, satellites and weather stations, to nuclear reactor components.

Czyrnyj, 25, graduated from the University of Manitoba's electrical engineering program in 1978, and now he's designing and building both the hardware and software for a microcomputer-based weather station. Computer hardware is the actual mechanics of a system, while software refers to the programming.

Czyrnyj, who refers to himself as an electronics engineer, said, "I first thought of electrical engineering as wiring and big power station engines. Now, electronics has blossomed into microprocessors."

His choice of an engineering career came about, he said, because "I was a whiz at math and physics in high school. A science degree seemed to lead to no definite goal, whereas, with an engineering degree, I could begin designing circuits right away."

He believes that electrical engineering graduates with a penchant for computers can easily find employment: with virtually any company using microprocessing equipment, most computerized systems are increasingly being used to monitor everything from plant temperature to production.

"Computers are being used in so many places now that people with this sort of experience are very valuable," he stressed.

Czyrnyj said some students experience disappointment on joining the workforce after university because commercial companies sometimes lack the "exotic" equipment available at university. But, he added, "I was surprised that the work was very similar. At Bristol, I stepped right into modern technology."

In the fast-changing world of computer engineering, he went on, computers come up with better, faster, more efficient microprocessors every year, and if they are going to stay in competition, they have to re-design their computers, making use of the new electronic developments.

Czyrnyj believes young people today are getting better experience with computers at the junior and senior high school level than he did. "The first time I touched a computer was in university. Now they've hanging out programs in grades nine and 10," he said.

Kids love them

Computers are part of the young person's world, Czyrnyj said. Older people are apt to be afraid of touching computers "in case they knock out the system. But kids aren't afraid to try it and start typing merrily."

Ian Walkey spent seven years with the Department of National Defence in Dartmouth, N.S., developing anti-submarine detection equipment. In the 2½ years he's been with Bristol Aerospace, Walkey, head of the company's data collection systems section, has been designing computer hardware for use in data collecting and processing equipment.

"The degree of difficulty is designing an instrument depends on what it will be used for, Walkey explained. "If it has to work over a wide temperature range, for instance, components from off the shelf might not work. Often, we have to design components to increase accuracy of a system."

Walkey, 31, a 1973 graduate of the U of M's electrical engineering program said "the average person doesn't realize what goes on in the area of electronics and computer application. Most people who know me probably think I work on aircraft."

Glen Catlin, manager of Bristol's electrical engineering department, graduated from the U of M in 1977 and went to work for a large American electronics company as an engineering designer.

At that time,computers were just starting to incorporate computers. "A computer then was a room full of equipment," and very expensive. Now, the whole thing has evolved into microelectronics and integrated circuits, and has been reduced to a size anybody can have."

Catlin thinks computers are still too difficult for the average person to use. More development work is needed to make them cheaper and easier to operate, and to increase the instrument's memory capacity. He predicts that perhaps in the next decade, operating complex equipment will be "as easy as talking, because computers may well be equipped with voice-recognition components."

Neil Williams is in charge of software engineering at Sperry Univac Defence Systems in Winnipeg. The 1977 U of M computer science graduate said he's had his eye on computer work since he was a junior high school student and realized there was a future in it. "Whenever you talk about computer work, there's a kind of mental block you have to overcome to comprehend it. I got over it in high school, so I was in the right frame of mind when I got to university."

Williams said his job entails providing support to the hardware designers, helping them verify design changes as well as working with the programming systems. "We've developed a pretty advanced level of expertise around here," he said, citing rugged electronic military computers for air and sea navigation, communication and electronic warfare.

But keeping up with advancements in the industry isn't easy. "There's as much work out there to be done, you can still be doing worthwhile tasks even with 20-year-old equipment."

Williams added: "I'm not afraid of learning new things. You can't stay stagnant in this field. You might be able to find jobs, but you certainly won't advance without either."

Joan Coughlin is a newcomer to the computer field. A former medical lab technician at the Cancer Foundation, Coughlin found that after five years of lab work, she needed a change. "I always liked math and didn't want to go into medicine," said Coughlin, 31, who graduated with her electrical engineering degree in April. Now, as a software engineer at Sperry Univac, she's in the process of making changes to the operating system of a microcomputer and converting the standard engineering functions of two different computers to see if it can handle a prescribed workload.

Ken Buechler has spent nearly three years at Sperry Univac as a computer engineer. Buechler attributed his interest in computers to his father, Wallace, who "was always an electronics nut, too."

Wonderful feeling

The 25-year-old engineer, who received his electrical engineering degree three years ago from the U of M, said, "I like designing and coming up with new ideas, as well as the feeling of accomplishment when I see it working."

Buechler said he finds challenge in "pinpointing and correcting problems in production. It feels good when you have a need for days on a problem and finally overcome it."

Buechler said he found that politics and management were two subjects that weren't taught him in university. "It's something new when you go to work in a big company. Everybody has his or her own job, and you are expected to know a lot. I've probably learned more from three years in the field than in four years of university." But, he pointed out that "without a university background in engineering, you can't do any good for anybody."

The key to designing computers, Buechler said, is to make the hardware and software compatible. A well-designed piece of hardware must also be easily programmable or "it's not worth as much" to the company. He contends that "something not really tough: well (in the university level) is systems architecture, or how the hard and software work together. When you get the whole idea, you can do a better job in whichever area you work."

Until this year, most people working in the computer engineering field have been electrical or computer science graduates. This year, the U of M is offering a separate computer engineering degree program, and Professor Mohan Mathur, head of the department, said 36 students have already enrolled.

Computer engineering is open to students who have completed two years of basic electrical engineering courses like electronics, digital logic, circuit theory and computer programming.

"Our emphasis is on preparing students to become designers of computer hardware and systems," Mathur explained. "Ever since integrated circuits came onto the market, the microrevolution has created a demand for graduates from digitally-oriented courses." He said a survey of employers and potential employers of computer engineers representing 40 provincial industries conducted 18 months ago, disclosed a need for computer engineering graduates. Other studies have shown "a gross shortage of computer engineers and scientists," he said.

So far, there is only one accredited computer engineering course in the country — at McMaster University, Hamilton, Ontario.

The University of Manitoba, plus a handful of other institutions, including Concordia University, University of Alberta, and Carleton University, have begun computer engineering courses. U of M engineering professors expect to receive accreditation near the beginning of the final year of the first graduating class.

Engineers are needed

Computer engineering "is a very new thing, and we have responded to it fairly early," Mathur said. He pointed out that the entire electronics industry is moving in the direction of computers, and "we need engineers who understand and can design computer-based controls and processors."

Mathur said students entering the new course will spend more time on computer-related courses than previously offered in electrical engineering, and that they can choose courses which will lead them into either software or hardware specialties.

He concluded that "the future looks very bright right now, and graduates should have no difficulty securing jobs."

Computer engineers Joan Coughlin and Ken Buechler of Sperry Univac: Designing and coming up with new ideas.

Computer engineers

☐ **Education:** For the first time this fall, the University of Manitoba is offering a separate degree program in computer engineering. Entrants to the program must have completed two years of basic electrical engineering. The final two years are geared toward computer programming and design. Third-year courses include subjects like microprocessing systems and digital logic sub-systems, while fourth-year electives include advanced data structures, programming language and language translators. Students will graduate with a Bachelor of Science degree in computer engineering. For more information, contact Electrical Engineering, Room 456, Engineering Building, University of Manitoba, Winnipeg, R3T 2N2.

☐ **Salary range:** Art Hourd, chairman of the salary survey committee for the Association of Professional Engineers estimated the salary of a computer engineer would start at about $23,000/year ranging to $31,000/year after five years.

☐ **Job future:** Good. Surveys show a gross shortage of computer engineers and in all areas of computer work.

☐ **Employers:** Any business, industry or government agency which relies on computers or computer-based systems.

Bun, cookie baker offered $8.50 hourly

Canada Employment Centres in Winnipeg have a variety of job

ty to drive 3-ton truck with a 30-foot trailer. Salary in piecework $11 to

Industry Recognition

High-tech export key to survival

By Deborah Read

Business

Manitoba's computer firms are unlikely to ever rival multi-national electronic giants like IBM or Data General, even though they sell their products world-wide.

This province is still "pretty small potatoes on the world scene," said Michael Clarke, manager of electrical and mechanical industries for Manitoba's department of economic development and tourism.

There are 35 electronic companies in Manitoba, making a variety of electronic units, including computers, but "about 18 per cent account for 70 per cent of the employment (in the industry), and very few of those are locally owned and controlled," said Clarke.

Since the domestic market is not large enough to be the sole support of a Canadian electronics industry, more than 75 per cent of these companies depend heavily on exports. Half of them make the majority of their sales outside the country.

"The markets available to us are as remote from here as any place else in the world, so there's no market restrictions. Our competition is other countries, not other provinces," said Clarke.

THE COMPUTER AGE Part 4

Computers are rapidly becoming a tangible presence in our work lives, our schoolrooms, and even our homes. An entire generation of children are growing up for whom the computer is the television set of the 80's — a luxury that is fast becoming a necessity. This four-part series looks at the effects of the new computer age.

For instance, France is now working on a semi-conductor that may make possible a system superior to Canada's Telidon videotex system, he said. "If they attack us in the world marketplace, will we make it? I can only hope we will, and be able to get our fair share of that business."

The provincial government wants to encourage industry here to move into high technology; it's been official policy for several years. It uses a combination of "moral suasion" and government assistance programs to that end, said Clarke.

But most Canadians identify "Silicon Valley North" — the Ottawa Valley — as the Canadian home of microelectronics. It receives the most publicity because many of its companies are Canadian-owned and controlled, said Clarke. "That's what makes them interesting and exciting."

Here in Winnipeg, although two of the largest microelectronics firms are U.S.-based Sperry-Univac and Burroughs, the biggest is still home-grown Northern Telecom Canada Ltd. But, "if you take Northern Telecom out of the statistics, there's not much left," said Clarke.

Few of the Manitoba electronic firms are involved in the burgeoning, and ever-crowded, home computer market. "We're talking about an industry that didn't exist five years ago," said Clarke. "There are some reports now that the home computer market is saturated. The logical extension is to move into small business computers, but then you start to rub up against the establishment; companies that were strong in the 60s and are even stronger now."

Winnipeg's half-dozen computer firms such as Patrick Computer Systems usually concentrate on a specialty line. For example, Kraus Industries Ltd. makes a computer for industrial application, and Homestead Computer Services Ltd. for agri-business. "No one (here) is pretending to be in the Apple or Commodore business," said Clarke. "The people who tackle the big market are asking for big competition."

World seller

All Winnipeg firms sell their electronic equipment outside Canada. "None of these firms exist on the local market; you would never survive," said Clarke.

Northern Telecom, which manufactures electronic telecommunications equipment, sells its equipment in Canada, the U.S., Japan, and South Korea, among others. "We're bidding on a few others," said plant manager Klaus Floch.

"The business volume that one can get in Canada forms a good base; you can certainly stay viable on a small scale. But you'd have some difficulty expanding in the Canadian market."

A naval defence systems computer made at the Sperry-Univac plant on Saulteaux Cr. is also a world-seller.

Sixty-five assemblers at the plant spend their days on the painstaking, eye-straining work of assembling some 23 different units, including the microcomputer.

One circuit board assembly alone, "we build about 1,000 to 1,200 a week and send them to the U.S. Navy," said engineering manager John Westergren.

The computer — called the UYK-502 — is currently used in Canada, the U.S., Great Britain, Japan, Australia and Malaysia. Ten to 15 other countries, mostly NATO members and countries in southeast Asia, buy other Sperry-Univac electronic items manufactured in Winnipeg.

The naval defence computers are used to control combat systems, air traffic, gunfire, radars, sonars, data processing and message processing, among other duties, said Westergren.

U.S. market needed

"The Department of National Defence here in Canada cannot support a defence system industry; that's why we sell to the U.S. and other friendly countries," said Westergren. Restrictions from both Canadian External Affairs and the U.S. State Department — since Sperry is a U.S.-based company — determine who may buy, but "our markets are governments," said Westergren. The company also sells to other computer companies which have contracts to supply either the Department of National Defence in Canada, or foreign users.

Sperry-Univac, which came to Winnipeg in 1977, employs 130 people here. A second Canadian factory is in Dorval, Que.

"We find the people we need are right here in Winnipeg," said Westergren. The engineers are University of Manitoba graduates, the technician force from Red River Community College. Others received on-the-job training, he said. "We are very satisfied with the Winnipeg area."

Sperry-Univac not only makes computers, it depends on them to run its business. The 23 computer terminals at the Winnipeg factory are tied in a main computer in St. Paul, Minnesota, which monitors the four North American factories producing naval defence systems — in Clearwater, Fla.; Salt Lake City, Utah; St. Paul and Winnipeg — and co-ordinates their efforts.

The system keeps track of everything in the building. Management can determine in seconds where any component is in the manufacturing process, how long it will take, and the exact cost of producing it to date. Inventory, personnel information, filed documents, data stored on microfilm, and other information on the four factories is all available instantly.

"We try to have as much automated work as possible," said Westergren.

In that respect, Sperry-Univac is only one example of how North American manufacturing is learning to decentralize.

Good for economy

"You walk through plants now and more and more you find computer terminals on people's desks," said Clarke

With the aid of computers, the massive factories of the past are ceasing to exist. Communities will not be dependant on the payroll of one huge company, and the companies in turn will not be paralysed by a single strike.

"I think all major companies spread their operations around like that," said Westergren.

Northern Telecom also uses computers extensively to control production.

"When I think back to what we were doing five or six years ago, I would say the application of computers has increased tremendously in manufacturing technology," said Floch. The computers allow better control of the manufacturing process, resulting in higher productivity and lower costs, he said.

The company uses computers, "to be able to stay competitive," he said.

"One of our largest competitors is the Japanese, and that's how they do it."

Last of a series.

WAYNE GLOWACKI/WINNIPEG FREE PRESS

John Westergren shows a finished computer board at Sperry Univac's plant in Winnipeg. The company manufactures components used in naval defence systems.

Public Recognition

Sperry-Univac Develops A Higher Public Profile

Susan Hoeschen

The Canadian electronics industry can expect a higher profile over the next few years from Sperry Univac Defence Systems in Winnipeg.

Sperry Inc., the giant New York based multi-national with worldwide sales of over $5 billion, quietly set up the Defence Systems Division in Winnipeg four years ago under an offset requirement for contracts the parent company had secured from the Canadian government.

Instead of building a plant, Sperry Univac found one already built in the Murray Industrial Park area in west Winnipeg and converted the 11,000-square-foot facility for its needs.

The opening this month (April) of a new $3.3 million, 44,000-square-foot plant just down the street from the old one, marks the end of the company's low key approach to its Canadian operation.

"We want to establish our image in Canada," says G.R. (Jerry) Smith, director of Canadian operations for Sperry Univac Defence Systems.

He points out that Sperry is the largest supplier of communications systems to the U.S. Navy and that it would be nice to stake out a similar position with the Canadian Navy.

Sperry Defence Systems, in the old plant, was already one of Western Canada's major suppliers of defence electronics but the new plant will open up new market avenues.

In Minnesota

Sperry's Canadian experience started in 1976 when Smith, then working for the parent company in Minnesota, was asked to look into setting up a manufacturing facility in Winnipeg. The plant opened in 1977 and began producing assemblies and sub-assemblies for Sperry Univac Defence Systems plants in St. Paul, Minn., Clearwater, Florida and Salt Lake City, Utah. The components were destined for the Canadian Forces Aurora long-range patrol aircraft.

The crucial point in the history of the Canadian operation came in 1979 when the parent company agreed to give it the world product mandate for the AN/UYK-502 Microcomputer and the AN/UYK-501 SHINPADS system Data Bus, both high speed, rugged electronic systems designed for use by the military.

A product mandate is a program developed by the federal government to encourage the development of technology in Canada. Instead of doing all the development work in the U.S. and then assigning menial assembly work to the Canadian subsidiary, a multinational agrees to assign all the development and manfacturing work associated with a particular product to the subsidiary, giving the Canadian branch a chance to develop expertise along the way.

Smith feels the securing of the product mandate was the turning point for Sperry Defence Systems in Canada. It gave the Canadian subsidiary a reason for expansion and a long-term future.

He explains that, because the Winnipeg plant was Sperry D.S.D.'s first manufacturing plant outside continental United States, the company proceeded cautiously at the beginning to minimize risk.

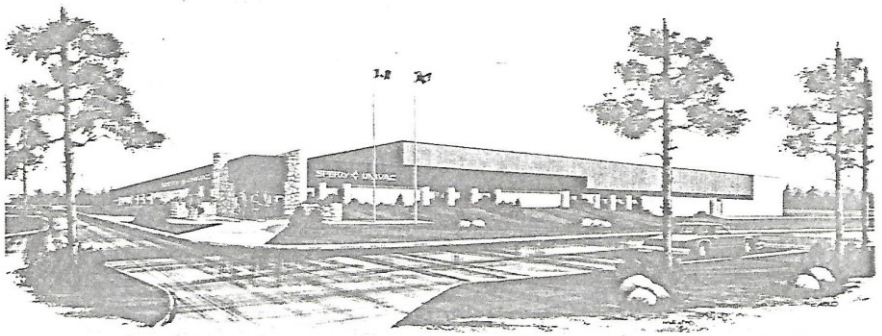
"But the growth came and we have been able to achieve a high level of productivity in the Winnipeg plant," says Smith. He attributes success in Canada to an availability of a stable labor force and a good manufacturing environment in Winnipeg.

"The talent is available in this area. We can hire engineers and then send them to the United States for training in our design engineering groups.

Smith, an industrial engineer who worked for Sperry Defence Systems in Minnesota before his Canadian assignment, says the Canadian subsidiary's product mandate really amounts to a vote of confidence in the operation. "These products could have been made in the company's U.S. plants but it was decided that, during the life cycle of the product, they could be made profitably in Winnipeg."

Vigorous Competition

Companies competing for Canadian defence systems electronic work can expect vigorous competition from Sperry Univac, now working out of



Sperry Univac is opening a new $3.3 million Winnipeg plant that substantially expands the company's manufacturing space.

Public Recognition Cont'd

the new headquarters. Right now, the company exports 80 per cent of its computers and it will be seeking Canadian buyers. Both the 501 and the 502 meet the rugged requirements of the Department of National Defence for the Canadian patrol frigate.

Sperry has already sold military computers from the new product line to Japan and Malaysia and the U.S. and England. The new plant will be shipping 20 computers per month by the end of the year and projections call for shipment of over 1,000 during the next five years.

The key requirement for military computers is what Smith calls "shake, rattle and roll," the ability to withstand a more demanding environment than that which surrounds conventional electronic equipment. "They have to be faster and more rugged than the average commercial application."

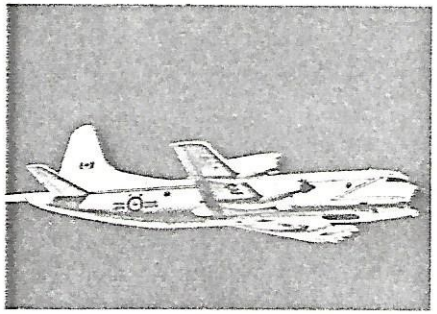
The plant is certified by the Department of National Defence as a manufacturer of electronic equipment. Sperry has its own in-house laboratory for failure analysis and contracts out further component analysis.

Temperature Chambers

In the new plant, the manufacturing and test facility takes up 34,000 square feet. The 7,000-square-foot test laboratory contains temperature chambers meeting the complete range of military requirements. A typical product has to withstand temperature variation from -5 degrees (C) to 60 degrees (C).

The plant, which now employs 120 people, is expected to employ 285 by 1985 when the new plant is fully operational.

Smith also foresees further development work resulting from the current product mandates in further refinement and product improvement.



The Winnipeg company is making the on-board computer for the Canadian Forces C-140 aircraft.

Engineering Department

circa 1983

FSCM

* Federal Stock/Supply Classification/Code for Manufacturers (FSCM) changed from Eagan assigned 90536 to 61830 “Made In Canada”

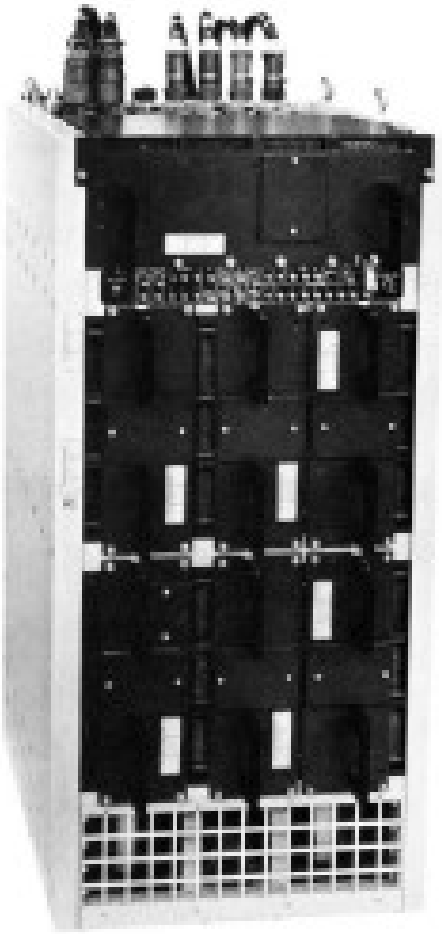
Third and Final Plant

* 101 - 51 Burmac Road
* Co-existed with UNISYS Commercial, 1994
* 80,000 sq ft
* Product Development and Manufacturing
* ~160 Employees

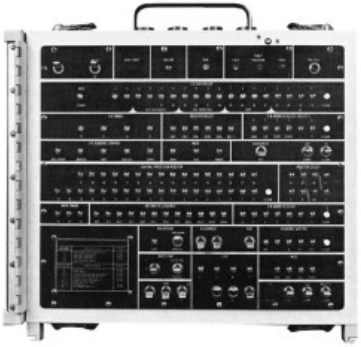
Trivia

* What was the reason for opening the Winnipeg facility?
  * Canadian Airforce CP-140 Patrol Aircraft Industrial Benefits

Trivia

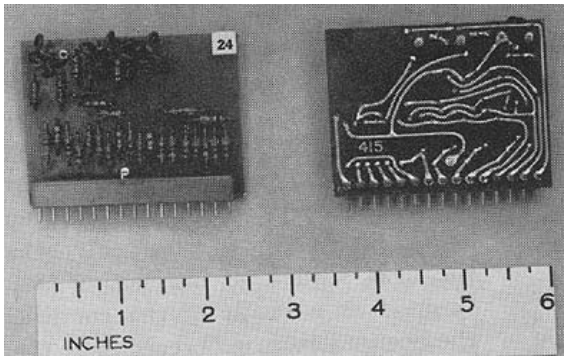


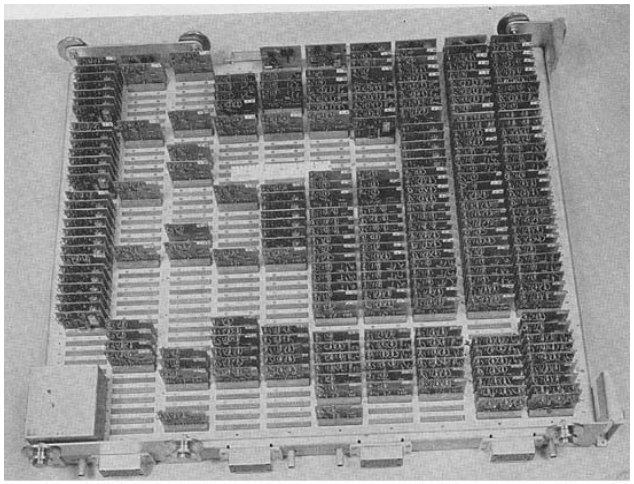
* What was the first product-line manufactured?
  * OJ-172 DEAC (Data Exchange Auxiliary Console) harnesses
  * AN/UYK-7(V) wire harnesses and maintenance consoles



Trivia

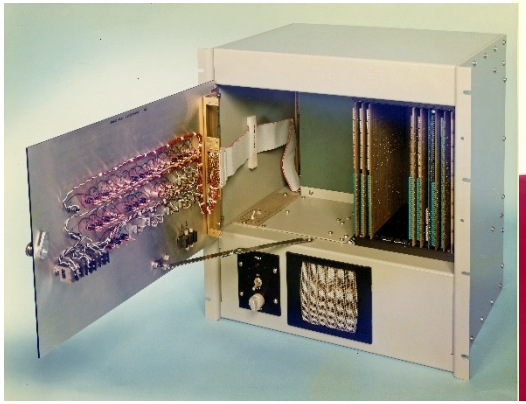
* What was the second product-line manufactured?
  * UNIVAC M-460 15-pin circuit boards
    * Deployed on the USS Iowa Class Battleships as the enhanced Fire Control System 16” guns

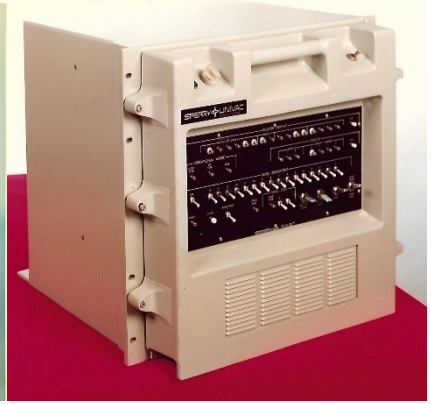




Factoid

* First Canadian products to be developed and manufactured in Winnipeg:
  * AN/UYK-502(V) Data Processing Set, Canadian Navy
  * AN/UYC-501(V) SHINPADS (SHipboard INtegrated Processing And Display System), US Marine Corp, Marine Air Traffic Control And Landing System (MATCALS)





Factoid

* First Implemented Serial Data Bus System:
  * AN/UYC-501(V) SHINPADS (SHipboard INtegrated Processing And Display System), US Marine Corp, Marine Air Traffic Control And Landing System (MATCALS)

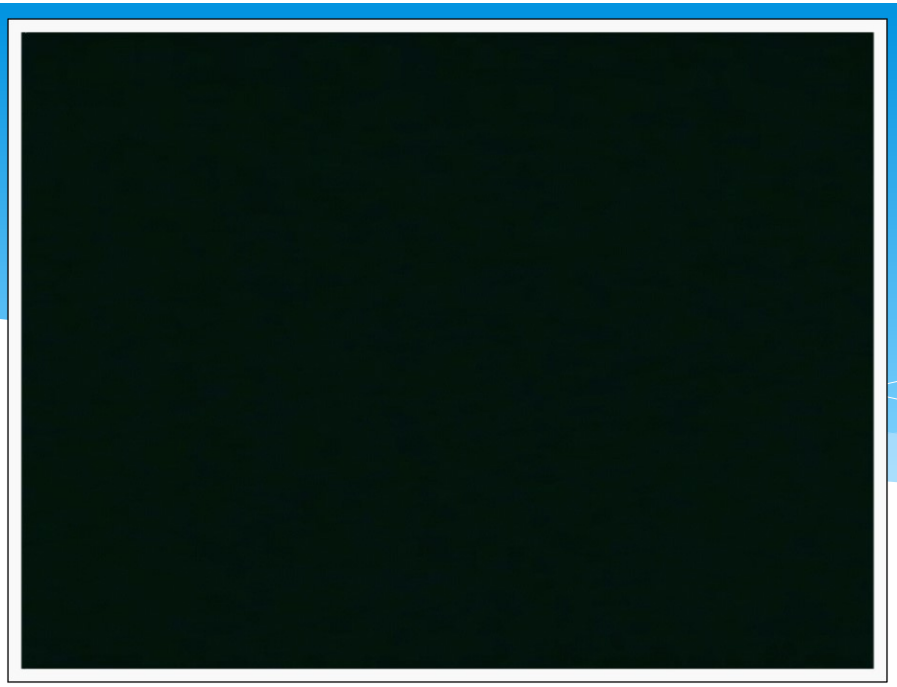
Voice Information Processing System (VIPS)

* Allows users to interrogate a Series 1100 database, guided by voice prompts, through any touch-tone phone.
* Under the Series 1100 host, a user-defined vocabulary of words, phrases, or prompts can guide the telephone user in retrieving or entering data to host based applications.
* Infancy to online ordering system.

Trivia

* What does the military equipment designation AN/UYK stand for?
  * AN/ – Army-Navy (JETDS System)
  * U – General utility (includes two or more general installation classes, airborne, shipboard, and ground)
  * Y – Data processing
  * K – Computing

Factoid

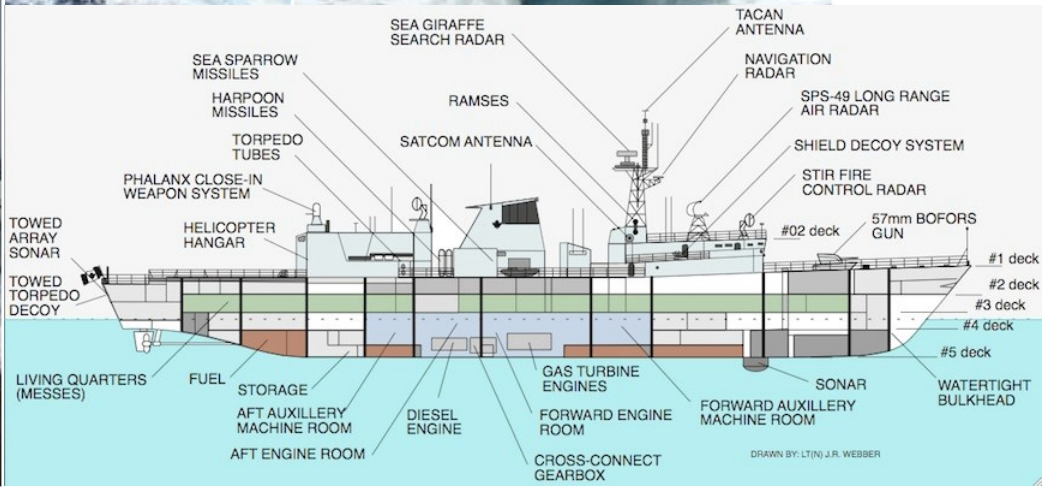


* The Winnipeg facility was able to market and access all three services of the Canadian Armed Forces.
* Winnipeg manufactured product lines were deployed in:
  * Canadian Air Force, Army and Navy,
  * US Air Force, FAA, Marine Corp, and Navy, and
  * International Navies

Factoid

* All product lines manufactured in Winnipeg were highly reliable and extremely low maintenance
  * Navy Products designed, developed, and manufactured from the Winnipeg facility, vintage 1980, are still operational onboard CPF CCMS (Communications Control and Monitoring System), MPS (Message Processing System) and Metrology
  * AN/UYC-501 SHINPADS Serial Data Bus equipment was finally decommissioned in 2018

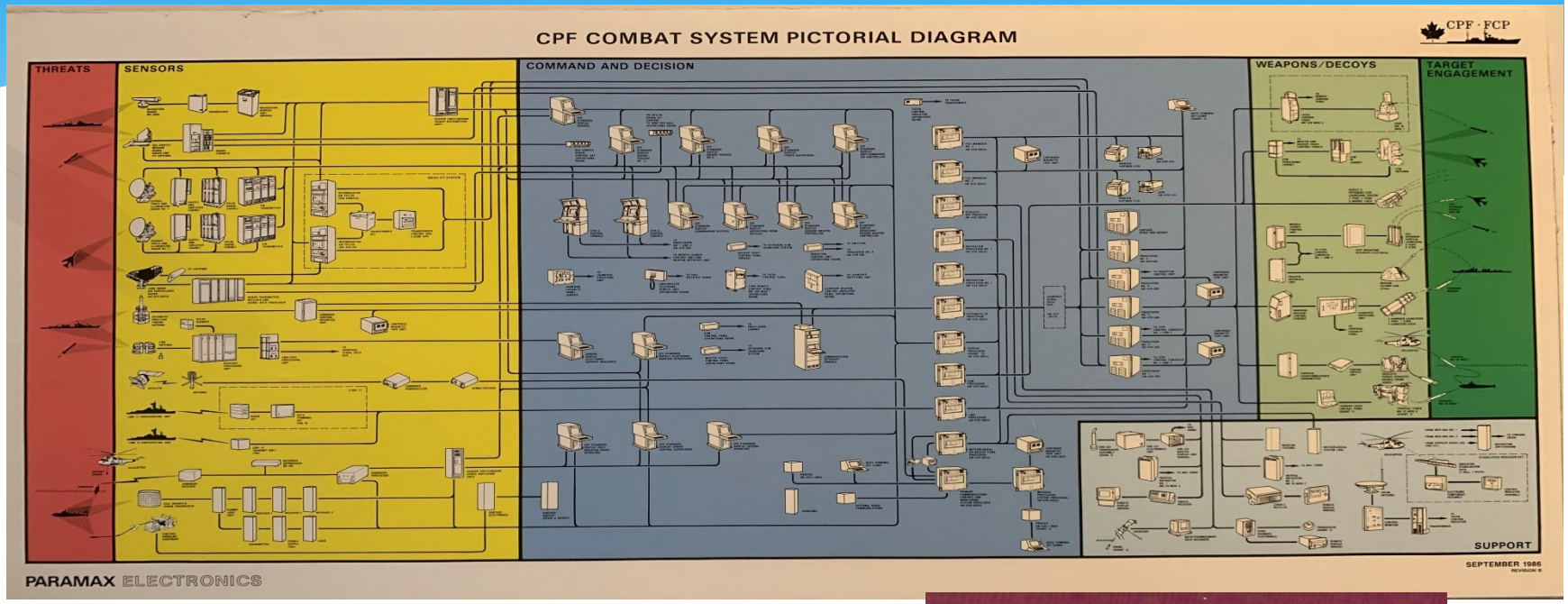
Canadian Patrol Frigate (CPF) Halifax Class

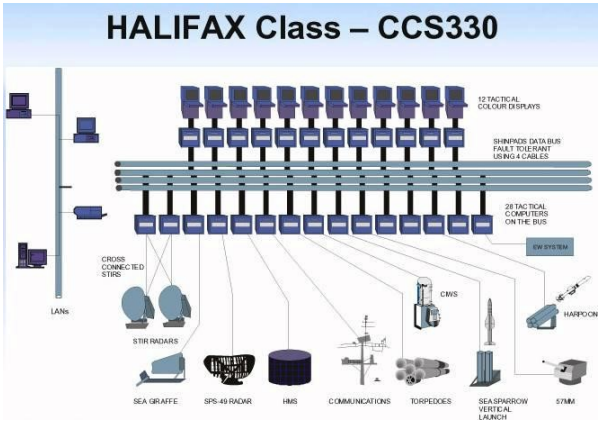


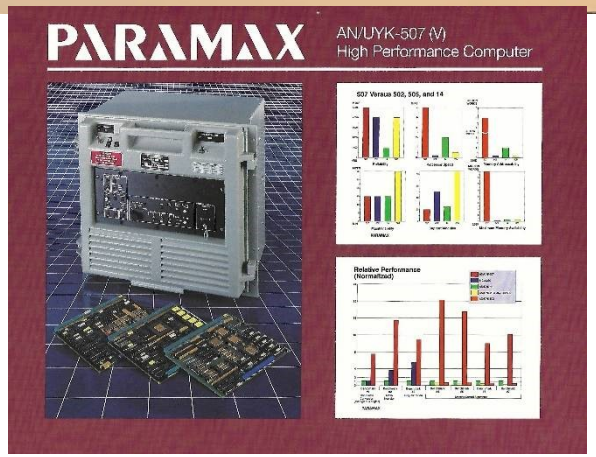
AN/UYC-501 Serial Data Bus

Customer:	DND Canada	US Air Force	US Marine Corp
Platform:	CPF/TRUMP	ABCCC	MATCALS
No. of Systems Deployed:	19	4	17

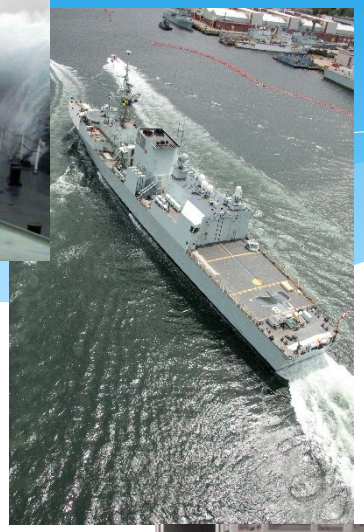
AN/UYC-501 Serial Data Bus







AN/UYK-507,UYC-503,UYC-504, MU5028/U Products



Customer: DND

Platform: CPF/TRUMP

No. of Units Deployed:

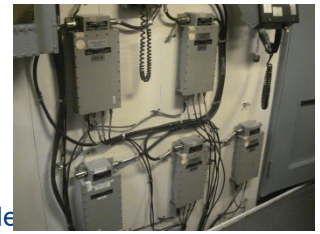
110 UYK-507s

700+ UYQ-505s including subsets

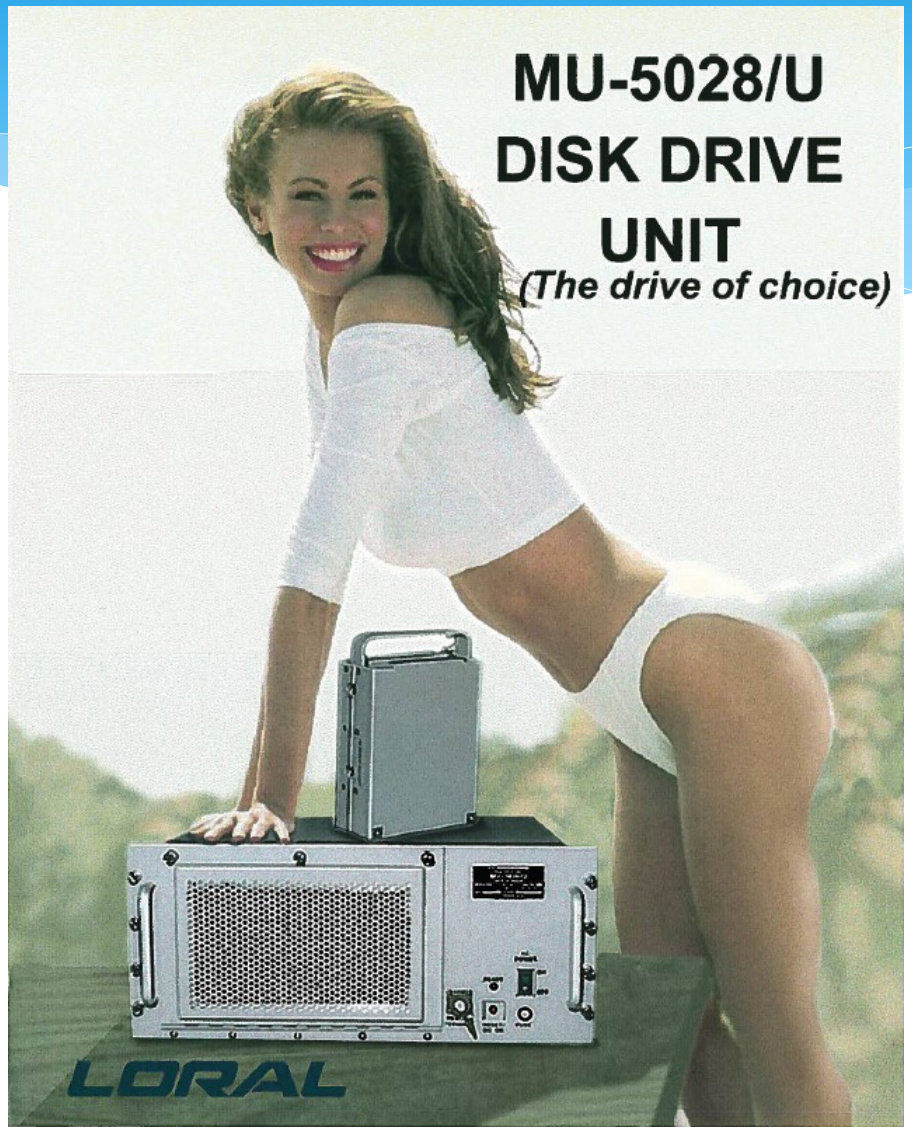
95+ UYC-503 Quad Nodes

716+ UYC-504 BAMs

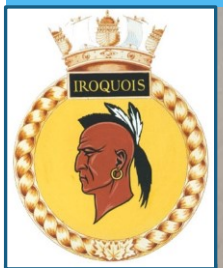
66 MU-5028/U Disk Drive Units w 236 RDUs

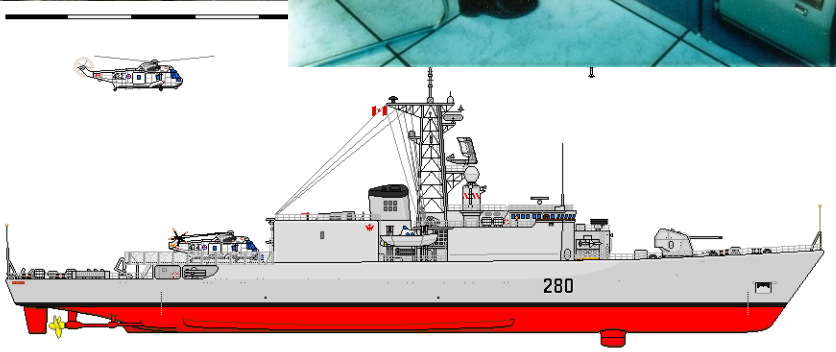


Product Brochure: We had our moments…



Tribal Refit &Update Modernization Program (TRUMP)





AN/UYK-507 & UYK-44EP ASICs

(Application Specific Integrated Circuits)

Joint Venture: Unisys Eagan and Winnipeg Engineering

Customer: US and Canadian Navies

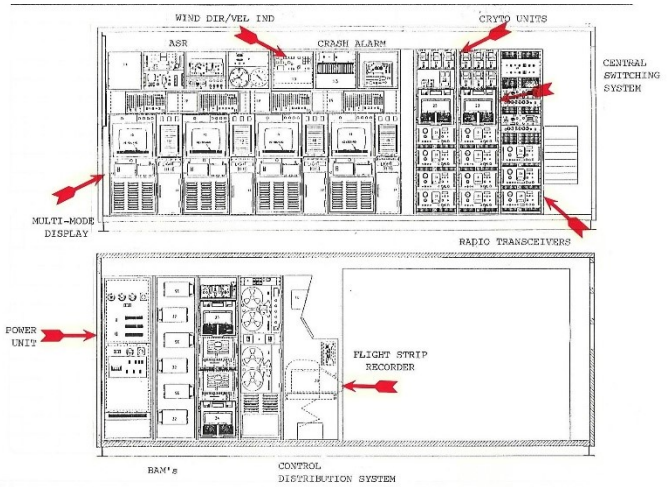
Platform: Various

MATCALS Product Line

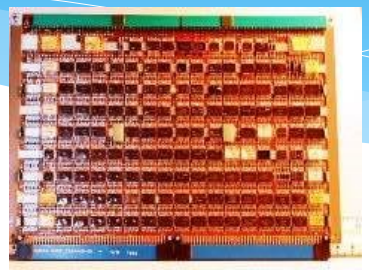
Customer: US Marine Corps

Platform: Marine Air Traffic Control And Landing System

No. Of Units Deployed: 34 UYQ-505s,
136 UYC-503 Nodes, and
204 BAMs



AN/UYK-502 Product Line



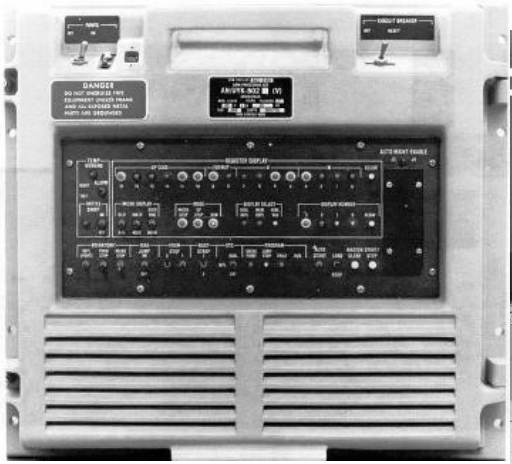
Customer: Various

Platform: Shipboard

No. Of Units Deployed: 50+ UYK-502s

Countries Deployed:

* US Navy
* Australia Defence, Navy
* Japanese Navy, ASWOC
* Royal Thai Navy, MPS
* Malaysian Navy, MASS

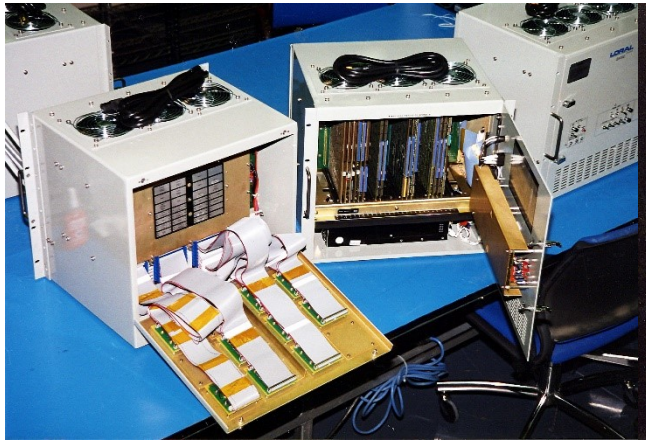


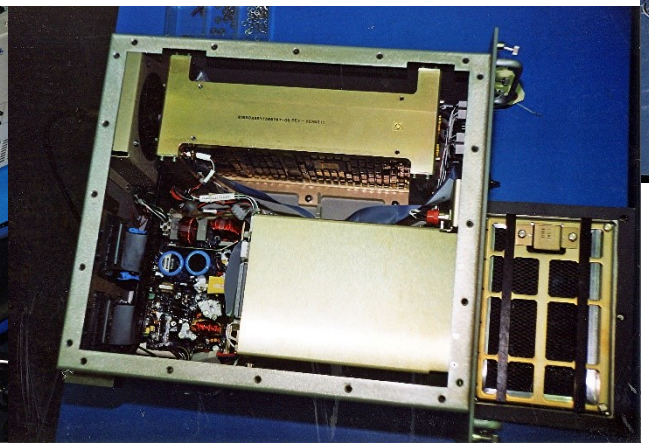
Ops Room Team Trainer (ORTT) Product Line

Platform: Shore Base Training Facility, Halifax

No. of Units Deployed:

* 56 UYQ-505c Data Processing Sets
* 2 UYC-503c Quad Nodes
* 6 Multi-BAM units
* 4 MU-5028/c Disk Drive Units
* 22 Trainer Display Consoles





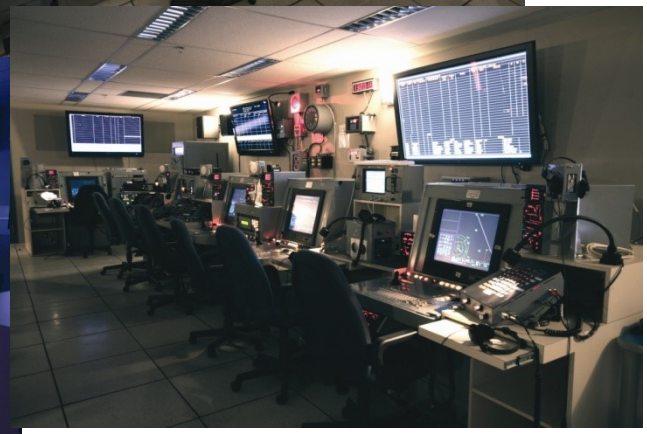
Ops Room Team Trainer (ORTT) Cont'd

Ops Room Team Trainer (ORTT) Product Line

Platform: Shore Base Training Facility, Halifax

No. of Units Deployed:

* 56 UYQ-505c Data Processing Sets
* 2 UYC-503c Quad Nodes
* 6 Multi-BAM units
* 4 MU-5028/c Disk Drive Units
* 22 Trainer Display Consoles

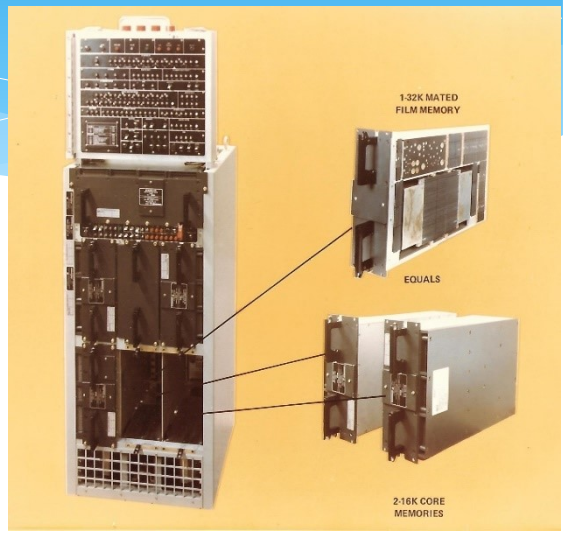


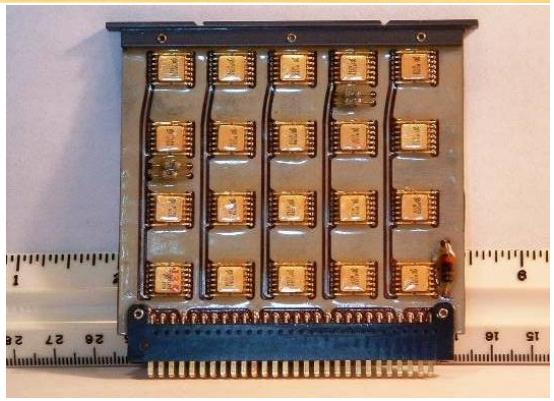
Other Naval Products

* ~150 VME Single Board Nodes deployed, DND Canada
  * System Health Monitoring
  * Tactical Data Collection System
  * CPF CCM6
* 2193 MineHunt Sonar consisting of five unique circuit card assemblies integrated into a mixed-signal piezoelectric acoustic Search and Classify arrays

Other Naval Products Cont'd

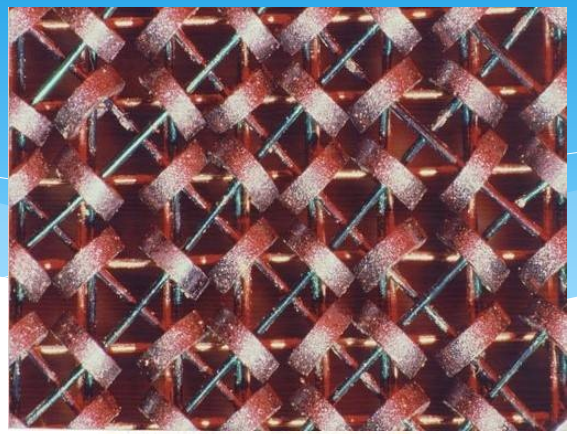
* AN/UYK-7 Core Memory Assemblies and CCAs
* AN/UYK-20A (V) Core Memory Assemblies
* Portable Cable Testers

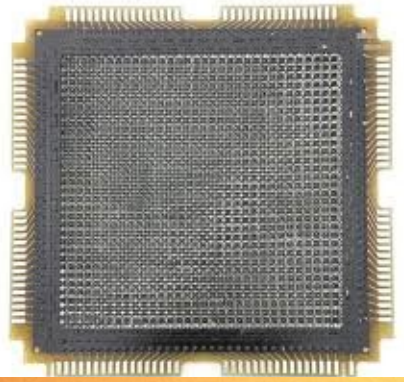


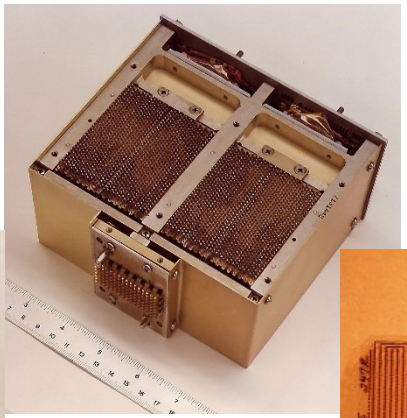


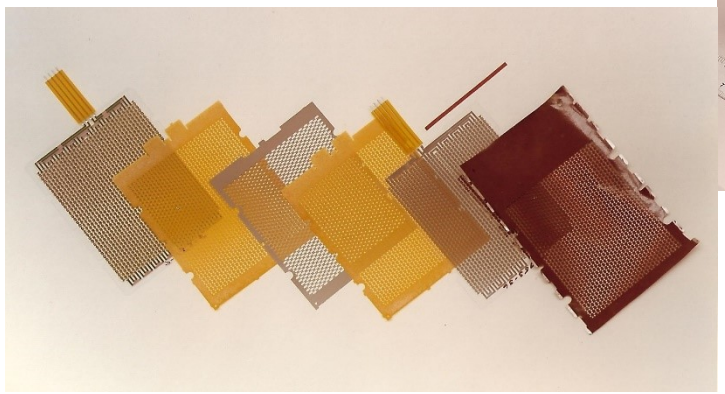
UYK-7 Core & Double Density Mated Film Memory

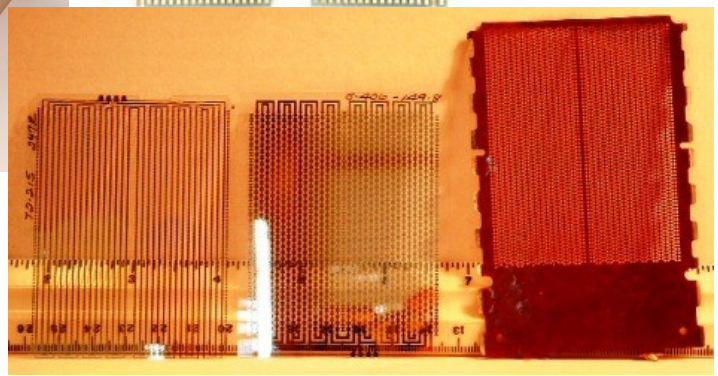
* Memory Stack consists of a temperature sensor, X and Y drive lines, inhibit lines, sense lines, and magnetic cores. Each memory stack is capable of retaining 4,096 32-bit words.











Remember…… "Tin Whiskers", the by gone era

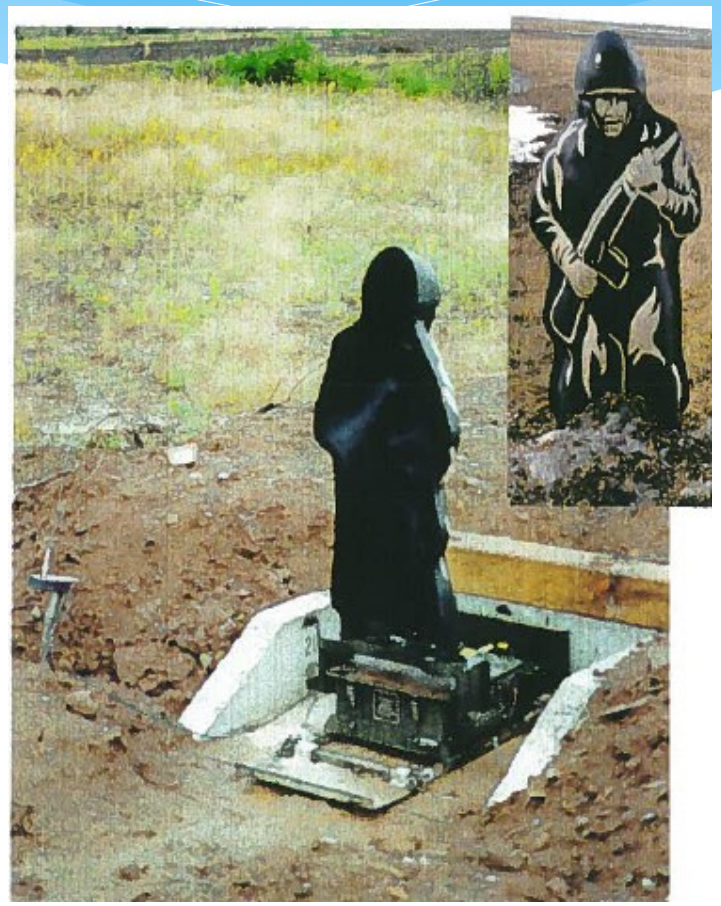
* What are Tin Whiskers?
  * At ~50°F along with a specific salt induced humidity, tin crystals will form overlapping solder joints causing a short. Tin Whiskers were found on the UYK-7 core memory arrays and the AN/AYK-10 mated-film memory arrays causing memory shorts during the 80's.
  * 2004; ask the Toyota Corp regarding "Tin Whiskers" and the drive-by-wire accelerator circuit….causing the "sudden unintended acceleration syndrome" in certain makes and models of Toyota vehicles….
  * Other vehicle OEMs experienced/reported similar incidences, though not reported as such. Lesson learned?

Army Product Line

* Direct Fire Targetry (DFT) – Integrated Targetry Suite
  * DFT home bases are CFB Gagetown, NS, CFB ASU Wainwright, AB, CFB Valcartier, QC, and CFB Petawawa, ON
  * DFT equipment and LM personnel are also deployed to various areas in Canada, USA, and Jamaica

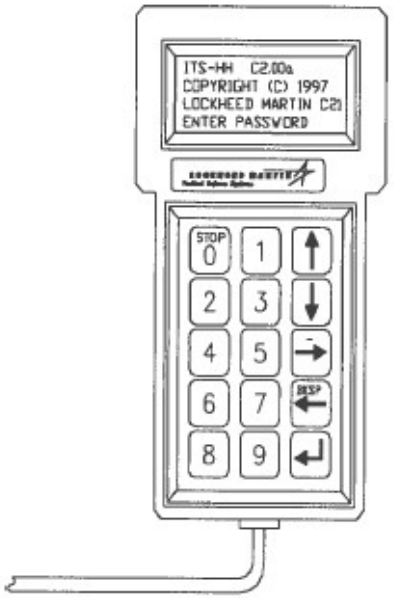
Direct Fire Targetry Systems

* Static Infantry Target
  * Developed using self-healing molded plastic



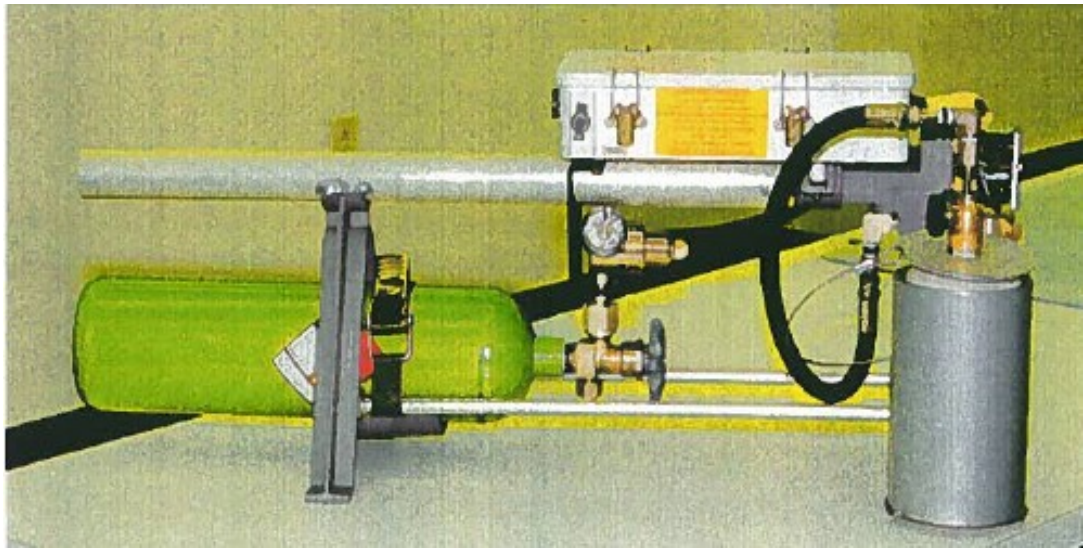
DFT Systems Cont'd

* Hand-held Controller
  * Radio control capable of handling multiple target systems



DFT Systems Cont'd

* Light – Hostile Fire Simulator (L-HOFS)
  * Provides realistic small-arms, audible single-shot and automatic rifle fire with muzzle flash and rate of 600 rounds per minute.



DFT Systems Cont'd

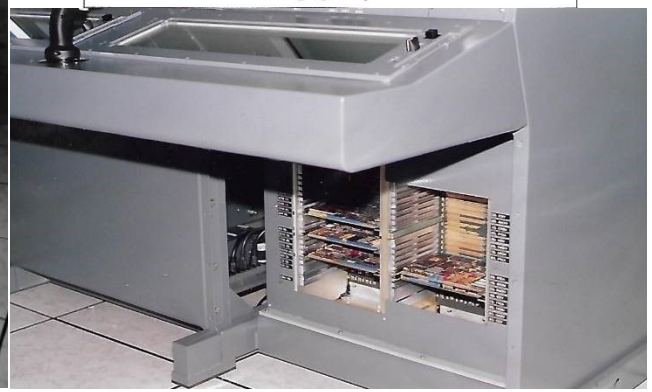
* Moving Vehicle Target Mechanism
  * Equipped with variety of guidance systems, wire follower GPS, or remote video
  * Available to power thermal targets

New Shipborne Aircraft (NSA)

* 1987 Contract awarded for 35 Agusta Westland EH-101 Anti-Submarine Helos to replace the aging Sikorsky Ch-124 Sea Kings, which served the RCN from 1963 to 2018
* Unisys Canada awarded Mission Control System
* Sikorsky CH-148 Cyclone recently deployed

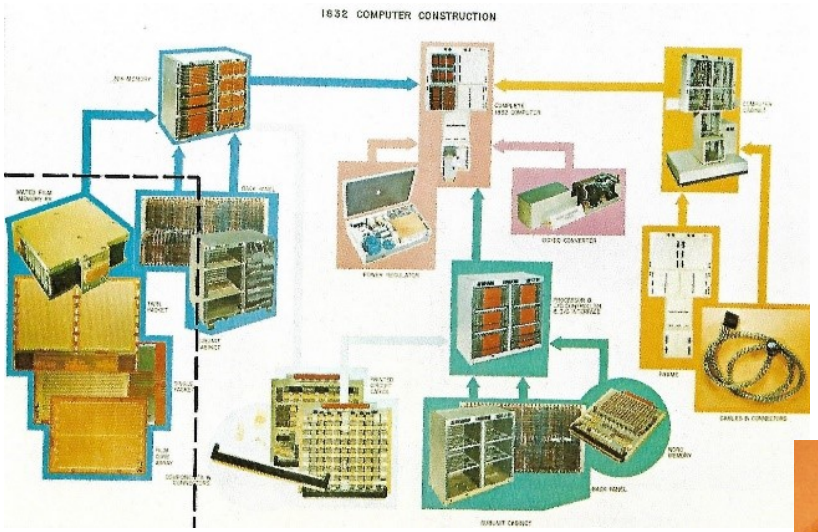
NSA Advanced Development Model (ADM) Mission Control Console

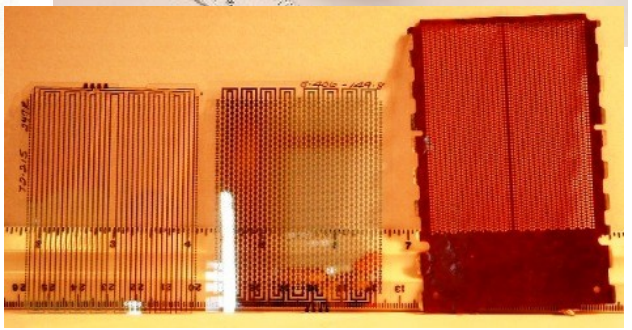
* 1993 Liberal Government under the leadership of Jean Chretien canceled the contract paying out millions in contract cancellation fees



Airborne Products

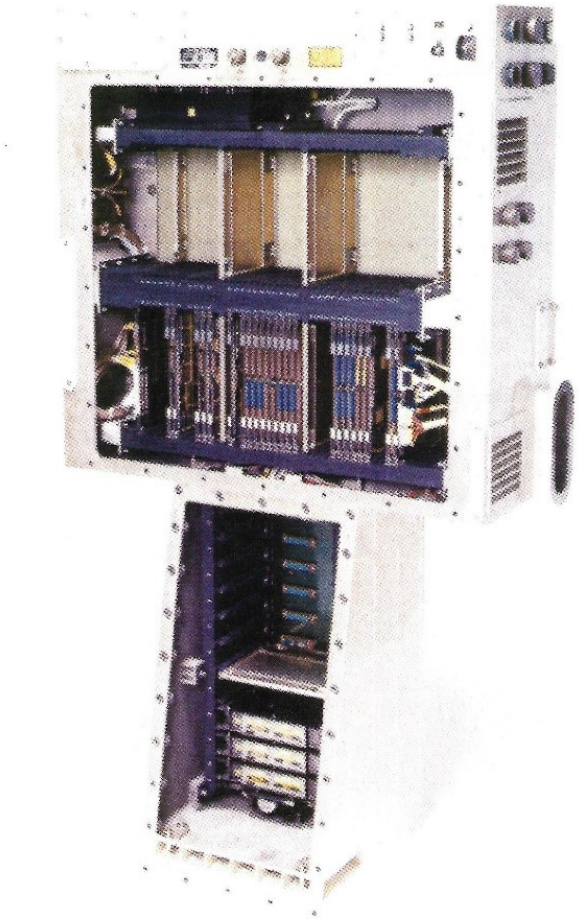
* AN/AYK-10 (V) Double Density Mated Film Memory Assemblies





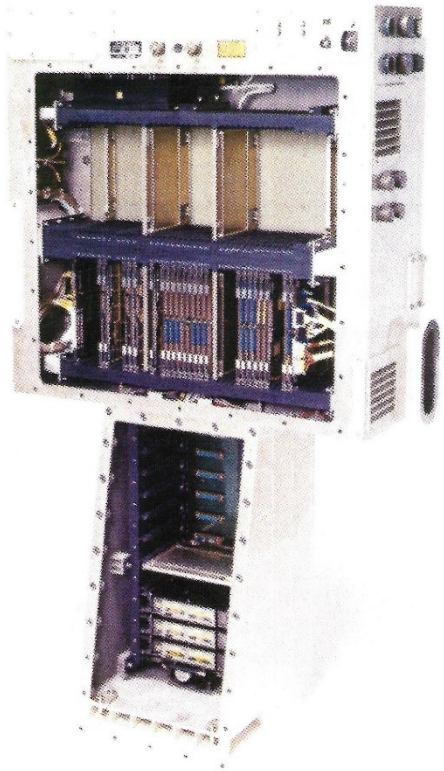
Airborne Products Cont'd

* AN/AYK-23 (V) Computer Processor Memory Unit (CPMU)



Airborne Products Cont'd

* AN/AYK-23 (V) Computer Processor Memory Unit (CPMU)



Lockheed Martin Canada Recognized For Outstanding Program Performance By United States Navy

KANATA, ONTARIO, 07/10/2001 -- Lockheed Martin Canada, a unit of Lockheed Martin Corporation (NYSE: LMT), has received an award of recognition for outstanding performance in the design and delivery of the United States Navy's AN/AYK-23 (V) mission computer for the S-3B Viking surveillance aircraft. During a ceremony at the company's Kanata head office, Cdr. Harry Wedewer, deputy program manager for the S-3B Viking Avionics and Software Systems, Naval Air Systems Command, Patuxent River, MD, presented Lockheed Martin Canada President Dan Spoor a framed picture of the U.S. Navy's S-3B surveillance aircraft in carrier operations. .

During his address to the AN/AYK-23 Production Team, Cdr. Wedewer stated that in 19 years of service it was the first time he had visited a contractor to express appreciation for outstanding program performance.

"AN/AYK-23 is the best of the Navy's S-3B Viking avionics retrofit programs and the squadrons have been delighted with its performance. The equipment performs flawlessly in a harsh operational environment I believe may be second only to the Space Program," said Cdr. Wedewer.

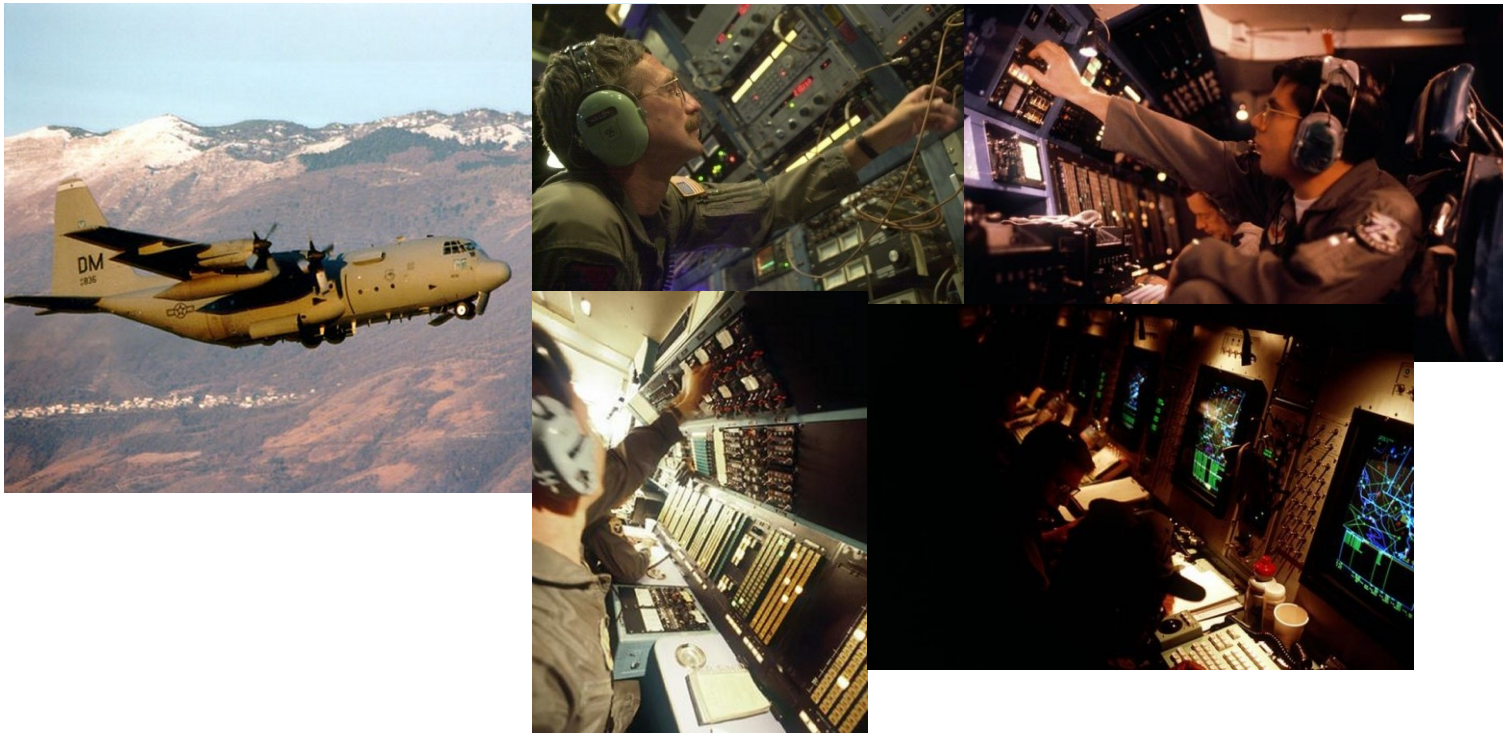
The AN/AYK-23 program was initiated in 1991 to replace the MU-576/AYS Post and Display Processor and the AYK-10 General Purpose Digital Computer. In partnership with Lockheed Martin Tactical Systems, Eagan, MN, Lockheed Martin Canada has delivered 25 units and is in the process of completing an additional 31. The unit is produced and shipped directly from Lockheed Martin Canada to the fleet where they are installed and immediately deployed into the demanding environment onboard U.S. Navy aircraft carriers.

"I am delighted to accept this honour on behalf of the men and women of the AN/AYK-23 team," said Dan Spoor. "I believe that our performance on this program speaks to our commitment to servicing our customers' needs and I am pleased that our partnership with Eagan will continue as we pursue key programs such as the upgrades of the CP140 and the Brazil P3."

A leader in systems integration, software development and the design and manufacture of advanced electronic systems, Lockheed Martin Canada employs more than 600 employees at facilities in Kanata (Head office), Montreal, Halifax, Victoria, Denver, Esquimalt, Dartmouth, Valcartier, Petawawa and Wainwright, Alberta. Core lines of business include Army, Airforce, Navy, Intelligent Transportation Systems (ITS), and Information Systems and Services (IS&S). Lockheed Martin Canada is a division of Systems Integration - Owego, NY and is a unit of the Lockheed Martin Corporation headquartered in Bethesda, Maryland. The corporation's core businesses are systems integration, space, aeronautics, and technology services.

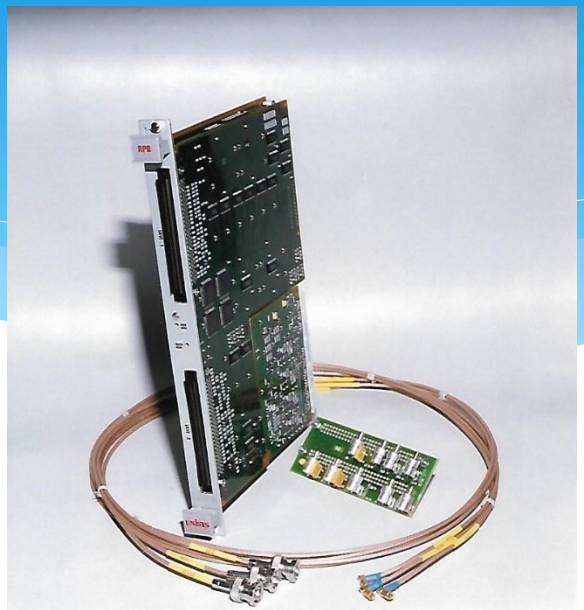
Airborne Products Cont'd

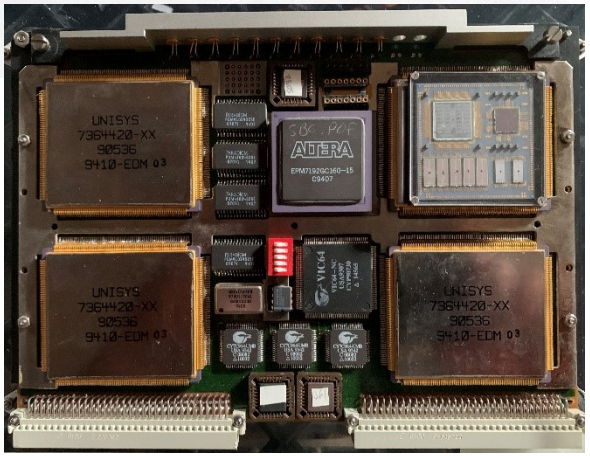
* EC-130E Airborne Battlefield Command and Control (***ABCCC***) SHINPADS SDB Inter-connect



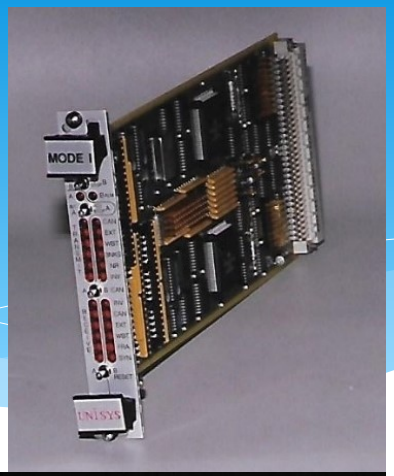
Other Product Lines

* FAA ARTS-III (Automated Radar Terminal System) Power Supplies
* VME Sensor Array Radar Scan Converter
* VME Quad C-40 DSP (Digital Signal Processor)





Additional Product Lines

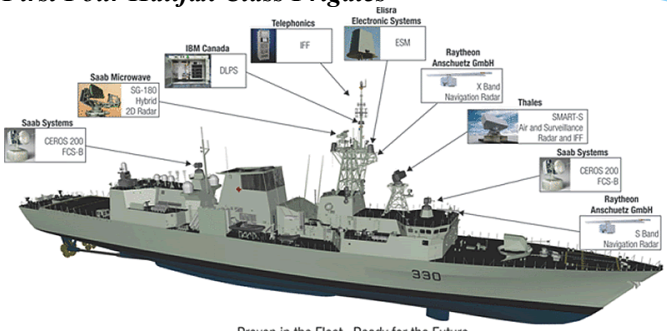


* Dual Channel AUTODIN
* Advanced Tactical Workstation
* Lightweight Composite Workstation

Halifax Class Modernization – The Legacy Lives On

https://youtu.be/W1cFECTHeM4

Lockheed Martin Canada MST Celebrates the Modernization of the First Four Halifax Class Frigates



Proven in the Fleet • Ready for the Future

HALIFAX, NS November 24, 2014 – Today, Lockheed Martin Canada Mission Systems and Training (LM Canada MST) joined the Government of Canada and the Royal Canadian Navy (RCN) in celebrating the successful modernization of the first four Halifax-Class frigates. The Halifax-class modernization/frigate equipment life extension (HCM/FELEX) is a $4.3 billion program to upgrade and enhance the existing fleet of 12 ships.

The HCM Combat Systems Integrator modernization program was awarded, in late 2008, to LM Canada MST for the mid-life upgrade of radars, major critical sensors, command and control systems, operations room, and a suite of simulation/training systems. The work scope also included redesign of ship compartments and all shipyard work to refit the ship platform.

The first four frigates modernized as part of the program are HMCS Halifax, Fredericton, Calgary, and Winnipeg. These ships have been through a rigorous at-sea test program which included Harbour Acceptance Trials and Sea Acceptance Trials. The trials were preceded by an intensive test regime at LM Canada's Land Based Test Facility where thousands of warfare scenarios were tested. HMCS Fredericton is currently preparing to deploy as the first modernized frigate at high readiness in early 2015.

The Honourable Rob Nicholson, Minister of National Defence, said, "We couldn't have done this without our tremendous partnership with the Canadian ship-building industry. Lockheed Martin Canada has taken care of all the integration software and combat management systems – a truly critical aspect of the modernization process."

LM Canada MST is proud of its role as the combat systems integrator. Rosemary Chapdelaine, leading the operations of LM Canada MST said, "I extend my congratulations to every person on the HCM team for delivering this modern, world class combat management system back into the hands of the Royal Canadian Navy. We, your industry team, want to ensure you are equipped with the very best products to accomplish your mission, keep you safe and bring you back home."

As the RCN continues to execute its most extensive peacetime modernization in history, the 12 with an experienced LM Canada naval systems engineering team as a foundation. That foundation was enhanced by leveraging the great talent cultivated in Canadian universities and technical schools.

The impressive capability built in Canada provides an exciting entry into the world market. The recent contract award for the New Zealand Frigate System Upgrade, which will bring hundreds of jobs into Canada, is directly attributable to the expertise and record of success LM Canada MST has established with HCM.

Capabilities Overview April 1993 Addendum