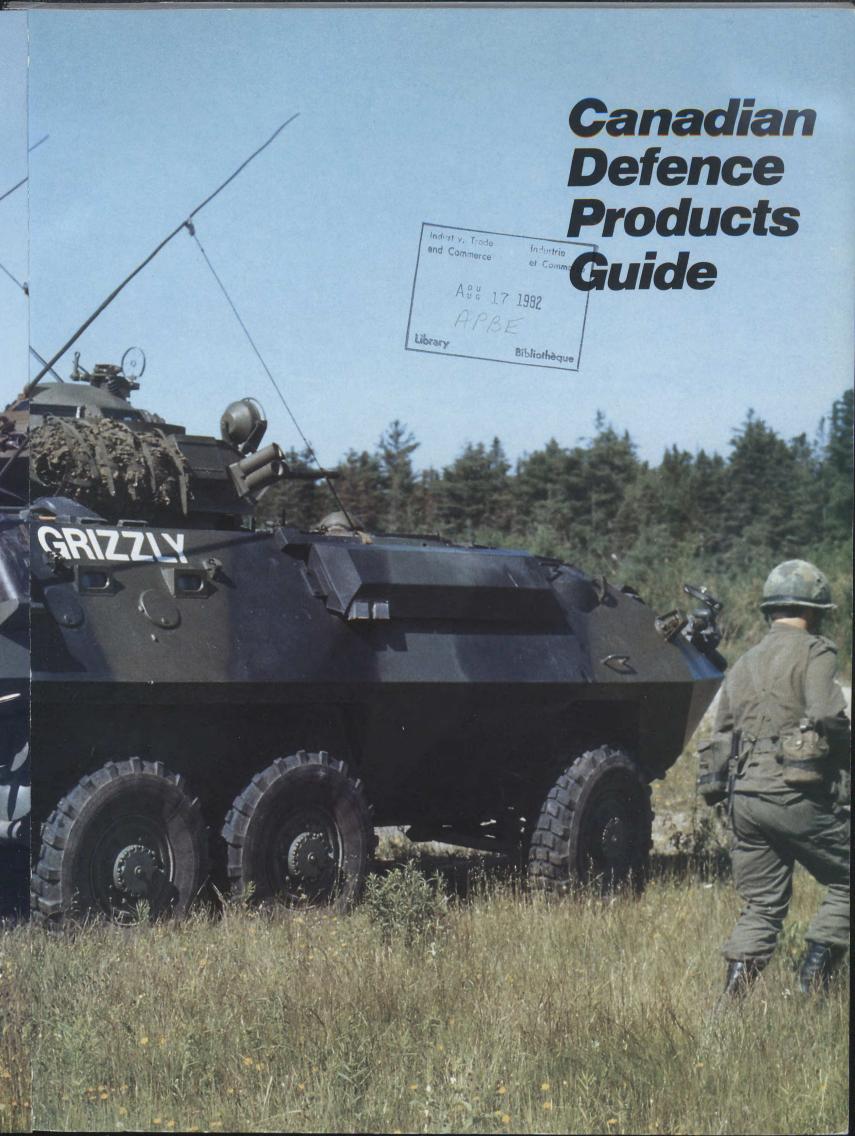
UF535 .C2 A53312 Canadian Defence Products Guide Canada









# Canadian Producers Offer a Wide Range of Specialized Defence Equipment

Canada was one of the first Western countries to recognize the need for international co-operation to harmonize defence requirements and to co-ordinate defence research, development, and production programs with friendly countries. Canadian policy has encouraged the domestic defence industry to specialize in certain product areas on the basis of natural advantage. The national geography — vast distances and extreme climate variations — has resulted in the development of innovative and advanced transportation and communications equipment. Other areas of expertise have their roots in Canadian military operational experience.

This book has been compiled to assist officials in other countries interested in a basis for co-operation in defence, including procurement from Canada. It does not cover a complete list of products and services. The firms whose defence-related products and capabilities are described do not represent the total production of the Canadian defence industry; they have been selected to illustrate the variety of defence products available from Canada.

Canada can be a unique source of defence requirements because of its international reputation for high quality products and equipment manufactured to exacting standards. Canadian industry is thoroughly familiar with North American and NATO military specifications and standards.

At the back of this book is an alphabetical product listing for easy reference identifying the names of Canadian companies that manufacture each product, followed by an alphabetical listing of the names of all companies identified together with their products.

The services of the Canadian Commercial Corporation are available for those countries wishing to purchase defence equipment on a government-to-government basis.

Since a publication of this nature cannot completely cover the detailed specifications and other relevant data on the equipment portrayed, potential users are invited to contact the Canadian companies directly or obtain further information from the closest Canadian embassy or trade office.



### **Canadian Commercial Corporation**

Canadian Commercial Corporation (CCC) is a Crown Corporation owned by the Government of Canada. It was established in 1946 by Act of Parliament "to assist in the development of trade between Canada and other nations."

CCC's principal function is to act as the contracting agency when foreign governments and international agencies wish to purchase goods or services from Canada on a government-to-government basis. Contracting for the Corporation is carried out by the Department of Supply and Services, the central procurement agency for the Government of Canada. The customer is assured that the Canadian supplier is considered by the Government of Canada to be financially and technically capable of conforming with bid specifications, contract terms, and supplier warranties.

The availability of CCC's services does not prevent foreign governments or international agencies from contracting directly with Canadian manufacturers if they so desire. However, the Corporation can provide foreign buyers with the same level of purchasing services as enjoyed by the Government of Canada when it purchases for its own account. Using the services of the government's own purchasing experts CCC can identify competent sources and assure customers that prices and terms from Canadian suppliers are equitable. In addition, the financial aspects of transactions are simplified; approved customers receive open-account privileges and CCC assumes responsibility for paying suppliers' invoices and performing contract audits where required.

Arrangements can also be made to have Quality Assurance and acceptance of defence goods carried out in Canada on behalf of the customer government by the Canadian Department of National Defence.

Enquiries concerning CCC should be addressed to the Canadian Embassy, High Commission or Consulate in your country, or directed to:

Canadian Commercial Corporation Export Supply Centre Ottawa, Ontario, Canada K1A 086

Tel: (613) 996-0034 Telex: 053-3703



# **Contents**

	Page		Pag
The Acton Rubber Ltd.	1	International Uniforms Ltd.	5
Aircraft Appliances and		Internav Ltd.	60
Equipment Limited	2	Irvin Industries Canada Ltd.	6
Anachemia Ltd./Ltée	3-5	Aerospace Division	
AOCO Limited/Limitée	6	Leigh Instruments Limited	62
Aviation Electric Ltd.	7	Ernst Leitz Canada Limited	63-64
Bayly Engineering Limited	8	Levy Auto Parts Company	65-66
Bell Aerospace Canada Textron	8	Litton Systems Canada Limite	d 67-72
Division of Textron Canada Limited		Magline of Canada Limited	75
Bombardier Inc.	9-10	Marine Industries Limited	76
Bristol Aerospace Limited	11	Maritime Industries Ltd.	77
Burrard Yarrows Corporation	12	Miller Communications	70
CAE Electronics Limited	17	Systems Ltd.	76 78
Canadair Limited	13-14	Norpak Ltd. Northwest Industries Limited	
Canadian Arsenals Limited	15-16	A Division of CAE Industries Ltd	
Canadian Astronautics Limited	18	Optotek Limited	79
Canadian Foremost Ltd.	19	Pacific Truck and Trailer Ltd.	80
Canadian Marconi	21-29	Patlon Aircraft and	
Divisions: Telecommunications,		Industries Ltd.	81-82
Avionics, Marine and Land Communications, Radar		Pedsco Canada Ltd.	80 83
Canoe Cove Manufacturing Ltd.	19	Philips Electronics Ltd.  Crystal Division	03
Casey Copter Accessories Ltd.	20	Pratt & Whitney Aircraft of	
Codalex Ltd./Ltée	30	Canada Ltd.	84
Computing Devices Company	31	R-Metrics Ltd.	85
Division of Control Data Canada Ltd.	. 31	Rayshield Limited	86
C-Tech Ltd.	32	Raytheon Canada Limited	87
DAF Indal Ltd.	33	Rockwell International of Canada Ltd.	88
Davie Shipbuilding Limited	34	Collins Canada Division	
A Subsidiary of Dome Petroleum Lin	nited	Saint John Shipbuilding &	00
The de Havilland Aircraft of		Dry Dock Co. Ltd.	89 90
Canada, Limited	_ 35	Scan Marine Inc. Scepter Manufacturing Co. Lt	
Deltaire Industries Ltd.	36	Seagold Industries Corporation	
Devtek Corporation	37	SED Systems Inc.	92
Divisions: Hermes Electronics Limited Diemaco Inc.	<b>a</b> , _	Sinclair Radio Laboratories	
Diffracto Ltd.	36	Limited	<b>9</b> 3
ESE Limited	38	Skykeesh Industries Limited	94
Exide Canada Inc.	39	Spar Aerospace Limited	95-96
Exide Electronics Division	00	Groups; Mechanical and Electrical Space and Electronics	ii,
Fathom Oceanology Limited	40	Sparton of Canada, Limited	97
Ferguson Industries Limited	43	Sperry Incorporated	98
Fleet Industries 4	11-42	Gyroscope Division	00
Garrett Manufacturing Limited 4	15-49	Sperry Univac  Defence Systems Division	99
General Motors of Canada	,	Sprung Instant Structures Ltd.	103
Limited	44	SR Telecom Inc.	100
Diesel Division			101-102
Global Thermoelectric Power Systems Ltd.	50	Techwest Enterprises Ltd.	104
Goodwood Data Systems Ltd.	50 51	Treco Inc.	103
Greening Donald Co. Ltd.	52	Uniroyal Ltd. Valcartier Industries Inc.	105 106
Halifax Industries Limited	53		107-108
Hand Chemical Industries	54	Varian Canada Inc.	107-108
Hawker Siddeley Canada Inc.	55	Versatile Vickers Inc.	111
Orenda Division		Versatile Vickers Systems Inc.	
Heede International Ltd.	58	Vulcan Industrial Packaging	
John T. Hepburn, Limited	56	Limited  Explosafe Division	110
Hewitt Equipment Ltd.	57	141 11 1 1	113-114
nternational Submarine			115-114
Engineering Ltd.	58		121-124

#### The Acton Rubber Ltd.

881 Landry, P.O. Box 300 Acton Vale, Quebec, Canada JOH 1A0

Tel: (514) 546-2776 Telex: Lambert 055-60364

Protection, safety and comfort are provided by Acton Rubber with a wide range of military rubber footwear for all services and uses including nuclear biological chemical (NBC) overboots and chemical warfare (CW) gloves.

The company has been engaged for more than 50 years in the manufacture of vulcanized process rubber footwear, including light and heavy overshoes, rubber boots, gloves, etc., for military, domestic and industrial needs. The Acton line features leather top and flight boots, lumberman footwear, rubber arctics, excluders and insulated boots for extremely cold weather (Mukluk).

Acton's chemical warfare

protective gloves (lined

and unlined).

Designed for military purposes are Acton gloves, an integral part of the system of CW protective clothing, consisting of duo-stretch knitted cotton coated with butyl rubber for complete protection, durability and comfort. The soft butyl rubber plus finger and palm of curved configuration allows excellent manipulative dexterity together with dependable durability.

Also part of the CW protective clothing the Acton overboots incorporate the same highly protective butyl rubber as the gloves. The boots are similar in design to high quality rubber winter footwear, made to fit over regulation combat boots. Closure is designed for security and quick operation.

The overboot upper is of butyl coated duo-stretch cotton fabric while the thicker outsole and upper reinforcing components are made of neoprene rubber.



Lightweight chemical warfare overboots provide safety and comfort.

# Aircraft Appliances and Equipment Limited

152 East Drive, Bramalea, Ontario, Canada L6T 1E1

Tel: (416) 791-1666 TWX: (610) 492-4396 Telex: 069-7540



Aircraft Appliances and Equipment Limited has the expertise to finance and complete any program within the scope of its present facilities. Established more than 30 years ago, it is independently owned and operated. Products manufactured in Canada and available for export include military generator sets with power output range of 1.5 kW and 30 kW; industrial/agricultural brushless alternators with power output ranging from 1.5 kW to 200 kW; tachometer generators and starter generators for civil aviation and military aircraft; filters, strainers and coalescers for aerospace and marine application, both for civilian and military use; ground power equipment (generator set) for aircraft service.

The company also maintains a complete repair and overhaul service which includes AC/DC generators and associated regulators and control equipment, AC/DC motors, relays, contactors, circuit breakers, and other equipment associated with the firm's products. The company's longestablished relationship with the armed forces of Canada and the United States has resulted in improved design and techniques for military and civilian purposes.







#### Anachemia Ltd./Ltée

P.O. Box 147 Lachine, Quebec, Canada H8S 4A7

Tel: (514) 489-5711 Telex: 055-66129

A simple, inexpensive, expendable device for the detection of dangerous concentrations of nerve gas vapours — and other safety devices — are being produced for service in the Canadian Armed Forces and other NATO countries by Anachemia Ltd.

The equipment requires a minimum of training to use effectively. Because it is on issue to the individual soldier, it is designed to be simple, low cost and small in size.

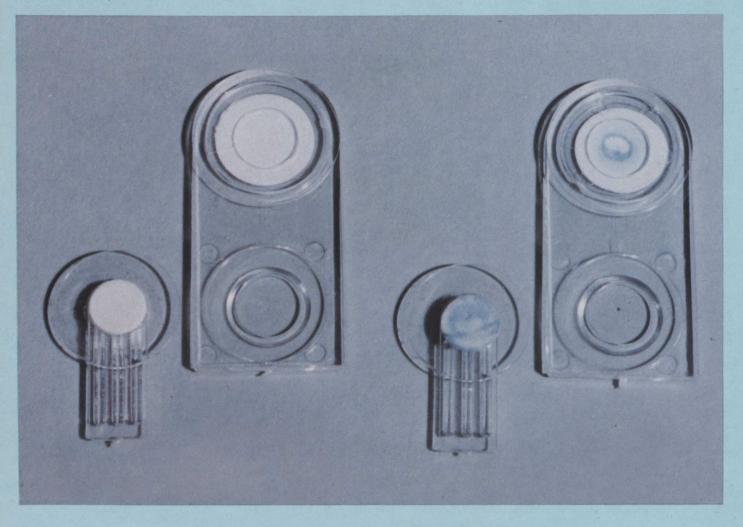
The use of the detector is twofold: to quickly determine if a chemical attack detected by a "gas alarm" system is dangerous in the immediate vicinity of the individual, and to quickly determine when it is safe for an individual to unmask.

The chemical reaction is of the failsafe type.

The detector consists of two main parts — a plastic body containing an enzyme impregnated test paper; and a plastic holder containing a chemically impregnated test paper.

The unit, which is 8.9 x 2.9 x 0.65 cm, is packaged in an airtight, moisture-proof foil wrap for protection against environmental conditions until required for use.

Device by Anachemia for the detection of dangerous concentrations of nerve gas vapours. It requires a minimum of training and provides maximum protection.



### Anachemia Ltd./Ltée

The Anachemia chemical agent C-2 detector kit is designed for issue to a small unit. It is operated by one person, requiring little training.

Complete detector kit with carrying case designed for issue to small unit, easily operated by one person.

The kit is used for determining the presence or absence of chemical agents resulting from an attack, identifying chemical agents, collecting vapour samples of unknown chemical agents for laboratory identification, identifying when it is safe to unmask for either short (1/2-hr.) or long (12-hr.) periods, and testing whether an area is chemically contaminated.

The kit consists of a vinyl-coated carrying case designed to withstand prolonged exposure to severe environmental conditions. It contains the following: paper, chemical agent detector, liquid-detectors, chemical agent, nerve vapour to detect high concentration of nerve vapour agents; detector tubes white band used in conjunction with an air sampling pump to collect samples of unknown vapours; chemical reagents, used with detector tubes or detector chemical agent; air sampling pistontype pump with a head to accept various tubes or chemical agents; and detector tube dispenser designed to hold 10 detector tubes.



#### Anachemia Ltd./Ltée

The three-way detection paper produced by Anachemia was developed to meet the need for a simple and rapid method of detecting and differentiating between the three major groups of warfare agents which constitute a threat when in liquid form.

This "three-way paper" consists of a paper base impregnated with dyestuff and coated on one side with an adhesive backing. The three agent groups detected and differentiated are the G and V agents (both nerve agents but differing in many characteristics) and the H (mustard) agents.

The detector paper is used to detect liquid chemical agents in the form of falling droplets or splash from chemical munitions. The paper is attached to exposed clothing or unscreened surfaces or, where an area is suspected of previous liquid contamination, the paper is pressed or rubbed over the suspected surface such as grass, broad leaves, etc.

The chemical agent detector is made of a strong paper with good wet strength and stability in storage when kept dry and away from sunlight. The paper is loaded with three water insoluble dyes to permit detection and differentiation between G, H and V agents. Each sheet of paper is perforated to allow easy removal from the booklet. There are 12 sheets 6.4 x 10.2 cm assembled in the booklet. The paper's adhesive backing is protected by silicone treated Kraft release paper.

Anachemia's detection paper for use against liquid chemical agents. The paper can be attached to exposed clothing or areas suspected of contamination.

6665-21-858-8494

### PAPER

CHEMICAL AGENT DETECTOR, .13-WAY LIQUID, ADHESIVE BACKED)

#### INSTRUCTIONS FOR USE OF PAPER

Detach a sheet of detector paper from the book and attach it to clothing or place on a surface so it can be exposed to drops or liquid splash of chemical agents. It coloured spots appear chemical agent is present, Put on protective mask. Compare coloured spot with colours on inside cover to determine type of agent. The paper may also be used to detect liquid contamination by placing the paper in contact with the suspect surface.

#### DETECTS LIQUIDS ONLY POUR LIQUIDES SEULEMENT

G:

ORANGE TO LIGHT YELLOW ORANGE À JAUNE PÂLE

H:

SMALL VARIATIONS OF SHADES OF RED PETITES VARIATIONS DE NUANCES ROUGES

#### L'UTILISATION DU PAPIER-DETECTEUR

Détachez du livret une feuille de papier-de-tecteur et attachez-la à vos vétements ou pla-cez-la sur une surface de façon à ce qu'elle soit exposée aux gouttes ou aux éclabous-sures liquides de substances chimiques. L'ap-parition de ta hes colorées indique la pré-sence d'une .ubstance chimique. Mettez vo-tre masque protecteur. Comparez la couleur de la tache avec celles qui se trouvent à l'in-térieur de la couverture, pour déterminer la sorte de substance chimique. Le papier peut être également utilisé pour déterminer s'il y a contamination par un liquide, en mettant le papier en contact avec la surface suspecte.



#### **AOCO Limited/Limitée**

60 Mobile Drive Toronto, Ontario, Canada M4A 2R7 Tel: (416) 752-8780



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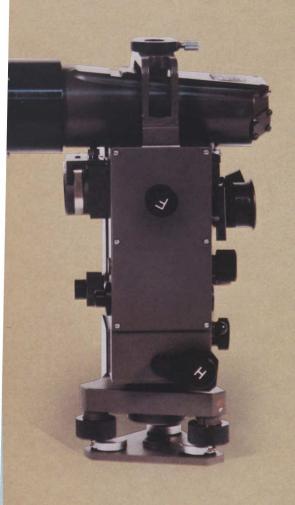
Eyeglasses, or spectacles, have presented a problem of compatibility with the gas mask for nearly every military force. Their increased general use in recent years, combined with greater need for unimpaired vision in an ever-widening spectrum of military services and situations, has aggravated the situation. Although contact lenses have eased the problem, many persons cannot wear them, and they have proved impractical for contin-

uous wear. The Canadian Department of National Defence has resolved the difficulty by developing spectacle frames — produced by AOCO — suitable for use in all combat conditions, but particularly by providing compatibility with the gas mask. The frames are fairly normal in design, made of silver, and have slightly increased clearances between lenses and nose (a wider bridge) to allow for the mask nose cup.

These combat spectacles have undergone exhaustive trials including field training, battle physical training, exercises requiring use of gas masks (with training agents employed), night driving and firing exercises, parachuting and operational flying wearing helmet and oxygen mask. The spectacles are available in lens sizes of 44, 46 and 48 mm and bridges of 24 and 26 mm.







#### Drone alignment system. Accuracy to .1 mil. Attaches easily to existing military aiming circles and meets STANAG No. 3606 Edition 3 Safety Standards. Solid state.

# **Aviation Electric Ltd.**Subsidiary of the Bendix Corporation

200 Laurentien Boulevard St. Laurent, Quebec, Canada H4M 2L5

Tel: (514) 744-2811 Telex: 05-826688

From a small beginning in 1931, Aviation Electric Ltd. has grown to become the world's largest producer of fuel control systems for small aircraft gas turbine engines.

The company designs and produces aircraft turbine engine fuel control systems, land navigation systems, vehicle compass systems, drone alignment systems, custom-made industrial hydraulic power units and installations, and mobile pneumatic and hydraulic test stands. Aviation Electric services also cover the repair and overhaul of aircraft, flight and engine instruments, electrical and hydraulic accessories, wheels, brakes, navigational aids and airborne radar.

In addition, the company fabricates, assembles and tests complex systems under licence from other aerospace firms.

Aviation Electric, Pacific Division, adjacent to Vancouver International Airport provides sales, service, repair and overhaul of aircraft, industrial and marine accessories.

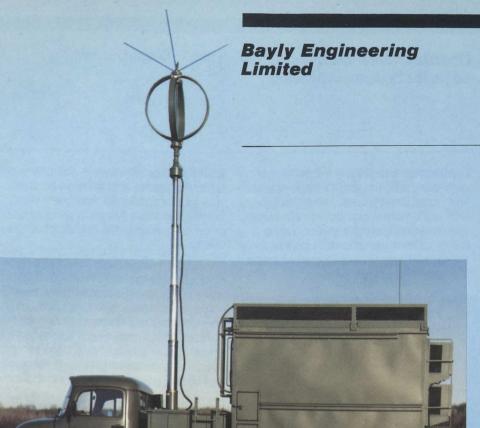
Military vehicle heading reference/land navigation system designed to provide accurate azimuth and position information for the navigation of military vehicles under all conditions encountered in the field.





Gun and Alignment Control System

It's three systems in one. An automatic north-alignment system for all guns. A digital fire-orders transmission system using radios or line, A two-way voice communication system.



167 Hunt Street Ajax, Ontario, Canada L1S 1P6 Tel: (416) 683-8200

Telex: 06-981293

Bayly Engineering Limited — a member of the AEG-Telefunken group designs and produces a new concept in radio directional finders, including the VLF (very low frequency) to UHF (ultra high frequency) three-channel 200 model. The system provides complete coverage of 150 kHz through 512 MHz; instant visual indication of bearing and sense; panoramic frequency display; single frequency tuning while surveying the spectrum; positive identification of bearing trace; vertical or horizontal polarization: integral antenna array for direction finding and sense.

Bell Aerospace Canada **Textron Division of Textron** Canada Limited

P.O. Box 160 Grand Bend, Ontario, Canada NOM 1TO Tel: (519) 238-2333

Telex: 064-7268



LACV-30 air cushion vehicle produced by Bell

Bell Aerospace is a leading producer of commercial and military air cushion systems. The company's specially designed, fully amphibious high-speed cargo carrier has been quantity produced for the United States Army. Its prime function is to move cargo from ship to shore and inland rapidly and efficiently, when other facilities are not available.

The Bell cargo carrier travels at speeds up to 99.78 km/h (62 mph) and operates over water, land, snow, ice, marshes and swamps. It serves many purposes as coastal, harbour and inland waterway patrol; search and rescue missions; medical evacuation rescues; water and fuel resupply; vehicle, personnel and troop transport; pollution and fire control.

The carrier needs no dock or berthing facilities and operates effectively from sub-zero to tropical conditions.

# **Bombardier Inc.**Logistics Equipment Division

Valcourt, Quebec, Canada J0E 2L0

Tel: (514) 532-2211 Telex: 05-832504

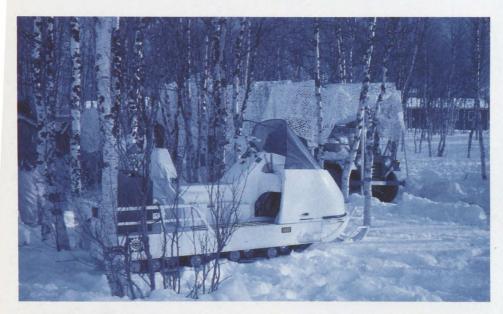
Bombardier explores the frontiers of defensive mobility, troop deployment and combat readiness — working with both advanced and conventional systems and next-generation equipment. Laboratory and field test facilities are engaged in continual concept studies.

With 6,000 employees — 15 manufacturing plants and after-sales service in more than 50 countries — Bombardier can satisfy a wide range of tactical or logistic vehicle requirements

Chassis, transmissions, frames and hulls all undergo individual development programs. Patented track technology involves positioning, tension and skid frame pressures. Engine durability and capacity is examined under variable conditions simulating different horsepower, torque, load and RPM.

Bombardier equipment is engineered with simple on-site maintenance and service in mind. Complete Bombardier servicing includes convenient spare parts availability and staff training.

With plants in Canada, the United States and Austria, Bombardier is the world's largest manufacturer of snowmobiles. It is a world leader in high technology products, specializing in the fabrication and assembly of metal, fibreglass and thermoplastic products. Bombardier manufactures everything from locomotives and







diesel engines to flexible reinforced tracks and solid rubber tires . . . from protective outdoor clothing to fireretardant seating . . . from aerospace systems to heat transfer products.

The Bombardier range of products designed for military service also includes patrol vehicles, personnel carriers, trucks, motorcycles - and

includes patrol vehicles, personnel carriers, trucks, motorcycles - and scores of other "manoeuvrables." Bombardier also manufactures industrial vehicles, ruggedly constructed for durability under field conditions; half-track and personnel carriers; versatile two-wheel gun carriages; overthe-snow tracked cargo and personnel carriers; shelters and trailers.

Equipment is engineered with simple on-site maintenance and repair in mind.

Bombardier vehicles have been traction tested in snow, swamp and sand for military dependability.



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# **Bristol Aerospace Limited**

P.O. Box 874 Winnipeg International Airport Winnipeg, Manitoba, Canada R3C 2S4

Tel: (204) 775-8331

Telex: 07-57774: 07-57804

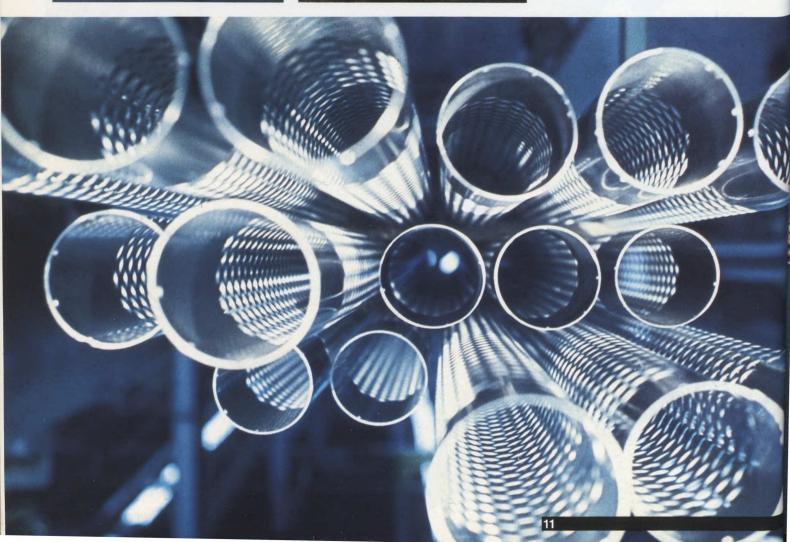


Ready to meet the demands of today and the challenges of tomorrow, Bristol Aerospace Limited, offers a wide range of specialized products for the technological and aviation industries. Products and services include combustion and exhaust components. The company has developed advanced techniques in forming, welding, machining and processing of high strength heat resistant materials for use in the manufacture of gas turbine components — specializing on those in the "hot" section of the engine.



Bristol is also a world leader in the fields of aircraft sheet metal assemblies; helicopter component test cells; nuclear reactor core components; high altitude research rockets; research rocket telemetry, precision jigs, fixtures and tooling; rest and development facilities.

The wire strike protection system (WSPS) is a proprietary product of Bristol. The system, originally codeveloped with the Canadian Armed Forces for retrofitment of Bell helicopters, is now available for military and commercial operators of helicopters in the United States as well as helicopters of foreign manufacture.



# **Burrard Yarrows Corporation**

P.O. Box 86099 North Vancouver, British Columbia, Canada V7L 4J6

Tel: (604) 988-2111 Telex: 04-352652

Burrard Yarrows with facilities in both Vancouver and Victoria, B.C., on the Canadian Pacific coast, is fully experienced in shipbuilding, ship repairs, and general marine engineering.

The company has an extensive background in undertaking naval refit work—mainly for the Canadian Navy. It has capabilities of building vessels up to 153 metres (505 feet) long and 28 metres (92 feet) wide and dry-docking

Burrard Yarrows' new floating dock in the Port

of Vancouver which can handle vessels up to

75,000 DWT.

and servicing vessels up to 230 metres (760 feet) long and 45 metres (149 feet) beam in the Vancouver facilities, and 358.64 metres (1,184 feet) long and 38.4 metres (127 feet) wide at the Esquimalt dock in Victoria.

The firm is a member of the Versatile Group of Companies, and is equipped to meet the needs of both naval and commercial vessels.



#### **Canadair Limited**

1800 Laurentian Boulevard St. Laurent, Quebec, Canada H4R 1K2

Tel: (514) 744-1511 Telex: 05-826747

Canadair is one of Canada's major aircraft manufacturers. Its main facility, consisting of four separate plants, is located at Cartierville Airport in St. Laurent, a suburb of Montreal. Its facilities have a total of 250,000 square metres (2.7 million

square feet) of covered manufacturing space.
Extensive modernization of machines and processes has made Canadair one of the best equipped and most versatile aerospace manufacturers in the

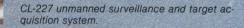
world.

Canadair employs approximately 7,000 people.

Since its inception in 1944, Canadair has produced more than 3,900 aircraft, military and commercial, both for the Canadian Armed Forces and for export. In addition, more than 600 units of an unmanned airborne surveillance drone system have been supplied to the armed forces of Britain, the Federal Republic of Germany, Italy and France.

Canadair's latest product is the Challenger, an entirely new business jet aircraft which incorporates a widebodied fuselage, advance technology wing and two high by-pass ratio turbofan engines. The Challenger has a range of approximately 6,000 kilo-

CL-215 multi-purpose amphibian.



metres (3,728 miles), a normal cruise speed of 780 kilometres per hour (485 mph) and can carry up to 19 passengers or a 1,800 kilogram (3,968 pound) payload.

Canadair also produces the CL-215 multipurpose aircraft. Primarily intended for forest firefighting, the CL-215 is adaptable to a wide variety of roles including aerial spraying, maritime patrol, search and rescue and transportation.

Canadair is a world leader in the design, development and production of unmanned airborne surveillance systems. Three of these intelligence gathering systems for battlefield commanders are currently in production or under development.

The CL-89 is designed to meet the needs of the army division commander. The system consists of reusable air vehicles, or drones, plus related ground support and operational maintenance equipment. The drone carries either a photographic or infra-red line scan sensor. The CL-89 is now in the inventories of the armies of Britain, the Federal Republic of Germany, France and Italy.

The CL-289 is designed to meet the needs of the army corps commander. It is being developed jointly by Canadair and Dornier GmbH to meet German Army requirements.

The CL-289 operates in a similar manner to the CL-89, however the drone is larger, has longer range and a more accurate navigation system, and carries both optical and infra-red imagery via a data-link.

The CL-227 is a medium range surveillance and target acquisition system consisting of a remotely piloted air vehicle (RPV) plus ground support and maintenance equipment. The air vehicle can take off and land vertically, translate to horizontal flight, and hover. It is highly survivable due to its very low noise level, its small size and low radar signature. Its sensor transmits real-time radar, TV or laser designating data.

Canadair also manufactures major components for other manufacturers' aircraft including the Boeing 747Sp and 767, the Lockheed C-5A and P3C, the McDonnell Douglas F-15 and F-18 and the Grumman EF-111A.



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CL-289 unmanned airborne surveillance system.



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The CL-227 is a medium range surveillance and target acquisition system consisting of a remotely piloted air vehicle (RPV) plus ground support and maintenance equipment The air vehicle can take off and land vertically, translate to horizontal flight, and hover. It is highly survivable due to its very low noise level, its small size and low radar signature. Its sensor transmits real-time radar, TV or laser designating data.

Canadair also manufactures major components for other manufacturers' aircraft including the Boeing 747Sp and 767, the Lockheed C-5A and P3C. the McDonnell Douglas F-15 and F-18 and the Grumman EF-111A.

CL-289 unmanned airborne surveillance



er business jet.







CL-227 unmanned surveillance and target ac-

### Canadian Arsenals Limited

5 Montée des Arsenaux Le Gardeur, Quebec, Canada J5Z 2P4 Tel: (514) 581-3080

Tel: (514) 581-3080 Telex: 05-24642

For the past 40 years, Canadian Arsenals has produced armament and related products for the Canadian Armed Forces.

Through the years, the company has developed an expertise and gained an enviable reputation in the fields of medium and large calibre ammunition, related military products and various ancillary military equipment.

In these areas of activities, Canadian Arsenals has established a centre of excellence in Canada and will continue to maintain the high standards of safety, quality and reliability which are recognized by NATO countries.

The company's manufacturing operations are supported by an experienced and innovative engineering department. A rigid quality control program is enforced, from the reception of raw materials to the final assembly and testing of the finished products.

With an enlarged line of defence material, Canadian Arsenals is offering, at competitive prices, an everincreasing variety of high-quality products.





- 1 3"/50 spotting charge practice cartridge
- 2 3"/50 high explosive cartridge
- 3 3"/50 inert charge practice cartridge
- 4 3"/70 high explosive cartridge
- 5 3"/70 spotting charge cartridge
- 6 3'170 practice cartridge, inert
- 7 76 mm practice cartridge, squash head
- 8 76 mm cartridge, high explosive squash head
- 9 105 mm practice cartridge, tank, discarding sabol
- 10 105 mm practice cartridge, tank, squash head
- 11 155 mm howitzer shell, high explosive
- 12 High explosive 105 mm howitzer cartridge, fuze M<sup>6</sup>



Constantly innovating and improving, Canadian Arsenals' research and development department gives priority to the search for better products and processes, for today and tomorrow.

Substantial expenditures are devoted to maintaining a staff of highly qualified, well trained people to provide varied services in the explosives and aero-ballistics fields, testing and evaluating materials, mechanical processes and armaments systems.



E B

- A C14 practice shot
- 2.75 inch warhead practice frangible
- 105 mm practice cartridge, tank, discarding sabot C-74
- 105 mm practice cartridge, tank, squash head, C-72
- 105 mm APFSDS XC76
- 90 mm APFSDS
- C15 squash head practice projectile



- 13 105 mm howitzer smoke cartridge, fuze M557
- 14 105 mm howitzer practice cartridge, squash head
- 15 81 mm mortar cartridge, high explosive
- 16 Dummy anti-tank mine, C9

- 18 23 19 24 21 20
- 17 Gas mask, C-3 18 Primer M80A1
- 19 Primer M28A2
- 20 Primer No. 15 MK5

- 21 Fuze M557
- 22 Propelling charge M3 for 155 mm howitzer
- 23 Propelling charge M4A2 for 155 mm
- 24 Propelling charge M67 for 105 mm howitzer

## **Canadian Arsenals** Limited

5 Montée des Arsenaux Le Gardeur, Quebec, Canada J5Z 2P4 Tel: (514) 581-3080 Telex: 05-24642

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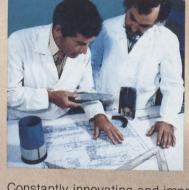
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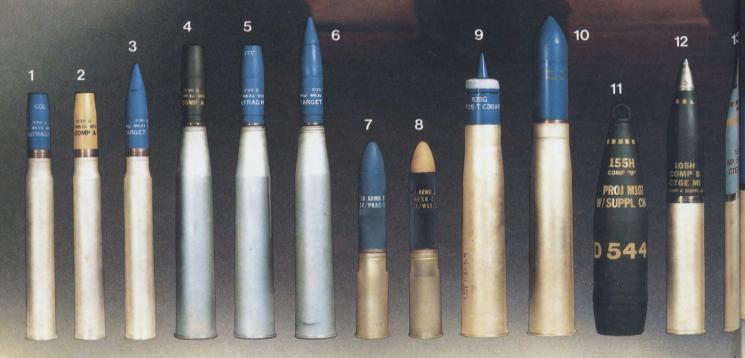


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- 14 105 mm howitzer practice cartridge, squash head
- 15 81 mm mortar cartridge, high explosive
- 16 Dummy anti-tank mine, C9

### **CAE Electronics** Limited

P.O. Box 1800, St. Laurent Montreal, Quebec, Canada **H4L 4X4** 

Tel: (514) 341-6780 Telex: 05-824856

NATO's AWACS advanced simulator designed and produced by CAE, under in-plant testing. The unit has been installed at a base in Germany for crew training.

CAE Electronics is a world leader in the design and production of sophisticated flight and tactical simulators for training aircrews, and airborne magnetic anomaly detection (MAD) equipment for anti-submarine warfare.

CAE's simulators safely reproduce actual aircraft performance within the full flight envelope to train aircrew in systems operation. Both normal and

abnormal conditions, as well as a wide range of emergency procedures, can be simulated, with no danger to personnel. The simulator flight deck looks, sounds, and feels exactly like the real aircraft, and a number of sophisticated tactical systems can be included in the training. Examples are radar, weapons release, terrain following, electronic warfare, and antisubmarine tactical systems. Instructors can monitor, record, and play back all aspects of a flight training exercise and can easily and quickly change the aircraft configuration, environmental conditions, and the tactical situation.

CAE Electronics has designed and built simulators for the MRCA Tornado and CF-18 tactical combat aircraft, the close support/advance trainer Alpha Jet, the C-130 Hercules transport, the E-3A AWACS, and the CP-140 maritime patrol aircraft. Helicopter simulators have been built for the UH-1D, CH-53, CH-47, AB-205, AB-212, and the SAR Sea King.

In the MAD field, CAE produces the AN/ASQ-502 magnetometer for submarine detection. The AN/ASA-60 and AN/ASA-65 compensators eliminate interference from aircraft manoeuvres, and a more advanced OA-5154/ ASQ fully automatic compensation system (FACS) is fitted in the CP-140. The SM-5016/ASQ submarine signal simulator provides a variety of submarine magnetic signatures, permitting MAD operator training on routine patrols.



The CAE fully automatic compensation system consisting of a vector magnetometer, control indicator and amplifier converter.







# Canadian Astronautics Limited

Suite 201 1024 Morrison Drive Ottawa, Ontario, Canada K2H 8K7

Tel: (613) 820-8280 Telex: 053-3937

A diversified company, Canadian Astronautics Limited (CAL) is engaged in developing and manufacturing a wide range of high-technology items and providing systems engineering services.

The products and services offered include electronic warfare (EW) systems, airborne synthetic aperture radar, radar simulators, satellite ground stations, instrumentation, signal processing and computer systems.

The laboratories, which include a clean room for aerospace hardware assembly, are equipped to support analog and digital electronic development, antenna and radio frequency (RF) development, and computer facilities for signal processing and process control work.

Radar signal simulator.

CAL's expertise in signal processing, has made the company a leading supplier of search and rescue satellite system (SARSAT) ground stations. The stations operate with the international search and rescue satellite for emergency location of distressed aircraft and vessels. The company has supplied one station to Canadian authorities, four stations to NASA and one station to France.

The company, in support of Canada's Department of National defence, completed a study into the detection of exotic radar signals. The study used computer simulations to detect, measure and sort individual pulses in a high density environment. In particular, sophisticated algorithms were developed to measure the intrapulse characteristics of pulse compression radars.

process control work. CAL has been involved with studies for several antenna beamshaping projects including one for a UHF satellite program, another for MBB in Germany for the Anik C design, and one for a South American satellite communication system. C-band synthetic aperture radar. SARSAT local user terminal. AT LOCAL USER TERMINAL

18

# Canadian Foremost Ltd.

1616 Meridian Road North East Calgary, Alberta, Canada T2A 2P1

Tel: (403) 272-3322 Telex: 038-22772

Founded in 1965, Canadian Foremost Ltd. is primarily engaged in the design and manufacture of heavyduty off-highway vehicles, both wheeled and tracked, with load capacities ranging from five to 70 tonnes. The Foremost vehicles are in service

throughout the world providing versatile off-road transportation for many industries including pipeline and powerline construction, geophysical exploration, mining, heavy oilfield hauling, and logistic support. They are also used to service military needs.

The company's HEP oilfield equipment division manufactures oilwell pumping units designed for both conventional and heavy oil production, primary and enhanced recovery programs.

# Canoe Cove Manufacturing Ltd.

2300 Canoe Cove Road P.O. Box 2218 Sidney, British Columbia, Canada V8L 3S8 Tel: (604) 656-3915

Since its inception in the building of custom commercial vessels almost 50 years ago, Canoe Cove has expanded to meet the growing demand for more sophisticated governmental and commercial vessels.

Canoe Cove's Commercial Division has constructed a variety of craft of

high quality workmanship, incorporating its proven hull design. These include fishing vessels, water taxis, camp tenders, tour boats and government patrol vessels. Agencies of the Canadian Government have purchased a large number of Canoe Cove boats, that range in size from seven to 18 metres (20 feet to 53

feet), which are in service in all phases of the marine field, and are in use on both Canadian coasts as well as the Great Lakes and other inland waters. The majority of these craft are built to meet the rigid standards of the Canadian Steamship Inspection Service.

### Casey Copter Accessories Ltd.

P.O. Box 121 Montreal AMF Dorval, Quebec, Canada H4Y 1A5

Tel: (514) 636-6155 Telex: 05-8228401



The Casey Shroud Heater System was developed in Canada based on many years experience in the Canadian north. Under these difficult conditions of extreme cold, system reliability is a paramount consideration. Accordingly the design of the system provides few moving parts and positive mechanical linkages for all controls.

Acting as an air to air heat exchanger the unit serves to heat outside air using waste heat from the aircraft turbine, and this hot air is mixed with ambient air to achieve a comfortable cabin environment. As this is an essentially passive system, maintenance is minimal and no additional fuel is required for its operation.

There are no restrictions on heater use when using the Casey heater allowing clear visibility and crew comfort during all operating conditions. It does not reduce range, restrict airspeed nor reduce rate of climb because it requires neither bleed air nor precious fuel.

Comfort under all conditions provided by Casey shroud heater systems for helicopters.



# Canadian Marconi Company

2442 Trenton Avenue Montreal, Quebec, Canada H3P 1Y9

Tel: (514) 341-7630 Telex: 05-827822 Cable: ARCON

The Canadian Marconi Company consists of six major divisions that cover a broad field of modern technology. They include:

#### **Avionics Division**

Activities are development, production and marketing of Doppler and Omega navigation systems, engine instruments, status display systems, flight advisory computers, and digital avionics for aircraft, Navstar GPS systems for land, sea, and air vehicles, telex exchanges, and photogrammetric processors.

#### **Components Division**

The primary role of the Components Division is the custom manufacture of multilayer printed circuit boards, thin film, thick film, and hybrid microcircuits, edge-lit panels, power supplies, and magnetic devices.

# Marine and Land Communications Division

A wide range of equipments produced by this division includes HF/SSB, VHF/FM and UHF/FM radio in many physical configurations, and a shortrange radar for ships or helicopters.

#### **Radar Division**

The Radar Division is engaged in the development, production and marketing of surveillance radar systems.

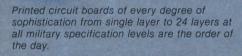
#### **Special Services Division**

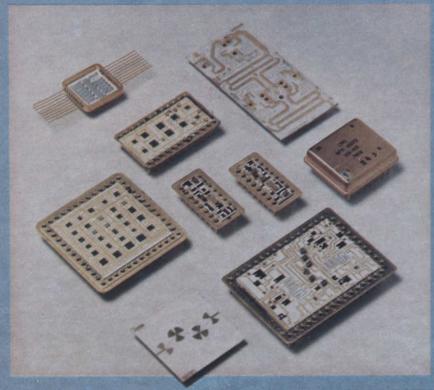
This division is concerned with the installation and maintenance of ground-based radar, communications and air navigation systems, equipment repair and overhaul, and calibration of test equipment to traceable standards.

#### **Telecommunications Division**

The Telecommunications Division is involved in the development, manufacturing and marketing of families of military land-based tactical communications equipment.

Thin film, thick film, and hybrid microcircuits are designed and built to customer specifications in an environment which assures the ultimate reliability.





# Canadian Marconi Company

**Telecommunications Division** 

Canadian Marconi Company's Delta Multiplexer MTD-1010 (Deltaplex) is a self-contained all solid state unit, providing 15 voice channels over a radio or cable link in military tactical communication systems, using delta modulation techniques. The unit can be used in both Stand-Alone and Master/Slave configurations.

The stand-alone configuration has 15 full duplex digital ports, accessed by delta modulation voice frequency codecs, or by optional channel codecs for teletype or data access.

The master/slave configuration has up to four Deltaplex units stacked, with one selected as master unit. The number of available channels can be increased from 15 to 63.

Electrically, the Deltaplex unit is a 16-channel multiplexer having 15 identical accessible channels, and one reserved channel, used for frame synchronization. The channel sampling rate is 16 or 32 kb/s, or by crystal selection, 18 or 36 kb/s. An internal switch allows operator selection of high or low sampling rate in either case. The basic configuration uses 15 delta modulation voice frequency codecs, any or all of which can be replaced by optional codecs providing extended facilities. The Deltaplex power supply provides for 115/230 Vac input, or 24 Vdc, with automatic changeover.



### Canadian Marconi Company

**Telecommunications Division** 

The MSB-1224 is a 12-line, semi automatic field tactical switchboard and incorporates a circuit-switching crosspoint matrix which is microprocessor-controlled. This allows straightforward subscriber interconnection and status display, and provides automatic release at the completion of each call. Two units may be interconnected to service 24 lines with a single operator. This compact switchboard is one-man transportable and is designed for service in adverse tactical environments, meeting MIL-STD-810C requirements for mechanical handling and climatic variation.

In addition to the automatic call release, which allows the operator to concentrate his attention exclusively on establishing calls, the unit confirms the tactical loop connection to the calling subscriber by providing ringback tone each time the switchboard is accessed and a service request is made. The two-wire switching matrix is non-blocking and provides an uninterrupted metallic through path. The unit has an increased operating range in the CB/CBS modes by use of a nominal 36 volt supervision supply. Conference calls can be set up for any combination of subscribers with independent automatic release for any or all conferees. Operator preemption of any busy line can be carried out at subscriber request. Two units may be stacked together to provide full non-blocking 24-line operation by using the optional cable link between the expansion connectors on the rear panel of each MSB-1224 unit.



### Canadian Marconi Company

**Telecommunications Division** 

The AN/TRC-145 (V) Radio Terminal Set is a vehicular or air-transportable shelter-mounted assemblage and trailer used to provide tactical multichannel communication facilities in forward areas.

The equipment assemblage is completely self-contained and is ready for instant operation in any location. Apart from its primary use for military communications it is also eminently suitable for all types of emergency communications in situations such as natural disasters, where hurricane damage, flooding or earthquake may have destroyed normal communications.

The ease of operational deployment is such that two men, with minimal prior instruction, can set up the antenna and mast at a chosen site and establish communication with a second similar site in less than 30 minutes after arrival.

Where security is important, this equipment provides a totally enclosed operating area, which can be barred to all unauthorized personnel; directional line-of-sight propagation, which is difficult to intercept; and compatibility with special voice-coding equipment for complete privacy.

The equipment can be arranged as a dual terminal, providing up to 60 channels of telephone communication over two separate paths to two other terminal locations; as a single terminal, with complete standby equipment; as a through (Video Patch) repeater; or as a drop-and-insert (Audio Patch) repeater. Telegraph facilities could be added externally, if desired. Duplicate power supply generators and space for operational spares are included in the assemblage.

## **Canadian Marconi Company**Telecommunications Division

The AN/GRC-103 is a lightweight, mobile, tactical radio relay equipment designed for the rapid establishment of high quality radio relay circuits in military forward area communications systems. It is intended for use with delta modulation, pulse code modulation, or frequency division multiplex equipment and is suitable for transmitting a wide variety of traffic including telephone, telegraph, teletype, facsimile, and data. The equipment operates in the 220 to 1,850 MHz frequency range in five separate frequency bands. Any of the r-f channels can be rapidly selected by means of simple front panel controls.

The AN/GRC-103 represents the most advanced radio relay equipment in its class and is notable for its compact size, high reliability, and ease of operation and maintenance.

A directional antenna system and a lightweight, portable mast assembly, specifically designed for this equipment, are also available. The transmitter and receiver operate on the same antenna; a corner reflector or parabolic antenna is used according to the frequency band. All units of the equipment are designed for continuous operation and fully meet military environmental and qualitative specifications for this class of equipment

Basically the radio set will carry 15-63 channels delta modulation, 6-24 channels pcm, or 4-60 channels fdm.

The equipment can be operated from many types of primary power supplies, at a low power consumption level, thereby eliminating most power supply problems previously encountered in field application of radio relay equipment.



### Canadian Marconi Company Avionics Division

CMA-730 Vertical Scale Instruments by Canadian Marconi Company provide analog and digital readouts for a wide range of monitoring functions. They are compact, modular and highly reliable, with solid-state processing, a measurement accuracy of ±0.5 per cent F.S., and an average response time of one second. The CMA-730 range of instruments meets or exceeds the requirements of MIL-E-5400 Class 1A and DO-160, and is TSO approved. These instruments are suitable for both fixed wing and helicopter applications.



CMA-776Status Display System (SDS) is a computer based system which provides the pilot with three levels of warning: master warning/caution alerts; system failure communication; specific fault identification on two lines of alphanumeric readouts. Control of the system is either from the Control and Display Unit (CDU) or from a remote switch on the control column. The system also provides checklist readouts, maintenance data logging of all caution/warning events with time of occurrence, periodic sampling of engine parameters and air data for engine performance analysis. The maintenance information can be replayed on board the aircraft using the CDU, or transferred for stor-age to the CMA-796 Data Collection Unit, or printed in hand copy using a standard RS232 printer. Voice warning is available in conjunction with the SDS. The CMA-923 Flight Advisory Computer (FAC), available for both fixed wing and helicopter applications, provides information to the pilot from filght operational data held in the FAC's memory enabling him to operate the aircraft more efficiently and safely.





# Canadian Marconi Company Marine and Land Communications Division

The LN66, produced by Canadian Marconi Company, is a marine craft surface search radar designed to provide accurate data for target location, navigation, collision and adverse weather avoidance. The system includes a 10 kW transmitter/receiver unit, a high resolution 10 inch (25.4 cm) PPI display including relative or north stabilized presentation, and antenna assembly.

In addition to its use by the U.S. Navy in all classes of ships from river patrol boats to nuclear powered aircraft carriers, the LN66, under the nomenclature AN/SPS - 59 (V), is used extensively by U.S. Army marine craft.

A 75 kW high powered version of the LN66 is used on all U.S. Navy LAMPS helicopters in ASW and surveillance roles, and under the nomenclature AN/TPS-66, in the U.S. Navy AN/TSQ-108 surveillance centre.



### Canadian Marconi Company Avionics Division



The Doppler Navigation System combines with the aircraft heading reference to give a fully self-contained dead reckoning navigation capability. CMC's AN/APN-221 is installed on U.S.A.F. PAVE LOW III night/adverse weather search, rescue and recovery helicopters and on a number of special C-130s. A unique feature of the AN/APN-221 is the combination of a powerful built-in navigation computer with an interactive CRT display in the cockpit. Capabilities include automatic search patterns, moving target rendezvous, helicopter hover and steering guidance, and automatic approach and hover control.

Omega Navigation Systems from Canadian Marconi are in routine service with major

operators in the airline, general and military

oriented Omega/VLF system, compatible with ARINC-559. It features high interface flexibility for integration with a variety of other navigation and/or navigation management systems. The

total weight (excluding the antenna) is 14.6 kg (30.0 lb.), with a choice of Magnetic Field Orthogonal Loop ("H" field), or Electric Field

("E" field) antenna couplers capable of sharing

The CMA-771 is a fully automatic, earth-

aviation communities.



CMC's line of Omega/VLF systems features the CMA-771 Alpha, with a solid-state alphanumeric control/display to communicate with the operator, a capacity for 500 stored way-points, and an interface to Nav Data banks such as the Vandling NDB-2. The CMA-771 readily encompasses future software advances, since the computer-entry mode allows for a wide variety of applications.



### Canadian Marconi Company

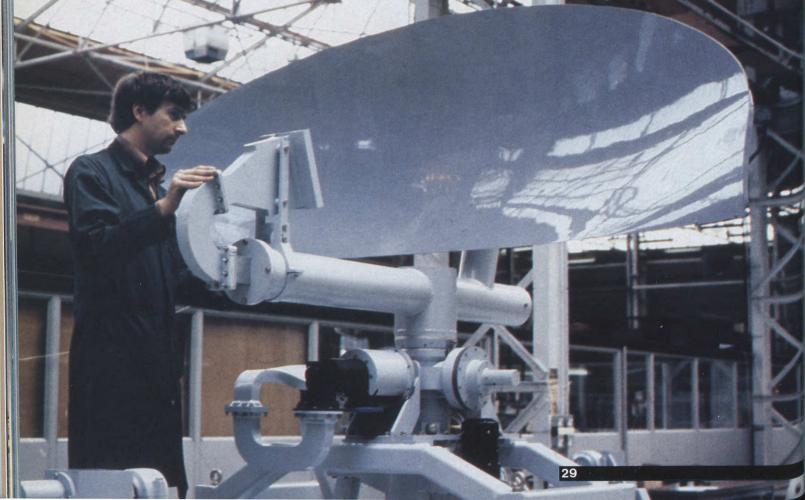
**Radar Division** 



The AN/SPS-503 is an E/F (S) band, shipborne Air Search Radar which can be used in severe ECM and sea clutter environments. Frequency agility, pulse compression and advanced signal processing techniques provide superior performance in a compact and lightweight system. It is ideally suited for fitting to ships as small as 300 tonnes.

The modular design permits selection of various system configurations including low and high-power transmitter options and a range of small, medium or large aperture antennas with or without stabilized platforms. IFF facilities can be incorporated. Features of the SPS-503 include coherent transmitter with pulse-topulse frequency agility, pulse compression, sidelobe cancellation, jamming strobe, digital signal processing, CFAR, PFR discrimination, and adaptive velocity compensation.

System output can be conventional video or digital data and a plot extractor (digitizer) can be provided and accommodated with the signal processor unit.



### Codalex Ltd./Ltée

5780 Decelles Avenue Montreal, Quebec, Canada H3S 2C7 Tel: (514) 731-3251

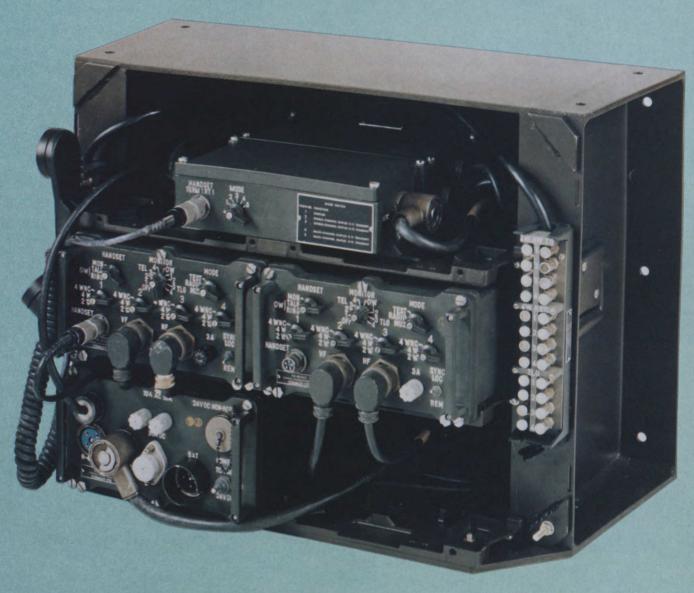
Telex: 05-25225

A leading producer of tactical frequency division multiplex (FDM) systems, Codalex is a major supplier of multiplex systems and accessories to the U.S. Department of Defense and the armed forces of several Far Eastern and Middle Eastern, African and European countries.

The Codalex systems are principally designed for use with standard military tactical radio sets such as the AN/VRC-12 and AN/PRC-77. Compatibility is being verified with the newly developed VHF frequency-hopping radio sets.

The basic multiplex unit has the nomenclature Terminal, Telegraph-Telephone, TH-81/GCC. This unit permits four telephone channels, four VF telegraph channels and 1 order-wire channel to be carried over a single radio or wire path originally designed to carry only one conversation. All telephones and teleprinters connected to the system may be used simultaneously with no interference between them.

Codalex provides product support through training and custom designed test equipment, both manual and automatic, for field and depot maintenance.



A typical Codalex multiplex system — the Terminal set, Telegraph-Telephone AN/TCC-501 supplied to Canada's Department of National Defence.

Projected Map Display — The proven system, the Projected Map Display, has 11 years of operational flight experience. It has demonstrated pilot confidence and greatly reduced cockpit workload.

# Computing Devices Company Division of Control Data Canada Ltd.

P.O. Box 8508 Ottawa, Ontario, Canada Tel: (613) 596-7000 Telex: 053-4139 TWX: 610-563-1632

Since 1948, Computing Devices has been in the forefront of technological innovation and invention, responding to the exacting and highly specialized demands of the defence electronics environment. The United States, the United Kingdom, and many other

friendly nations around the world use its facilities for innovative, highly technical products to solve major defence problems on land, at sea and in the air. For defence electronics, Computing Devices commands attention and respect around the world.

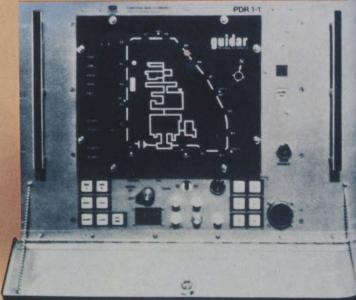


Perimeter Surveillance System: Computing
Devices has developed a unique perimeter
Surveillance sensor system — GUIDAR — that
scan conversion smart display system for all
shipboard sensors, i.e. radar, sonar, infra-red and
television with photographic overlay.

-



Tank Ballistic Computer — Computing Devices supplies the digital processor for the fire control system of the U.S. Army's M-1 "Abrams" tank.



### C-Tech Ltd.

1150 Montreal Road Cornwall, Ontario, Canada K6H 5S2

Tel: (613) 933-7970 Telex: 05-811538

### C-Tech Omni Sonar and Transducers

C-Tech has been involved for over a decade in the design and manufacturing of more than 25 different types of electronic scanners in use in sonar equipment of the NATO navies.

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270 90

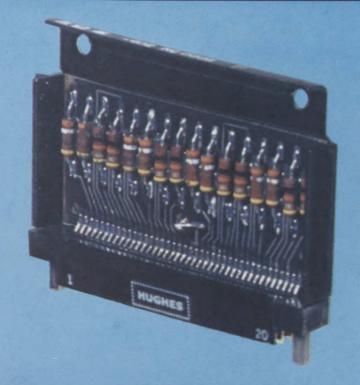
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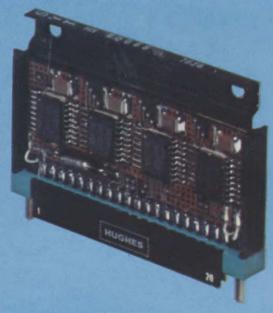
C-Tech's capabilities include the manufacture of a variety of multi-element cylindrical and planar array transducers with all of the physical, functional, environmental, and reliability characteristics essential for use by the Canadian, United States, Royal Netherlands, Belgian and Royal Navies. These transducer capabilities extend beyond the military to encompass designs for use by other organizations, both government and commercial.

C-Tech was the first to use electronic scanning and colour displays in its line of omni sonars. Although the major application of C-Tech's commercial sonar is commercial fishing, the sonars are suitable for other marine and offshore industries and have been used by foreign navies.

#### C-Tech Standard Electronic Modules

C-Tech has been an active participant in the U.S. Department of Defense standard electronic module (SEM) program since 1971, both as a user, designer and manufacturer. C-Tech is a qualified supplier of a broad range of "standard" SEMs, as well as manufacturing "special" SEMs to fulfill customer requirements.







## Davie Shipbuilding Limited

A Subsidiary of Dome Petroleum Limited

P.O. Box 130 Levis, Quebec, Canada G6V 6N7

Tel: (418) 837-5841 Telex: 051-2254 Cable: DAVIE SHIP

Aerial view of Davie shipyard at Lauzon, Quebec, Canada. Decades of shipbuilding in Canada during peace and war have created an international reputation for Davie Shipbuilding Limited in the construction of commercial and naval ships.

Davie's Marine Division continues in the dedication to Canadian naval defence and commercial needs. The division's activities are shipbuilding, heavy steel fabrications and machining where ships of up to 80,000 tons dead weight have been built. It has built and repaired ships of all kinds such as combat ships and landing vessels; transport, passenger, troop, cargo, tanker, and fishing vessels; special service vessels such as tenders and tugs; barges and lighters, cargo and special purpose; small craft, pontoons and floating docks, drydocks, dredges, and ice breakers.

The general Engineering Division is responsible for industrial engineering projects and military subcontract work. It manufactures custom designed steel fabrications for the varied needs of heavy industry. Its products include ship and marine equipment; ship and propulsion components, booms and masts, marine hardware, hull items and steel buoys; tank cars and hopper cars for the railroad industry; the fabrication of equipment for nuclear reactors and nuclear plant components; the manufacture of large diameter pipes and pipelines; the design and fabrication of metal tanks for various purposes such as storage tanks, tower structures, penstocks, gates, towers fractioning, wind tunnel; commercial and industrial gas cylinders.



Naval ship Contruction, typical of naval vessels refitted at Davie yards.

### The de Havilland Aircraft of Canada, Limited

Garratt Boulevard
Downsview, Ontario, Canada
M3K 1Y5
Tal: (446) 622 7210 (extension

Tel: (416) 633-7310 (extension 214) Telex: DE HAV TOR 06-22128

The de Havilland Aircraft of Canada has designed and produced more than 3,800 commuter and utility transports since it was founded in 1928. Currently in production are the 19-seat Twin Otter, 50-54 seat Dash-7 and 48-seat Transporter and military Super Buffalo. Scheduled for delivery in 1984 is the 36-seat Dash-8. The Buffalo is the world's only medium tactical transport which is capable of providing logistic support to front line areas. When operated from unprepared surfaces, it can uplift or deliver six tonnes of supplies, with a ground run of 950 feet (300 metres) at ISA sea level. More than 100 Buffalos are now in service with 18 military

organizations around the world. The military Twin Otter is an all-metal, fixed tricycle light transport powered by two PT6A turboprop engines. In military roles the Twin Otter can carry a totally disposable load of 6,500 pounds (3,000 kg). The Dash-7 can be equipped with an optional cargo door for easy conversion between all-cargo, or mixed cargo/ passenger loads.







### **Deltaire Industries Ltd.**

4400 Agar Drive (No. 101) Richmond, British Columbia, Canada V7B 1A3

Tel: (604) 273-5131 Telex: 04-355756



Supplying total helicopter support to military and civilian operators worldwide, Deltaire services consist of airframe inspection, repair, overhaul, modification and rebuild after crash damage. Deltaire also provides dynamic component repair and overhaul, engine inspection and service. The company maintains facilities for avionics repairs, sales, installation, aircraft painting, non-destructive tests as well as full logistical support for aircraft parts and related systems.

Deltaire is quality approved to the Canadian Ministry of Transport and Department of National Defence criteria.

Components for overhauling, testing and inspection of helicopters at Deltaire facilities.

### Diffracto Ltd.

6360 Hawthorne Drive Windsor, Ontario, Canada N9T 1J9 Tel: (519) 945-6373



From a modest beginning Diffracto has achieved world prominence over the past decade in non-contact electro-optic gauging and inspection of pieces parts at production line rates. Key systems have been supplied to the aerospace, munitions and automotive industries for the following applications:

Dimensional measurements of lengths, widths (internal and external dimensions), thickness profiles and contours; surface conditioning such as roughness, flaws and defects; laser engraving of characters, logos and bar codes; part recognition; and systems for pattern recognition, colour detection, proximity and alignment.

In addition to custom turnkey inspection systems, Diffracto offers standard laser/electro-optical product lines.

Programmable airfoil contouring system available from Diffracto Ltd.

### **Devtek Corporation**

Two divisions of Devtek are special-

ists in the design and production of defence equipment which has

280 Rayette Road Concord, Ontario, Canada L4K 1B1

Tel: (416) 669-4484 Telex: 06-964608

achieved international recognition.

Hermes Electronics Limited, 40

Atlantic Street, Dartmouth, Nova



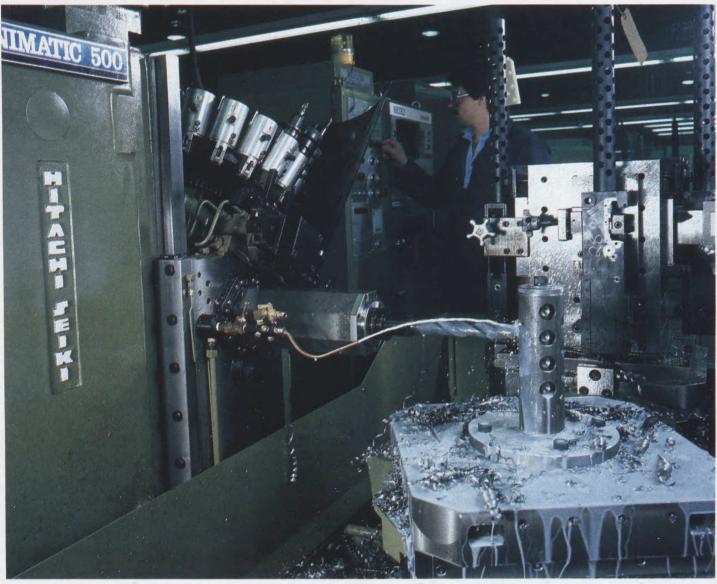
Final electrical testing of sonobuoys at Hermes

Hermes Electronics Limited, 40 Atlantic Street, Dartmouth, Nova Scotia, Canada, B2Y 4A1 manufactures sophisticated products in the field of anti-submarine warfare, communications and ocean data systems. Products include: sonobuoys air launched expendable devices designed to detect underwater sounds and relay the information back; bathythermographs — a fully automatic thermal gradient transmitter launched prior to the sonobuoy; high frequency (HF) aperiodic loop antennas - lightweight, low profile, broadband receiving antennas offering optimal directional

characteristics; HF oblique ionospheric sounding equipment — transmitting and receiving equipment used to enhance the reliability of HF communications.

Diemaco Inc., 1036 Wilson Avenue, Kitchener, Ontario, Canada, N3C 1J3 — Precision parts for small arms weaponry and related products and repair and overhaul of small arms for the aerospace/defence industry. Included is the unique ability to coldforge barrels on a continuous basis, the only Canadian source of this expertise. The company has been designated the sole source of product support for certain requirements of Canada's infantry forces.

Diemaco's small arms numerical control machining centre.



### **ESE Limited**

1780 Albion Road Rexdale, Ontario, Canada M9V 1C1

Tel: (416) 749-2271 Telex: 06-989522 TWX: 610-492-6360



ESE Limited is a subsidiary of Codex Corporation which is part of the Motorola DataComm Organization. The teamed architecture signal processor (T-ASP) uses an array processing architecture which minimizes overhead. Features include efficient and flexible data transfers; compound-complex machine instructions; floating point hardware with complex and real number arithmetic; very high speed computing and data transfer rate; modularity in computing power; input-output and memory transfer rates and memory capacity.

The high speed of the T-ASP compared to other units is shown in the table of algorithm execution times for a 1024-point complex fast fourier transform.

TASP Configuration	Execution Time	Speed Factor over FPS 100 Processor
Arithmetic units	Microseconds	
Two	640	11.26
Four	320	22.53
Eight	160	45.06

Applications include processing of satellite and infra-red imagery, synthetic aperture radar, active and passive sonar and real-time processing of television video.

The T-ASP — teamed architecture signal processor.

### **Exide Canada Inc.**Exide Electronics Division

5200 Dixie Road, Unit 20 Mississauga, Ontario, Canada L4W 1E4

Tel: (416) 625-9627 Telex: 06-961272

Exide Canada Inc., Exide Electronics Division, produces a line of uninterruptible power systems for critical load situations of momentary powerline surges, brownouts, or millisecond interruptions; batteries; and power back-up — all for a broad range of military applications.

The company is a Canadian leader in the manufacture and supply of high performance step-wave uninterruptible power sources (UPS) and produces a complete range of UPS equipment consisting of rectifiers/chargers and inverters; static bypass switches; controls and built-in test equipment (BITE). In typical operating mode, the system features high efficiency at part load as well as full load. It is designed for high reliability with long MTBF (mean time before failure) and short MTTR (mean time to repair).

UPS and frequency converter systems are available in output ratings

from 30 kVA three-phase to 750 kVA three-phase modules. They are also available with inputs of 50 and 60 Hz and outputs of 50, 60 and 400 Hz. These systems may be parallelled for high powers in the megawatt range.

Exide's lead-calcium battery is specifically designed for UPS-duty heavy current requirements. It features low water loss; low maintenance; minutes to hour-long protection; flat-plate construction with calcium alloy grids; 20-year life expectancy.

Also from Exide Electronics is the Centaurus single phase AC power system that offers better protection against blackouts or brownouts. Sine wave distortion is only five per cent maximum. The Centaurus series features 250, 500, 1000; and 1500-VA modules used where a continuous source of uninterrupted power is required such as in essential telecommunications and on-line data handling.

An uninterruptible power supply (UPS) system from Exide Canada Inc. in a 2 x 300 kVA parallel redundant configuration employed for defence, industrial and commercial purposes.



### Fathom Oceanology Limited

863 Rangeview Road Port Credit, Ontario, Canada L5E 1H1

Tel: (416) 274-1551 Telex: 06-960226

Fathom Oceanology specializes in the development, design, testing and manufacture of towed naval acoustic systems. The company has developed towed acoustic systems for anti-submarine warfare and mine counter measures applications and has delivered such equipment for many Canadian and foreign industrial and defence programs. The company's hydrodynamic experience has helped to develop a range of controllable and cable-dominated towed bodies for use with military and oceanographic systems. Fathom has been heavily committed to studying the hydrodynamic performance of tow cables and fairings which has resulted in the development of fairings with the lowest drag coefficient available.

Structural experience has accounted for the manufacture of cabling systems that operate at speeds up to 40 knots and tensions of up to 22,500 kg (50,000 pounds). The company is also engaged in motion compensation which is an integral component of the military cabling-handling systems it designs and builds.

To complement the towed acoustic systems, Fathom is a world-wide supplier of hull mounted sonar domes. The company also undertakes projects involving the supply of custom deck machinery such as davits, traction winches, to meet various international military and civilian requirements.

The United States Navy hydrofoil "Highpoint" towing a Fathom variable depth sonar system at speeds in excess of 30 knots.



### Fleet Industries

P.O. Box 400 Fort Erie, Ontario, Canada L2A 5N3 Tel: (416) 871-2100

Toronto: (416) 366-4435 Telex: 021-5165 TWX: 610-373-0101

Fleet Industries manufactures major components for the prime Canadian and United States manufacturers of military and commercial aircraft; satellites; radar and sonar systems.

Today Fleet concentrates on the production of major components. The

company's facilities occupy approximately 46,450 square metres (500,000 square feet) and the firm employs about 1,000 men and women. Assembly and test methods meet the latest and strictest requirements of military and civil authorities in both Canada and the U.S.

The major aircraft manufacturers served by Fleet include Boeing, Canadair, de Havilland, Gruman, Lockheed, McDonnell Douglas Canada Limited, McDonnell Douglas Corporation, Sikorsky Aircraft and Pratt & Whitney Aircraft of Canada Limited

Fleet manufactures advanced composite graphite avionic doors for the Canadian CF-18 Hornet.



41

Advanced technological ment; collaborates in the review of structures for specifications; generates quality communications and assurance procedures; reviews environmental satellites quality problems; effects corrective manufactured by Fleet Industries. action and reports departmental quality performance to management. Standard mechanical inspection techniques are supplemented by magnaflux, fluorescent penetrant, radiography, destruction testing, chemical analysis and three-axis co-ordinate measuring equipment. Fleet Industries supplies radar equipment to General Electric, Lockheed Electronics, Raytheon and Sperry. Satellite components are produced for Hughes Aircraft Company and Spar Aerospace. Sonar equipment is manufactured for EDO Corporation, General Electric, Westinghouse Canada Limited, Raytheon, and Department of Supply and Services (Government of Canada).

42

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P.O. Box 400 Fort Erie, Ontario, Canada L2A 5N3 Tel: (416) 871-2100 Toronto: (416) 366-4435 Telex: 021-5165

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The major aircraft manufacturers served by Fleet include Boeing, Canadair, de Havilland, Gruman, Lockheed, McDonnell Douglas Canada Limited, McDonnell Douglas Corporation, Sikorsky Aircraft and Pratt & Whitney Aircraft of Canada Limited.

Fleet Industries' Quality Assurance Program meets the requirements of both Canadian government specification DND-1015 and United States military specification MIL-Q-9858A. The average ratio of inspection to direct labour is 1:10.

To insure that production of components meets contractual requirements, the Quality Assurance Department reviews and defines product quality with the engineering depart-

Bonded metal-to-metal components for de Havilland DHC 5-6-7 and Dash 7, leading edges and ailerons produced by Fleet. ment; collaborates in the review of specifications; generates quality assurance procedures; reviews quality problems; effects corrective action and reports departmental quality performance to management.

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Advanced technological structures for communications and environmental satellites manufactured by Fleet Industries.





HORNET

Fleet manufactures advanced composite

graphite avionic doors for the Canadian CF-18





### Ferguson Industries Limited

Pictou, Nova Scotia, Canada B0K 1H0

Tel: (902) 485-4313 Telex: 019-36535

Located on the Atlantic Seaboard, Ferguson Industries is ideally situated as specialists in shipbuilding, ship repairing and industrial production with emphasis on heavy steel fabrications and specialty products of aluminum and stainless steel for defence and commercial purposes.

An associate company, The Sydney Engineering and Dry Dock Company Limited, of Sydney, N.S., specializes in shipbuilding, ship repairing and mining equipment.

A second firm associated with Ferguson, Oxford Industries Limited, of Oxford, N.S., concentrates on the manufacture of industrial machinery for forest products, material handling as well as serving various phases of the marine industry.



## General Motors of Canada Limited Diesel Division

P.O. Box 5160 London, Ontario, Canada N6A 4N5

Tel: (519) 452-5000 Telex: 064-7231

Diesel Division of General Motors of Canada Limited was established in London, Ontario, in 1949 for the manufacture of diesel-electric locomotives. Early in 1977 Diesel Division signed a contract with the Canadian Government to supply 350 armoured vehicles for the Canadian Armed Forces. Known as the armoured vehicle general purpose (AVGP) the six-wheeled amphibious unit is produced in three models; a personnel carrier, a fire support vehicle, and a maintenance recovery vehicle.

Diesel Division was awarded a contract to supply four eight-wheeled (8 x 8) amphibious armoured vehicles and supporting services for the United States Marine Corps.

The vehicle order followed an earlier United States design-study contract awarded to Diesel Division, which sought the matching of an armanent system with an existing vehicle model. The four 8 x 8s are similar to the 6 x 6 units produced by Diesel Division for the Canadian Armed Forces.

The family of armoured amphibious Piranha vehicles consists of four-wheeled, six-wheeled, and eight-wheeled operational variants. Armament variants include machine gun, anti-aircraft, assault cannon and mortar.

The AVGP is capable of 100 km/h (62 mph) road speed and 10 km/h (6.2 mph) swim speed. These highly mobile vehicles thus offer low profile, high speed, and manoeuvrability.

The family of vehicles enjoys a high degree of interchangeability and adaptability in hull and driveline components. Many versions of the basic vehicle can be designed or built to meet armed forces requirements throughout the world.



Two examples of the family of General Motors defence vehicles

**GRIVIY** 

255 Attwell Drive Rexdale, Ontario, Canada M9W 5B8

Tel: (416) 675-1411 Telex: 06-989142





Garrett Manufacturing Limited is a wholly-owned subsidiary of the Garrett Corporation. One of The Signal Companies, Garrett employs approximately 1,000 people in five facilities in the Rexdale area of Toronto, Ontario

Garrett Manufacturing Limited supplies a broad mix of products and services to the world aerospace industry. Garrett's aerospace products include aircraft cabin, cockpit and compartment temperature controls; windshield heat controls; airflow sensing and controlling systems; engine speed sensors; radio communications equipment for personnel and air traffic control applications; ground test equipment for aircraft air data systems; temperature control systems and other custom applications; and thick and thin film hybrid microcircuits. Garrett Manufacturing is the Canadian repair and overhaul base for all the company's products in Canada. In addition, Garrett assembles and tests electronic equipment on a "build-to-print" basis.

Garrett is supported in the field by the Garrett Corporation's worldwide sales and service organization with offices in most major cities of the world.

Garrett is actively engaged in research and development in control systems, RF communications and analog and digital circuit design, and peripheral vision displays. Environmental and EMI qualification testing to military/aerospace standards is performed in Garrett's government-approved test facility. A single-standard quality control system that conforms to DND 1015 and meets the requirements of MIL-Q-9858 and NATO AQAP.1 is employed.









#### **Communication Systems**

Emergency locator beacons developed by Garrett are used throughout the world in military, commercial and general aviation applications. These low power transmitters automatically provide an emergency homing signal to assist search aircraft to locate an aircraft in distress.

Personal locator beacons and survival radio sets are recent product developments which permit two-way voice communication with search aircraft as well as providing an emergency homing signal. These radios are being used by the Canadian Armed Forces and the Swedish Air Force.

VHF/AM single channel transmitters and receivers are produced for civil aviation air traffic control communications. Installed at air radio facilities this ground station equipment offers many performance and maintenance features not previously available.

Personal locator beacon.

VHF/AM transmitter and receiver.



#### **Microcircuits**

Garrett's microelectronic products are made in a fully integrated facility with a dedicated engineering, sales and production staff housed in a separate and unique manufacturing plant. This facility produces thick and thin-film hybrid microcircuits. The microcircuit installation, considered one of the best in North America, is equipped with five million dollars worth of specialized manufacturing equipment including automatic laser trimming, computer controlled testing

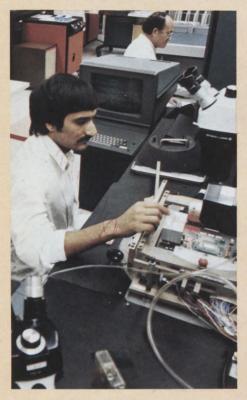
and electron beam scanning microscope. This facility can produce microelectronic devices to the most demanding military and commercial specifications.

Hybrids manufactured by Garrett are used in missile guidance systems, inertial navigation systems, radar systems and other electronic equipment on a variety of military and commercial aircraft, as well as in United States government electronic security systems.

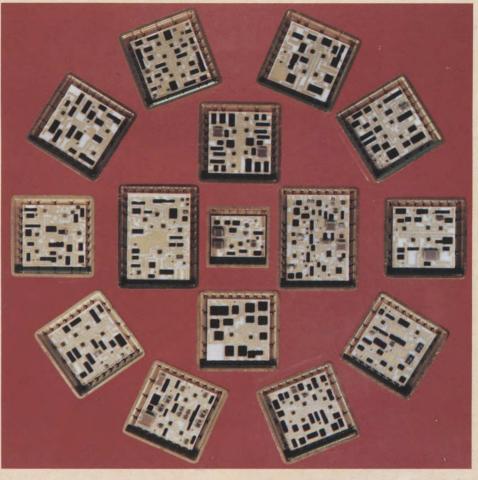
General assembly of microcircuits at the Garrett plant.



A few of the many different custom hybrids from Garrett.



Laser trimming — computer-controlled testing.



#### Major System Subcontract Manufacturing

The "major system" aspect of this Garrett activity offers many attractive opportunities to foreign suppliers seeking to sell systems equipment to the Canadian Government. Through licensing, teaming, joint venture agreements and by direct involvement in the equipment being offered for sale, or indirect involvement through technology transfer, the Canadian Offset/Industrial Benefits requirements of major procurements can be accomplished.

The subcontract manufacturing service, build-to-print, assembly and test of electronic systems, sub-assemblies and printed wiring board assemblies enables Garrett's customers to meet

demanding delivery schedules, by employing the company's highly experienced manufacturing groups including aerospace standard quality assurance and modern automatic test equipment, eliminating the need to make additional investments in plant equipment.

These services are backed up by Garrett's high technology team that employs the latest in design and manufacturing techniques to provide more effective co-operation in major procurements programs.



### **Temperature Control Systems**

Garrett Manufacturing's temperature controls are a major subsystem of the Garrett environmental control systems that fly on more than 70 per cent of the commercial and military aircraft in the western world.

Garrett temperature controls are used in cabin, cockpit and compartment air-conditioning systems; wing anti-ice temperature control systems; window heat control systems, equipment bay temperature control systems, and some liquid coolant systems.

Garrett Manufacturing's temperature control systems usually consist of electronic control boxes; temperature and/or airflow sensors; and temperature selectors. The most recent designs, feature microprocessor-based digital electronics for improved performance and increased reliability.

These types of Garrett systems are used on the following representative selection of aircraft.

A300, A310, 727, 737, 747, 757, 767, DC-9, DC-10, KC-10, F-14, F-15, F-16, F-18, F111 and EF111, CL-600 and 601, GII and III, BAE 125, IAI1124/1125, SabreLiner, Lear 54/55, HU-25, SA366, AAH.

F-18 air-conditioning sub-system (ACS).



F-16 temperature control systems.

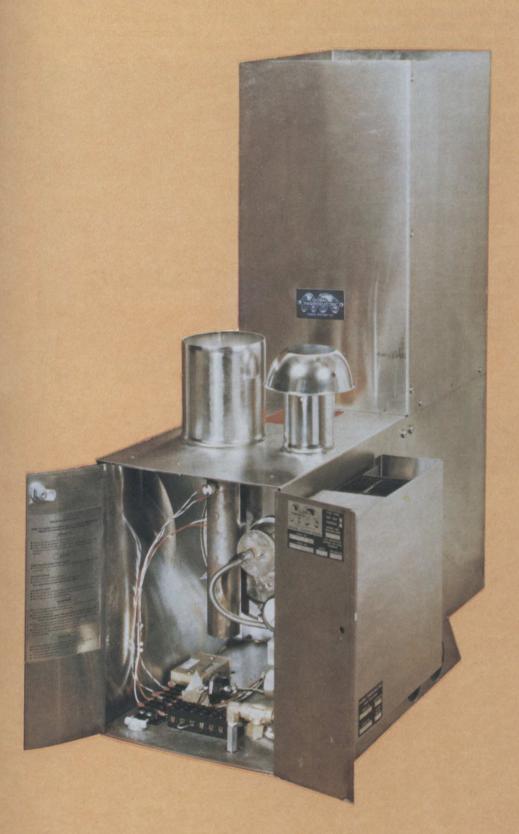


F-15 air-cycle air-conditioning system (ACACS)



## Global Thermoelectric Power Systems Ltd.

P.O. Box 90 Bassano, Alberta, Canada TOJ 0B0 Tel: (403) 472-3512 Telex: 03-848141



Global is a private Canadian corporation providing field-proven remote power systems based on the thermoelectric energy conversion principle. Activities include research and development, manufacturing and marketing.

The firm produces a line of solid state generators with outputs of 15, 25, 50 and 108 watts, capable of economic, reliable electrical generation in remote, unattended applications.

Military research and development programs include a portable, ½ kW, multi-liquid fuelled generator and a self-powered vehicle engine/heater.

Global's energy conversion/power generation technologies are marketed throughout the world to military, governmental agencies and private industries.

## Goodwood Data Systems Ltd.

150 Mill Street P.O. Box 210 Carleton Place, Ontario, Canada K7C 3P4

Tel: (613) 257-3610; (613) 238-5706

Telex: 053-3593



Goodwood procedure trainer serving United Air Lines B767.

Goodwood Data Systems Ltd., an employee-owned company, is primarily engaged in custom designed and manufactured systems in the general categories of weather radar processing systems, flight information display systems, message switching systems and audio visual computer aided tutors.

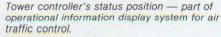
The weather processing systems provide full colour display of rainfall distribution, forecast precipitation, storm warning data, and vertical cross-sections of selected vectors. The technology is used by meteorologists to provide weather forecasts, data to airports, cloud seeding potentials and forecast hydrological data.

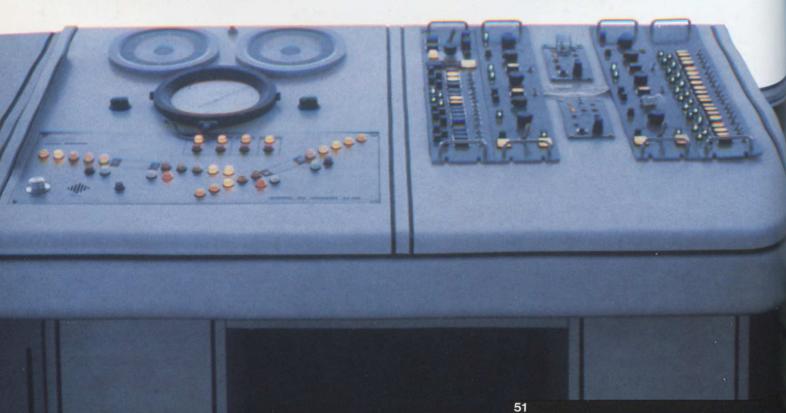
Flight information display systems have been supplied to all the major airports in Canada. The system when used with electromechanical displays automatically provides the latest information to passengers and operational personnel.

The message switching system is a microprocessor-controlled device designed to route and display messages via a telecommunications network. The primary applications thus far addressed by Goodwood are related to routing of meteorological data for flight plan traffic in both military and civil applications. The system can be programmed to meet local requirements and provide automatic conversion from World Meteorological Organization (WMO) to International Civil Aviation Organization (ICAO) message formats.

The audio visual computer-aided tutor (AVCAT) can be applied to most training situations and is particularly cost-effective in training flight crews on procedures prior to training on advanced simulators. In this latter application, the system is known as a systems procedure trainer (SPT).

LEK-333 colour graphics terminal with bit-pad.





## **Greening Donald Co.** Ltd.

55 Queen Street North P.O. Box 430 Hamilton, Ontario, Canada L8N 3J3

Tel: (416) 528-5971 Telex: 061-8601

Cable: GREENDON HAMILTON

The oldest, continually operating wire rope manufacturer in the Western Hemisphere, Greening Donald has more than a century of experience supplying high technology, wire ropes and wire rope assemblies to the defence, manufacturing and resource industries.

The company is a leader in the supply of the world's most sophisticated rope assemblies — such as those used for launching and arresting aircraft on navy carriers.

Greening Donald is the leading supplier of these assemblies to the United States Navy and has provided similar assemblies to Latin American and European countries.

In addition to wire rope products, the company manufactures stainless steel wire, wire screens, perforated metals and wire products for storage and handling, including stainless steel wire to manufacture control cables for military and commercial aircraft, mine sweep ropes and other ropes resistant to highly corrosive environments.

Following are some of the products the company has manufactured for the defence industry; aircraft carrier arresting pendants, carrier purchase cable, launching bridles, flattened strand elevator rope, helicopter haul down assemblies, mine sweep ropes, aircraft control cables and acoustic perforated metal panels.

A resident inspector representing the Canadian Department of National Defence is situated on the premises to check on the procedures, methods and standards of manufacture. These quality assurance procedures and practices provide for full qualifications to DND 1015 standards.

Greening Donald's international sales force and distribution network is capable of servicing markets in most areas of the world.



Elevator hoisting aircraft from below deck storage. Elevator wire rope from Greening Donald is used to hoist elevator.



### Halifax Industries Limited

Barrington Street North P.O. Box 1477 Halifax, Nova Scotia, Canada B3K 5H7

Tel: (902) 423-9271 Telex: 019-22672

One of Canada's leading firms in the field, Halifax Industries specializes in ship repair, shipbuilding and industrial engineering to serve both military and industrial needs. The company has extensive marine railway and drydock facilities in its shipyards for vessels up to 16,000 tonnes — and 36,000 tonnes by April, 1983.

Its capabilities include modern steel fabrication (capacity 10,000 tonnes a year) and versatile machine shops.

The company's proximity to the Canadian Armed Forces principal East Coast naval base has provided the yard with extensive background and experience in the repair of naval vessels. Halifax Industries and the Halifax shipyard is fully equipped and manned to meet the most challenging demands of modern-day shipbuilding, ship repair and industrial engineering requirements.

Naval ship repair activities at the new Scotia dry dock of Halifax Industries Limited.



## Hand Chemical Industries

221 Nipissing Road Milton, Ontario, Canada L9T 1R3 Tel: (416) 878-2831

Telex: 06-960229

Hand Chemical Industries is a pioneer Canadian company, established in 1873 specializing at that time in the manufacture of fireworks.

Hand Chemical has expanded over the decades to become one of the foremost firms on the international scene in the production of a complete line of custom military pyrotechniques

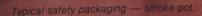
The company designs, manufactures and services a complete range of

training simulators including airburst liquid nuclear biological chemical (NBC), groundburst powder (NBC), groundburst liquids (NBC), land mines, thunderflash, projectile groundbursts, assorted smokes, practice grenades, flares, ground bombs, air bombs, nuclear bomb simulator, practice bomb cartridges, disaster simulation displays.

Operation stores produced by Hand Chemical feature marine markers, assorted smoke generators, radar drones and chaff, signal cartridges and illumination projectiles.

Hand Chemical Industries is an operating division of Lorcon Inc.

Training land mine







Nuclear biological chemical (NBC) training device.

## Hawker Siddeley Canada Inc. Orenda Division

3160 Derry Road East Mississauga, Ontario, Canada Mailing Address: P.O. Box 6001 Toronto, Ontario, Canada L5P 1B3 Tel: (416) 677-3250

Telex: 06-968620: 06-968727

Cable: ORENDA

The Orenda Division of Hawker Siddeley was established in 1946 as the gas turbine division of A. V. Roe, Canada, Limited, and was formed by the purchase of a Crown company. The division employs more than 750 workers primarily engaged in the manufacture, repair and overhaul of aerial gas turbine engines with current sales exceeding \$40 million (\$Can.) annually.

The operations include: Aircraft gas turbines — manufacture, assembly and test of complete engines (in excess of 5,000 Orenda, J79 and J85 engines have been produced); subcontract manufacturing - a full range of modern machining and fabricating equipment, including many numerically controlled machine centres with capacities up to 12 feet (3.6 metres) in diameter; industrial gas turbines - repair and overhaul, and supply of spare parts for Orendaproduced units. Other services include an engineering department to support manufacturers, a quality control department, and a graphic department.

Repair, overhaul, and product support — give major services measured by sales or direct labour. Its largest element covers the repair and overhaul of J79 and J85 engines for the Canadian Armed Forces, together with the associated component repair, parts supply and support engineering.

Spare parts manufacture in support of engines originally produced by Orenda provides a domestic source of parts for the Canadian Armed Forces, and generates substantial export sales.





### John T. Hepburn Limited

914 Dupont Street Toronto, Ontario, Canada M6H 1Z2

Tel: (416) 671-2200 Telex: 06-968793

Replenishment-at-sea system in operation transferring stores and fuel.



John T. Hepburn Limited has proven capabilities in the design and manufacture of marine and deck equipment for naval, fishing and other vessels as well as deck and drill machinery in the offshore oil industry.

The Hepburn range of products includes replenishment-at-sea (RAS) systems, ship cranes, winches, capstans, windlasses, elevators and chain tensioning units.

The RAS systems are available in various configurations for the underway transfer of fuels and/or solids between vessels. The systems have been supplied to the Canadian, French, Italian and Australian navies.

The large variety of ship cranes serves many purposes and includes fixed pedestals, rolling gantry, overhead, level luffing cranes with electric and/or hydraulic drives to

meet specific requirements for loading and unloading. The wide range of winches consists of stern anchor, mooring, towing, helicopter haul down, cargo handling — and other multi-purpose winches. The company manufactures forward and after mooring capstans, buoy handling and other special-purpose models.

Elevators are designed for stores, ammunition and helicopter lift configurations. The Hepburn chain tensioning units are developed to provide a compact economical alternative to the conventional anchor or winch.

Other Hepburn products include cranes for all industries; hydraulic presses; mine hoists; steel mill equipment; machine tools, design services; specialized products to customer specifications.



### Hewitt Equipment Ltd.

5001 Trans-Canada Highway Pointe Claire, Quebec, Canada H9R 1B8

Tel: (514) 697-6911 Telex: 05-821625

Air, sea and land power is provided by products of Hewitt Equipment Ltd. which has steadily expanded and diversified its operations since it was founded more than 30 years ago.

The company's product line is eminently suited to defence logistic support. Constant development work assures continuing progress.

Today, Hewitt deals in a very wide range of heavy construction equipment, fork and truck lift devices and electrical generating sets and engines. Hewitt Equipment has played a key role in many well-known Canadian projects such as the St. Lawrence Seaway, the DEW radar line in the Canadian Arctic, the Trans-Canada Highway, the Manicouagan, Outardes, Churchill Falls, and James Bay hydroelectric development projects in Quebec and Labra-

dor, Expo 67 and Mirabel International Airport.

Internationally, Hewitt switchgear with generator sets as well as other types of equipment have been exported to several nations. Most recently, the company competed successfully for NATO infrastructure financed contracts managed by various European nations and NATO agencies.

A particular strength of the company rests in its capability to customize products to customer specifications. A representative product line includes stationary and mobile diesel electric sets 10-930 kW; electrical switchgear up to 35 kV; synchronized control modules; generator and tactical auxiliary power; industrial and vehicular diesel engines; marine propulsion and auxiliary diesel engines; material handling equipment; and earthmoving equipment.











## Heede International Ltd.

3140 St. John's Street Port Moody, British Columbia, Canada V3H 2C7

Tel: (604) 461-5551 Telex: 04-353546

Cable: FALCON



Manufacturer of shipboard cranes for defence and industrial purposes, Heede International is the largest producer of Gantry cranes in North America. These cranes are popularly known as Heede portal cranes and are used in shipyards, pipe mills, steel manufacturing and warehouse facilities. They also represent a new generation of log-handling systems.

The company features an electrically-powered winch manufactured for Aerojet ElectroSystems Inc. of California, which constitutes a major component of a defence system produced by this company.

Electrically powered winch manufactured by Heede is a major component of a defence system produced by Aerojet ElectroSystems of California.

### International Submarine Engineering Ltd.

2601 Murray Street Port Moody, British Columbia, Canada V3H 1X1

Tel: (604) 931-2408 Telex: 04-353554 Cable: SUBENG



International Submarine and associated companies are builders and designers of manned and remotely controlled undersea vehicles; parametric-steered beam mapping sonars; remotely controlled cranes, winches and land vehicles; and synthesized radios.

The firm has built a large number of vehicles ranging in size and depth capability from 60 kilogram (132 lbs)/400 metre (1,320 feet) diving depth to 2,000 kilogram (4,400 lbs) and 1,000 metre (3,300 feet) diving depth. The company has also designed, built and delivered a large quantity of manipulator arms and vehicle systems suitable for mine counter-measures and other military needs.

HYSUB on location in North Sea.

#### International Uniforms Ltd.

265 St. Antoine Street West Suite 200 Montreal, Quebec, Canada H2Z 1H6 Tel: (514) 861-3970

Canada's foremost softbody armour specialists, International Uniforms, has researched and developed maximum protection against all handguns, while providing comfort and flexibility for the wearer.

International features several types of vests and other apparel designed for specific purposes ranging from law enforcement work to utilization for military purposes. The company's

products and fabrics have been thoroughly tested, and are in service in Canada, the United States and other parts of the world, to provide maximum safety against attack.

Products include:

Undershirt body armour vest without side protection for use by law enforcement officers.

The "Olympic" body armour vest which protected officials and others at the Olympic games held in Montreal in 1967. It is a popular one-piece garment.

The dual protector has proved to be ideal, it can be readily available and worn when needed.

The undershirt armour vest is made with 24 layers of Kevlar Aramid fabric encased in waterproof fabric for added protection.

With the wearer in mind, International designed the V.I.P. body armour vest — comfortable, fashionable, and lightweight. Worn with conventional clothing, it is ideal for secret service officers, and other individuals who require protection.



Undershirt body armour vest.



Olympic body armour vest.



Dual protector — safe and waterproof.



Undershirt vest with side protection.



V.I.P. vest, fashion plus protection.

#### Internay Ltd.

Point Edward Marine Park P.O. Box 1261 Sydney, Nova Scotia, Canada B1P 6J9 Tel: (902) 539-0660

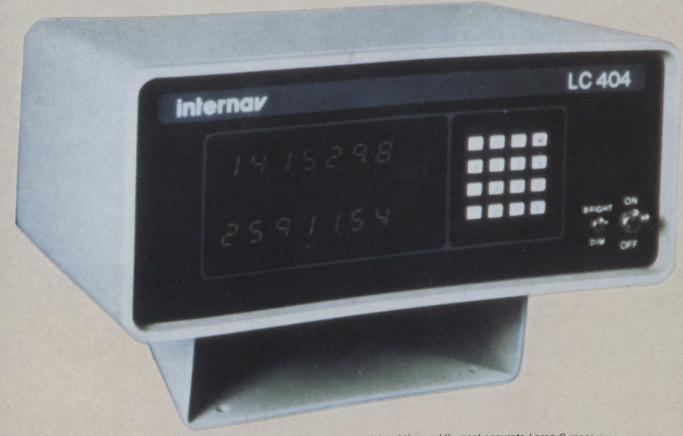
Telex: 019-35126

Designed and built by Internav, microprocessor-based Loran-C receivers are serving the needs of the Canadian Armed Forces and Coast Guard fleets in addition to specialized application in all classes of commercial and private vessels.

Commercial products range from simple, low-cost units for smaller vessels to the advanced LC-360, a comprehensive, 40-waypoint, latitude/longitude navigation system. LC-360 options include RS 232 data outputs and also continuous computation and display of equivalent Loran A and Decca Navigator readings to aid conversion from these earlier systems.

Often acclaimed as the world's most accurate Loran-C unit, Internav's LC-404 survey and monitor receiver can be operated locally or remotely, and is in worldwide use in hydrography, resource exploration, and precision monitoring. A variety of options are offered with the LC-404.

An advanced airborne Loran-C navigation system is available. Packaged in an ARINC form factor, the multichain system provides 200-way-point area navigation (R-Nav) capabilities, and is compatible with standard aircraft instrumentation.



Internav's LC-404, often acclaimed the world's most accurate Loran-C receiver.

# Irvin Industries Canada Ltd. Aerospace Division

P.O. Box 280 Fort Erie, Ontario, Canada L2A 5M9 Tel: (416) 871-6510

Telex: 061-5169



Irvin Industries has designed and manufactured a variety of special purpose recovery systems for the NASA Space Program, the AN USD 501 and AN USD 502 surveillance drone systems, cruise missiles, deceleration systems for supersonic transports and multi-use high reliability deceleration systems for fighter aircraft. A major breakthrough in improved reliability and survivability of emergency escape systems has been realized through Irvin's automatic inflation modulation (AIM) parachute program. The AIM parachute incorporates advanced fabrics which permits high speed parachute deployment without injury to the aircrew.

A wide range of aerial delivery systems for cargo and personnel is available which are tailored to the varying mission requirements of military forces. The cargo parachutes, containers and load rigging equipment are available for low level extraction, or when fitted with precision opening release systems are suitable for higher level deliveries. Personnel parachutes vary in size according to application such as nonsteerable, steerable and freefall military parachutes, high performance parachutes for special forces application, search and rescue and emergency parachutes.

The complementary product line includes inflatable life support equipment, air cargo ground handling equipment, aircraft, automobile and industrial restraint systems — including the vehicle "Air Bag".

Irvin's quality control program is designed to conform with the requirements of the Canadian Armed Forces. Irvin Industries Canada Ltd. has been listed by the military as an "approved" company since 1938

#### Leigh Instruments Limited

2680 Queensview Drive Ottawa, Ontario, Canada K2B 8J9 Tel: (613) 820-9720

Tel: (613) 820-9720 Telex: 053-4129

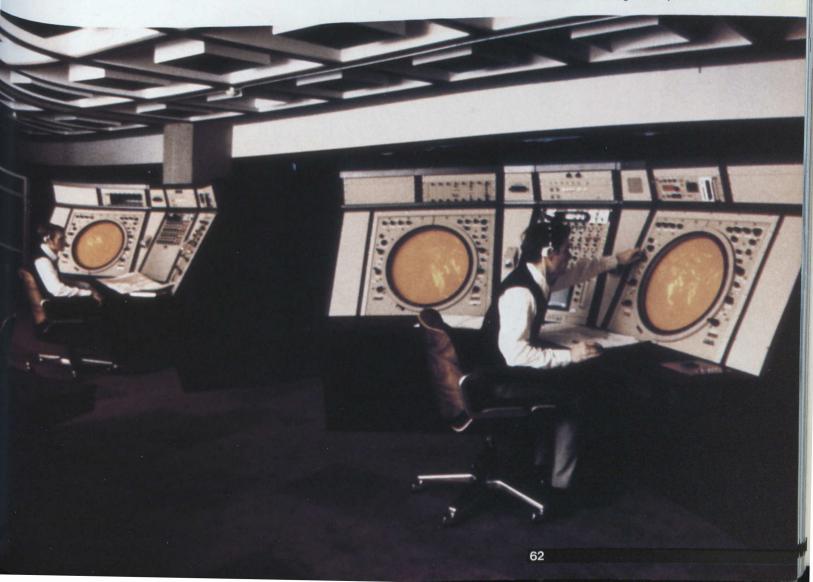
Crash position indicator.



Leigh Instruments is a Canadianowned company with more than 20 years' experience in the design and production of high technology electronics for military and civil markets. Company capabilities include the design, integration and management of large-scale turnkey systems for radar-based air and vessel traffic management; day/night surveillance systems; fixed and mobile air traffic control towers.

Company products include crash position indicators, flight data recorders, mechanical strain recorders, cockpit voice recorders, ice detection systems, electronic and electro-mechanical printers, high speed optical character recognition sorting systems, frequency control devices, and hermetic seals.

Vessel traffic management system.



#### **Ernst Leitz Canada** Limited

328 Ellen Street Midland, Ontario, Canada L4R 2H2

Tel: (705) 526-5401 Telex: 06-875561 Cable: ELCAN MID

Although best known for the worldfamous Leica cameras and photographic lenses, Leitz Canada has extensive design and manufacturing expertise in many areas of military, industrial and scientific optics. The range includes lenses for air reconnaissance cameras and laser systems, optical systems for data processing, optics for image intensifiers, and lenses for microfilm recording cameras and projectors.

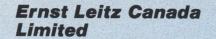
Other products with military capabilities are telescopes, periscopes, optical modules for laser range finders and sights for personnel carriers.

Leitz also provides specialized skills in the aerospace field with the design and production of cameras for instrumentation purposes having such special optics as relay systems, wide angle periscope attachments, optical gunsights, optics for heads up displays (HUD) and heads down displays (HDD), radar recordings, and missile guidance. Leitz lenses are used in aerial reconnaissance, earth resources and surveillance cameras, optical windows, wide band and wideangle anti-reflection coatings.

The naval and oceanographic equipment needs are suited with Leitz underwater contact lenses, lenses for anti-submarine warfare (ASW) for detection systems, wide angle reconnaissance and surveillance lenses, and cameras for instrumentation







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The naval and oceanographic equipment needs are suited with Leitz underwater contact lenses, lenses for anti-submarine warfare (ASW) for





#### Levy Auto Parts Company

1400 Western Road Toronto, Ontario, Canada M6M 4S7

Tel: (416) 243-2944 Telex: 065-2418 Cable: LEVYAUTO

Competence, quality and integrity in more than 40 countries have won worldwide recognition for Levy Auto parts.

The company specializes in the supply of maintenance spare parts and major assemblies applicable to wheeled and tracked armoured vehicles of Canadian and United States military design. Levy is particularly competent in the manufacture and supply of components and assemblies for the drive-train of these vehicles,

including engine assemblies (both gas and diesel), transmission assemblies, final drive assemblies, cooling systems and electrical systems.

Today, Levy is recognized worldwide as a major supplier of spare parts to NATO countries and other international organizations. A leader in the updating and repowering of existing military equipment, the company has also developed an unmatched capability in the design and prototyping of new vehicles.

Levy manufacturing facilities are equipped and staffed to provide quality engineered products and spare parts for all classes of military vehicles.

Aluminum main case casting of CD 850-6A transmission cross drive during drilling and tapping operations.

The company's computerized inventory control system also catalogues a complete range of parts and components for any custom designed Levy vehicle. Backed by the largest parts and reference library in existence, Levy assures a continuing supply of critical component parts.

Skilled technicians and the most modern equipment available combine to produce the highest quality component parts. Levy's production capability in the area of military equipment is unmatched in the world. Decades of experience have made the company leaders in supplying and rebuilding all types of transmissions and drive trains and the modification of equipment to meet special demands such as unusual climatic conditions.

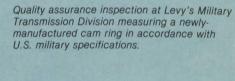
Single pieces of equipment, light and heavy, tracked and wheeled, are prototyped at the Levy facility. Complete new drive trains are installed. Units are repowered, dieselized. Bodies and suspension units are rebuilt or modified. Integral hydraulic and electrical systems are modernized. Mobility and range capability are enhanced through the addition of modern fuel supply systems, improved cooling systems and high speed drive mechanisms.

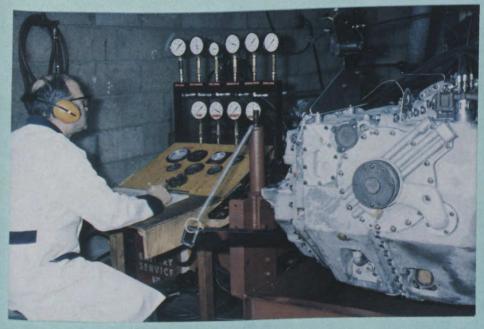
Levy products are tested and proved. Dynamometer equipped modern testing facilities at the Levy manufacturing site ensure that the prototype provided for demonstration and field trials is a quality engineered product which measures up to customer requirements and beyond.

A co-ordinated production program assures total dependability under all conditions. Once testing has been completed and a suitable location chosen, a total program of updating a

customer's existing equipment begins under the experienced eyes of Levy's technicians. The customer receives expert guidance in the installation training of operational and maintenance personnel. Continuity is assured through a custom-designed follow-up program which includes technical specifications literature, an ample supply of running spares and a co-ordinated program of vehicle servicing.







Test facility during the functional and pressure testing of a CD 500-3 transmission cross drive.

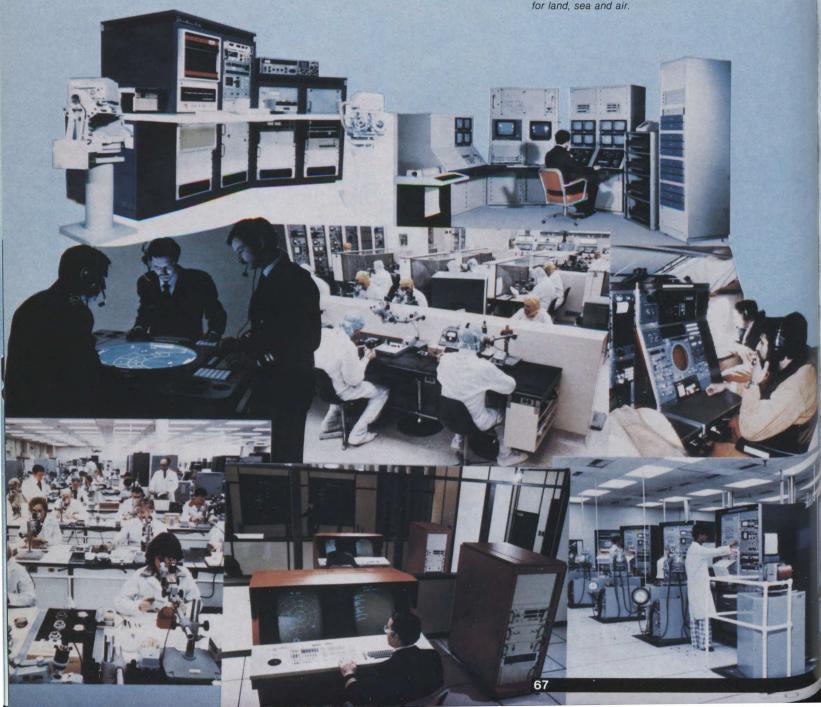
25 Cityview Drive Rexdale, Ontario, Canada M9W 5A7

Tel: (416) 249-1231 Telex: 06-989406 TWX: 610-492-2110

Litton Systems Canada Limited is a major designer, producer and integrator of high-technology products and systems for land, sea and air applications. It currently employs more than 2,500 highly skilled engineers, technologists and other specialists. The company has 46,450 square metres (500,000 square feet) of modern, environment-controlled facilities. Annual sales are currently in excess of \$140 million of which 85 per cent is exported. In addition to the products described in the follow-

ing pages, Litton Systems Canada, with its large-scale command and control, and electronic systems integration experience has proven system engineering management capabilities to undertake the design, acquisition, manufacture and installation of major turnkey projects.

Modern environment-controlled facilities of Litton specializing in high-technology products for land, sea and air.



The LTN-72R inertial/area navigation system used by major airlines and the P-3C aircraft.



Litton-made accelerometers for inertial navigation systems.



The LN-33 supplied to the Canadian Armed Forces for the CF-104 fighter/bomber.

### INERTIAL NAVIGATION SYSTEMS Transport

More than 4,000 Litton transport inertial navigation systems are providing worldwide, self-contained navigation capability to more than 90 international airlines, the majority of all "inertial equipped" corporate aircraft, many scientific aircraft, and military transport and patrol aircraft such as the P-3C.

The LTN-72R, the latest in the Litton family of inertial systems, is a combination inertial and area navigation system. In addition to ARINC 561 inertial navigation, the system has enroute, terminal, and approach RNAV capability.

The LTN-72R includes the capability to update the aircraft's inertial position automatically from VOR/DME inputs. To minimize cockpit workload, waypoints and station data may be entered into the computer using optically-encoded cards and the automatic data entry unit.

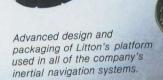
#### **Military**

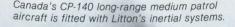
The latest of the more than 2,000 military inertial navigation systems, produced by Litton Systems Canada Limited, are the LN-33 systems aboard the Canadian CP-140 longrange patrol aircraft and the LW-33CF systems being refitted into the Canadian CF-104 Starfighter aircraft.

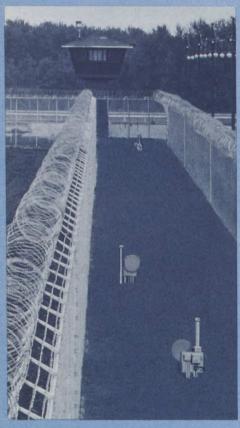
Both these systems incorporate the most modern technological developments in a standard design. This provides high accuracy and reliability at low cost and weight.

In 1978 the company was selected as second source for the inertial navigator unit for the U.S. Cruise Missile program. The Litton LN-35 system will provide geographically-oriented guidance reference for precise missile navigation and targeting; real-time processing for autopilot control and

vehicle steering; and sequencing and control of missile functions.







Microwave motion detectors — part of a Litton supplied perimeter security system at a prison.

#### INTEGRATED SECURITY SYSTEMS

Airports, water purification and pumping stations, communication networks, power generation stations, prisons and other essential facilities are prime targets for theft, sabotage, and terrorist activity. To protect these vital installations and guarantee their operation, today's governments and industry must invest in modern and efficient security systems. In response to this situation Litton Systems Canada Limited, with its large-scale command and control and electronic systems integration experience, has demonstrated that it has the specialized system engineering management capabilities to undertake the design, acquisition, manufacture and installation of turnkey security systems.

Litton integrated security systems are individually tailored to each installation while taking advantage of the reduced costs due to standardization which Litton can attain through its extensive system engineering capabilities.

Command and control consoles are human engineered to allow monitoring and control of the site's entire security systems by a single operator. Many functions formerly performed manually by the operator are now performed by the processor in the console.

Total civil defence systems can be designed for surveillance and protection of key facilities over very large areas including entire countries.



Litton supplies modern perimeter security systems to oil refineries and other installations requiring protection.



#### AIRBORNE RADAR

Litton airborne search radar has been designed to enhance the surveillance and detection capabilities of maritime patrol aircraft and to provide efficient tactical navigation.

The AN/APS-504 is a 100-kilowatt radar that is installed aboard Canadian Armed Forces and Royal Thai Navy Tracker aircraft. The APS-504 (V) 2 radar has been installed in maritime patrol versions of the Fokker F27, Israeli Aircraft Industries Sea-Scan, Australian Government Searchmaster, Beech 99 and Gates Learjet aircraft. It is also aboard Icelandic Twin Otters on ice patrol around Greenland.

The newest Litton radar is the APS-504 (V) 3 which utilizes a high resolution, digital display. Digital signal processing allows signal returns, although weak or intermit-

tent, to be better displayed, and also enables an improved level of clutter rejection. After being received, the video is processed by a scan converter into a form suitable for display by a TV-type raster indicator.

The TV-type raster marks a significant step forward, providing additional capability and flexibility. As well as allowing viewing in high ambient light conditions, alphanumerics are now displayed from internal or external navigation systems or tactical computer outputs. The display picture can be frozen for close study of critical areas. The indicator can also be used to display any other type of information compatible with an 875 line TV format, such as forward-looking infrared (FLIR) or low light level TV.

Litton APS-504 (V) 2 radar installed in maritime patrol aircraft.



#### LITTON AUTOMATED TEST SET

Litton Systems Canada Limited has designed, developed and produced the Litton automated test set (LATS), a computer-controlled automatic tester for avionic equipment. Test flexibility and a capability for testing a variety of avionic equipment are achieved through the use of an interchangeable adapter, provision of an on-board single pass compiler, and availability of a wide range of stimuli and measurement devices.

The LATS requires a minimum of personal judgment on the part of the operator to perform automatic acceptance and diagnostic tests at the system, black box, and plug-in module levels. It provides a hard copy printout of test results, including test running times and other pertinent data.

The Litton LATS provides complete test flexibility because it has a 2.5 million-word disc memory, coupled with the onboard single pass ATLAS compiler and a wide range of test stimuli and measurement devices.

All test languages are written in the abbreviated test language for avionics systems (ATLAS). ATLAS is a precisely defined language that enables detailed test procedures to be written in a standardized method without ambiguity. The language format and vocabulary are such that they can be read and understood with little or no training.

Litton automated test sets are already in use with eight customers in support of commercial and military avionics.



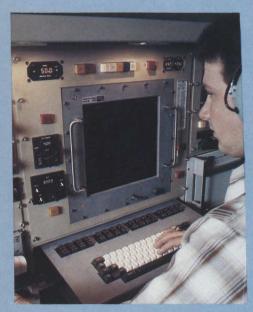
#### AUTOMATIC DATA LINK PLOTTING SYSTEM (ADLIPS)

The ability to react quickly to rapidly changing conditions is one of the most critical demands placed on the naval tactical commander. Today, modern weaponry and vehicles have significantly shortened the time he has available to make vital decisions. It is, therefore, imperative that all pertinent tactical data be acquired, collated, analyzed and displayed both accurately and swiftly. Litton Systems Canada Limited has responded to this need with ADLIPS — the automatic data link plotting system.

ADLIPS is a modular, low-cost command and control and tactical data communication system designed to replace electromechanical plotting tables and associated radar displays in non-TDS equipped ships. The system provides transmission, reception,

filtering and display of target track data from Link 11 and Link 14 data communication networks. ADLIPS also collects and processes own-ship weapon systems. When operating in a TDS environment, ships fitted with ADLIPS have the capability to share tactical data with each other as well as with aircraft and other ships similarly equipped with data communication systems. This capability aids co-ordinated tactical operations and, therefore, increases performance efficiency.





Litton's Inertial Referenced Flight Inspection System displays navaid calibrations directly to operator.

### INERTIAL REFERENCED FLIGHT INSPECTION SYSTEM

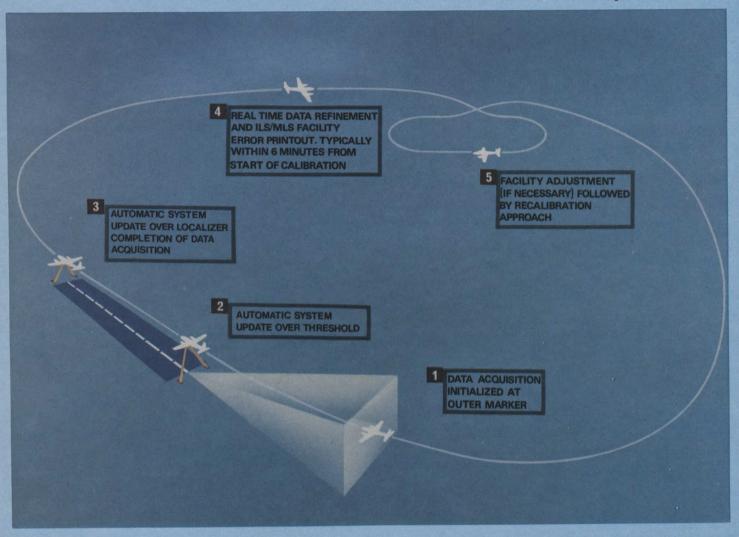
The Litton inertial referenced flight inspection system (IRFIS), when coupled with the normal navaid receiver, is a self-contained enroute and terminal navaid calibration system. The Litton IRFIS performs calibration of Category I, II and III ILS/MLS and TACAN systems to a higher accuracy and at operating costs lower than other systems now in use.

The system's high-speed data acquisition and computation capabilities permit calibration, correction, and recalibration to be performed during the same flight. Clear visibility is not a requirement; therefore calibration flight can be made in any flying weather.

Unlike other systems, the Litton IRFIS does not require ground personnel operating theodolites or other land-based supporting equipment.

The system is compact, lightweight and has minimal power requirement. The system and its one operator can be conveniently carried in an economically operated twin-engined, light aircraft.

IRFIS provides real-time measurement of calibration of aircraft navigational aids.



#### LITTON FLAT PANEL DISPLAYS

To ease the problem of crowded cockpit instrument panels and to improve the presentation of pertinent aircraft information to flight crews, Litton Systems Canada Limited has developed multifunction, light emitting diode (LED) displays. Multifunction displays, under computer control, can present a broad range of data, on demand, and yet require panel space for only one instrument.

The Litton Multi-Mode-Matrix display offers weight reduction and increased reliability in comparison to that offered by multiple, single purpose instrumentation that it can replace. Unlike cathode-ray-tube (CRT) multifunction displays the Litton flat panel, LED display requires a minimum of space behind the instrument panel. In extremely limited locations, display depth can be reduced to 3.8 cm (1½ inches).

The display face is composed of 2.5 cm (one inch) square, 64 x 64 LED matrix modules. This provides excellent resolution and contrast. The modular construction also permits flexibility in display face dimensions. LED luminance of 410 candella/m² (120 foot lamberts) ensure good legibility even in high ambient light.

The Litton Multi-Mode-Matrix display's small size, light weight and high resistance to shock and vibration make it ideal in civil and military aircraft as vertical and horizontal flight situation displays, dynamic air-toground tactical displays, navigation displays, check lists, fault indication, system status, sensor data and communication displays.

Litton Multi-Mode-Matrix display operates as an altitude director indicator.



#### Magline of Canada Limited

P.O. Box 219 Renfrew, Ontario, Canada K7V 4A3

Tel: (613) 432-5848 Telex: 053-3916

Canadian soldier with Magline-made equipment.



Pioneers in the construction of snowshoes for military service, Magline developed a new concept for the Canadian Armed Forces in the "Magliner trail snowshoe".

The basic frame of the Magliner snowshoe used by the Canadian Armed Forces consists of magnesium extrusions welded into a sturdy assembly. The stringing or mesh of the snowshoes is nylon-covered galvanized aircraft cable which is a standard commercial item. Slippage is reduced by gripping strips which are welded to the bottom of the frame.

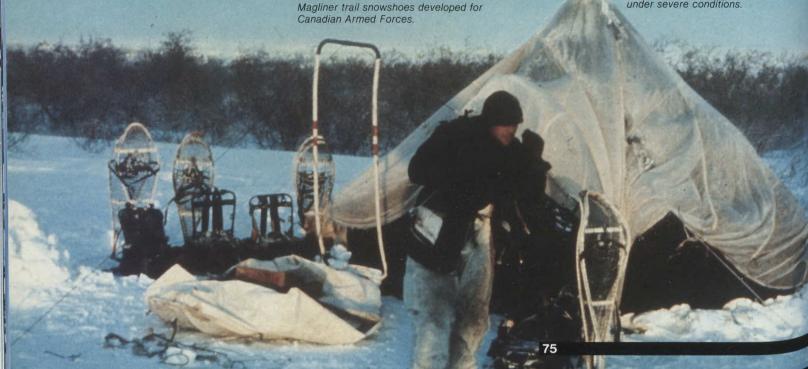
The snowshoes, which have also been adopted by other countries, have proved themselves over the years in terms of effectiveness and durability to serve the most rugged military and civilian needs.

Magline also designs, fabricates prototypes and makes production runs, specializing in light metals — magnesium and aluminum. The company stresses the use of welding, rivetting, machining, assembling and inspection methods.

The scope of the company is reflected in the extensive range of other products used by the Canadian Department of National Defence including aluminum jointed, telescopic tent poles; modular tent frame arches and purlins; survival tent frames; penthouse command post tent frames; tent pins; tent pole base plates; crooksticks; pace sticks; candle holders; magnesium sealing cups; aluminum folding tables; rocket containers; cases, communications equipment; mobile stands.



Modular tent frame, with telescopic poles for comfort under severe conditions.



#### Marine Industries Limited

P.O. Box 550 Sorel, Quebec, Canada J3P 5P5

Tel: (514) 743-3351 Telex: 055-61081

As one of Canada's leading shipbuilding and industrial complexes, Marine Industries Limited's production capabilities also include railroad freight cars, hydroelectric turbines and generators, material handling equipment, products for the chemical, petrochemical, mining and metallurgical industries as well as heavy industrial machinery and equipment for defence purposes.

Marine Industries was engaged by the Canadian Navy to build the prototype of a new series of helicoptercarrying destroyers. An important feature of these ships is their almost complete automation system.

Marine Industries is playing an important role in building fighting ships for the Canadian Navy and was the lead yard for the construction of Canada's latest destroyer program.

The company has conducted a feasibility study for the Canadian Department of National Defence on the evaluation of the overall properties of metallized coatings on seagoing vessels and research of seagoing applications for structural laminated light aerospace materials.

280

# Miller Communications Systems Ltd.

300 Legget Drive Kanata, Ontario, Canada K2K 1Y5

Tel: (613) 592-3020 Telex: 053-4164



Analog voice security device designed by Miller Communications Systems.

Specialists in the planning, designing and implementation of a wide range of communication systems, Miller Communications has become an important supplier of complex, custom-built systems for military and civil purposes. The company is a leading innovator and manufacturer of products to support advance communication programs.

While the emphasis remains on communications, Miller Communications also specializes in signal processing and radio frequency (RF) engineering which has led the company into the related fields of radar and navigational aids.

The company operates from a wellequipped plant housing a full range of test equipment, computing, and manufacturing facilities which provides effective execution of projects and products.

SYNCOMPEX (Synchronized Compression and Expansion) speech processing system.



### Maritime Industries Ltd.

6307 Laurel Street Burnaby, British Columbia, Canada V5B 3B3

Tel: (604) 299-7591

Telex: 043-54799 MARITAIR

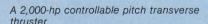
Cable: MARITAIR



Maritime Industries has achieved worldwide recognition for the development and production of an extensive range of marine products to meet both naval and civilian needs which is marketed throughout the world. The company is heavily involved in supplying military contracts in Canada, the United States, Australia and other countries.

Maritime Industries specializes in the following:

- Bowthrusters, with controllable and fixed pitch propellers up to 6,000 hp;
- Z and L drive propulsion units up to 6,000 hp of the type where the propeller is steerable through 360°. The units can be either through-hull or deckmounted, and can be supplied with the prime mover as an integral part of the unit;
- special custom-designed propulsion units and positioning systems.



Maritime propulsion units mounted on transom of Grumman hydrofoil. Units swing up transversely when vessel is foil-borne.



Grumman Aerospace Corporation patrol hydrofoils use Maritime Industries units for emergency propulsion and manoeuvring in confined areas

#### Norpak Ltd.

10 Hearst Way Kanata, Ontario, Canada K2L 2P4

Tel: (613) 592-4164 Telex: 053-4174

Interactive computer graphics and image processing systems including visual aid data processors are among the high-technology products of Norpak. The company is the principal developer and major manufacturer of Telidon videotex systems hardware.

Other Norpak products have been customized for Canadian military use in electronic warfare, command and control, and training applications. Development of Telidon-based military information handling systems is well advanced. Norpak also designs and manufactures systems for educational applications and training, process control and computer-aided design systems for commercial and industrial use.

Other products available from Norpak include special graphic display devices; "SuperVISION", a family of three high performance graphic image workstations; teletext encoder systems for vertical blanking interval (VBI) operation; and an information provider system.

Decoders include a business and residential two-way access information system with capability of receiving and displaying stored data. Norpak's Mark 3 decoders are compatible with both Canadian field trial standards and North American videotex standards.

Norpak also develops original equipment market (OEM) products for expanding computer graphic markets — the Apple II Telidon interface card is one example of the co-operative engineering projects undertaken by Norpak.



## Northwest Industries Limited

A Division of CAE Industries Ltd.

Municipal Airport P.O. Box 517 Edmonton, Alberta, Canada T5J 2K5

Tel: (403) 455-3161 Telex: 037-2681 TWX: 610-831-1230



Serving the needs of the military and civil aerospace industry for more than 40 years, Northwest Industries has emerged as one of Canada's important aerospace companies with a rapidly growing reputation at home and abroad for competence and innovation in a highly competitive market.

The company is primarily engaged in aircraft repair and overhaul; aircraft modifications; aircraft instruments and accessories overhaul; aircraft avionics design and systems interface; aircraft structural and systems engineering; aircraft electronics; technical publications; airframe component manufacture.

Northwest Industries Limited has onestop facilities to support all phases of overhaul and modification including instrument and avionics interface.

The extensive CF-104 repair and overhaul facilities provided by Northwest Industries.

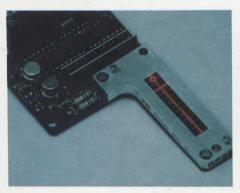
#### **Optotek Limited**

1283 Algoma Road Ottawa, Ontario, Canada K1B 3W7 Tel: (613) 746-3100 Telex: 053-3524

Optotek is involved in the design and manufacture of advanced optoelectronics display products, principally light emitting diode (LED) displays and associated electronic subsystems for application in the military, avionics and industrial sectors.

The company maintains active research and development programs directed towards improving material and device capabilities. Products include alphanumeric displays, bargraphs, matrix and linear displays, available in a number of colours ranging from red to green. Standard and custom-made products are available. Equipment covers a full complement of semi-conductor processing, test and assembly equipment.

Visual array designed for use as a heads-up display including integrated decode/drive electronics



Solid-state photo exposure recording head for reconnaissance purposes produced by Optotek.



#### Pacific Truck and Trailer Ltd.

935 West 3rd Street North Vancouver, British Columbia, Canada V7P 1E5

Tel: (604) 985-7121 Telex: 043-52529

Cable: "LOGGING" VANCOUVER

Pacific Truck and Trailer Ltd. is a manufacturer of custom-built, on/offhighway trucks and trailers, specializing in vehicles for the logging, construction, mining and petroleum industries and military service.

The company has a staff of technical sales and engineering personnel who have developed a full range of heavy duty trucks from 25 to 72 met nes GVW (gross vehicle weight), and up to 226 metr tonnes GCW (gross

cargo weight)

Pacific products can be found operating throughout North America, in Malaysia, Indonesia, The Philippines, New Zealand, Australia, India and

Custom-built on/off-highway truck produced by

Africa. With emphasis on quality and reliability, Pacific manufactures products to fulfill customers' truck needs throughout the world.

Pacific Truck and Trailer for milita industrial service.

#### Pedsco Canada Ltd.

180 Finchdene Square, Unit 3 Scarborough, Ontario, Canada M1X 1A8 Tel: (416) 298-9989

The Pedsco RMI lightweight multi-purpose vehicle has proved its efficiency and dependability under demanding conditions for both defence and police purposes. The vehicle is

designed for the remote handling of improvised explosive devices (IED), surveillance, fire-fighting, handling of radioactive material, anti-hijacking and hostage-taking — and many other varied and related needs.

Additional Pedsco products include disrupter (water gun) systems, battery operated pulsed X-ray equipment, "night vision" television systems, stethoscopes, radio control packages and car hooks, in use by the armed forces of several countries, and police forces.

The Pedsco RMI lightweight multi-purpose vehicle for defence and police purposes.

## Pation Aircraft and Industries Ltd.

5502 Timberlea Boulevard Mississauga, Ontario, Canada L4W 2T7

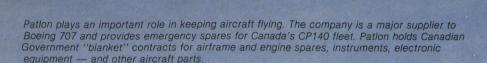
Tel: (416) 624-5572 Telex: 06-960379 TWX: 610-492-4312

Serving the total aircraft industry, Patlon Aircraft and Industries Ltd. is an engineering, sales and warehousing distributor. For more than a quarter of a century the company has specialized in the logistic support of a wide variety of North Americandesigned military, transport, and fighter aircraft.

Patlon's product list is extensive. The company has developed excellent sources of supply for both current and out-of-production equipment in North America, the Commonwealth and Europe. In fact the firm has one of the largest master reference libraries in Canada, which includes all the military vehicles and equipment puchased in the Free World. This enables Patlon to cross-reference products, replacing specified materials and equipment with qualified products from multiple sources usually at lower cost. The firm has been particularly successful in this area with the Canadian military, airframe and engine repair and overhaul depots, as well as with foreign governments.

Late in 1979 Patlon acquired an office in Miami. This wholly-owned subsidiary, Patlon Aircraft and Industries Inc., extends Patlon's military and commercial expertise to the general aviation field. In addition, the Miami location is ideal for servicing both the Central and South American markets.

Patlon has the ability to service and respond quickly to market demands as evidenced when the Canadian Government purchased its fleet of Boeing 707 aircraft. The government appointed Patlon as its exclusive supplier of all vendor items on the aircraft — in excess of 400 separate pieces of equipment. The Canadian Government uses the Boeing aircraft in diversified roles such as in cargo







5502 Timberlea Boulevard Mississauga, Ontario, Canada L4W 2T7 Tel: (416) 624-5572 Telex: 06-960379

TWX: 610-492-4312

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transport, personnel transport, airborne tankers for in-flight refuelling and northern surveillance. In these roles, the aircraft travel around the world in high-hour use and are kept in

the air almost continuously.

As the exclusive supplier of most of the Boeing 707 parts, Patlon is responsible for keeping down-time to a minimum and the company is called upon on a 24-hour basis to supply

Patlon's capabilities, the firm holds Canadian Government "blanket" contracts for the supply of airframe and

parts in many areas

-

of the world.

engine spares, instruments, electronic equipment, and other equipment for CF-5, T-33, Falcon, and other aircraft. Patlon is also supplying a similar service for the governments of Venezuela and Guatemala.

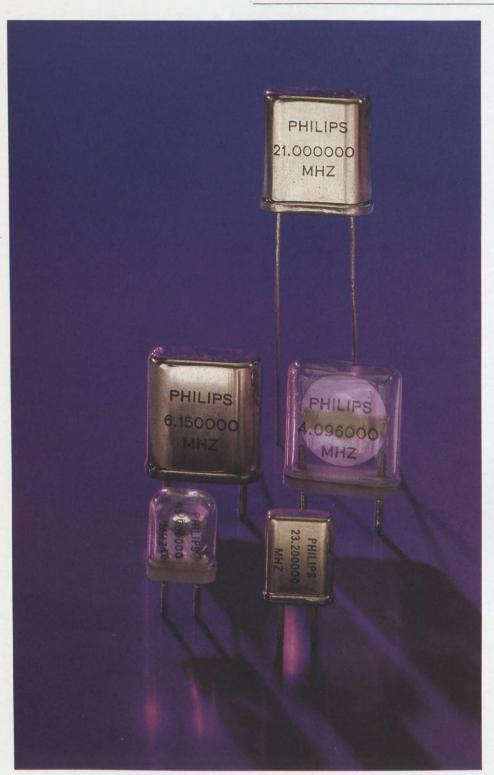


Patlon plays an important role in keeping aircraft flying. The company is a major supplier to Boeing 707 and provides emergency spares for Canada's CP140 fleet. Patlon holds Canadian Government "blanket" contracts for airframe and engine spares, instruments, electronic equipment — and other aircraft parts.

## **Philips Electronics Ltd.**Crystal Division

601 Milner Avenue Scarborough, Ontario, Canada M1B 1M8

Tel: (416) 292-5161 Telex: 065-25100



Typical Philips crystals including evacuated glass units for extremely high reliability.

Philips Electronics Ltd. is part of the worldwide Philips organization.

Among its varied activities is a high-technology quartz crystal manufacturing operation. The Crystal Division manufactures A T cut quartz crystal units in the frequency range 1.5 MHz to 175 MHz to all MIL-C-3098 U.S. Military Specifications for A T cut, (Qualified Product Listing approved). The in-plant testing laboratory is approved to MIL-C-3098 F.

Also produced are moderate-precision, glass-enclosed evacuated crystal units in the following holders: HC27/U-dimensionally equivalent to HC6/U; HC29/U-dimensionally equivalent to HC25/U; HC26/U-dimensionally equivalent to HC18/U. The holders meet all of the normal specification tolerances for military types listed in MIL-C-3098.



Vacuum evaporation machines deposit pure silver or aluminum electrodes on crystal blanks.

## Pratt & Whitney Aircraft of Canada Ltd.

P.O. Box 10 Longueuil, Quebec, Canada J4K 4X9

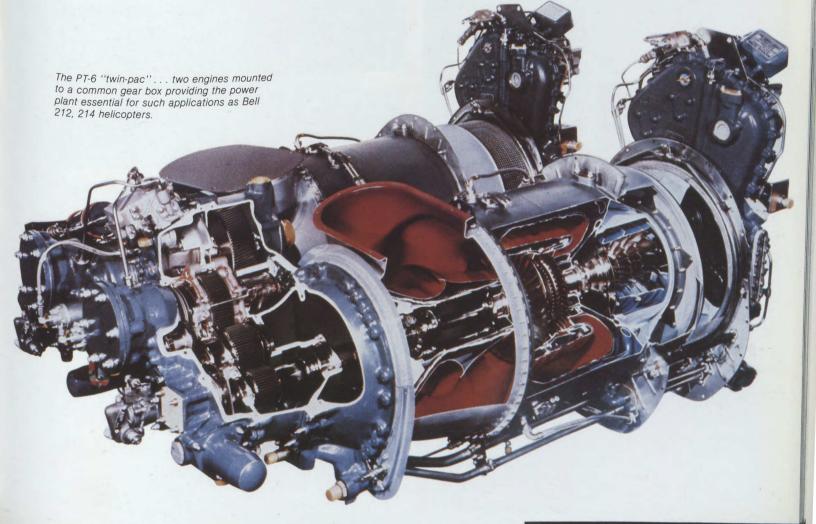
Tel: (514) 677-9411 Telex: 05-267509 Cable: PRATTWHIT MTL

Pratt & Whitney Aircraft — a subsidiary of United Technologies Corporation — is a world leader in the design, manufacture and repair of small gas turbine engines. The company's engines power a wide variety of aircraft in 130 countries. The Canadian operation is totally responsible for the design, development, manufacture and international marketing of the small gas turbine engines for air, land and sea application for military and civilian needs.

In addition to its aero engine design and manufacturing capabilities, the company is involved in helicopter and system modernization and repairs. It is an innovator in industrial and marine applications of gas turbine engines, such as power generating units, pumping stations for gas and oil pipelines and propulsion systems for ships.

Approximately 1,400 employees work full time on research and development projects to continually improve gas turbine technology that meets the challenges of today and the demands for decades ahead.

Research, development, manufacturing and overhaul operations are carried out in three main plants near Montreal, Canada, conveniently located to a major airport where company test flights are carried out. Pratt & Whitney also maintains complete facilities in the United States, Argentina, Brazil, France, Italy, Japan and Taiwan to augment a distribution network for spare parts and after-sales support of the company's products convenient to most major markets of the world.



#### R-Metrics Ltd.

486 Wyecroft Road Oakville, Ontario, Canada L6K 2G7

Tel: (416) 845-6036 Telex: 06-986766

Prominent in the manufacturing of nuclear radiation detection and measurement equipment, particularly for military applications, R-Metrics is engaged in several research and development projects for various agencies including the Canadian and U.S. defence departments.

The company has complete manufacturing facilities for nuclear and/or electronic products including clean room facilities. Besides all pertinent nuclear/electronic test equipment, R-Metrics has an electro-magnetic pulse test facility under development, plus an extensive set of radiation

sources of various isotopes from a few microcuries to several hundred curies. Environmental test facilities include heat, humidity, altitude, pressure, immersion, and others, plus combinations of various situations.

Products include area radiation monitors for land or ship installations and hand portable field survey equipment.

Additional information can be obtained in the book "Canadian NBC (Nuclear Biological Chemical) Equipment" available from the Canadian Trade Office in your territory.

- 1 Sensor and stand.
- 2 Interconnection box.
- 3 Simulator, radiac sensor SM-5022/ FDR-502 (V).
- 4 Radiacmeter IM-5016/PD.
- 5 AN/FDR-502 (control group).
- 6 Remote readout for the SDR 502.
- 7 RD 5080 emergency gamma survey meter (up to 12000 rad/HR).
- 8 RD 5070 high range gamma survey meter (up to 1000 rad/HR).
- 9 Remote alarm for the SDR 502.
- 10 IM 108/174 radiacmeter, high range up to 500 r/HR.





















#### Rayshield Limited

2630 Royal Windsor Drive Mississauga, Ontario, Canada L5J 1K7

Tel: (416) 822-6100 Telex: 06-982316

Rayshield Limited specializes in the construction of free-standing, pre-fabricated RF shielded enclosures and MIG welded rooms which are completely adaptable to all sizes and shapes of architectural spaces. The system was developed to provide a quality-controlled technique for constructing shielding under adverse field conditions that would ensure dependable performance. Manually operated doors require a very minimum of effort, and are available as single or double units. "Hands off" or auto-

matic powered door operators are also available.

Performance is tailored to meet requirements. Complete installation and turnkey services including testing and certification. A complete line of accessories — vent panels, waveguide penetration, lighting, work benches, and connector panels are available. Power signal and communication line filters for all applications including tempest. Rayshield also provides guaranteed performance installations, testing, and servicing.

The Rayshield modular prefabricated enclosure and welded room systems developed by Rayshield to provide a quality controlled shielding under adverse field conditions. They are completely adaptable to all sizes and shapes of architectural spaces.

#### Raytheon Canada Limited

400 Phillip Street West Waterloo, Ontario, Canada N2J 4K6

Tel: (519) 885-0110 Telex: 069-55431 TWX: 610-365-3469

Raytheon Canada Limited is an established supplier of high-technology electronic products, systems and associated services for both Canadian and international markets.

The primary activities of the company are in air traffic control and telecommunications systems.

The Raytheon Canada ASR-8000 series radar family comprises several advanced L band and S band primary radars capable of detecting aircraft in severe weather and clutter environments. They are equipped with a quadrature three-pulse moving target detector (MTD) with a 2<sup>16</sup> cell adaptive clutter map, and a 10-bit digital processor.

Raytheon Canada's line of navigational aids includes VHF omni-range (VOR) in both standard and doppler versions. Both the SVOR and DVOR are available in single and dualchannel configurations, with antenna and self-monitoring facilities. The

equipment is entirely solid state and is modular in construction for ease of maintenance. The distance measuring equipment (DME) is a complete ground station including dual transponders and monitors, and the antenna. Except for the output stage it too is all solid state. Both meet all applicable ICAO standards.

Raytheon Canada produces a line of long haul, high capacity terrestrial microwave equipment. Systems operating in the 4, 6, 8 and 11 GHz bands, complete with terminal and protection equipment, can be supplied with transmission capabilities up to 2400 channels. Raytheon is a major supplier of satellite earth stations in both the 4/6 and 12/14 GHz bands.

(Top left) Raytheon microwave relay; (top right) navigational aids VHF omni-range VOR; (bottom left) earth station for communications satellite; (bottom right) aircraft surveillance radar.









# Rockwell International of Canada Ltd. Collins Canada Division

150 Bartley Drive Toronto, Ontario, Canada M4A 1C7

Tel: (416) 757-1101 Telex: 06-963-573

The Collins Canada Division of Rockwell International of Canada Ltd. manufactures telecommunication products which consist of a new family of HF-radio equipment, a lightweight HF packset for tactical communications, and a new generation of automatic direction finders.

The HF-80 radio equipment is available with flexibility to meet the voice and data communication challenges of the 1980s. From simple, operatorattended receivers and transmitters to fully automated and remote communication stations, the HF-80 offers support and cost advantages not previously available from any other product line. This product is satisfying communication requirements in more than 40 countries.

The Collins AN/PRC-515 is a 20-watt HF man-pack transceiver built to meet a full range of tactical communications requirements. It provides the flexible and quiet operation necessary in a tactical environment. A synthesizer is used to enable frequency coverage from 2 to 29.9999 MHz in 100 Hz steps with fully automatic antenna tuning. This transceiver is standard equipment in the Canadian Armed Forces.

The DF-301E direction finder was designed to fulfill the requirements in new aircraft for smaller, more reliable avionics systems. The electronically rotated antenna permits the use of microelectronics to their best advantage in lowering power requirements and heat generation. The DF-301E includes a wide-band low noise preamplifier which enhances the sensitivity and reduces the susceptibility to noise pick-up on the coax to the companion receiver. Logical functional organization of the modules enables rapid isolation of a failure for minimal MTTR.







#### Saint John Shipbuilding & Dry Dock Co. Ltd.

P.O. Box 970 Saint John, New Brunswick, Canada E2L 4E5

Tel: (506) 693-9941 Telex: 014-47243

The Saint John Shipbuilding & Dry Dock Co. Ltd.'s shipyard is equipped with the most modern facilities in Canada, where the latest developments in technology, production control and management systems are applied in all operations.

The company has extensive experience in the design and construction of ships to meet the varied demands of the marine market. Many of these ships are innovative in concept and design and embody the latest trends in marine technology, ship safety and reliability.

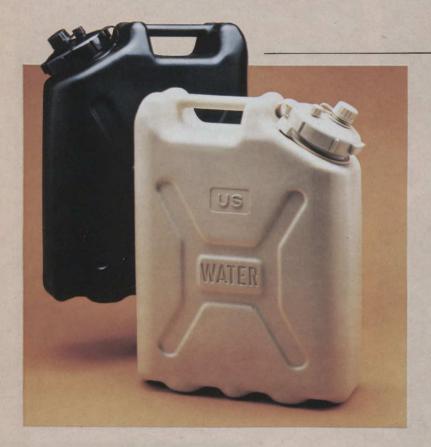
In the area of naval construction, conversion and refits, the yard has been involved for more than 50 years in supplying these services to the Canadian Armed Forces.

Operational support ship built by Saint John Shipbuilding & Dry Dock Co. Ltd.



## Scepter Manufacturing Co. Ltd.

11 Bermondsey Road Toronto, Ontario, Canada M4B 1Z3 Tel: (416) 751-3820 Telex: 06-23762



Developed by the Canadian Armed Forces, the 19-litre (five-gallon) plastic water container produced by Scepter has many advantages over traditional containers to fulfill the needs for both military and civilian use.

The container is 50 per cent lighter than metal items and requires no maintenance. It is 30 to 40 per cent less expensive than metal containers. The Scepter product does not rust and is more durable than metal containers. It is equipped with a cap and strap assembly. The large cap is locked in the tightened position by means of a tab on the can and strap assembly. Superimposed is a small pouring spout, with cap and breather cap assembly.

The container is also supplied to the United States and The Netherlands military forces.

#### Scan Marine Inc.

1000 rue de Serigny P.O. Box 80 Longueuil, Quebec, Canada J5K 5C6

Tel: (514) 651-9313 Telex: 05-25324

Scan Marine Inc., associated with Pratt & Whitney Aircraft of Canada Ltd., has been selected by the Canadian Government as one of two contractors for the Canadian Patrol Frigate Program.

The company specializes in all phases of marine high technology, both military and commercial, from research, development and design through to production supply and lifetime support.

Scan Marine's capabilities in naval architecture include hydro-dynamics and structures, marine propulsion, command control and communications, combat systems and system softwares.

The firm's engineers and designers are also experts in the fields of electrical generation and distribution, logistic support, arrangements and outfitting, deck machinery and ground tackle, quality assurance and quality control.



## **Seagold Industries Corporation**

4008 Myrtle Street Burnaby, British Columbia, Canada V5C 4G2

Tel: (604) 437-4445 Telex: 04-356682

Conventional desalting processes are energy intensive. Seagold's advanced reverse osmosis technology breaks this energy barrier, reducing the energy cost of sea water desalination by a factor of three relative to conventional reverse osmosis, which in turn is much more efficient than distillation. The process has been proved in the desalination of sea water and other contaminated water sources.

Present product developments are represented by three groups: manually operated portable desalinators; small to medium capacity motorized reverse osmosis systems, with or without Seagold's energy-recovery pumps; and energy-recovery pumps for the reverse osmosis industry.

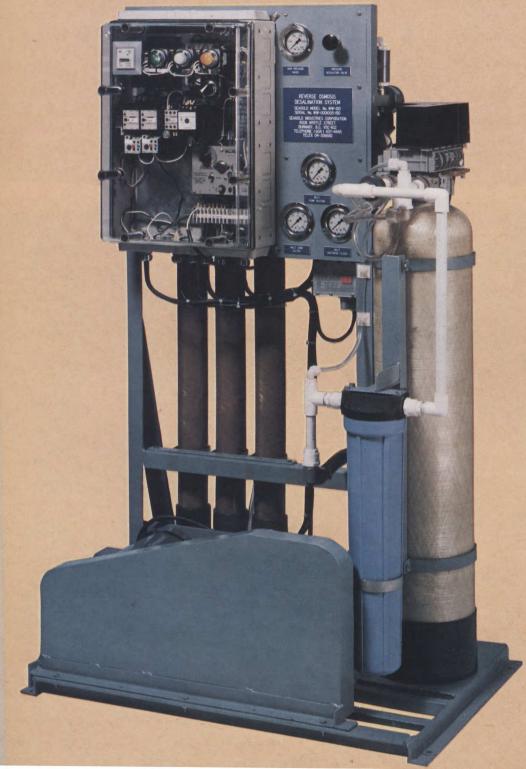
Seagold's manual desalinator is a compact and highly portable desalinator operated by a hand lever. Its patented energy pump allows a production rate of 4½ litres (one gallon) per hour product water from sea water (one glass of water in three minutes). The desalinator is so simple to operate that no special skills or training are required.

The motorized reverse osmosis systems by Seagold include a range of small to medium capacity reverse osmosis desalination systems, for both marine and land services. This product capacity range for sea water desalting systems is 450 to 225,000 litres (100 to 50,000 gallons) per day.

Seagold energy-recovery pumps for reverse osmosis systems offer several advantages. The reduction of power consumption is more than 60 per cent over that required by nonenergy-recovery pumps. The Seagold pump also eliminates the need for any other pressure-regulating device and the product flow rate is automatically held constant regardless of variations in feed water temperature or salinity.



Seagold manual desalinator — compact and highly portable.



Reverse osmosis motorized model WW 150 desalination system.

#### SED Systems Inc.

P.O. Box 1464 Saskatoon, Saskatchewan, Canada S7K 3P7

Tel: (306) 664-1768 Telex: 074-2495 TWX: 610-731-1476



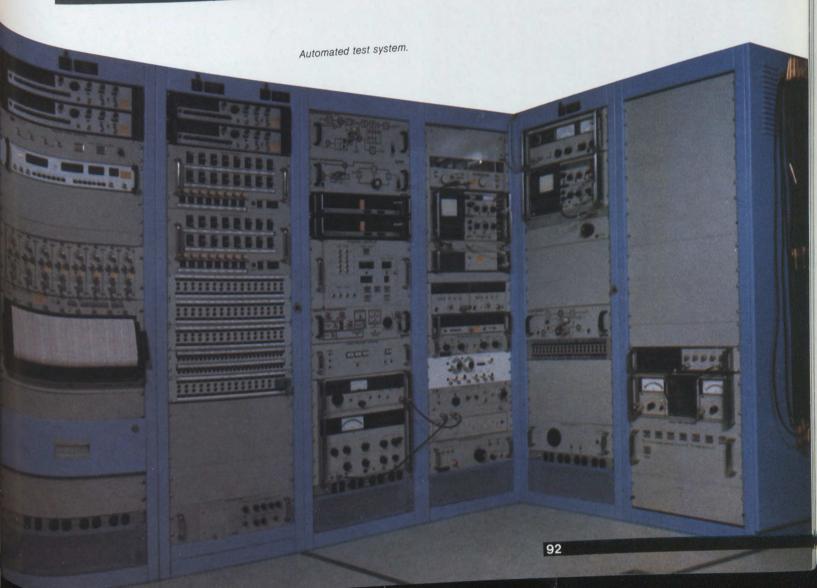
SED Systems has acquired an international reputation for engineering achievement in providing products and project services in the defence, space and communication markets.

Specific services provided by SED Systems include communications systems analysis and design; custom communications earth station systems and products; satellite telemetry, tracking and command stations; automated test systems, and custom software and hardware systems.

The company has played a major role in the joint surveillance system (JSS), search and rescue satellite (SARSAT), Canadian patrol frigate (CPF), Anik, A, B, C and D, satellite business systems (SBS), and Landsat.

Among the company's key customers are Hughes Aircraft Company, Sperry Systems Management, Telesat Canada, Canadian Department of National Defence and others.

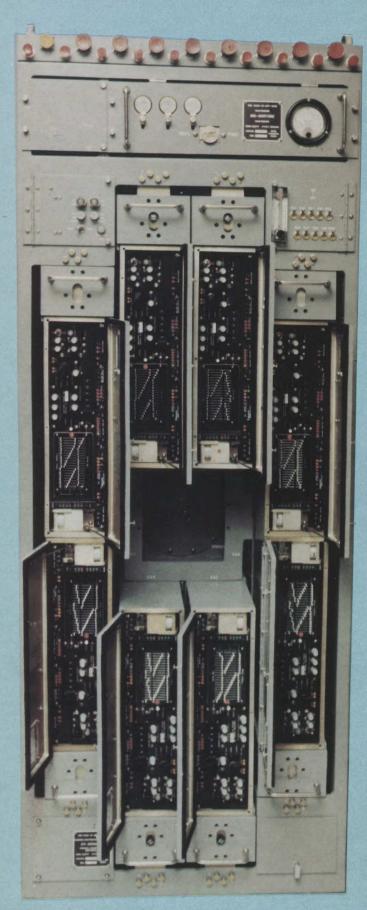
Telemetry, tracking and command station.



# Sinclair Radio Laboratories Limited

122 Rayette Road Concord, Ontario, Canada L4K 1B6

Tel: (416) 669-1244 Telex: 06-964598



Sinclair Radio Laboratories Limited is a 30-year-old company with an impressive record of innovation and expertise in the development and manufacture of radio communications equipment for industry and government. Sinclair products — base station and mobile antennas, filters, duplexers, combiners, isolators, circulators, and multicouplers — are sold throughout the world for military and civilian use, and in virtually every environment from the Arctic to the tropics. (There are Sinclair antennas at both poles!)

In the provisioning of military communications equipment, Sinclair has a proven track record; its equipment enjoys a well-earned reputation for performance. For example, the UC-301 (V) autotuned eight-channel UHF multicoupler provides the Canadian Armed Forces, Maritime (Royal Canadian Navy) with unmatched capability to operate simultaneously eight transceivers into a single broadband antenna. The UC-301 has 20 preset channels, and an optional coupler control unit can provide remote tuning of the full 7,000 channels available with this equipment in the 225-400 MHz band. Similarly, the Canadian Armed Forces, Maritime, the Royal Navy and the Royal Netherlands Navy have all selected Sinclair's SRL 246-2 antenna.

The Sinclair ultra high frequency (UHF) multicoupler capable of simultaneous operation of eight transceivers into a single broadband antenna.

# Skykeesh Industries Limited

P.O. Box 461 Vankleek Hill, Ontario, Canada K0B 1R0

Tel: (613) 678-3706 Telex: 05-839584







Skykeesh Industries, specialists in the manufacture of high technology products, focuses primarily on aviation related projects and products for both military and civil purposes.

The company produces prefabricated air traffic control towers, air traffic control consoles, transportable air traffic control towers, air traffic control trainers, communication trainers, communication control systems, spectrum surveillance systems.

STOL port facilities at Ottawa and Montreal were built by Skykeesh as were towers of various sizes at Edmonton, Cleveland, Venezuela and other places.

Skykeesh has provided custom designed control consoles for company control tower installation and for existing control towers constructed by other firms.

The transportable air traffic control towers can be transported by airplane, helicopter, rail, or flat bed truck. Several of these units have been built for the Canadian Department of National Defence.

Air control trainers include instructor and student consoles which simulate an air traffic control environment. Communication trainers are utilized to simulate radio and telegraph communication by using a closed circuit link between student and instructor consoles.

A recent development in new product research was the design and development of a new communications control system that provides a positive indication of the status of radios, telephone, intercom and tape recorder functions, designed to be compatible with most equipment on the modern market. Skykeesh has also been involved in the outfitting of spectrum surveillance vehicles in Canada and is actively marketing these units abroad.



# **Spar Aerospace Limited**Mechanical and Electrical Group

825 Caledonia Road Toronto, Ontario, Canada M6B 3X8

Tel: (416) 781-1571 Telex: 065-24240 TWX: 610-491-1503

Spar's Mechanical and Electrical Group is engaged through two operating divisions in the manufacturing, servicing, and sales of products for aerospace manufacturers and aviation operators.

The Gears and Transmissions Division manufactures and assembles lightweight, high-precision, high-speed, high-torque power transmission systems and accessory gearboxes for gas turbine engines and fixed and rotary wing aircraft.

The division produces accessory gearboxes for General Electric's J85-21 jet engine, the T700 turboshaft engine, the CT7 turboprop engine variants and transmission components for the S-76 helicopter.

The division fabricated the transmissions and other components for the Boeing Vertol CH-46 helicopter, and produced transmission gears for the Westland Lynx helicopter (U.K.), and gearbox components for the Puma helicopter made by Aerospatiale of France.

The Repair and Overhaul Division is engaged in the repair and overhaul of aircraft components, the maintenance and servicing of helicopters, and the sale of aviation products and accessories. Spar Aerospace customers include military and commercial aircraft maintenance centres and helicopter operators in Canada, the United States, Mexico, and Central and South America.

The division services cover engine and flight instruments; components of electrical, oxygen, navigational and auto pilot systems; constant speed drives; accessory gearboxes; and components of flight control and heating systems.

A large part of the division's business is derived from agreements with 17 aircraft equipment manufacturers in North America and Europe. These manufacturers have appointed Spar Aerospace Limited a Canadian warranty and service station for their products.



Assembly of General Electric T700 engine accessory drive gearbox.

Sikorsky helicopter transmission equipment.



Accessory drive gearboxes for turbine engines.



# Spar Aerospace Limited

**Space and Electronics Group** 

# **Defence Systems Division**

Lismer Building Kanata, Ontario, Canada K2K 1X3

Tel: (613) 592-3430 Telex: 053-4714

Spar has completed development of a shipboard Infra-red Surveillance System which has undergone successful sea trials by the Canadian and United States navies. Solid-state radar receivers are produced for the AN/SPS-10 and AN/SPS-12 radars.

Other activities include manufacturing of satellite electronics to OEM design; systems, design, development and life-cycle support, integrated logistics support, and repair and overhaul of radars and other electronic equipment.

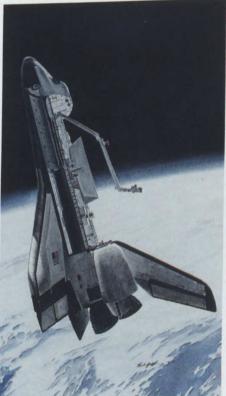


Artist's conception of communication satellite with Spar electronics being launched into

Assembly by Spar of electronics for ANIK-D

communication satellite.





# Aerospace and Communications Systems Division

21025 Trans Canada Highway Ste-Anne-de-Bellevue, Quebec Canada H9X 3R2

Tel: (514) 457-2150 Telex: 05-822792

The Aerospace and Communications Systems Division designs and builds communications equipment for satellite and terrestrial applications. It offers total subsystem contractor capability including systems engineering, design, management, integration, and test. The division has supplied communications systems and subsystems for more than 30 communications satellites and more than 100 complete satellite earth stations.

# Remote Manipulator System Division

1700 Ormont Drive Weston, Ontario, Canada M9L 2W7

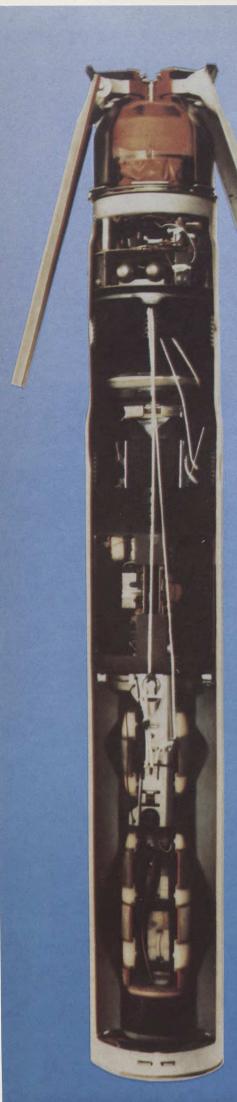
Tel: (416) 745-9680 Telex: 065-27360

The Remote Manipulator System (RMS) Division is prime contractor for the U.S. Space Shuttle Remote Manipulator System. The division has the capability to design and build both space and terrestrial manipulator systems. This capability includes systems engineering and management, design, verification, build and integration, full system test and both real-time and non-real-time simulation for mission and on-orbit dynamic analysis.



Shipboard infra-red surveillance system by Spar.

The Spar-built remote manipulator system (RMS) that was acclaimed worldwide for invaluable service on the space shuttle Columbia.



# Sparton of Canada, Limited

100 Elm Street P.O. Box 5125, Terminal "A" London, Ontario, Canada N6A 4N2 Tel: (519) 455-6320

Telex: 064-5876

Established more than a half century ago, Sparton of Canada, Limited has become a major supplier of sonobuoy products to the Canadian and United States governments as well as many countries around the world.

Sparton of Canada, Limited has complete facilities for the development, testing, engineering and manufacture of passive and active acoustic buoys for military anti-submarine warfare (ASW) and non-military (ocean surveillance) applications.

Sparton active (pinging) sonobuoy — used by

defence forces in many countries.

Other electronic products available from Sparton of Canada, Limited are custom designed regulated power supplies for the OEM market, and a line of passive (seismic, magnetic, infra-red) intrusion detection sensor systems for perimeter protection.

The company is a qualified producer of defence products, meeting the requirements of the Canadian Department of Defence, DND 1015 and US MIL-9858A Quality Assurance Programs. There is a resident military quality control detachment on the premises.

Sonobuoy types qualified for ASW service are as follows:

Passive Sonobuoy
AN/SSQ-527A — Omnidirectional,
passive, listening sonobuoy, developed and produced to the Canadian
Armed Forces specifications. It is
physically and electrically compatible

with the USN/SSQ-41B.

**AN/SSQ-53A** — Directional, passive, listening sonobuoy. This is the standard "A" size DIFAR sonobuoy conforming to the current USN specifications.

Active Sonobuoy
AN/SSQ-47B/522 — Range-only, active (pinging) sonobuoy, or sonar buoy. This is the standard range-only active sonobuoy in use by Canada, the United States and by the ASW forces of many other countries. The AN/SSQ-522 is the Canadian Armed Forces version of the AN/SSQ-47B.

# **Sperry Incorporated**Gyroscope Division

P.O. Box 1300 Rockland, Ontario, Canada K0A 3A0

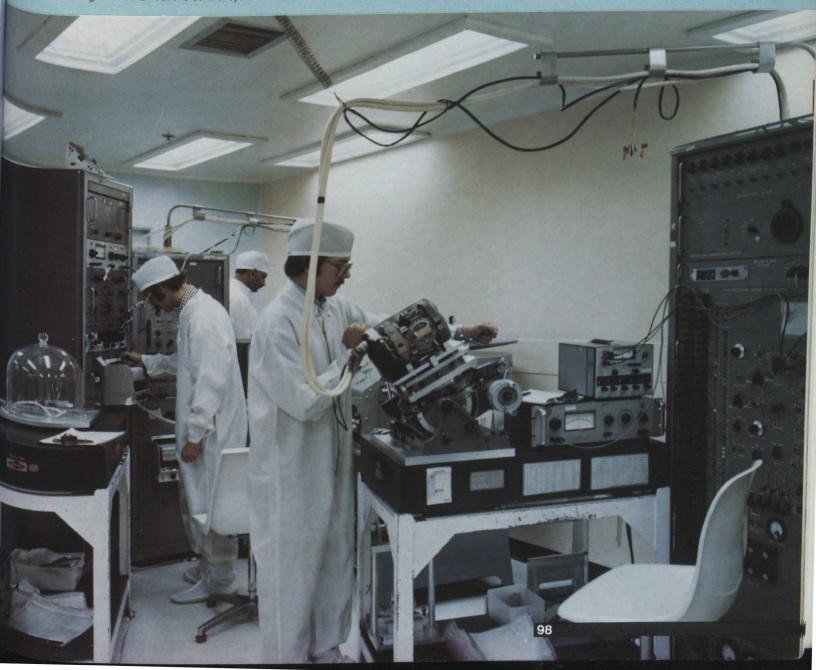
Tel: (613) 446-6011 Telex: 053-4806 TWX: 610-563-8590

The Sperry Gyroscope Division specializes in the design and manufacture of modular communications control systems, marine training simulators, time division multiplexers, gyro-stabilized horizon bars, temperature monitoring systems, aircraft navigation systems, environmental sensors and processing systems, and command and control systems to serve military and civil requirements.

The company also produces visibility measuring equipment, various cable assemblies, distortion analyzers and message test sets for telecommunication equipment and various headsets.

Sperry maintains complete facilities for the repair and overhaul of gyros, aircraft instruments, service devices and related fields. Sperry is a major supplier for the Canadian Departments of National Defence, Transport, Environment, and CN Telecommunications.

Sperry Gyroscope, "clean room" for total testing of communications control systems.



# **Sperry Univac**Defence Systems Division

200 Saulteaux Crescent Winnipeg, Manitoba, Canada R3J 3W3

Tel: (204) 888-4222 Telex: 07-55547

Sperry Univac, Defence Systems Division, is the most sophisticated electronics manufacturing facility in western Canada. Since operations began in 1977, the facility has more than quadrupled in size and employment has increased thirtyfold. Univac has the product mandate for the manufacture of the AN/UYK-502

microcomputer and the

AN/UYC-501

SHINPADS

(Shipboard

Integrated

Processing and Display System), serial data bus both key products for Canada's Department of National Defence. Univac also carries out custom work for anything from "build-to-print" assembly work through complete design, development, manufacture, test and integration of high technology products.

Printed circuit card assembly and test, coil wound assembly, product integration and final test comprise the company's manufacturing activities. The primary printed circuit board is a 200-pin multi-layer high-density board. Univac has the capability and capacity to assemble and automatically test boards of any size and complexity. Printed circuit assembly is a semi-automatic process with special care taken in the handling and control of parts sensitive to electrostatic discharge.

Temperature chambers are available which meet the complete range of military requirements and can test a total computer system. Random vibration capabilities meet the workmanship required on all new Canadian and international military procurements.

Sperry Univac provides final quality and workmanship inspections prior to final acceptance by the Department

of National Defence quality assurance representative. The facility is qualified to DND Quality Assurance Specification 1015.

The Sperry Univac AN/UYK-502 off-the-shelf, reconfigurable modular microcomputer with extensive physical and functional flexibility for wide use in defence and civil capabilities.

# SR Telecom Inc.

1415 Montée de Liesse St. Laurent, Quebec, Canada H4S 1J7 Tel: (514) 335-1210

Telex: 05-824919

The SR Telecom Subscriber Radio system provides automatic telephone service to posts throughout a region. Each system consists of a central station (usually regional headquarters) and a number of outstations located at command posts. The central station, accommodating up to 94 subscriber line circuits and 15 trunks, is connected to a telephone exchange or private automatic branch exchange (PABX). It is usually equipped with an omnidirectional antenna to serve any outstation within line-of-sight range.

Each outstation can accommodate six to 30 two-wire subscriber telephones, both pulse and dual tone multi-frequency (DTMF) operating independently from each other. A subscriber can be up to five km (three miles) from the outstation. The system can utilize special circuits, as required for data, as well as a normal telephone service.

Operational defence advantages of the system include rapid installation — the central station with antenna can be installed in one day; each outstation can be in service within 12 hours — outstations are packaged for outdoor installation. The modulation system of the radio link is inherently secure, making communication interception almost impossible.

The Subscriber Radio system operates in the 1400-1500, 1700-1900, and 2300-2500 MHz frequency bands and each network requires only two frequencies. It thus frees the 150 MHz and 450 MHz bands for mobile use. The system is designed to interface with existing exchanges and telephone sets and operates from readily available power sources -48 volts at the central station and 120/220 volts 50/60 Hz at the outstations.

The SR Telecom radio system features a new concept in low density telephone service with defence applications.



# Standard Aero Limited

Winnipeg International Airport Winnipeg, Manitoba, Canada R2R 0S8

Tel: (204) 775-9711 Telex: 07-57878

Standard Aero Limited is the largest aircraft engine overhaul facility and the largest distributor of aviation parts and products in Canada. The company was formed in 1938 and was privately owned until 1969, when it became a wholly-owned subsidiary of Federal Industries Ltd.

The company entered the turbine engine field in 1960 when awarded a contract for the overhaul of the Allison T56 engine in the Canadian Armed Forces C-130 Hercules aircraft. Since that time, Standard has expanded its turbine engine capabilities and now overhauls the Allison



501/T56 and 501K industrial engines, General Electric T58, Lycoming T53 and T55 series, AiResearch auxiliary power units, and Allison 250 series engines.

All related fuel, oil, pneumatic and electrical systems installed are overhauled at Standard Aero. In addition, a wide range of airframe components, such as wheels, brakes, actuators, valves, and hydraulic components are overhauled. Most units are stocked for immediate delivery on an exchange basis.

Standard Aero maintains sales and warehouse facilities at nine locations across Canada and abroad, in Vancouver, Edmonton, Calgary, Winnipeg, Toronto, Ottawa, Montreal, Fredericton, and London, England.

Inventory to support local airline, military and commercial operators is maintained at each branch with back-up support from the central warehouse in Winnipeg.

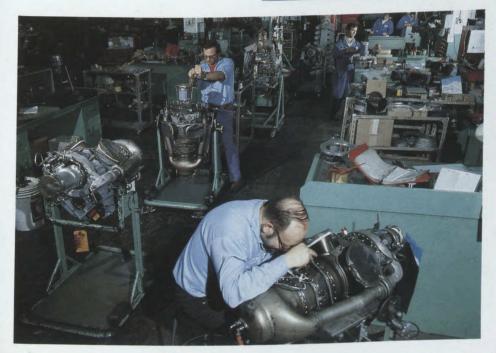
Standard Aero Limited maintains an extensive engineering and service department to provide in-plant technical assistance to all three overhaul divisions and service to customers. An extension to the engineering and service activity, the service engineers, who are specialists in various types of engines, also assist customers in performance, scheduled maintenance or trouble-shooting of engine problems wherever the customer, military or civilian, may be operating.

Recognized as a leader in turbine engine overhaul, Standard Aero's capabilities support Canadian Armed Forces, and commercial and military operators throughout the world. New tooling and equipment continues to be added to existing capabilities in this ever-changing field of aviation.

Field maintenance and troubleshooting assistance are provided to all Standard Aero customers. Turbine engine courses are available at the Winnipeg facility, or customers may be instructed at their own location.

The company also overhauls components including wheels, brakes, actuators, valves and hydraulic components. Repair and overhaul are carried out on all systems related to engines such as fuel, oil pneumatic and electrical.







# Sprung Instant Structures Ltd.

1001-10th Avenue S.W. Calgary, Alberta, Canada T2R 0B7

Tel: (403) 245-3371 Telex: 03-826590

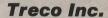


Sprung Instant Structures Ltd. is a member of the Sprung Group of Companies, which have been manufacturing since 1887. The company is now one of the largest suppliers of portable, modular, tension structures worldwide.

The structures are extensively used by military forces in many countries. Applications include barracks, mess halls, helicopter hangars and heavy armoured vehicle sheds. They are all transportable, quick to erect and dismantle and are ideally suited to virtually any military application.

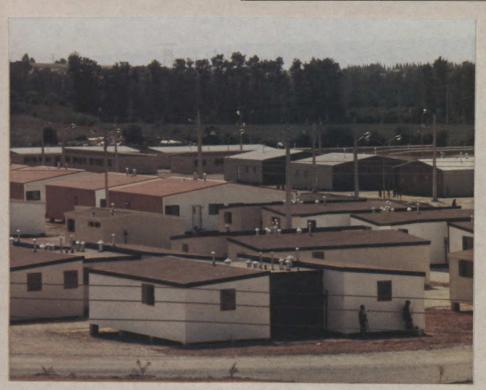
Comprehensive support and personnel training is supplied by Sprung Instant Structures Ltd., and a worldwide network of branch offices is available to ensure "instant" service.

Delivery is immediate, and a wide variety of door, window and ventilation options are available.



Siege Social St. Romuald, Quebec, Canada G6W 5M6 Tel: (418) 839-8861

Telex: 051-3303 Inwats: 1-800-463-3330



Typical Treco prefabricated housing designed for military accommodation.

Treco Inc. is an international company that constructs a wide range of prefabricated military buildings, of versatile design, many capable of housing more than 1,000 soldiers.

The company has been involved in many multi-million-dollar projects, and various defence departments around the world have been supplied with a large variety of prefabricated buildings for installation of communication equipment, military clinics, base kitchens, hospitals, stores, administration offices, hangar facilities, etc.

Treco prefab structures are particularly useful for accommodation in remote areas.

In addition, Treco manufactures furniture designed for use in military buildings, steel girders, conventional office equipment, wood processed for furniture making and laminated wood floorings used in transport industries.

# Techwest Enterprises Ltd.

3650 Wesbrook Mall Vancouver, British Columbia, Canada V6S 2L2

Tel: (604) 224-1113 Telex: 04-507748

Techwest Enterprises has achieved wide acceptance as a leader in the field of developing, designing and manufacturing custom-made cranes, hoists or winches for marine application; cable-handling systems; active, passive or active/passive motion compensation systems — with both military and commercial applications.

Techwest's reputation is based on innovative design capability, coupled with proven experience, both in design and production. Techwest cranes and hoists are used in Canada the United States, and the United Kingdom.

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The cranes or cable-handling systems usually incorporate long and fragile electro-mechanical cables. Without

usually incorporate long and fragile electro-mechanical cables. Without motion compensation, these cables would not withstand the high loads imposed by wave-induced ship

motions. Over the past several years Techwest has developed analytical techniques to predict the performance of towed systems with and without motion compensation. Mathematical models defining the vehicle. cable (with or without fairings) and the cable-handling system are regularly used. Inputs (ships, motions) may be specified for different ship headings according to customer requirements. Typically these may be sinusoidal, power spectral density functions or real-time data. Motions may be specified in any one or all six degrees of freedom.

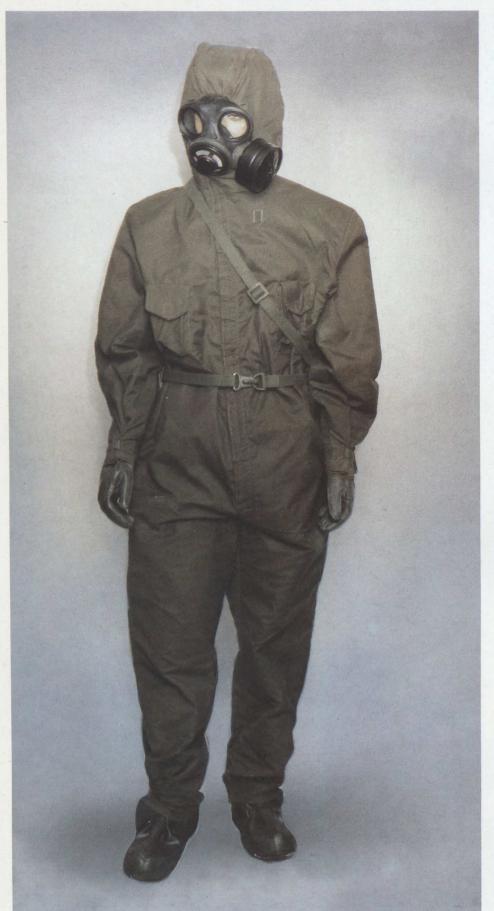
A recently delivered crane to the United States Navy included an onboard real-time micro-processor to drive the motion compensation system. Another recent program by Techwest involves a cable-handling system for Sperry Systems management in New York City, and for use by Britain's Royal Navy.



# Uniroyal Ltd.

1500 Don Mills Road Don Mills, Ontario, Canada M3B 3L4

Tel: (416) 446-5700 Telex: 06-966698 TWX: 610-492-1695



Uniroyal Ltd., through its Government Products and Development Division, has developed a unique expertise in servicing defence requirements.

At its Guelph, Ontario, research facilities, the company develops new high-technology products and manufacturing processes, with particular emphasis in the polymer chemistry, including arctic material development, chemical warfare protection, and advanced composite processing, tank track designs, and lightweight composite armour.

The research centre has developed, as an example, many new and improved plastic and elastomer products. The diversified activities of this division have produced NBC suits, military air mattresses, drone landing bags, advanced composite design and fabrication, air cushion skirts and fingers, military hose for fuel and water, and special research capability programs such as arctic materials and components, liquid polymer systems, composite materials, tank track components and lightweight ballistic armour.

Uniroyal has a long-established reputation for delivering well-researched products on time.

For further information, contact Uniroyal Ltd., Government Products and Development Division, 120 Huron Street, P.O. Box 1120, Guelph, Ontario, Canada N1H 6N3. Telephone: (519) 822-3790, or telex 069-56546.

The coverall by Uniroyal with attached hood is designed for maximum protection from chemical warfare agents, allows excellent air permeability for reduced heat stress and is launderable.

# Valcartier Industries

1010 Sherbrooke Street West (Suite 608) Montreal, Quebec, Canada H3A 2R7

Tel: (514) 282-1396 Telex: 05-24207 (IVI MTL) Cable: VALCAR (MTL)

Valcartier Industries Inc. is the sole supplier of military small arms ammunition and heavy brass cases to the Canadian Government, with military ammunition manufactured to the highest quality standards to meet all NATO specifications.

The plant facilities are fully integrated with the company foundries producing the brass, gilding metals and lead required for the manufacture of military ammunition. Military cartridge components are also available. Facilities include the necessary equipment to inspect and pack ammunition to NATO standards.

Canadian Armed Forces inspectors, resident in the plant, are available for processing and inspection of sales to foreign customers.

Valcartier is strongly committed to the development of new markets, both in Canada and overseas. The company has been particularly successful in Europe, Africa, Southeast Asia and South America. Plans for expansion around the world continue.

The company also produces a large assortment of sporting ammunition including .22 calibre rimfire ammunition, centrefire and shot-shells, sold in Canada under the Imperial brand name.



#### Valcom Ltd.

P.O. Box 603 Guelph, Ontario, Canada N1H 6L3

Tel: (519) 824-3220 Telex: 069-56593

Valcom engineers and manufactures electronic communication systems and meteorological instruments to serve both commercial and military customers.

Canada (AES) to repair its meteorological instruments. It then commenced production of radiosonde meteorological equipment for AES.

Based on its success in designing high quality sophisticated communications equipment, the firm's competence is based on an ability to

The company has established a repair and overhaul facility to refurbish equipment for the Canadian Department of National Defence. With this added capability Valcom can offer a complete products/service package consisting of design, manufacturing, refurbishment and warranty repair.

The company successfully negotiated a repair and overhaul contract with Atmospheric Environment Service of

design complex equipment that will withstand the rigours of military use for many years.

Valcom's radio frequency engineers have designed 1 and 10 kW couplers and coupler control units which, when combined with Valcom's whip antennas, are easily interfaced to various transmitters. The 1 kW coupler system operates in the 2-30 MHz frequency range, features a non-volatile amorphous memory, and is programmable to 128 bands.

Valcom's AS-2537 10.6 metre (35 foot) whip antenna designed and built to U.S. Navy requirements for shipboard use.

Directional finding antenna mounted on helicopter.

The Valcom 22.5 metre (74 foot) V33070 omnidirectional antenna.





The Valcom Fiberglass Products Division was established in 1964 to develop and manufacture a line of fibreglass whip antennas. The antennas feature a patented integral base which ensures mechanical strength and electric stability during operations under the severest conditions.

Available in sizes ranging from 10.6 to 30 metres (35 to 85 feet), these

antennas are designed to operate in the 100 kHz to 30 MHz range. Valcom is recognized as the world's leading manufacturer of high quality MF, HF, and VHF fibreglass whip antennas. The company's expertise in the areas of antenna design and manufacture has resulted in its 10.6-metre (35-foot) AS-2537 A/SR whip receiving MIL approval from the United States Navy.

The United States Navy, U.S. Coast Guard, Italian Navy and many commercial organizations specify Valcom's free-standing antennas for ground-to-air, ship-to-shore, and ship-to-ship applications. The company also supplies a wide range of custommade antenna accessories to complement its antennas.



One kilowatt digitally controlled coupler control 2-30 MHz.



ble for producing metal sub-assemblies as well as machining components and assemblies on a custom basis for defence and commercial purposes. With a fully equipped machine shop and skilled personnel, it possesses the capability to service customers whose production requirements range from several units to thousands of pieces. Strict quality standards are maintained due to a diversity of inhouse production equipment and competent production and quality assurance inspectors.

# Valcom Ltd.

P.O. Box 603 Guelph, Ontario, Canada N1H 6L3 Tel: (519) 824-3220 Telex: 069-56593

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Directional finding antenna mounted on

Valcom's AS-2537 10.6 metre (35 foot) whip The Valcom 22.5 metre (74 foot) V33070 antenna designed and built to U.S. Navy omnidirectional antenna requirements for shipboard use

Patented Inte-

grated Bases ensure strength

and dependabil-



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EES CANADIE

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From the experience gained in manufacturing its antennas, the Fiberglass Products Division's staff has developed the skill to produce other filament reinforced plastic products such as high tension insulators and extruded tubes.

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ment and competent production and

quality assurance inspectors.

Valcom's machine shop is responsi-

One kilowatt digitally controlled coupler control



# Varian Canada Inc.

45 River Drive Georgetown, Ontario, Canada L7G 2J4

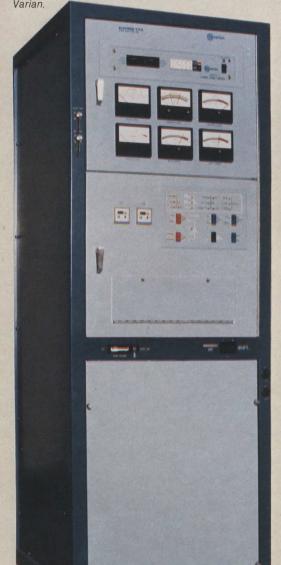
Tel: (416) 877-0161 Telex: 069-7502 TWX: 610-492-2641

A world leader in high technology millimetre wave products with a defence capability, Varian Canada has developed millimetre extended interaction oscillators (EIOs) covering frequency ranges from 18 GHz to 280 GHz with feasibility to 325 GHz. EIOs are used in a wide range of applications such as secure communications systems, radar modelling, fusion diagnostics, military radars, plasma heating, satellite communications and radio astronomy.

Travelling wave tube amplifiers, composed of a travelling wave tube and a power supply, are used in communication systems operating between 1.7 and 15.256 GHz. These medium power TWT amplifiers with modular, solid-state, switching power supplies, have a proven record of long-life service and dependability — especially in line-of-sight microwave systems.

The Varian-produced Klystron highpower amplifiers are used in satellite uplink ground stations or troposcatter systems. Available power levels up to 10 kW and frequency bands from two to 14.5 GHz permits their use in a variety of worldwide applications.

Klystron high power amplifier produced by



The Varian E10 extended interaction oscillator.



# **Vulcan Industrial Packaging Limited Explosafe Division**

414 Attwell Drive Rexdale, Ontario, Canada M9W 5C3 Tel: (416) 675-6492 Telex: 06-989378

The "Explosafe" explosion suppres-Through joint support from the Canasion system is a practical method of dian Government and United States Air Force at Wright Patterson Air protecting tanks and containers of Force Base, the Explosafe design has volatile liquids and gases from explosion caused by various sources of successfully undergone rigorous ignition. This Explosafe engineered testing to validate the effectiveness of the engineered system. system is made from heat conductive aluminum foil mesh which is designed The Explosafe design provides low to fill the interior of a fuel container initial costs, low-life-cycle costs, and and divides the area into a honeyguaranteed performance despite comb of small cells or compartments. extremes of operating temperature. It Thus, when a flammable substance in does not generate toxic fumes, the container is exposed to a source inherently suppresses static elecof ignition, the foil batt system acts tricity, is insensitive to humidity, supas a heat dissipator and limits flame presses liquid "slosh", and facilitates propagation in the container, prein-the-field weld repair of damaged venting the explosion hazard. vehicles without need for fuel cell The engineered system adds little weight to the container and displaces Explosafe is designed as a modular less than one (1) per cent of the liquid system, tailored for each application. volume. This concept allows installation by original equipment manufacturers, or installation by trained military service personnel with support from Explosafe Division technical field service personnel. Explosafe engineered system to protect tanks and other equipment from explosion.

110

# Versatile Vickers Inc.

5000 est, rue Notre Dame Montreal, Quebec, Canada H1V 2B4

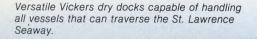
Tel: (514) 256-2651 Telex: 05-828735

Established in Canada in 1911 as a shipbuilder and ship repair firm, primarily for the Canadian Navy, Versatile Vickers is now divided into two divisions — industrial and marine.

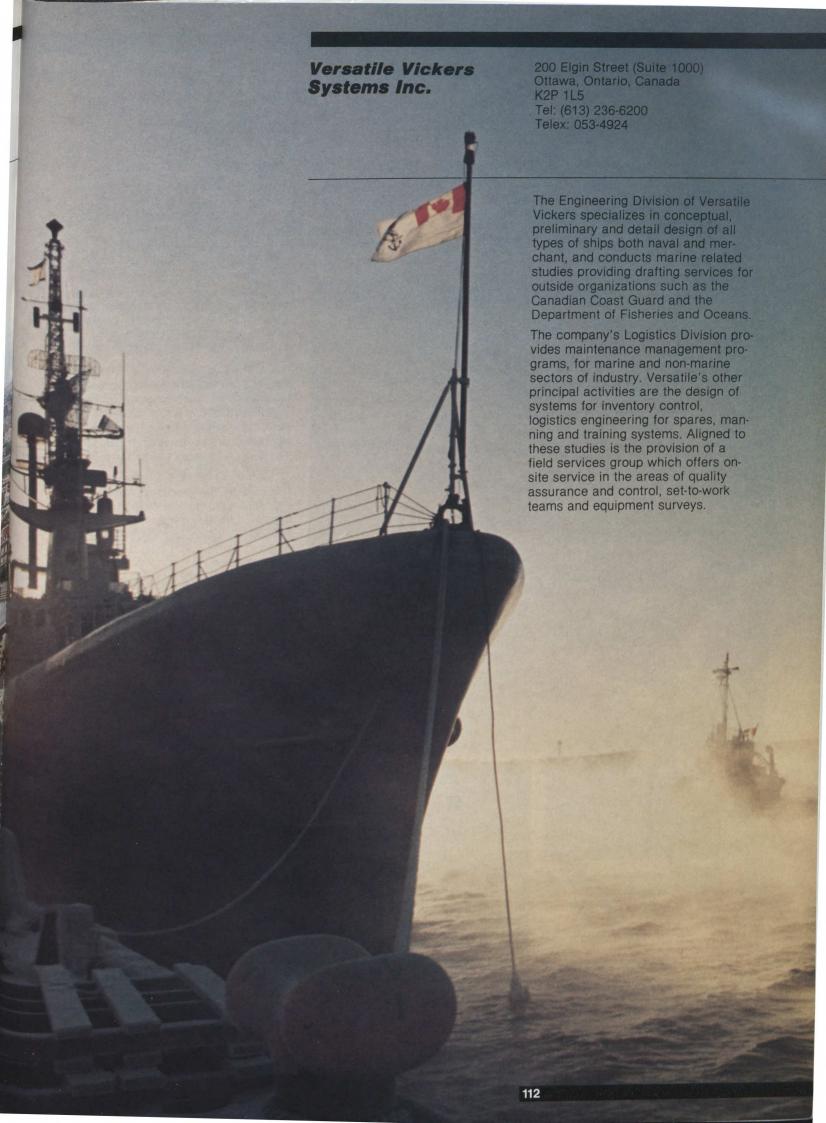
The Marine Division is engaged in repairs to both naval and commercial vessels, and is equipped with dry docks capable of handling all ships that can traverse the St. Lawrence Seaway. Some of the major defence customers are the Canadian Navy,

other NATO navies and major American shipbuilders under contract with the United States Navy.

The Industrial Division is extremely diversified in that it manufactures highly sophisticated items for both defence and industry. This division is also highly committed to nuclear energy. The principal products are CANDU calandria assemblies and their ancillary equipment. The firm's major clients are Atomic Energy of Canada and the Ontario Hydro Commission.







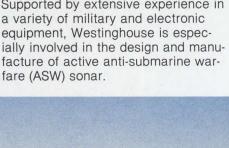
# Westinghouse Canada Inc.

777 Walkers Line P.O. Box 5009 Burlington, Ontario, Canada

Tel: (416) 528-8811 Telex: 061-8409

HS-1001 VDS with body rotating into launch position.

Supported by extensive experience in a variety of military and electronic equipment, Westinghouse is especially involved in the design and manufacture of active anti-submarine war-







HS-1000 display/control console and electronics cabinet.



**HS-1000 Series Sonar** 

The HS-1000 Series of sonars is a family of lightweight, omnidirectional ASW sonars which have been developed to give small and medium-sized naval vessels a modern sonar capability in search, detection and attack.

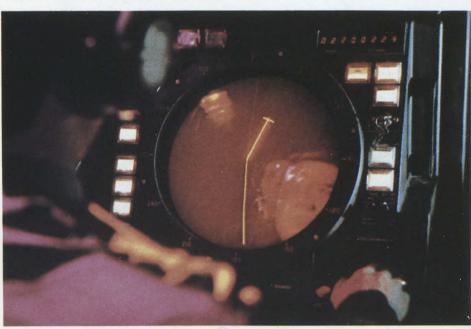
The HS-1001 is a lightweight variable depth sonar (VDS). The HS-1002 is a lightweight hull mounted sonar (HM) and the HS-1001/2 is a combined VDS/HM sonar with a single set of electronics.

The HS-1001 and the HS-1002 sonars are intended for use on patrol craft, hydrofoils and corvettes. All electronics, including receiver, transmitter, BITE, display, controls, power supplies and energy storage are contained in a single cabinet.

The HS-1007 is a medium-sized sonar available either in HM or VDS configuration featuring higher power. The HS-1007/7 is a medium-sized combined VDS/HM sonar with a single set of electronics.

The HS-1007 is intended for use on corvettes, frigates and destroyers. All electronics are identical to the HS-1001 and HS-1002 except that the transmitter is in two additional cabinets.

HS-1001 VDS at launch.



HS-1000 display.

Recognizing the many factors in the choice of anti-submarine warfare (ASW) sonar — such as oceanographic environment, the submarine threat, the ASW ship size and employment, and the sonar performance and sophistication, Westinghouse Canada offers a variety of small and mediumsized sonars capable of meeting various naval operational requirements.

# AN/SQS-505 and AN/SQS-509 Sonars

The AN/SQS-505 is a medium-sized search and attack sonar intended for use on naval vessels of 1,000 tonnes and above. It may be used in a hull mounted (HM) and/or variable depth sonar (VDS) application.

In Canadian ships, each vessel has two separate but identical AN/SQS-505s on board, one system VDS and the other HM.

Other navies have used the AN/SQS-505 in HM configurations only.

The Belgian Navy E-71 Class uses an HM configuration with a keel mounted transducer. The Royal Dutch Navy and the Greek Navy in their "S" frigate class utilize an HM configuration mounted in a bow dome.

An updated and lower frequency version, designated the AN/SQS-509 has been acquired by The Royal Netherlands Navy for its most recent "S" frigates.

#### **Sonar Test Set**

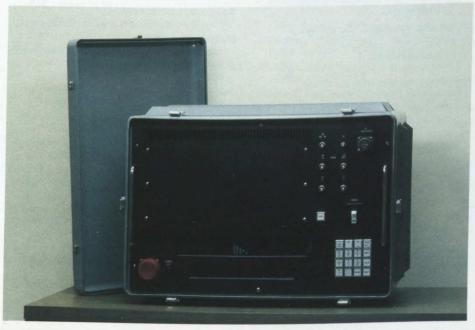
The sonar test set is a small, portable unit used to provide "simulated transducer outputs" to a sonar system, thereby permitting tests to be made which would otherwise require the use of an acoustic facility or extensive testing.

The sonar test set provides signal outputs, the amplitude and phase relationship of which are adjustable to suit the geometry and characteristics of the transducer it is simulating, in effect duplicating a planar acoustic wave striking the transducer.

The sonar test set enables measurements of horizontal beam pattern, spatial processing gain, doppler filter bank tests, fine video bearing accuracy, active detection threshold, and passive detection threshold.

AN/SQS-505 sonar and indicator group manned by a single operator.





Sonar test set.

#### **Product List**

**Acoustic processors** 

ESE Limited p 38

Acoustic transducers

C-Tech Ltd. p 32

Aerial delivery systems

Irvin Industries Canada Ltd. p 61

Air cushion vehicles

Bell Aerospace Canada Textron p 8

Air data systems, test equipment

Garrett Manufacturing Limited p 45

Airframe components
Fleet Industries p 41

Air traffic control communications

Garrett Manufacturing Limited p 45

Air traffic control systems, military Leigh Instruments Limited p 62

Air traffic control towers

Leigh Instruments Limited p 62 Skykeesh Industries Limited p 94

Air traffic control training equipment Skykeesh Industries Limited p 94

Airborne search radar

Litton Systems Canada Limited p 67

Aircraft

Canadair Limited p 13
The de Havilland Aircraft
of Canada, Limited p 35

Aircraft custom electronic systems
Northwest Industries Limited p 79

Aircraft environment control systems
Garrett Manufacturing Limited p 45

Aircraft flight and tactics simulators CAE Electronics Limited p 17

Aircraft modifications, design and fabrication

Northwest industries Limited p 79

Aircraft navigation aids calibration system
Litton Systems Canada Limited p 67

Aircraft reconnaissance cameras Ernst Leitz Canada Limited p 63

Aircraft spare parts

Patlon Aircraft and industries Ltd. p 81

Aircraft, STOL utility

The de Havilland Aircraft of Canada, Limited p 35

Airport displays, flight information Goodwood Data Systems Ltd. p 51

Air-to-ground rockets

Bristol Aerospace Limited p 11

Air-transportable communications Canadian Marconi Company p 21

Ammunition, large calibre Canadian Arsenals Limited p 15

Ammunition, small calibre

Valcartier Industries Inc. p 106

Antenna systems, D/F
Bayly EngineerIng Limited p 8

Antennas

Canadian Marconi Company p 21

Antennas, communications

\*Hermes Electronics Limited p 37 Sincialr Radio Laboratories Limited p 93 Valcom Ltd. p 107

Antennas, marine

Valcom Ltd. p 107

Armoured fighting vehicle fire control

Computing Devices Co. p 31

Armoured vehicles, wheeled

General Motors of Canada Limited p 44

Armour, body

International Uniforms Ltd. p 59

Array processors

ESE Limited p 38

Arrays, sonar

C-Tech Ltd. p 32 Westinghouse Canada Inc. p 113

Artillery computer systems
Computing Devices Co. p 31

ASW equipment

Sparton of Canada Limited p 97

**ASW** products

\*Hermes Electronics Limited p 37

ASW systems, sonar

Westinghouse Canada Inc. p 113

Automated test equipment

Litton Systems Canada Limited p 67

Automatic data link plotting system (ADLIPS)

Litton Systems Canada Limited p 67

**Aviation communications** 

Garrett Manufacturing Limited p 45

Barracks, prefabricated

Treco Inc. p 103

\*Diemaco Inc. p 37

Bathythermographs

Hermes Electronics Limited p 37

Battery level computers

Computing Devices Co. p 31

Beacons, emergency locator
Garrett Manufacturing Limited p 45

Binoculars

Ernst Leitz Canada Limited p 63

Boats, patrol

Canoe Cove Manufacturing Ltd. p 19
Ferguson industries Limited p 43

Boots, chemical warfare protective

The Acton Rubber Ltd. p1

**Bow thrusters** 

Marltime industries Ltd. p 77

Buildings, portable modular

Sprung Instant Structures Ltd. p 103

Buildings, prefabricated

Treco Inc. p 103

Bulletproof vests

International Uniforms Ltd. p 59

Buoys, acoustic

Hermes Electronics Limited p 37 Sparton of Canada Limited p 97

Cables, steel

Greening Donald Co. Ltd. p 52

Calibration system, navigation aids, automatic

Litton Systems Canada Limited p 67

**Camp stores** 

Magiine of Canada Limited p 75

\*Hermes Electronics Limited is a division of Devtek Corporation

\*Diemaco Inc. is a division of Devtek Corporation Capstans, shipboard

John T. Hepburn, Limited p 56

Cartridge cases, large calibre

Valcartier industries Inc. p 106

Cartridge components, small calibre Valcartier Industries Inc. p 106

Chaff

Hand Chemical Industries p 54

Chemical agent detection equipment Anachemia Ltd./Ltée p 3

Clothing, military, cold weather Bombardier Inc. p 9

Command and control equipment and systems, shipborne

Computing Devices Co. p 31 Litton Systems Canada Limited p 67 Sperry Univac Defence Systems Division p 99

Command and control systems
Litton Systems Canada Limited p 67

Communications control systems

Sperry incorporated
Gyroscope Division p 98

Communications engineering
Miller Communications Systems Ltd. p 76
SED Systems Inc. p 92

Communications equipment, aviation Garrett Manufacturing Limited p 45

Communications equipment, tactical Canadian Marconi Company p 21

Communications systems
Canadian Marconi Company p 21

Communications systems, microwave
Raytheon Canada Limited p 87

Communications, satellite Spar Aerospace Limited p 95

Communications, search and rescue Garrett Manufacturing Limited p 45

Compass systems, vehicular Aviation Electric Ltd. p 7

Computer systems, artillery Computing Devices Co. p 31

Computers, acoustic signal processing Computing Devices Co. p 31 ESE Limited p 38

Computers, artiliery fire control Computing Devices Co. p 31

Computer, military microprocessor Sperry Univac Defence Systems Division p 99

Containers, water and gasoline Scepter Manufacturing Co. Ltd. p 89

Control systems, aircraft environment Garrett Manufacturing Limited p 45

Converters, frequency Exide Canada inc. p 39

Cooling systems, wheeled and tracked vehicles

Levy Auto Parts Company p 65

Couplers, antenna Sinclair Radio Laboratories Limited p 93

Vaicom Ltd. p 107
Cranes and winches, marine, motion

compensated
Techwest Enterprises Ltd. p 104

Cranes, marine

Heede International Ltd. p 58

Cranes, remotely controlled

International Submarine Engineering Ltd. p 58

Cranes, shipboard

John T. Hepburn, Limited p 56 Heede International Ltd. p 58

Crash position indicators

Leigh Instruments Limited p 62

Crook sticks

Magline of Canada Limited p 75

Crystals, quartz, military specification Philips Electronics Ltd. p 83

Data links, shipboard command and control Litton Systems Canada Limited p 67

Data links, telemetry

Bristol Aerospace Limited p 11

Data systems, air, test equipment Garrett Manufacturing Limited p 45

Deck machinery, naval

John T. Hepburn, Limited p 56

Delta modulation multiplexers
Canadian Marconi Company p 21

Desalination equipment, portable and fixed Seagoid Industries Corporation p 91

Detection systems, ice Leigh instruments Limited p 62

Detectors, fog

Sperry Incorporated Gyroscope Division p 98

Devices, millimetre wave Varian Canada Inc. p 109

Digital communications equipment, tactical Canadian Marconi Company p 21

Direction finders, airborne

Rockwell International of Canada Ltd. Collins Canada Division p 88

Direction-finding equipment
Bayly Engineering Limited p 8

Display systems, projected map Computing Devices Co. p 31

Displays, airborne

Canadian Marconi Company p 21 Computing Devices Co. p 31 Litton Systems Canada Limited p 67 Optotek Limited p 79

Displays, flat panel Litton Systems Canada Limited p 67

Displays, graphic Norpak Limited p 78

Displays, light-emitting diode (LED) Litton Systems Canada Limited p 67 Optotek Limited p 79

Displays, military

Computing Devices Co. p 31 Litton Systems Canada Limited p 67 Norpak Ltd. p 78

Displays, multi-mode-matrix
Litton Systems Canada Limited p 67

Displays, pilot

Computing Devices Co. p 31

Displays, sonar C-Tech Ltd. p 32

Distance measuring equipment (DME)
Raytheon Canada Limited p 87

Domes, sonar, hull-mounted Fathom Oceanology Limited p 40 Doppler navigation systems
Canadian Marconi Company p 21

Drive propulsion units, marine
Maritime Industries Limited p 77

Drive train components and assemblies, wheeled and tracked vehicles
Levy Auto Parts Company p 65

Drones, surveillance Canadair Limited p\_13

Earth stations, satellite

Canadian Astronautics Limited p 18 Raytheon Canada Limited p 87 SED Systems Inc. p 92 Spar Aerospace Limited p 95

Electrical systems, wheeled and tracked vehicles

Levy Auto Parts Company p 65
Electronic enclosures

Rayshield Limited p 86

Electronic printers
Leigh Instruments Limited p 62

Electro-optics

Spar Aerospace Limited p 95
Emergency locator beacons

Garrett Manufacturing Limited p 45

EMI shielding Rayshield Limited p 86

Enclosures, electronic

Rayshield Limited p 86

Engine assemblies, wheeled and tracked vehicles

Levy Auto Parts Company p 65

Engine heaters

Giobal Thermoeiectric Power Systems Ltd. p 50

Engineering, communications

Milier Communications Systems Ltd. p 76

SED Systems Inc. p 92

Engines, aircraft, repair and overhaul Hawker Siddeley Canada Inc. Orenda Division p 55

Engines, diesel Rombardier inc. p 9

Engines, gas turbine
Pratt & Whitney Aircraft of Canada Ltd. p 84

Engines, marine propulsion Hewitt Equipment Ltd. p 57

Explosion suppression systems (Explosafe)
Vulcan Industrial Packaging Limited
Explosafe Division p 110

Explosive ordnance disposal (EOD) handling equipment

Pedsco Canada Ltd. p 80

Fibreglass antennas Valcom Ltd. p 107

Field radios

Canadian Marconi Company p 21

Field switchboards
Canadian Marconi Company p 21

Fire control systems, tank Computing Devices Co. p 31

Fire-fighting and rescue equipment, flight deck

DAF Indal Ltd. p 33

Fire-fighting equipment

Pedsco Canada Ltd. p 80

**Fiares** 

Hand Chemical Industries p 54

Flight crew procedure trainers

Goodwood Data Systems Ltd. p 51

Flight deck refuelling systems, helicopter DAF Indal Limited p 33

Flight Information display systems, airport Goodwood Data Systems Ltd. p 51

Flight recorders

Leigh Instruments Limited p 62

Frequency control devices

Leigh Instruments Limited p 62 Philips Electronics Ltd. p 83

Frequency converters

Exide Canada Inc. p 39

Fuel tank safety systems

Vulcan Industrial Packaging Limited Explosafe Division p 110

Gasoline-diesel conversion kits, armoured fighting vehicles Levy Auto Parts Company p 65

Generators, diesel-electric

Hewitt Equipment Ltd. p 57

Generators, electric

Aircraft Appliances and Equipment Limited p 2

Generators, thermoelectric

Global Thermoelectric Power Systems Ltd. p 50

Global positioning system (GPS)
Canadian Marconi Company 21

Gloves, chemical warfare protective The Acton Rubber Ltd. p 1

Ground effect machines

Bell Aerospace Canada Textron p 8

**Ground power equipment** 

Aircraft Appliances and Equipment Limited p 2

Gun alignment systems

Aviation Electric Ltd. p 7

Handling equipment, radioactive material Pedsco Canada Ltd. p 80

Hangars, telescoping, shipboard DAF Indal Ltd. p 33

Heaters, engine

Global Thermoelectric Power Systems Ltd. p 50

Heilcopter heating systems

Casey Copter Accessories Ltd. p 20

Helicopter horizon bars

Sperry Incorporated Gyroscope Division p 98

Helicopter Ice detection systems Leigh Instruments Limited p 62

Helicopter transmission systems Spar Aerospace Limited p 95

Hellcopter wire strike protection systems
Bristol Aerospace Limited p 11

Hermetic seals

Leigh Instruments Limited p 62

HF manpack

Rockwell International of Canada Ltd. Collins Canada Division p 88

**HF multicoupiers** 

Valcom Ltd. p 107

Hoists, shipboard

John T. Hepburn, Limited p 56

Hoses, military, water and fuel Uniroyal Ltd. p 105

Housing, prefabricated Treco Inc. p 103

**Hull-mounted sonar** 

Westinghouse Canada Inc. p 113

ice detection systems, helicopter Leigh Instruments Limited p 62

imagery, real-time

Canadair Limited p 13

improvised explosive devices handling equipment

Pedsco Canada Ltd. p80

Indicators, crash position

Leigh Instruments Limited p 62

Inertial navigation systems
Litton Systems Canada Limited p 67

Inflatable equipment

Irvin Industries Canada Limited p 61

Infra-red surveillance system, shipborne Spar Aerospace Limited p 95

Inspection systems, assembly line Diffracto Ltd. p 36

Instruments, aircraft

Canadian Marconi Company p 21 Sperry Incorporated Gyroscope Division p 98

Instruments, filght

Canadian Marconi Company p 21 Computing Devices Co. p 31

instruments, marine

Sperry Incorporated
Gyroscope Division p 98

Instruments, measuring, electro-optical Diffracto Ltd. p 36

Instruments, meteorological

Valcom Ltd. p 107

Intrusion detection systems

Computing Devices Co. p 31 Litton Systems Canada Limited p 67

IR surveillance, shipborne

Spar Aerospace Limited p 95

**JATO** rockets

Bristol Aerospace Limited p 11

Jerrycans, plastic, water and gasoline Scepter Manufacturing Co. Ltd. p 89

**Kiystrons** 

Varian Canada Inc. p 109

Landing bags

Uniroyai Ltd. p 105

LED displays

Litton Systems Canada Limited p 67 Optotek Limited p 79

Lens systems, optical and infra-red Ernst Leitz Canada Limited p 63

Lighting systems, flight deck DAF Indal Ltd. p 33

Line terminating units

Canadian Marconi Company p 21

**LORAN-C receivers** 

Internav Ltd. p 60

MAD systems

CAE Electronics Limited p 17

Magnetic anomaly detection equipment CAE Electronics Limited p 17

Map displays, moving

Computing Devices Company p 31

Marine engineering services

Scan Marine Inc. p 90

Versatile Vickers Systems Inc. p 112

Marine radar

Canadian Marconi Company p 21

Markers, marine

Hand Chemical Industries p 54

Masks, protective, NBC

Canadian Arsenals Limited p 15

Masts, radio

Canadian Marconi Company p 21

Material handling equipment

Hewitt Equipment Ltd. p57

Measurement systems, production Diffracto Ltd. p 36

Mechanical strain recorders

Leigh Instruments Limited p 62

Message switching systems
Sperry Incorporated

Gyroscope Division p 98 Goodwood Data Systems Ltd. p 51

Meteorological instruments
Valcom Ltd. p 107

Meteorological stations

Bristol Aerospace Limited p 11

Microcircuits, hybrid, military

Garrett Manufacturing Limited p 45

Microcomputers, AN/UYK-502

Sperry Univac

Defence Systems Division p 99

Military switchboards

Canadian Marconi Company p 21

Millimetre wave products

Varian Canada Inc. p 109

Moblie antennas

Sinclair Radio Laboratories Limited p 93

Modules, standard electronic

C-Tech Ltd. p 32

Motorcycles, military Bombardier Inc. p 9

Multichannel radio

Canadian Marconi Company p 21

Multicoupiers, radio

Sinclair Radio Laboratories Limited p 93 Valcom Ltd. p 107

Multiplexers, military

Canadian Marconi Company p 21

Muitiplexers, time division

Sperry Incorporated

Gyroscope Division p 98

Multiplex, tactical Canadian Marconi Company p 21

Codalex Ltd./Ltée p 30

Muiti-element arrays, sonar

C-Tech Ltd. p 32

Multi-fuel generators
Global Thermoelectric Power Systems
Ltd. p 50

Multi-mode-matrix display

uiti-mode-matrix dispiay Litton Systems Canada Limited p 67

Navai combat systems

Scan Marine Inc. p 90

Navigation aids, air traffic control Raytheon Canada Limited p 87

Navigation equipment, doppier Canadian Marconi Company p 21 Navigation equipment, land Aviation Electric Ltd. p 7

Navigation equipment, OMEGA Canadian Marconi Company p 21

**Navigation systems** 

Leigh Instruments Limited p 62 Sperry Incorporated Gyroscope Division p 98

Navigation systems, airborne Canadian Marconi Company p 21 Computing Devices Co. p 31 Internav Ltd. p 60 Litton Systems Canada Limited p 67

Navigation systems, LORAN-C Internav Ltd. p 60

Navigation systems, vehicular Aviation Electric Ltd. p 7

NAVSTAR, GPS Canadian Marconi Company p 21

**NBC** protective ciothing Uniroyal Ltd. p 105

Nuclear, biological and chemical warfare protective equipment \*NBC p 127

**OMEGA** navigation systems Canadian Marconi Company p 21

Optical character recognition equipment Leigh Instruments Limited p 62

Optical fire control equipment Ernst Leitz Canada Limited p 63

Optics, image intensifier Ernst Leitz Canada Limited p 63

Optics, laser rangefinder

Ernst Leitz Canada Limited p 63

Order wires, digitai Canadian Marconi Company p 21

Osciliators, microwave Varian Canada Inc. p 109

Pace sticks

Magline of Canada Limited p 75 **Parachutes** 

Irvin Industries Canada Ltd. p 61

Patroi boats

Canoe Cove Manufacturing Ltd. p 19 Ferguson Industries Limited p 43

Perimeter security systems Computing Devices Co. p 31 Litton Systems Canada Limited p 67

Personal locator beacons Garrett Manufacturing Limited p 45

Personnei carriers Bombardier Inc. p 9

Pianar arrays, sonar C-Tech Ltd. p 32

Plotting, command and control systems Litton Systems Canada Limited p 67

Portable shelters

Magline of Canada Limited p 75

Positioning systems, ship Maritime Industries Ltd. p 77

Power sources Exide Canada Inc. p 39

Power supplies Varian Canada Inc. p 109

Power supplies, no-break Exide Canada Inc. p 39

Power supplies, thermoelectric

Global Thermoelectric Power Systems Ltd. p 50

Power supplies, uninterruptible Exide Canada Inc. p 39

Printers, dot matrix

Leigh Instruments Limited p 62

Printers, electronic

Leigh Instruments Limited p 62

Printers, electro-mechanicai Leigh Instruments Limited p 62

Procedures trainers Goodwood Data Systems Ltd. p 51

Processors, array ESE Limited p 38

Processors, Imagery ESE Limited p 38

Processors, radar ESE Limited p 38

Processors, video ESE Limited p 38

Processors, visual data Norpak Ltd. p 78

Propeilers, controllable, fixed pitch, marine Maritime Industries Ltd. p 77

Protective ciothing, NBC Uniroyal Ltd. p 105

**Pyrotechnics** Hand Chemical Industries p 54

Quartz crystais Philips Electronics Ltd. p83

Radar processors ESE Limited p 38

Radar receivers Spar Aerospace Limited p 95

Radar, air search Canadian Marconi Company p 21

Radar, helicopter Canadian Marconi Company p 21

Radar, marine Canadian Marconi Company p 21

Radar, navigation Canadian Marconi Company p 21

Radar, air traffic controi Raytheon Canada Limited p 87

Radar, airborne surveillance Litton Systems Canada Limited p 67

Radar, maritime aviation Litton Systems Canada Limited p 67

Radar, search, airborne Litton Systems Canada Limited p 67

Radar, shipborne surveillance Canadian Marconi Company p 21

Radar, synthetic aperture

Canadian Astronautics Limited p 18 Radar, vessei traffic management

Leigh Instruments Limited p 62

Radar, weather Goodwood Data Systems Ltd. p 51

Radiation detection equipment R-Metrics Ltd. p 85

\*Note: The Canadian NBC catalogue listing the complete range of equipment is available from the Canadian Trade Office in your country.

Radio antennas

Sinclair Radio Laboratories Limited p 93

Radio communications systems, field army Canadian Marconi Company p 21

Radio communications systems, microwave Canadian Marconi Company p 21 Raytheon Canada Limited p 87 SR Telecom Inc. p 100

Radio direction finding systems, mobile Bayly Engineering Limited p 8

Radio muiticoupiers

Sinclair Radio Laboratories Limited p 93 Valcom Limited p 107

Radio reiay, tacticai Canadian Marconi Company p 21

Radios, air traffic controi Garrett Manufacturing Limited p 45

Radios, ionospheric sounding

Hermes Electronics Limited p 37 Radios, manpack

Rockwell International of Canada Ltd. Collins Canada Division p 88

Radios, military Rockwell International of Canada Ltd. Collins Canada Division p 88

Radios, muitichannei Canadian Marconi Company p 21

Radios, single-channel Canadian Marconi Company p 21

Real-time imagery Canadair Limited p 13

Receivers, radar Spar Aerospace Limited p 95

Recorders, airframe strain Leigh Instruments Limited p 62

Leigh instruments Limited p 62 Recorders, flight incident

Recorders, cockpit voice

Leigh Instruments Limited p 62

Recorders, mechanicai strain Leigh Instruments Limited p 62

Refueiling systems, flight deck, helicopter DAF Indal Ltd. p 33

Remote handling equipment, explosive

Pedsco Canada Ltd. p 80 Remote manipulation systems

Spar Aerospace Limited p 95

Remote subscriber access communications systems

SR Telecom Inc. p 100 Remotely piloted vehicles

Canadair Limited p 13

Repair and overhaul, aircraft Northwest Industries Limited p 79

Repair and overhaul, aircraft electrical systems

Aircraft Appliances and Equipment Limited p 2

Repair and overhaul, aircraft engines Hawker Siddeley Canada Inc. Orenda Division p 55

Pratt & Whitney Aircraft of Canada Ltd. p 84 Repair and overhaul, aircraft instruments

and accessories Aviation Electric Ltd. p 7 Spar Aerospace Limited p 95

Repair and overhaul, gearboxes, constant speed drives

Spar Aerospace Limited p 95

Repair and overhaul, helicopters Bristol Aerospace Limited p 11 Deltaire Industries Ltd. p 36

Repair and overhaul, ship Ferguson Industries Limited p 43

Repair and overhaul, small arms Diemaco Inc. p 37

Repair and overhaul, aircraft engines Standard Aero Limited p 101

Repair and overhaul, aircraft wheels and hydraulic components Standard Aero Limited p 101

Replenishment at sea systems John T. Hepburn, Limited p 56

RFI shielding, architectural Rayshield Limited p 86

Rocket containers
Magline of Canada Limited p 75

Rocket, air-to-ground

Bristol Aerospace Limited p 11

Rockets, JATO
Bristol Aerospace Limited p 11

Rockets, research, high altitude Bristol Aerospace Limited p 11

Rope, steel wire Greening Donald Co. Ltd. p 52

RPVs

Canadair Limited p 13
Safety equipment

Irvin Industries Canada Ltd. p 61

SARSAT SED Systems Inc. p 92

SATCOM earth terminals
Raytheon Canada Limited p 87
SED Systems Inc. p 92
Spar Aerospace Limited p 95

Satellite communication equipment and components

SED Systems Inc., p. 92

SED Systems Inc. p 92 Spar Aerospace Limited p 95

Satellite communications engineering Canadian Astronautics Limited p 18

Satellite earth stations

Canadian Astronautics Limited p 18 Raytheon Canada Limited p 87 SED Systems Inc. p 92 Spar Aerospace Limited p 95

Seals, hermetic

Leigh instruments Limited p 62

Search and rescue communications
Garrett Manufacturing Limited p 45

Search and rescue equipment
Canadian Astronautics Limited p 18
Garrett Manufacturing Limited p 45
SED Systems Inc. p 92

Security systems and components
Computing Devices Co. p 31
Litton Systems Canada Limited p 67
Sparton of Canada Limited p 97

Security systems, perimeter Computing Devices Co. p 31

SEMs, navai C-Tech Ltd. p 32

Sensors, acoustic marine Hermes Electronics Limited p 37 **Sheiters** 

Sprung Instant Structures Ltd. p 103

Sheiters, prefabricated Treco Inc. p 103

Shielded enclosures
Rayshield Limited p 86

Ship construction

Burrard Yarrows Corporation p 12
Davie Shipbuilding Limited p 34
Halifax Industries Limited p 53
Marine Industries Limited p 76
Saint John Shipbuilding & Dry Dock Co.
Ltd. p 89

Ship integrated processing and display system (SHINPADS)

Sperry Univac Defence Systems Division p 99

Ship repair and overhaui

Burrard Yarrows Corporation p 12
Davie Shipbuilding Limited p 34
Halifax Industries Limited p 53
Marine Industries Limited p 76
Saint John Shipbuilding & Dry Dock Co.
Ltd. p 89
Versatile Vickers Inc. p 111

Shipboard antennas Valcom Ltd. p 107

Shipborne displays
Computing Devices Co. p 31

Shipborne helicopter hauldown and securing systems

DAF Indal Ltd. p 33

Signal processing engineering
Miller Communications Systems Ltd. p 76

Simulators, airburst, NBC Hand Chemical Industries p 54

Simulators, aircraft flight and tactics CAE Electronics Limited p 17

Simulators, flight procedures Goodwood Data Systems Ltd. p 51

Simulators, groundburst, NBC Hand Chemical Industries p 54

Simulators, training, diesel engine Sperry Incorporated Gyroscope Division p 98

Small arms weapons and components Diemaco Inc. p 37

Snowmobiles

Bombardier Inc. p 9

Snowshoes, military Magline of Canada Limited p 75

Sonar displays C-Tech Ltd. p 32

Sonar equipment
Fleet Industries p 41

Sonar systems
Westinghouse Canada inc. p 113

Sonar, beam-mapping
International Submarine Engineering

Ltd. p 58

Sonar, shipborne
C-Tech Ltd. p 32
Westinghouse Canada Inc. p 113

Sonobuoys
Hermes Electronics Limited p 37

Sonobuoys, active and passive Sparton of Canada Limited p 97

Spacecraft
Spar Aerospace Limited p 95

Spacecraft components Varian Canada Inc. p 109

Spectacles, combat AOCO Limited/Limitée p 6

Standard electronic modules, naval C-Tech Ltd. p 32

STOL aircraft

The de Havilland Aircraft of Canada, Limited p 35

Structures, portable modular Sprung Instant Structures Ltd. p 103

Structures, prefabricated Treco Inc. p 103

Surveillance drones Canadair Limited p 13

Surveillance systems, airborne Canadair Limited p 13

Survelliance systems, IR
Spar Aerospace Limited p 95

Surveillance systems, perimeter Computing Devices Co. p 31

**Survival equipment, desailnation** Seagold Industries Corporation p 91

Switchboards, military Canadian Marconi Company p 21

Switchboards, tactical Canadian Marconi Company p 21

Systems procedures trainer
Goodwood Data Systems Ltd. p 51

Systems, command and control Litton Systems Canada Limited p 67

Systems, communications control Goodwood Data Systems Ltd. p 51 Sperry Incorporated Gyroscope Division p 98

Systems, gauging Diffracto Ltd. p 36

TACAN
Leigh Instruments Limited p 62

TACAN calibration
Litton Systems Canada Limited p 67

Tactical communications equipment Canadian Marconi Company p 21

Tactical transport aircraft
The de Havilland Aircraft of Canada,
Limited p 35

Tank fire control systems
Computing Devices Co. p 31

Telemetry systems
Bristoi Aerospace Limited p 11

**Telemetry, satelite** SED Systems Inc. p 92

Telephone centrals, remote subscriber access

SR Telecom inc. p 100

Temperature control systems
Garrett Manufacturing Limited p 45.

Tentage hardware, magnesium and aluminum

Magline of Canada Limited p 75

Terminai, telegraph-telephone
Codalex Ltd./Ltée p 30

Test equipment automated
Litton Systems Canada Limited p 67
SED Systems Inc. p 92

Test equipment, sonar Westinghouse Canada Inc. p 113 **Thunderflashes** 

Hand Chemical Industries p 54

Towed acoustic systems, anti-submarine

Fathom Oceanology Limited p 40

Towed acoustic systems, mine counter measures

Fathom Oceanology Limited p 40

Towed sonar

Westinghouse Canada Inc. p 113

Towers, air traffic control Leigh Instruments Limited p 62 Skykeesh Industries Limited p 94

Track pads, armoured vehicle Uniroyal Ltd. p 105

Trainers, flight procedures Goodwood Data Systems Ltd. p 51

Training equipment, communications and air traffic control

Skykeesh Industries Limited p 94

Transducers, acoustic C-Tech Ltd. p 32

Transmission components and assemblies, wheeled and tracked vehicles Levy Auto Parts Company p 65

Traveiling wave tubes Varian Canada Inc. p 109

Trucks, cargo Bombardier Inc. p 9

**Underwater vehicles** International Submarine Engineering Ltd. p 58

Uninterruptible power supplies Exide Canada Inc. p 39

Variable depth sonar Westinghouse Canada Inc. p 113

Vehicles, air cushion Bell Aerospace Canada Textron p 8

Vehicles, ali-terrain Bombardier Inc. p 9

Vehicles, off-highway, heavy duty Canadian Foremost Ltd. p 19 Pacific Truck and Trailer Ltd. p 80

Vessel traffic management systems Leigh Instruments Limited p 62

Vests, builetproof International Uniforms Ltd. p 59

Video processors ESE Limited p 38

Videotex systems, Telidon Norpak Ltd. p 78

VLF/OMEGA navigation equipment Canadian Marconi Company p 21

**VOR VHF omni-range** Raytheon Canada Limited p 87

Warship construction

Burrard Yarrows Corporation p 12 Davie Shipbuilding Limited p 34 Halifax Industries Limited p 53 Marine Industries Limited p 76 Saint John Shipbuilding & Dry Dock Co. Ltd. p 89

Warship design

Saint John Shipbuilding & Dry Dock Co. Ltd. p 89 Scan Marine Inc. p 90 Versatile Vickers Inc. p 111

Warship repair and overhaul

Burrard Yarrows Corporation p 12 Davie Shipbuilding Limited p 34 Halifax Industries Limited p 53 Marine Industries Limited p 76 Saint John Shipbuilding & Dry Dock Co. Ltd. p 89

Versatile Vickers Inc. p 111

Water cannon Pedsco Canada Ltd. p 80

Weather radar

Goodwood Data Systems Limited p 51

Wheeled vehicles, tactical General Motors of Canada Limited p 44

Winches, remotely controlled International Submarine Engineering Ltd. p 58

Winches, shipboard John T. Hepburn, Limited p 56

Winch, electric, aerospace Heede International Ltd. p 58

Wire Greening Donald Co. Ltd. p 52

Wire strike protection systems, helicopter Bristol Aerospace Limited p 11

# Company List

#### The Acton Rubber Ltd.

Boots, chemical warfare protective Gloves, chemical warfare protective

#### Aircraft Appliances and Equipment Limited

Generators, electric Ground power equipment Repair and overhaul, aircraft electrical systems

#### Anachemia Ltd./Ltée

Chemical agent detection equipment Detection equipment, chemical agent

#### Aoco Limited/Limitée

Spectacles, combat

#### Aviation Electric Ltd.

Compass systems, vehicular Gun alignment systems Navigation equipment, land Navigation systems, vehicular Repair and overhaul, aircraft instruments and accessories

#### **Bayly Engineering Limited**

Antenna systems, D/F Direction-finding equipment Radio direction-finding systems, mobile

#### **Bell Aerospace Canada Textron**

Air cushion vehicles Ground effect machines Vehicles, air cushion

#### Bombardier inc.

Clothing, military, cold weather Engines, diesel Motorcycles, military Personnel carriers Trucks, cargo Snowmobiles Vehicles, all-terrain

## **Bristol Aerospace Limited**

Air-to-ground rockets Data links, telemetry Helicopter wire strike protection systems JATO rockets Meteorological stations Repair and overhaul, helicopters Rockets, JATO Rockets, air-to-ground Rockets, research, high altitude Telemetry systems Wire strike protection systems, helicopter

#### **Burrard Yarrows Corporation**

Ship construction Ship repair and overhaul Warship construction Warship repair and overhaul

#### **CAE Electronics Limited**

Aircraft flight and tactics simulators MAD systems Magnetic anomaly detection equipment Simulators, aircraft flight and tactics

#### Canadair Limited

Aircraft Drones, surveillance Real-time imagery Remotely piloted vehicles Surveillance drones Surveillance systems, airborne

#### Canadian Arsenals Limited

Ammunition, large calibre Gas masks, NBC Masks, protective, NBC

#### **Canadian Astronautics Limited**

Earth stations, satellite Radar, synthetic aperture Satellite communications engineering Satellite earth stations Search and rescue equipment Systems, satellite

#### Canadian Foremost Ltd.

Vehicles, off-highway, heavy duty

#### Canadian Marconi Company

Air-transportable communications Antennas Communications equipment, tactical Communications systems Delta modulation multiplexers Digital communications equipment, tactical Displays, airborne Doppler navigation systems Field radios Field switchboards Global positioning system (GPS) Instruments, aircraft Instruments, flight Line terminating units Marine radar Masts, radio Military switchboards Multichannel radio Multiplexers, military Multiplex, tactical Navigation equipment, Doppler

Navigation equipment, OMEGA Navigation systems, airborne NAVSTAR,GPS OMEGA navigation systems Order wires, digital Radar, air search Radar, helicopter Radar, marine Radar, navigation Radar, shipborne surveillance Radio communications systems, field army Radio communications systems, microwave Radio relay, tactical Radios, multichannel Radios, single-channel

### Canoe Cove Manufacturing Ltd.

Tactical communications equipment

VLF/OMEGA navigation equipment

Patrol boats

# Casey Copter Accessories Ltd.

Switchboards, military

Switchboards, tactical

Helicopter heating systems

#### Codalex Ltd./Ltée

Multiplex, tactical Terminal, telegraph-telephone

Computing Devices Co. Artillery computer systems Battery level computers Command and control equipment and systems, shipborne Computer systems, artillery Computers, acoustic signal processing Computers, artillery fire control Display systems, projected map Displays, airborne Displays, military Displays, pilot
Armoured fighting vehicle fire control systems Fire control systems, tank Instruments, flight Intrusion detection systems

Map displays, moving Navigation systems, airborne Perimeter security systems Security systems and components Security systems, perimeter Shipborne displays Surveillance systems, perimeter

Tank fire control systems

#### C-Tech Ltd.

Acoustic transducers Arrays, sonar Displays, sonar Modules, standard electronic Multi-element arrays, sonar Planar arrays, sonar SEMs, naval Sonar displays Sonar, shipborne Standard electronic modules, naval Transducers, acoustic

#### DAF indai Ltd.

Fire-fighting and rescue equipment, flight deck Flight deck refuelling systems, helicopter Hangars, telescoping, shipboard Lighting systems, flight deck Shipborne helicopter hauldown and securing systems Refuelling systems, flight deck, helicopter

### **Davie Shipbullding Limited**

Ship construction Ship repair and overhaul Warship construction Warship repair and overhaul

#### The de Havilland Aircraft of Canada, Limited

Aircraft, STOL utility STOL aircraft Tactical transport aircraft

#### Deltaire industries Ltd.

Repair and overhaul, helicopter

#### \*Diemaco inc.

Barreis, small arms, cold forged Repair and overhaul, small arms Small arms weapons and components

#### Diffracto Ltd.

Inspection systems, assembly line Instruments, measuring, electro-optical Measurement systems, production Systems, gauging

#### \*Diemaco Inc. is a division of Devtek Corporation

#### **ESE Limited**

Acoustic processors Array processors Computers, acoustic signal processing Processors, array Processors, imagery Processors, radar Processors, video Radar processors Video processors

#### Exide Canada inc.

Converters, frequency Frequency converters Power sources Power supplies, no-break Uninterruptible power supplies

#### Fathom Oceanology Limited

Domes, sonar, huil-mounted Deck machinery, naval Towed acoustic systems, mine counter measures Towed acoustic systems, anti-submarine warfare

#### Ferguson industries Limited

Boats, patrol Patrol boats Repair and overhaul, ship

#### Fleet industries

Airframe components Sonar equipment

#### **Garrett Manufacturing Limited**

Air data systems test equipment Air traffic control communications Aircraft environment control systems Aviation communications Beacons, emergency locator Communications equipment, aviation Communications, search and rescue Control systems, aircraft environment Data systems, air, test equipment Emergency locator beacons Microcircuits, hybrid, military Personal locator beacons Radios, air traffic control Search and rescue communications Search and rescue equipment Temperature control systems

# General Motors of Canada Limited

Armoured vehicles, wheeled Wheeled vehicles, tactical

### Global Thermoelectric Power Systems Ltd.

Engine heaters Generators, thermoelectric Heaters, engine Muiti-fuei generators Power supplies, thermoelectric

#### Goodwood Data Systems Ltd.

Airport displays, flight information Flight crew procedure trainers Flight information display systems, airport Message switching systems Procedures trainers Radar, weather Simulators, flight procedures Systems procedures trainer Systems, communications control Trainers, flight procedures Weather radar

#### Greening Donald Company Ltd.

Cables, steel Rope, steel wire Wire

#### Hailfax industries Limited

Ship construction Ship repair and overhaul Warship construction Warship repair and overhaul

#### **Hand Chemical Industries**

Chaff Flares Markers, marine **Pyrotechnics** Simulators, airburst, NBC Simulators, groundburst, NBC Thunderflashes

#### Hawker Siddeley Canada inc. Orenda Division

Engines, aircraft, repair and overhaul Repair and overhaul, alreraft engines

#### Heede international Ltd.

Cranes, marine Cranes, shipyard Winch, electric, aerospace

#### John T. Hepburn, Limited

Capstans, shipboard Hoists, shipboard Cranes, shipboard Deck equipment Replenishment at sea systems Winches, shipboard

## \*Hermes Electronics Limited

Antennas, communications ASW products Bathythermographs Buoys, acoustic Radios, ionospheric sounding Sensors, acoustic marine Sonobuoys

#### Hewitt Equipment Ltd.

Engines, marine propulsion Generators, diesel-electric Material handling equipment

# international Submarine Engineering Ltd.

Cranes, remotely controlled Sonar, beam-mapping Winches, remotely controlled Underwater vehicles

#### international Uniforma Ltd.

Armour, body Bulletproof vests Vests, bulletproof

#### Internay Ltd.

LORAN-C receivers Navigation systems, airborne Navigation systems, LORAN-C

## irvin industries Canada Ltd.

Aerial delivery systems Inflatable equipment Parachutes Safety equipment

<sup>\*</sup>Hermes Electronics Limited is a division of Devtek Corporation

Leigh Instruments Limited

Air traffic control systems, military Air traffic control towers Crash position indicators Detection systems, ice

Electronic printers Flight recorders

Frequency control devices

Helicopter ice detection systems

Hermetic seals

Ice detection systems, helicopter

Indicators, crash position

Mechanical strain recorders

Navigation systems

Optical character recognition equipment

Printers, dot matrix Printers, electronic

Printers, electro-mechanical

Radar, vessel traffic management

Recorders, airframe strain

Recorders, cockpit voice

Recorders, flight incident

Recorders, mechanical strain

Seals, hermetic

**TACAN** 

Towers, air traffic control

Vessel traffic management systems

#### **Ernst Leitz Canada Limited**

Aircraft reconnaissance cameras Binoculars

Lens systems, optical and infra-red

Optics, image intensifier Optical fire control equipment

Optics, laser rangefinder

#### Levy Auto Parts Company

Drive train components and assemblies, wheeled and tracked vehicles

Cooling systems, wheeled and tracked vehicles

Electrical systems, wheeled and tracked vehicles

Engine assemblies, wheeled and tracked

Gasoline-diesel conversion kits, armoured fighting vehicles

Transmission components and assemblies wheeled and tracked vehicles

#### Litton Systems Canada Limited

Airborne search radar

Aircraft navigation aids calibration system

Automated test equipment

Automatic data link plotting system (ADLIPS) Calibration system, navigation aids,

automatic Command and control equipment and

systems, shipborne

Command and control systems

Data Ilnks, shipboard command and control

Displays, airborne Displays, flat panel

Displays, light-emitting diode (LED)

Displays, military Displays, multi-mode-matrix

Inertial navigation systems

Intrusion detection systems

LED displays

Multi-mode-matrix display

Navigation systems, airborne

Perimeter security systems

Plotting, command and control systems

Radar, maritime aviation

Radar, airborne surveillance

Radar, search, airborne

Security systems and components TACAN calibration

Test equipment, automated

#### Magline of Canada Limited

Camp stores

Crook sticks

Pace sticks

Portable shelters

Rocket containers

Snowshoes, military

Tentage hardware, magnesium and aluminum

#### Marine industries Limited

Ship construction

Ship repair and overhaul

Warship construction

Warship repair and overhaul

#### Maritime Industries Ltd.

Bow thrusters

Drive propulsion units, marine

Positioning systems, ship

Propellers, controllable, fixed pitch, marine

### Miller Communications Systems Ltd.

Communications engineering Engineering, communications Signal processing engineering

#### \*NBC

Nuclear, biological and chemical warfare protective equipment

#### Norpak Ltd.

Displays, graphic

Displays, military

Processors, visual data

Videotex systems, Telidon

#### Northwest Industries Limited

Aircraft custom electronic systems Aircraft modifications, design and fabrication Repair and overhaul, aircraft

#### Optotek Limited

Displays, airborne

Displays, light-emitting diode (LED)

# Pacific Truck and Trailer Ltd.

Vehicles, off-highway, heavy duty

### Pation Aircraft and Industries Ltd.

Aircraft spare parts Pedsco Canada Ltd.

#### Explosive ordnance disposal (EOD) handling equipment

Fire-fighting equipment

Handling equipment, radioactive material Improvised explosive devices handling

eauipment

Remote handling equipment, explosive

devices Water cannon

#### Philips Electronics Ltd.

Crystals, quartz, military specification Quartz crystals

#### \*Note: The Canadian NBC catalogue listing the complete range of equipment is available from the Canadian Trade Office in your country.

#### Pratt & Whitney Aircraft of Canada Ltd.

Engines, gas turbine

Repair and overhaul, aircraft engines

#### R-Metrics Ltd.

Radiation detection equipment

# Rayshleid Limited

Electronic enclosures

EMI shielding

Enclosures, electronic

RFI shielding, architectural

Shielded enclosures

# Raytheon Canada Limited

Communications systems, microwave

DME distance measuring equipment

Earth stations, satellite

Navigation aids, air traffic control Radar, air traffic control

Radio communications systems, microwave

SATCOM earth terminals

Satellite earth stations

#### VOR VHF omni-range Rockwell international of Canada Ltd.

# Collins Canada Division

Direction finders, airborne

HF manpack

Radios, manpack Radios, military

#### Saint John Shipbuilding & Dry Dock Co. Ltd.

Ship construction

Ship-repair and overhaul

Warship construction Warship repair and overhaul

Warship design

# Scan Marine Inc.

Naval combat systems design Ship propulsion systems design

# Warship design

Scepter Manufacturing Co. Ltd. Containers, water and gasoline

# Jerrycans, plastic, water and gasoline

Seagoid industries Corporation Desalination equipment, portable and fixed

# Survival equipment, desalination

SED Systems inc.

Communications engineering Earth stations, satellite

Engineering, communications SÄRSAT

SATCOM earth terminals

Satellite communication equipment and components

Satellite earth stations

Search and rescue equipment Telemetry, satellite

#### Test equipment, automated Sinclair Radio Laboratories Limited

Antennas, communications

Couplers, antenna

Mobile antennas Multicouplers, radio

Radio antennas Radio multicouplers

#### Skykeesh Industries Limited

Air traffic control towers
Air traffic control training equipment
Towers, air traffic control
Training equipment, communications and
air traffic control

#### Spar Aerospace Limited

Communications, satellite Earth stations, satellite Electro-optics Helicopter transmission systems Infra-red surveillance system, shipborne IR surveillance, shipborne Radar receivers Remote manipulation systems Repair and overhaul, aircraft instruments and accessories Repair and overhaul, gearboxes, constant speed drives SATCOM earth terminals Satellite communications equipment and components Satellite earth stations Spacecraft Surveillance systems, IR Systems, satellite

#### Sparton of Canada, Limited

ASW equipment
Buoys, acoustic
Security systems and components
Sonobuoys, active and passive

#### Sperry Incorporated Gyroscope Division

Communications control systems
Detectors, fog
Helicopter horizon bar
Instruments, aircraft
Instruments, marine
Message switching system
Multiplexers, time division
Navigation systems
Simulators, training, diesel engine
Systems, communications control

# Sperry Univac

# Defence Systems Division

Command and control equipment and systems, shipborne Computer, military microprocessor Microcomputers, AN/UYK-502 Military computer systems Ship integrated processing and display system (SHINPADS)

#### Sprung Instant Structures Ltd.

Buildings, portable modular Shelters Structures, portable modular

#### SR Telecom Inc.

Radio communications systems, microwave Remote subscriber access communications systems

Telephone centrals, remote subscriber access

#### Standard Aero Limited

Repair and overhaul, aircraft engines Repair and overhaul, aircraft wheels and hydraulic components

#### Techwest Enterprises Ltd.

Cranes and winches, marine, motion compensated

#### Treco Inc.

Barracks, prefabricated Buildings, prefabricated Housing, prefabricated Shelters, prefabricated Structures, prefabricated

#### Uniroyal Ltd.

Hoses, military, water and fuel Landing bags NBC protective clothing Track pads, armoured vehicle

#### Valcartier Industries Inc.

Ammunition, small calibre Cartridge cases, large calibre Cartridge components, small calibre

#### Valcom Ltd.

Antennas, communications Antennas, marine Couplers, antenna Fibreglass antennas HF multicouplers Meteorological instruments Multicouplers, radio Shipboard antennas

#### Varian Canada Inc.

Devices, millimetre wave Klystrons Millimetre wave products Oscillators, microwave Power supplies Spacecraft components Travelling wave tubes

#### Versatile Vickers Inc.

Ship construction Ship design Ship repair and overhaul Warship design Warship repair and overhaul

# Versatile Vickers Systems Inc.

Marine engineering services

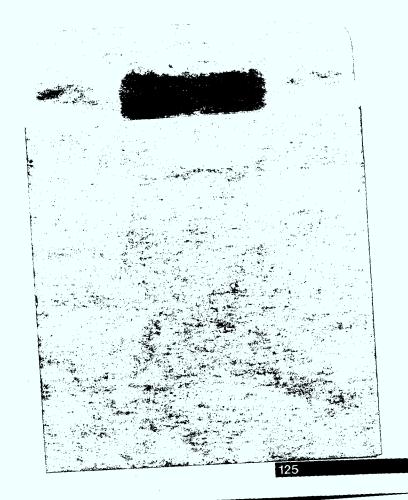
#### Vulcan Industrial Packaging Limited Explosafe Division

Explosion suppression systems (Explosafe) Fuel tank safety systems

#### Westinghouse Canada Inc.

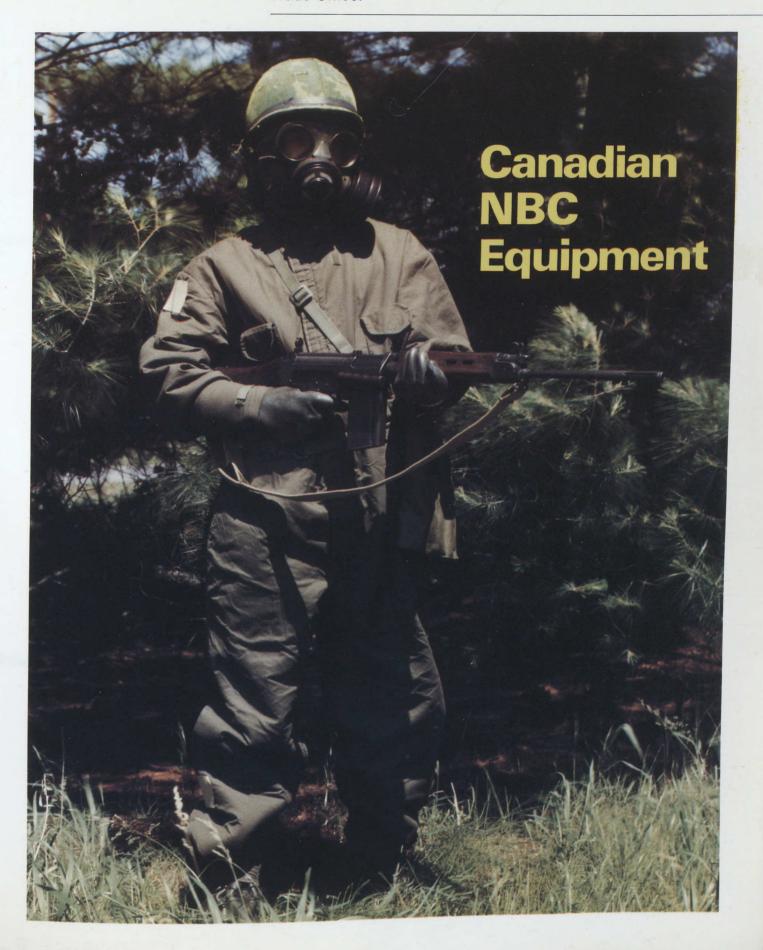
Arrays, sonar ASW systems, sonar Hull-mounted sonar Sonar systems Sonar, shipborne Test equipment, sonar Towed sonar Variable depth sonar UF535/.C2/A53312 Canada. Dept. of Industry, Canadian defence products guide. APBE c. 1 aa ISTC

notes



Brochure on Canadian nuclear, biological and chemical (NBC) protective equipment available from your nearest Canadian Trade Office.







For further information on the Canadian Defence Products Industry please contact:

Defence Programs
Department of External Affairs
L. B. Pearson Building
125 Sussex Drive
Ottawa, Canada
K1A 0G2

or your nearest Canadian Trade Office



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