

Canadian production of nuclear weapons components

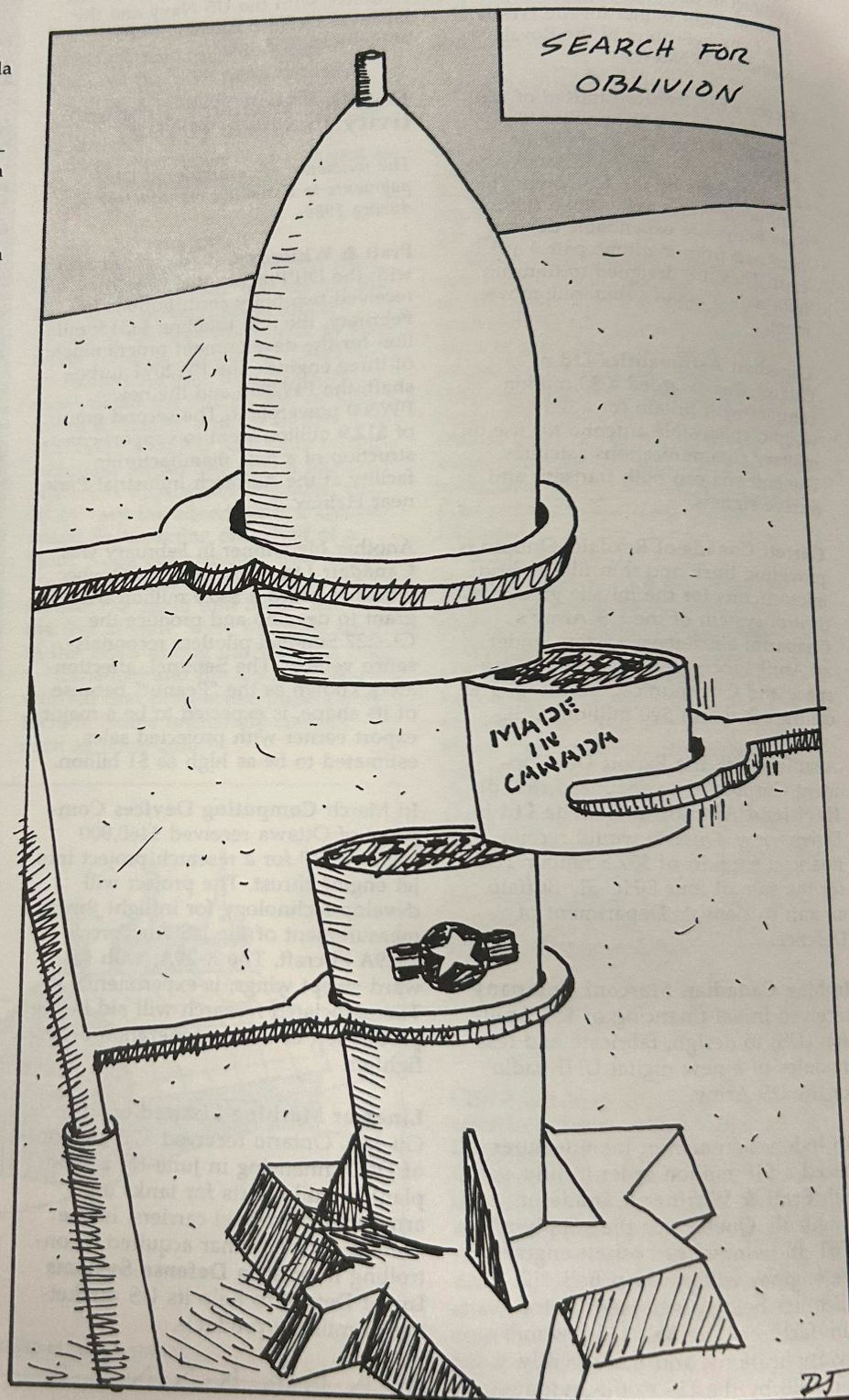
More Bucks for the Bang

by Ken Epps and Bill Robinson

Canadians are well aware of the production by Litton Systems Canada in Rexdale, Ontario of guidance systems for the Tomahawk and Air-Launched Cruise Missiles. Yet there are also many other Canadian manufacturing companies playing a role in the nuclear arms race. The accompanying tables, which list Canadian components for nuclear weapon systems and for nuclear-capable weapon systems, demonstrates that Canadian companies produce, or have recently produced, a wide variety of parts for the U.S. nuclear arsenal.

The tables distinguish between two types of nuclear-related weapons systems. By "nuclear weapon systems" we refer to systems that are designed primarily to carry nuclear weapons. Thus, MX Missiles or Trident submarines are intended to carry nuclear warheads or missiles respectively — strategically they serve no other function. "Nuclear-capable weapon systems" are those that can carry nuclear weapons but can also, in a different configuration, serve other purposes. As an example, the F-18A Hornet aircraft can deliver B57 or B61 nuclear bombs but it can also (and, as the Canadian CF-18, can solely) be used as a jet fighter with conventional bombs and missiles.

The table was compiled from information contained in the Canadian Military Industry Database of Project Ploughshares and its background vertical files. This information was pieced together from a variety of sources, including company annual reports, trade journals, news periodicals and US Department of Defense prime contract listings. The information is gathered from several sources because existing federal policies preclude disclosure of a comprehensive itemization of Canadian-U.S. military trade, nuclear or otherwise. For example, the government will not release information available to it about American military subcontracts placed with Canadian companies or subsidiaries. When queried on this refusal, reference is made to the "commercial confidential" nature of the information. Because the data is provided on a volunteer basis, Ottawa claims its



**Table 1:
Canadian Components for
Nuclear Weapon Systems since 1982**

Air-Launched Cruise Missile (ALCM)

Air-to-surface missile for B-52 and B-1 strategic bombers.
Equipped with one W80-1 nuclear warhead in 200 kiloton range.
Litton Systems Canada Rexdale Inertial guidance system

B-1B Bomber

Strategic bomber carrying B28, B61 and B83 nuclear bombs, air-launched cruise missiles and short-range attack missiles.
Haley Industries Ltd Haley Castings

B-52 Stratofortress bomber

Two versions in squadron service: B-52G/H.
Carrier of AGM-86 air-launched cruise missile, short range attack missile (SRAM) and B28, B43, B53, B57, B61 and B83 nuclear bombs.
Maximum load is 24 nuclear weapons.
Gabriel of Canada Ltd Toronto Spares
Garrett Manufacturing Ltd Rexdale Temperature control systems

**Tomahawk Sea-Launched Cruise Missile (SLCM)
and Ground-Launched Cruise Missile (GLCM)**

Long-range missile capable of being deployed from a variety of air, surface ship, submarine and land platforms.
Equipped with W-80-0 nuclear warhead in 200-250 kiloton range.
Litton Systems Canada Rexdale Inertial guidance system
Canadian Commercial Corporation Ottawa Guided missile components

MX Missile

Four stage intercontinental ballistic missile that can carry 10 nuclear warheads, each in the 300 kiloton range.
Boeing of Canada Ltd Winnipeg Nose cone components
Ebc Industries Ltd Richmond Basing system
Prototype component

Trident submarine

Nuclear powered submarine strategic weapons launcher.
24 missile tubes for Trident I C4. Each missile has eight nuclear warheads.
ATS Automation Tooling Systems Inc Kitchener Parts
Canadian Marconi Co Montreal
Versatile Vickers Montreal LN-66/SP surface search radar
Hull components
Cylinders for torpedo tubes
ICBM tube casings

Nuclear Bomb Simulator

Training device.
Hand Chemical Industries Milton Design, manufacture and service of device.

Notes on Tables 1 and 2:

1. The tables are drawn from information contained in Project Ploughshares' *Canadian Military Industry Database* and its background vertical files.
2. Descriptions of nuclear weapons and nuclear-capable weapons are taken from *Nuclear Weapons Databook, Volume I*, by Thomas B. Cochran et al., Ballinger Publishing Company, Cambridge, Mass, 1984.
3. Company and component listings are based on known prime contracts and subcontracts. Because there is no full government disclosure of military exports these listings are incomplete.
4. Information in the table dates from 1982. A company has been included if it has had one or more contracts since that year. Not all contracts are current.
5. For the purposes of the tables a "nuclear weapon system" is defined as a system that is designed primarily to carry a nuclear weapon. A "nuclear-capable weapon system" is defined as a system that is not so designed, that is, a system that also has non-nuclear functions.
6. The *Canadian Commercial Corporation* (CCC), a Crown corporation, acts as a broker for Canadian companies wishing to bid on US military contracts.

release would be contravening confidentiality and, further, would jeopardize business competitiveness. Consequently, the table does not provide a complete picture of Canadian industrial involvement in nuclear arms because all the necessary information is not publicly available.

Despite the incompleteness of the table, it attests to considerable Canadian participation in the production of nuclear components. It shows that, as with Canadian military production as a whole, the manufacture of parts for nuclear arms is concentrated in Ontario and Quebec. Perhaps more significantly, the table reveals that, in addition to the cruise, several recent major US nuclear-weapon programmes — the MX missile, the B-1B bomber, the Trident submarine — all involve Canadian participation. It is apparent that Canadian military production now includes regular nuclear contracts even if the full extent of nuclear weapon component manufacture is unknown.

It is worth noting that the table says nothing about Canadian participation in the US Strategic Defense Initiative. One reason is that to date there have been no announcements

by the SDI Office of Canadian companies receiving Star Wars prime contracts. Nor have there been announcements of Canadian subcontracts from US prime contractors. Another reason is that the table lists Canadian components for nuclear weapons or nuclear weapon delivery systems only.

The components are exported to the US under the terms of the Defence Development and Production Sharing Arrangements (DDPSA). These arrangements, which have created a kind of common market in military goods between Canada and the United States, make no distinction between nuclear and non-nuclear weapons, or between types of nuclear weapons which may be stabilizing or destabilizing. Decisions to bid for nuclear-related contracts are made on a commercial basis and, because military exports to the US do not require permits, none are subject to government review outside the terms of DDPSA. (Only the export of actual nuclear materials for use in nuclear weapons is prohibited under separate government safeguards.)

The production of nuclear weapons should not be simply a commercial

decision. Canada, as a sovereign country, is responsible for the weapons it produces and exports. Canadian arms production is a significant element of this country's role in the world community and it has real consequences for Canadian arms control initiatives and other policies.

Currently, for example, Canadian production may implicate Canada in a violation of the SALT II strategic arms agreement: the United States has violated the agreement by deploying Air-Launched Cruise Missiles on an excessive number of B-52 (and B-1B) bombers. Canada opposes the violation of this treaty, but Canadians have produced components for all of these systems — subsidizing the production in the case of the ALCM — and now Canada has no say as the results of that production are used to violate SALT II. By producing components for nuclear weapons systems like these, Canada has contributed to the nuclear arms race in ways that this country cannot control or even, necessarily, predict. What may be merely job creation on one day may be a violation of arms control on the next.

It is unacceptable to base military

exports on commercial grounds. The decision on military exports must be a national judgement, held politically accountable, and based on the implications of the weapon itself. Such accountability cannot be achieved under the DDPSA, through which the Canadian government has given industry a blanket permit to military exports to the United States. The government is not involved in deter-

mining which weapons exports are consistent with Canadian interests. This blanket approval must be withdrawn and replaced with a system requiring individual permits for each export, as is already in place for military exports to all other countries, including the other NATO allies. Furthermore, this process should be open to public scrutiny, with full public disclosure of all exports, to ensure

that Canadian weapons export policies are accountable to the Canadian people.

Only in this way will Canadians be able to work towards the elimination of the manufacture of nuclear weapons components and take responsible control over the weapons that their hands and tax dollars create.

Table 2:
Canadian Components for
Nuclear-Capable Weapon Systems since 1982

A-4 Skyhawk aircraft

Nuclear capable versions A-4D/E/M
Capable of carrying one of B28, B43, B57, or B61 nuclear bombs.
Fleet Industries Fort Erie, Ont Speed brakes and flaps

A-6 Intruder aircraft

Nuclear capable version: A-6E.
Capable of carrying three of B28, B43, B57 or B61 nuclear bombs.
Fleet Industries Fort Erie Inboard and outboard flaps
West Heights Mfg. Kitchener Bonded honeycomb assemblies
Parts

A-7 Corsair II aircraft

Nuclear capable versions: A-7A/B/D/E
Reportedly capable of carrying four of B28, B43, B57 or B61 nuclear bombs.
Canadian Commercial Corporation Ottawa Maintenance-repair of components
Flight instruments
Maintenance-repair shop equipment
Air conditioning/heating
Navigational instruments
Spares
Computing Devices Co Ottawa
Gabriel of Canada Ltd Toronto Maintenance of components
Garrett Manufacturing Ltd Rexdale, Ont Maintenance of shop equipment
Aircraft equipment

AV-8B Harrier II aircraft

Capable of carrying one B61 nuclear tactical bomb.
Canadian Marconi Co Montreal Misc communication equipment
Dowty Canada Limited Ajax, Ont Outrigger landing gear
Lucas Industries Canada Montreal Hydromechanical parts for gas turbine starter control
Ltd Gas turbine jet engine parts
Rolls-Royce (Canada) Ltd Lachine, Que
West Heights Mfg Kitchener Parts

F-4 Phantom II aircraft

F-4C/D/E are nuclear capable versions.
Three pylons can carry nuclear weapons (B28RE, B43, B57, B61 or B83 nuclear bombs) weighing up to 2170 lb.
Canadian Commercial Corporation Ottawa Electrical and electronics equipment
Transmitter
Equipment repair
Air conditioning/heating
Relays and solenoids
Pressure/temperature/humidity instruments
Landing gear components
Electronics
Relays and solenoids
Temperature control systems
Engine components
Hardware
Parts

Gabriel of Canada Ltd Toronto
Garrett Manufacturing Ltd Rexdale, Ont
Hawker Siddeley Mississauga
Litton Systems Canada Rexdale
West Heights Mfg Kitchener

F-15 Eagle aircraft

F-15A/C/E are nuclear capable versions.
Although not primarily for nuclear weapons use, the F-15 is nuclear certified.
Can possibly carry the GENIE (W25) air-to-air missile.
Canadair Ltd Montreal Parts
Canadian Commercial Corporation Ottawa Measuring instruments
Air conditioning/heating
Pressure/temperature/humidity instruments
Electrical converters
Maintenance-repair shop equipment
Landing gear components
Rudder fairing structure
Temperature control systems
Hybrid microcircuits
Castings
Radio navigation equipment
Airborne electronics equipment
Parts

Fleet Industries Fort Erie
Garrett Manufacturing Ltd Rexdale, Ont

Haley Industries Ltd Haley, Ont
Rockwell International Toronto
of Canada Ltd

West Heights Mfg Kitchener

F-16 Fighting Falcon aircraft

Nuclear capable versions: F-16A/B/C/D/E.
Capable of delivering up to five of B43 or B61 nuclear bombs. Standard weapons configuration is one or two nuclear weapons.
Canadian Commercial Corporation Maintenance-repair of components
Electronic parts
Air conditioning/heating
Flight instruments
Switches
Non-airborne radar equipment
Airborne radar equipment
Misc communications equipment
Accessories
Maintenance, repair and rebuilding
Temperature control systems
Hybrid microcircuits
Gearbox castings
Parts

Gabriel of Canada Ltd Toronto
Garrett Manufacturing Ltd Rexdale

Haley Industries Ltd Haley, Ont
Leigh Instruments Ltd Ottawa/
Carleton PI

Litton Systems Canada Rexdale Light emitting diode
data entry display

F-18 Hornet aircraft

F-18A is nuclear capable version. (Canada's CF-18 is not nuclear capable.)
Capable of carrying two of B57 or B61 nuclear bombs.

Bendix Avelex Inc Montreal Fuel control components
Canadair Ltd Montreal Nose barrel assemblies
Canadian Commercial Corporation Ottawa Misc communications equipment
Air conditioning/heating
Gas turbine/jet engine parts
Main heads up display housing
Cercast Inc Montreal, Que

Fleet Industries	Fort Erie, Ont	Radar racks Graphite composite gunloader and avionics doors Temperature control systems Hybrid microcircuits Castings Forward fuselage side panels Wing pylons Automatic test equipment Ribs and splice fittings Launch bar power unit Side brace assembly
Garrett Manufacturing Ltd	Rexdale	
Haley Industries Ltd	Haley, Ont	
McDonnell Douglas Canada Ltd	Mississauga	
Spar Aerospace Ltd	Toronto	
UDT Industries Inc	Montreal	
West Heights Mfg	Kitchener	
F-111 aircraft Nuclear capable versions: F-111A/D/E/F. Can carry up to three of B43, B57, B61, or B83 nuclear bombs.		
Canadair Ltd	Montreal	Vertical fins
Canadian Commercial Corporation	Ottawa	Air conditioning/heating Pressure/temperature/humidity instruments Communications/electronics equipment repair and parts Navigational instruments Maintenance-repair of components Hydraulic system Airborne radar equipment Unmounted antifriction bearings Screws Electronic microcircuits Radar equipment Communication equipment Repair equipment Temperature control systems Hardware Heat exchangers and chassis Parts
Canadian Marconi Co	Montreal	
Gabriel of Canada Ltd	Toronto	
Garrett Manufacturing Ltd	Rexdale, Ont	
Litton Systems Canada	Rexdale	
Magna Electronics	Scarborough	
West Heights Mfg	Kitchener	
P-3 Orion aircraft Nuclear capable versions: P-3A/B/C. Can carry two B57 nuclear depth charges.		
CAE Electronics Ltd	Montreal	Operational tactics trainer for Royal Netherlands Navy AN/ASA-65(V) compensator Structural components Misc communications equipment Maintenance-repair of communication equipment Engine instruments Airborne radio navigation equipment Airframe structural components Misc electrical and electronic components Flight stations Communications equipment repair AN/ASA-65(V) repair Electronics Misc communications equipment LTN-72R inertial/area navigation system Parts
Canadair Ltd	Montreal	
Canadian Commercial Corporation	Ottawa	
Fleet Industries	Fort Erie	
Gabriel of Canada Ltd	Toronto	
Leigh Instruments	Carleton Pl	
Litton Systems Canada	Rexdale	
West Heights Mfg	Kitchener	
S-3 Viking aircraft Nuclear capable version: S-3A. Capable of carrying one B57 nuclear depth charge.		
Canadian Commercial Corporation	Ottawa	Switches Air conditioning/heating Spares Hybrid microcircuits
Gabriel of Canada Ltd	Toronto	
Garrett Manufacturing Ltd	Rexdale	

SH-3 Sea King helicopter

Nuclear capable version: SH-3D.
Capable of carrying one B57 nuclear depth bomb.

Canadian Commercial Corporation	Ottawa	Hydraulic components Radar equipment Spares RAST hauldown system
Indal Technologies Inc	Mississauga	

SH-60 Seahawk helicopter

Nuclear capable version SH-60F.
Capable of carrying B57 nuclear depth charge.

Canadian Commercial Corporation	Ottawa	Aircraft arresting barrier Misc aircraft accessories Flight instruments Navigational instruments Airborne auto pilot mechanisms Miscellaneous accessories Blade subassemblies Castings for T700 engine RAST hauldown system Main transmission, intermediate and tail rotor gearboxes and tail rotor gearboxes
Canadian Marconi Co	Montreal	
Fleet Industries	Fort Erie	
Haley Industries Ltd	Haley	
Indal Technologies Inc	Mississauga	
Spar Aerospace Ltd	Toronto	

Tornado aircraft (Britain, Germany and Italy)

Capable of carrying B28, B43, B57 and B61 nuclear bombs.

CAE Electronics Ltd	Montreal	Flight simulator Weapons procedure trainer Airborne microwave landing system receiver Castings Flight data recorder Crash position indicator
Canadian Marconi Co	Montreal	
Haley Industries Ltd	Haley	
Leigh Instruments Ltd	Ottawa	

Aegis anti-air defence system

Used on the Ticonderoga class cruiser.

Primary weapon is the nuclear-capable Standard-2 missile system.

Fleet Industries	Fort Erie	Antenna
Magna Electronics	Scarborough	Power divider

Ticonderoga Class Cruisers (CG-47)

Capable of carrying nuclear anti-submarine rockets, Harpoon cruise missiles, Tomahawk cruise missiles and Standard-2 missile system.

Indal Technologies Inc	Mississauga	Helicopter hauldown system
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Spruance Class Destroyer (DD-963)

Capable of carrying nuclear anti-submarine rockets, Harpoon cruise missiles and SH-3 helicopters equipped with B57 nuclear depth charges.

Aircraft Appliances & Equipment Ltd	Bramalea	Valves
Indal Technologies Inc	Mississauga	Helicopter hauldown system

Lance Missile (MGM-52G)

Nuclear-capable surface-to-surface ballistic missile.

Canadian Commercial Corporation	Ottawa	Launchers
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M-109 155mm Self-Propelled Artillery Gun

Capable of firing W48 nuclear artillery projectile.

Bata Industries Ltd	Batawa	Vehicular power transmission Large calibre gun system Weapons
Canadian Commercial Corporation	Ottawa	

M-110 8-inch Self Propelled Artillery Howitzer

Capable of firing W33 nuclear projectile.

Bata Industries Ltd	Batawa	Parts
Levy Industries Ltd	Toronto	Fuel systems