

be funnelled into companies making aircraft and aircraft components, electronic and communication equipment, motorized vehicles, engines, ships and scientific instruments....

Exports and research

Our exports of defence products are now bringing in about \$500 million a year, despite our export policy, one of the world's most restrictive, prohibiting defence sales to areas of conflict.... Since 1959, some 600 Canadian companies have sold about \$6 billion in defence-related products. Defence exports provide, directly, some 25,000 jobs, typically scientists, engineers and technicians. Indirectly — and not counting commercial spin-offs — they create at least 100,000 jobs.

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...Defence research is the leading edge of technology. It's given us radar, computers, navigational aids, helicopters, jet planes, new high-temperature alloys, automatic transmissions, anti-icing equipment, fire-retarding paints and flame-proof fabrics, among other things. Defence orders keep our science-based companies abreast of the new advances, and we have to ensure that our companies stay competitive.

We do this with government grants for research and development, by sharing these R & D costs and production runs with our allies, and by what is called the Canada/U.S. Defence Production Sharing Agreement. This allows us to buy the world's best equipment at the lowest possible price, and to sell our technological products in the world's biggest market. Tariffs are suspended, the Buy American Act is waived, and Canadian firms compete for American defence orders on fairly even terms with American firms.

Until 1976, we sold about as much in the States as we bought. Then we started a major re-equipment program. We ordered 18 long-range patrol planes, worth \$1.1 billion, from Lockheed Aircraft in the U.S.; as well as 128 *Leopard* tanks, worth about \$135 million, from Krauss Maffei in Germany; and 350 Swiss Armoured Personnel Carriers, worth \$211 million, to be made under licence in London by General Motors of Canada. And we'll soon be placing a \$2.3-billion order for jet fighters....

Technology to industry

Government support for deHavilland and Canadair...has given this country an out-

standing lead in vertical lift and STOL technology. Other centres of excellence, though all too few over-all, are sonar, space, navigation, flight-safety systems, military communications, seaborne helicopter equipment, practice ammunition, lasers, batteries, diving gear, training simulators, small gas turbine engines, and ...weather and atmospheric rockets that are used around the world. In all these areas, DND and Industry, Trade and Commerce, by funding research and development, have helped Canadian companies push back technological frontiers.

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It has...been DND policy to transfer technology, wherever possible, from our six research establishments to industry, and this will now be policy throughout the government. For example, lasers are used by the military for long-distance range finding, and in the Sixties a 20-man DND team gave the rights on a breakthrough in high-powered low-cost gas lasers to Lumonics Research Ltd. of Ottawa. Lumonics has pyramided those rights into a company of 80-odd people, which has sold its lasers as research tools in the U.S., Europe and Asia, and pours its profits into R & D to come up with new uses such as LaserMark, for burning sales codes onto hard-to-mark items.

In sonar, our transfer of DND technology to industry has given our firms an expertise probably unexcelled in the world. Research in space could do much the same for space products. It was DND's *Alouette 1* that made us the third nation into space and gave us our lead in equipment for communications satellites. And for years, due to batteries developed by DND scientists, *Alouette 1* was the oldest satellite still functioning.

The know-how to build our third satellite was transferred to industry — at one time we had as many as 80 people from industry working with our defence research team — and as a result the landing gear of the first spaceship on the moon was made by a Quebec firm, Heroux Ltd. RCA (Canada) has supplied the space program with telemetry transmitters, and SPAR Aerospace, which started by making antennas on a shoestring, has a contract for one of the most complicated pieces of the space shuttle: its huge computer-controlled manipulator arms, a kind of space crane....

NATO communications

...We're taking part in developing a NATO global communication system tying

national systems together by satellite, and enabling Admiral Falls, the Chief of Defence Staff, to pick up the phone and talk directly to the commander of our peacekeeping force in, say, Cyprus. The Canadian contribution will be a portable terminal, a switching facility incorporating very advanced technology. Our contract for a prototype will give one of our smaller firms a chance at a large NATO order rich in civilian possibilities.

Only DND can open the door to such orders, and we in DND, as well as the Canadian Commercial Corporation, and the Defence Programs Branch of ITC, continually brief our allies at both formal and informal meetings. A dozen or so years ago DND naval engineers developed a system called Haul-Down, or Beartrap. It allows a helicopter to land on a ship as small as a destroyer, in what was formerly impossible sea conditions.... We're now adapting the Bear Trap for the U.S. Navy, and if it passes their tests they'll place one-third of their order in Canada. That's a contract of about \$40 million for Canadian industry.

DND helps industry in many ways. We recently provided Collins Canada with documentation on our trials of their highly successful Canadian-designed man-pack radio — which, incidentally, we funded — and this helped them sell the Yugoslavian Government. In Holland this summer we test-flew, on a cost-recoverable basis, a commercial version of a military radar system for Litton Industries. And in June, at the request of Canadian Marconi, we demonstrated their world-selling radio....

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We've joint programs with the Americans on space and infrared systems that detect incoming missiles by heat emissions. We're working with Britain on a DND development called STUP, for spinning tubular projectile, a practice shot that duplicates a normal tank gun trajectory and then drops rapidly to earth, reducing the size of the firing range required. We're taking part in a program in which the Americans will produce a gas mask, and DND, through Mansfield Denman, will make the cannister. This is a field in which we have great competence. We've developed radiation detectors, a meter to measure radiation, an anti-radiation oral drug, and the world's best protective clothing. And all these products have been, or will be, produced by Canadian industry....

(Continued on P. 8)