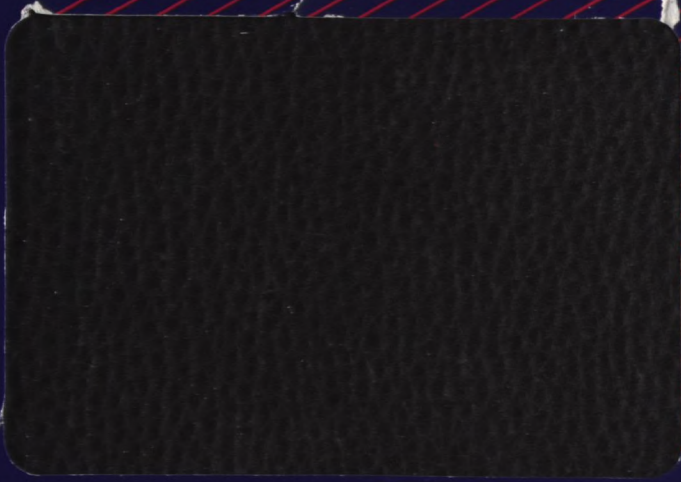


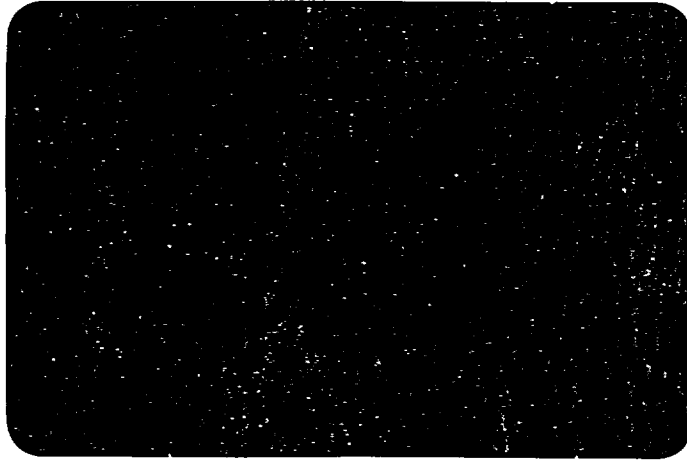
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Canada



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MARKETPLACE

ADVANCED TECHNOLOGY

MARKET PROFILES

Dept. of External Affairs
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ASIA-PACIFIC

BANGKOK, THAILAND

Telecommunications - Thailand

The Thai economy continues to be among the most rapidly growing in the world. This expansion will require support in the development of a telecommunications infrastructure in areas relating to international trade, exports, investment and tourism.

There will therefore be a continuing emphasis by the Thai government on improving international telephone services, telex and facsimile, international data communications via satellite, and cellular telephone communication services.

The Communications Authority of Thailand is responsible for external communications. It plans to continue investment in satellite communication, submarine cable systems, digital microwave systems, radio services and optical fibre communications.

The Telephone Organization of Thailand is responsible for domestic service. It recently awarded a contract of two million lines to Telecomasia (formerly CP Telecommunications), and is tendering for a further one million lines for rural areas.

A third organization, the Post and Telegraph Department, is now responsible only for radio spectrum management, domestic satellite service, and international and regulatory affairs. In addition, many banks, universities and large state corporations have built their own voice and data communications networks, as have the military and police forces and other ministries and government organizations, such as the State Railway and the Department of Fisheries.

Although international competition is very intense, there are currently several major Canadian communications companies active in the Thai market, usually through the intermediary of a local agent.

Vietnam

The telecommunications system in Vietnam is seriously underdeveloped. Given the country's large population, it possesses only a modest amount of telecommunications equipment, and what there is usually outdated and often in disrepair. Transmission networks are limited and of poor quality. Technical and managerial expertise are lacking and the network has not been expanded in over 15 years.

An improved telecommunications network is imperative if the country is to be able to take advantage of the ongoing efforts being made to reform and develop its economy. Financing remains the major barrier to development of the country's infrastructure. Foreign exchange is scarce and funds from international financial institutions will not be available

until the USA imposed embargo is lifted. Nonetheless, it is expected that many opportunities in the telecommunications sector will develop when the embargo is ended and full advantage can be taken of the country's potential.

Telecommunications in Vietnam come under the control of the Directorate General of Posts and Telecommunications (DGPT), an autonomous government agency. The DGPT has an overall role for corporate planning and management.

Laos

Laos is currently in the midst of upgrading its primitive telecommunications network, using a combination of World Bank loans, bilateral assistance and private investment.

Bids were submitted in November 1991 for the centrepiece of the \$45 million World Bank-sponsored telecommunications project, the installation of a communications "backbone" to link the country's major cities and towns. At around the same time, the World Bank announced the provision of another US\$30 million for the construction of links connecting the "backbone" with all provincial capitals. Transmission will be via microwave.

While the country is small in terms of population and is one of the least economically least developed countries in the world, it stands to benefit economically from sweeping economic reforms being undertaken (including a liberal foreign investment code), its abundant natural resources and its proximity to the booming Thai economy.

Aerospace - Thailand

Air passenger traffic in Thailand is expected to grow at an average annual rate of 9.8% during the period 1990-95, after growing an average of 15.4% during the period 1986-90. This dramatic growth has severely taxed the country's existing aviation infrastructure and, as a result, planning is in process for the development of a new \$3 billion international airport for Bangkok and the upgrading and expansion of several of the country's regional airports.

In addition to the civil engineering expertise required for new airport construction, it is expected that there will be a requirement for the purchase of substantial amounts of aerospace related equipment including microwave landing systems for the major airports and ILS and VOR for the regional airports.

To meet the surge in domestic and international air travellers, Thai Airways International (TG) will take delivery of 30 new aircraft over the next few years. In addition, the government has begun allowing limited competition with TG on some domestic and regional routes from smaller airlines, thus opening up the prospect for sales of smaller commercial aircraft. There is also a small but growing market for corporate and private aircraft and related services.

The prospects for sale of aerospace equipment to the military can be found in the overview of the military sector.

Vietnam, Laos, Cambodia

The post in Bangkok is also responsible for Vietnam, Laos and Cambodia. Economic reform in the three Indochinese countries has drawn attention to the need for the countries' rudimentary aviation infrastructures to be upgraded. Financing in these markets will remain a serious problem, however, particularly while the USA imposed economic embargo remains in place for Vietnam, the largest potential market.

Military - Thailand

Thailand remains a substantial purchaser of military equipment because of its strategic location and the traditionally strong military role in the government. While exact figures are very difficult to obtain, military equipment purchases are thought to be around \$700 million per year. In the late 1980s, the Thai military began sourcing a good deal of equipment from China, but the United States and European countries have regained much of their dominant role in this market.

The Royal Thai Navy (RTN) took delivery in 1991 of the first of six Chinese-built Jiangsu class frigates, some of which may require significant amounts of equipment after their arrival in Thailand. At the same time, there have been indications the RTN may be interested in purchasing several used frigates and minesweepers from the USA. The used ships would likely be refitted with modern communications equipment and weapons systems. The RTN has also announced its intention to procure a small helicopter carrier. Three used maritime patrol aircraft are on order, and the RTN may be interested in purchasing more. All could be expected to require at least some upgrading.

The Royal Thai Army (RTA) began taking delivery in 1991 of 53 used M-60 A3 tanks from the USA. These may require some refitting. The RTA may also be interested in purchasing many more main battle tanks, along with artillery. Discussions are also underway for the purchase of 250 armoured personnel carriers. The RTA is also expected to purchase a significant number of helicopters in the next few years.

The Royal Thai Air Force (RTAF) currently has 18 F-16s on order in addition to the squadron it already has. 20 trainer aircraft have also been ordered and it is expected that more aircraft will be ordered in the near future, including ground support transport and early warning and command. There may also be a need to upgrade the country's early warning radar system over the next few years.

Foreign military equipment is sold to the Thai armed forces almost exclusively through local agents. It is necessary to expend considerable effort to develop contacts with both an agent and the military before sales can be expected. Numerous repeat visits will likely be necessary.

Computers

The reduction of the Thai import tax on computers and components in July 1991 expanded the local computer market and increased operational efficiency of both private and government organizations. The import duties on a completed computer were reduced from 20% to 5%, peripherals from 40% to 5%, computer parts from 40% to 5% for traders, and to 1% for manufacturing for local use and no tax for manufacturing for export. Some of the computers sold in the country are from locally assembled products of which components and spare parts are imported. Taiwanese and South Korean products have captured the largest market shares of such products. More sophisticated computers are imported to serve high-income customers and businesses which require high efficiency machines. Imports increased annually by 28.7 per cent during 1987-1990. In 1990 Thailand imported computers, spare parts and CPU parts worth approximately \$1.2 billion.

In light of the tariff reductions, sales of DOS based personal computers are predicted to increase 60-80% this year, in comparison with earlier predictions of about 33%. It is expected that 82,600 PCs will be installed. Workstations and Unix-based minicomputers are also expected to experience rapid growth in 1991.

Software

The PC software industry has long been dormant despite the growth of hardware sales, but this is changing. Last year's total sales of software were \$3-5 million, a level expected to double in 1992. However, should copyright law clearly protecting software be enforced, the industry is expected to be worth 3-5 times that figure. It is hard to estimate the actual size of software industry since most software distributed to date in Thailand has been pirated copies. But the trend is slowly changing, with the increasing awareness of the value of software resulting in local users being more willing to pay for software. Other factors contributing to the changes are that a wide variety of software is now available at more affordable prices and that local versions of popular packages are merging.

Networking (especially LAN), accounting and Unix software packages will become increasingly popular this year, while Windows platform is expected to gain greater acceptance, but it will take a few years to take off.

Consumer Electronics

The Thai electronics industry has grown rapidly over the past five years, with an average annual growth rate of 34.2 percent. Thailand now uses high tariffs to attract consumer electronics factories which produce parts and components, thus building the country's subcontracting base.

An inexpensive and easily trained labour force, and government support in the form of tax and other incentives are the main reasons leading electronic product manufacturers are relocating their production bases, particularly from Japan, Taiwan, the USA and South Korea, in Thailand. With over 600 companies promoted by the Board of Investment (BOI), the industry has now branched out into more sophisticated consumer products such as microwave ovens, video tape players, floppy disk drives, electronic watches, facsimile machines and telephones. Thailand exported over \$4 billion worth of consumer electronics in 1990, and the final 1991 figure is expected to be nearly 20% above that.

Major investment opportunities in the electronics industry are found in consumer electronics, which still tends to be oriented towards the domestic market, computers and peripherals, where establishment of several large-scale manufacturers has laid the groundwork for further investment and telecommunications equipment to support the implementation of the country's numerous telephone projects.

Geomatics

Both remote sensing and geographic information systems were introduced to Thailand over a decade ago. The first Thai earth station for receiving MSS DATA OF the OS LANDSAT satellites was built near Bangkok in 1981.

The station has since been upgraded and it currently can receive data from SPOT, NOAA and MOS-1. Geographic information systems were first used in Thailand in 1985 and since then the use of geomatics products and services has grown rapidly. There are currently about 20 government agencies involved in the use of remote sensing technologies and more than 30 known users of GIS technology in Thailand. Seven state universities are involved in the field of geomatics. The expertise developed in cooperation with several countries, including Canada, has expanded into many areas including agriculture, forestry, land use, computer science, geography, geology, hydrology, oceanography and multidisciplinary environmental monitoring.

Thailand is planning the integration of GIS with the remote sensing data for natural resource development and environmental monitoring. The Ministry of Science, Technology and Energy is in the process of setting up a National GIS Centre which aims to promote and develop GIS technology in Thailand. The Centre is expected to be in operation by 1996. The largest GIS application is cadastral, while the next largest is in the field of rural and agricultural development as well as land use planning. An estimate of the total cost of the

GIS facilities being currently used in Thailand is close to \$4 million. At the moment, American software holds a majority market share. The geomatics market in Thailand is expected to grow rapidly in the 1990's, especially as the private sector realizes the technology's potential.

Instrumentation (for electricity generation)

Thailand's economic growth has led to sharp increases in the demand for electricity. Demand over the next five years is expected to grow by 10.3 per cent annually, from a peak demand of 8,072 megawatts in 1991 to 13,075 megawatts in 1996. The Electricity Generating Authority of Thailand (EGAT) is currently operating with an installed capacity of 9,300 megawatts. In the seventh five-year plan (1991-1996), EGAT is expected to require a total investment of nearly \$10 billion for electricity generation in 23 projects, some of which will be operated by the private sector. This will generate demand for electrical products and instrumentation used in power generation and transmission. EGAT's average annual spending on instrumentation, including audio-visual and office equipment, is about \$4 million. There will be a corresponding rise in the demand for instrumentation related to the transmission and delivery of electricity.

The major companies involved in this industry are from Japan, the United States, and Europe, and competition is intense. In addition to pricing, competitiveness depends on experience, technical know-how and after-sales services.

KUALA LUMPUR, MALAYSIA

Advanced Technology

Electronics

Malaysia is moving higher up the "Silicon Valley" status as the electronics industry undergoes a major structural change from mere assembly to a manufacturer of sophisticated products. The electronics industry is the key to the industrialisation of the country because it is the biggest exporter of manufactured goods and a major employer with a workforce of 144,000 people. Last year the industry exported Cdn \$9.7 billion worth of goods such as semi-conductor devices, audio/video equipment, computers and telecommunications products. The components sub-sector accounts for 57.6 percent of the total output, consumer electronics 23.2 percent and industrial electronics 19.2 percent. At the end of 1990 there were about 420 companies involved in the electronics industry, of which 267 were producing components, 81 consumer goods and 85 industrial products.

The electronics sector is dominated by foreign investors, many of which are multinational corporations, which have been attracted to Malaysia by tax benefits, good infrastructure and a skilled labour force. Recently however, the industry is facing an acute shortage of manpower, which is being attributed to the large inflow of foreign investment to the local electronics industry and the expansion programmes undertaken by existing electronics companies.

Foreign investors should consider seriously the longer term advantages of technology upgrading and quality enhancement that will ultimately determine their competitive edges. In addition to the attractiveness of Malaysia as an investment centre for electronics firms, excellent opportunities exist for the sale of components and electronics products in this market, provided the products are price competitive.

Telecommunications

Telekom Malaysia Berhad, formerly called Syarikat Telekom Malaysia Berhad, or STM, is the main operator of telecommunication services in the country. It operates an extensive local and international telecommunication network, offering a full range of domestic and international voice, message and data communication facilities. With 28,000 employees nationwide, Telekom Malaysia brings telephone facilities to 1.4 million subscribers in urban centres and rural areas via its local network. About 3.2 million cable pairs are available in the local network and are connected to 550 telephone exchanges with a combined capacity of 2.3 million exchange lines. Of these exchanges, 55% are computerized enabling 72% of customer subscribers to enjoy benefits like push button dialling, itemized billing and enhanced telephone facilities.

Telekom Malaysia is directly connected to 30 countries via cable, satellite and microwave. The telecommunications operator is increasing its fibre optic routes. The Kuantan-Kota Kinabalu Optic Fibre Submarine Cable System, which spans 1500 km across the South China Sea, will cater for the domestic and international telecommunications traffic up to early 2000. Telekom Malaysia expects to launch the first phase of Integrated Service Digital Network (ISDN) commercially sometime in 1993, whereby telephone line, telefax, computer and data features would be combined into one common line. The availability of ISDN will further enable Telekom Malaysia to expand the range of services and provide high quality service. By the year 2000, the objective is to achieve complete digitalization of the network.

Telekom Malaysia's Customer Automated Services System (CASS), developed with the assistance of Bell Canada International, enables a more efficient servicing of customers. Before CASS, service application processing would take months. Now Telekom Malaysia is able to give service on demand where CASS is available. This system is being implemented in stages and soon all telephone subscribers should enjoy the benefits of CASS.

Telekom Malaysia is committed to provide adequate telephone services to the rural population in support of the Government's efforts to foster national development. The telephone customer base in rural areas has increased from 146,000 in 1987 to over 200,000. The number of rural public telephones increased 30% over the last three years. Where physical cable connection to outlying and isolated areas are not possible, Telekom Malaysia has provided the ATUR system and solar energy.

Telekom Malaysia is expected to invest nearly Cdn \$5 billion in further developing Malaysia's communications infrastructure under the Sixth Malaysia Plan (1991-1995). Under this plan, a major portion of the investment will be used for digitalizing telecommunications networks at the customer end, installing new exchanges and the construction of optical fibre networks.

The telecommunications sector growth rate is projected at 12 to 15% for the next five years, with as much as 30% of the growth in telephone lines being accounted for by the business sector alone. The total number of telephone subscribers is growing at an average of 11% a year, and improved efficiency at the national telephone company, Telekom Malaysia, is expected to generate a 12% growth rate for telephone subscribers over the next few years. Telekom Malaysia will continue to introduce value added services, as it had in 1990 with four new services; videotext, circuit switched data network, public electronic message service and toll free service. In addition, the allocation for rural telecommunications is expected to increase by 300% from the present Cdn \$2.1 million to Cdn \$8.4 million. To meet the requirements of banking and other sectors involved in mass transfer of data, private firms and banks have begun to install digital multiplier pulse code modulation and line equipment.

Potential areas for Canadian involvement are in computerization and automation, long distance fibre optics, consultancy and training services, network management and integrated services digital network (ISDN). The key to increasing Canadian participation in the Malaysian high technology sector is not just a matter of price, technical compliance, technology transfer or after sales service but also one of "staying power" or the ability to maintain a continued presence in Malaysia.

Informatics (Computing and Software)

The computer industry in Malaysia started with the commissioning of the first computer in 1965. Up to the 1970s, the environment was predominantly mainframe, with installations predominantly in the public sector rather than in the private sector, with multinational corporations being the exception. When the import duty on computers was lifted in 1982, the growth of the industry accelerated substantially, aided by the parallel rapid development of hardware elsewhere in the world which had lowered prices to the extent that many enterprises could computerise their operational systems such as payroll, accounts, personnel records and inventory control. The second half of the 1980s emphasized integration to meet corporate planning requirements, the present market being distributed foremost in the government sector followed by banking and finance, manufacturing and distribution, trading, retail and services.

The Malaysian computer industry has witnessed substantial growth with the Government sector as the single largest user. A five-year programme for a national development information systems has been announced which will involve the computerization of 125 district agencies of which 70% are in Peninsular Malaysia. This will mitigate somewhat the present situation where only a minority (estimated 20%) of the 884,000-strong civil service in a national population of 17 m has direct access to computer facilities including some 230 mainframes. Privatization will further strengthen the demand for computerization in Malaysia.

Taiwan and Singapore in particular have taken assertive steps to invest in assembly plants in Malaysia. The related Malaysian electronic component industry has enjoyed a 15% growth rate for the past 10 years. In 1991, a sizable number of foreign manufacturers have relocated or expanded their production lines for computer accessories to the country, and the local computer manufacturing industry is well situated to take advantage of a plethora of downstream support industries from which it can tap up to 20% component production supply.

There is good potential for development of the computer software market provided public perception of cost efficiency is recognised. The first publication rule under the Malaysian Copyright Act provides intellectual property right protection to all works released in Malaysia within 30 days of publication in the country of origin. The areas of activity to date cover manufacturing and distribution, financial, insurance and brokerage services and healthcare, with the educational sector being yet untapped. In addition to the contributions

from software divisions of foreign-based local information technology organizations, a number of software companies have been established whose services cater to a spectrum of clients. Client specifications include user-friendliness, installation ease documentation, price and hardware association, marketing considerations covering commission basis to state-level dealers, multiple-copy discounts, upgrading options, applications training, maintenance, and promotion and advertising. Identified as a value added export source, the software development industry is a fertile ground for investments especially when its status as an industry enjoying strong investment incentives and support is combined with the availability of trainable manpower. Joint ventures in this area should bring returns conservatively by the third or fourth year.

With the property market recovering from the aftermath of the recession and the construction industry stirring again, there is scope for exploration of CAD/CAM applications in a centralized environment. Such enterprises should examine the potential for computer applications particularly in agrobased, electronic and electrical, chemical and petrochemical and metal based manufacturing.

The new generation of Malaysians have been given a good measure of exposure to computer technology and plans are in place to initiate a nationwide computers-in-education programme which will equip 300 secondary schools with computers in 5 phases of education software available in Bahasa Malaysia. Malaysian universities have been active in training and their programmes have been given a neo-vocational complement by a number of private institutions and training centres offering overseas-affiliated courses and packaged application courses. Computer courses remain one of the favourite options of many Malaysians.

Local incentives for relocation of operational headquarters and the comparatively low cost of living in the country, supplemented by the ready availability of cost-attractive resources, should point to good potential for a sectoral investment in offshore bureau services including batch data processing and contract programming. This could proliferate as an industry in itself, with spinoffs for developing a pool of trained operators, programmers and support staff.

The Malaysian Government has come out strongly in support of computerization. Without the constraints of regulation, the industry remains favourably disposed for growth and development. The public sector has recognized the need to upgrade its administrative machinery in order to coordinate mechanisms for IT growth propelled by the private sector and for formalization of consultative linkages between government and private sectors and within cross-boundaries of the private sector. Steps have been taken to establish projects such as technology parks where entrepreneurs could enjoy basic administrative facilities and consultative linkages.

The Association of Computer Industry Malaysia (ACIM) had begun to conduct a nationwide survey of the industry with the objective of providing the Government sector with the necessary findings to formulate a national information technology policy for the 21st

century, the corporate-planning and academic circles with data input for market definition, research targets and training rationalization and the manufacturing sector with achievable goals in specific product offerings measured against market trends and fine tuning of the industrial masterplan.

Geomatics and Instrumentation

Remote sensing for resource monitoring was introduced into Malaysia during the 1950s. The Malaysian Agricultural Research and Development Institute (MARDI) was the agency that first utilized aerial imagery. Interest is now widespread throughout Government (particularly in the agricultural and resource based industries) and in the oil and gas sector. The development of geographical information systems (GIS) in Malaysia is still in its early stages and many government departments and public institutions have initiated data-based programs that could be used as part of a GIS.

With the assistance of a \$3 million dollar grant from CIDA, a Remote Sensing Centre was established within the Ministry of Science, Technology and the Environment. The prime contractor for the centre was MacDonald Dettwiler and Associates of Vancouver. The general objectives of the Malaysian National Remote Sensing Program are: 1) upgrade Malaysian remote sensing facilities, 2) strengthen and co-ordinate remote sensing and related technologies; and 3) promote greater utilization of these technologies for resource management, environmental protection and strategic planning of the country. Facilities available at the Malaysian Centre for Remote Sensing include: 1) an image processing system capable of analyzing satellite and airborne data from a variety of sources including Landsat, SPOT, MOS, SAR, and AP; 2) a geographic information system for the analysis of spatially referenced data; and 3) a dedicated photographic laboratory for high resolution hard copy outputs.

Many Government organizations with resource jurisdictions follow developments in remote sensing applications closely and the National Remote Sensing Committee has been established for government units with an interest in the field. Within the private sector, oil, gas and mineral exploration firms, major plantations and engineering consultants have all shown an interest in remote sensing and GIS applications. The ASEAN Institute for Forest Management (AIFM) was set up with CIDA support to offer resource monitoring assistance on a regional basis. The mission of the AIFM is to upgrade capabilities through technology transfer thereby enhancing the prospects for sustainable conservation and management of tropical rain forests. The AIFM is equipped with state-of-the-art systems for assessing and monitoring tropical forest resources. The Institute is also equipped with computer-aided management systems to optimize conservation of the forests.

The Department of Surveys and Mapping is the only organization in Malaysia licensed to conduct aerial surveys. This department must be approached for approval of all

independent survey proposals. Malaysia is participating in the ESCAP (a United Nations agency) Regional Remote Sensing Program, the ASEAN Cooperation Committee on Remote Sensing, and the Earth Resources Program of the European Space Agency.

Defence

Regular force personnel in the Malaysian Armed Forces total 128,000, consisting of 105,000 in the army, 10,500 in the navy and 12,400 in the airforce. Reserves total 40,000 consisting of 38,000 in the army, 2000 in the navy and 600 in the airforce. Regular force strength is expected to be reduced to about 100,000 and reserve force strength increased over the next decade.

In 1991 government defence expenditures were estimated at US\$1.73B less the U.K. Defence MOU expenditures and the internal security budget, or about 3.8% of GDP and 14.8% (including internal security) of the federal operational budget. From Malaysian independence in 1957 the military fought a 42 year counter-insurgency war against the Communist Party of Malaysia (CPM). Since its victory over the CPM in December 1989, the military has redefined its role to one of defending the nation from external aggression and protecting its economic assets in its Exclusive Economic Zones (EEZ) of the South China Sea. Currently, Malaysia has no identified external threat, but has recognized the requirement to protect its current oil and gas production and reserves within its EEZ. These new military roles will result in a larger navy equipped with sophisticated surface combatants, and funds permitting, a submarine force. The air force is expected to acquire modern maritime surveillance and air defence aircraft, supported by sophisticated early warning ground based installations. The army will restructure to a conventional equipped force of tanks, self propelled artillery and mechanized infantry that will include one rapid reaction division capable of deploying anywhere in peninsular Malaysia within 24 hrs.

Preparing for this armed forces conversion from counter-insurgency to a conventional warfare capability Malaysia signed a defence Memorandum of Understanding (MOU) with the U.K. government in September 1988. In this document Malaysia agreed to purchase one billion pounds sterling (C\$2.05 billion) of defence equipment over ten years from the U.K. with 70 to 80% of the costs to be offset by counter-trade arrangements in oil and commodities.

Exact prices of goods purchased by both countries is subject to negotiation under the terms of the MOU. While delivery of U.K. defence equipment will significantly improve the military capabilities of Malaysia's armed forces there will be a continuing requirement for acquisitions from other suppliers to enhance its operational effectiveness. As such, opportunities do exist for Canadian defence firms to bid with British partners to provide U.K. equipment under the MOU, for promoting auxiliary equipment that will improve the capabilities of U.K. equipment, for bidding on tenders issued by the Malaysian military for replenishment stocks of general stores and supplies and for equipment not provided for in the MOU.

SEOUL, KOREA

Opportunities in the Korean Software Market

Major areas of opportunity have recently emerged, in Korea's software market for Canadian companies supplying packaged software, technical assistance or technology transfers. Those exporting software products to Korea will find a ready market for products that will either be of benefit to Korean companies that are computerizing and automating their operations to reduce costs, or that are of necessity for use in Korea's computerized information network system.

Korea's software market will grow 25-30% annually over the next five years as a result of a number of major computerization projects and Korean government inducements for increased computerization and automation in Korea's manufacturing, distribution and financial industries. While Korea has long placed a priority on developing a hardware manufacturing capability, there is little domestic expertise for specialized software requirements.

Although domestic software companies account for the major share of software revenues, their revenues come predominantly from orders for customized software and services in a few specialized industries or for general business management packages such as personnel and payroll or supply and inventory.

The Embassy recently completed a market study that may be of interest and use to Canadian firms investigating the potential of the Korean market. The study reveals an emerging market with substantial opportunities.

A \$2 Billion Telecommunications and Datacommunications Market

A \$2 billion telecommunications and datacommunications market exists in Korea as was recently discovered by Canadian telecommunications companies.

Opportunities will continue to be in abundance for Canadian exporters as the Korean government plans to invest heavily in upgrading telecommunication infrastructure as well as in research and development in order to become a technologically advanced country by the year 2000.

The country intends to increase the number of digital switching systems and set up a switching network for international fax service, packet-switching networks, network management systems, data communications networks, satellites, mobile telephone service and wireless paging service.

Total telecommunications equipment needs are expected to increase at an average annual rate of 10.1 percent, reaching US \$3.6 billion by 1996.

This modernization plan offers good sales prospects to Canadian suppliers of data communications, packet switching, LAN and network devices, network management systems, mobile communications equipment, fibre optic equipment, cables, satellite communications equipment, antenna and VSAT equipment.

It should be noted however, that the Korean market is only for experienced exporters who have a quality product and the export skill necessary to win a slice of a profitable and growing telecommunications market.

The Embassy has developed integrated and targeted marketing strategies including a market study available to Canadian companies, a recent mission of 11 companies led by Minister Wilson, and participation in a major trade fair in February. Canadian firms have been successful in export sales and technology transfer agreements. This is a sector of priority and great opportunities.

Overview of the Korean Space Technology Market

With the recent awarding of the contract to General Electric Astrospac and their Korean partner Goldstar for Korea's first satellite to be launched in 1995 Korea began the first stages of its space program. Korea appears interested in expanding its cooperation with Canada to expedite the priority space program.

Canadian companies could provide technology cooperation which would expedite the Korean program and not compromise Canada's position. Korea is well behind Canadian capabilities in this sector, and the broad focus of Korea complements Canada's niche approach.

Canadian companies should pursue cooperation with Korean industry along the lines of cooperation-equipment supply, training and including technology transfer of current but not state-of-the-art technology to bring Korean industry up to speed including granting a world mandate which Korean industry would probably exploit in developing countries.

Opportunities in the Geomatics Market

The Korean geomatics industry is in an early stage of development and has very limited experience in applying the technology. Major research and development works in geomatics are undertaken by the government R&D centers to develop/gain experience in this technology. Main areas of R&D work are focused in data processing/interpretation, image analysis and geographic information system (GIS).

Korea only has a limited amount of hardware available to researchers such as a satellite data receiving ground station at the Korea Meteorological Service (KMS) and Korea Institute of Science and Technology (KIST) plus aerial photography equipment. Many Korean researchers obtain satellite data from Japan as they have limited access to satellite data within Korea.

An experimental scientific satellite will be launched in the near future as part of the Korea space development program. This satellite may carry a thematic mapper/or a radar/or a magnetospectrometer.

Major players involved in this area are as follows:

- Systems Engineering Research Institute (SERI), KIST
- Korea Ocean Research and Development Institute (KORDI), KIST
- Meteorological Research Institute, KMS
- Korea Institute of Energy and Resources (KIER)
- National Geographic Institute of Korea
- Office of Hydrographic Affairs, Ministry of Transport
- Agricultural Science Institute, Ministry of Agriculture and Fisheries
- Forest Research Institute, Forestry Administration
- Agency for Defence Development, Ministry of National Defence

Opportunities in the Computer Hardware Market

Major areas of opportunity in the Korean imported computer hardware market are main frame computers and peripheral devices such as large monitors, mass storage devices, printers, plotting devices, mother boards, add-on cards, ASIC chip sets and other parts and components. Foreign-made high performance personal computers and work station are now gaining in popularity in Korean business areas for CAD/CAM and industrial applications.

The Korean market for imported computer hardware has increased by more than 30% per annum during the last four years as a result of a vast expansion in consumer demand. Importation of large capacity computers has maintained steady growth, however the personal computer market has expanded dramatically. This has resulted in the massive importation of necessary devices/components which are not available locally.

Import statistics indicate that Korea imported approximately US\$ 1,022 million worth of computer hardware in 1990. This was a remarkable growth over 1987 when approximately US\$ 470 million was imported. Japan, United States, Taiwan and Hong Kong are major suppliers to Korea.

In 1991, the Korean computer hardware industry suffered a set back in its growth rate in both domestic and overseas markets as sales of computer hardware increased only slightly.

This situation will however not hamper the growth of the Korean computer hardware industry as the growth of the domestic market will offset the difficulties in overseas markets. This is attributable to the increased computer literacy among Korean consumers as well as Korean government programs to increase the use of personal computers in homes and schools by the year 2000.

Instrumentation Market

The Korean instrumentation market has grown rapidly in the last decade, increasing at an average annual rate of 15.6% from 1986-90. Though local production has grown an average of 24% annually during the same period, in 1990 imports made up 84% of the market. Japanese, American and European companies dominate the market.

The rapid growth in the instrumentation market, about double the growth of the economy, is expected to continue for the next five years at between 14-15%.

The industrial process control and instrumentation market was a US \$214 million market in 1990, growing at an average annual rate of 6.4% over the past five years. Growth should continue at around 8% due to significant growth in end user industries. Yokogawa, Foxboro and Honeywell are current market leaders in Korea.

The test and measurement market was a US \$351 million market in 1990, growing at an average annual rate of 18.3% over the past five years. Growth should continue at around 16%. Tektronix, John Fluke, Hewlett Packard, Anritsu and Lwatsu are current market leaders.

The laboratory and scientific equipment market was a US \$263 million market in 1990, growing at an annual range of 15% since 1986. Growth should continue around 18%. Current market leaders are Varian, Perkin-Elmer, Millipore Waters, Beckman, Spectra-Physics, Shimadza, Rigaku and Hitachi.

The Embassy recently completed a market study that is available to interested Canadian companies. The various market segments and opportunities for Canadian suppliers are outlined in the study and the Embassy would be pleased to assist firms to enter this competitive but profitable market.

Aerospace and Defence Opportunities

Despite the continuing movement toward unification of North and South Korea, concerns over national security are expected to continue. Defence restructuring will lead to purchases of new command control communications equipment as well as a continued upgrading of naval and air force capability. The possibility of a gradual down scaling of the U.S. military presence is expected to create new requirements as Korean forces take on increased responsibilities.

As part of the naval upgrading program there is an opportunity for Canadian systems integration capability in the ROK destroyer acquisition program (Value - \$450 million).

The Korean Army will be acquiring Mobile Subscriber Equipment. In Air Force procurement, the F-16 aircraft has been selected for the 120 aircraft Korean Fighter Program. Many Canadian companies produce components and should have opportunities through the FMS Program. Moreover Canadian direct sales of follow up maintenance, testing and ground support should be developed although it will be difficult to overcome USA purchase guidelines. The F5 upgrade program may also provide opportunities for Canadian companies.

Purchases of executive aircraft are expected from both the Government and private corporations. Coastal patrol, search and rescue and forest firefighting is a growing priority for the Korean government. Dash 8 sales could see better prospects with possible commuter airlines developing after further deregulation. The building of a new Seoul Airport and upgrading of local airports will enhance sales of ground equipment, navigation and radio equipment.

SINGAPORE

Overview

Singapore is a major trading nation and plays an increasingly key role in the South East Asian regional economy with its well-developed transportation, communications and financial infrastructure and extensive trading links. The country, while small, has a dynamic and sophisticated economy and offers substantial opportunities for Canadian firms interested in marketing their products, technologies and services both in Singapore and throughout the region. Singapore is increasingly the base of operations for many Canadian advanced technology companies.

Canadian firms seriously seeking to enter the market will have to consider the appointment of a local agent(s), the establishment of a representative office or possibly the formation of a joint venture with a local firm.

Telecommunications

Already boasting one of the world's most efficient telecommunications infrastructures Singapore Telecom will be spending C\$2.5 billion over the next five years on switching equipment, transmission plant and equipment, optical fibre submarine cable systems, frequency spectrum management system, building projects such as a new communication tower, and several other development projects.

Projects in the pipeline include the development of an island-wide "intelligent network", broadband integrated switching digital network (ISDN), new Phone Plus service, digital cellular mobile network, and a new integrated mail and parcels centre to be ready by the mid 1990s. Singapore Telecom also plans to connect all homes and offices with optical fibre within the next two decades.

In view of the above, there is a large potential for relevant Canadian suppliers. Potential Canadian suppliers should take note that Singapore telecom procurement is usually by way of tender notices issued in the major local newspaper (usually on a Friday). Hence, it is virtually essential to appoint a good local agent or distributor to monitor the tender exercises and assist in local marketing. For major multi-million dollar procurement projects, Singapore Telecom publishes the tender notices in the international press.

Singapore Telecom is working towards privatization in 1992. It is expected that there will be additional areas of opportunity for Canadian suppliers of products, systems and services brought about by an increased number of service providers.

Informatics

Singapore Information Technology (IT) industry revenue crossed the C\$1.3 billion line in 1990, up 45 percent over the previous year. The local market accounted for a 69 percent share, or almost C\$897 million, of the revenue. Total hardware sales hit the C\$645 million mark. The software and services market grew from \$227 million in 1989 to C\$280 million in 1990.

Market opportunities can basically be divided into the hardware and software categories.

The hardware market is dominated by the USA, Japan, United Kingdom and other regional and local suppliers. Canadian hardware suppliers face strong competition and are generally absent from the market.

The software market offers more opportunities for Canadian firms as evidenced by the success of Canadian companies.

Singapore is currently working on a new masterplan called IT2000 with full government support. Basically the IT2000 plan aims to utilize IT technology to its fullest to make Singapore into an "Intelligent City" state by the year 2000. Market opportunities open to Canadian suppliers include: industrial and commercial automation systems; robotics; intelligent building systems; supervisory control and data acquisition (SCADA) systems; artificial intelligence; niche application software or systems for the tourism and leisure industries, healthcare, education, defence and transportation.

Broadcasting

The Singapore Broadcasting Corporation (SBC) has traditionally procured television production and broadcasting equipment from the United Kingdom, Japan and the U.S.A.

Nonetheless, market opportunities are available to Canadian companies including television production and broadcasting equipment, satellite earth stations, mobile earth stations, multi-point microwave distribution systems (MMDS), switching equipment, pay-TV equipment and accessories, films and film laboratory.

Plans exist for SBC to be privatized within two years time. More opportunities may be created for Canadian suppliers of new television production and broadcasting equipment with the entry of new competition into Singaporean broadcasting.

In addition studies are now underway to develop a cable TV system in Singapore. The overall project is valued at in excess of C\$1.3 billion and will offer major opportunities for suppliers of equipment, technologies and services.

Aerospace/Aviation Products, Equipment and Services

There is a potential market in Singapore for Canadian manufacturers of civil and military aircraft and helicopters (inclusive of parts).

Singapore serves as a centre for the aerospace industry in the Asia-Pacific region. Although Singapore does not manufacture complete aircraft, its aerospace industry has played an increasingly visible role in the region in the maintenance, overhaul and repair of aircraft (both civil and military) as well as in the manufacturing of aircraft parts and components. Between 1980-1990, output of Singapore aerospace industry grew from C\$140 million to C\$700 million.

Although a small number of well-known Canadian manufacturers have already supplied aircraft parts as well as helicopters, other Canadian companies are encouraged to establish representation or to pursue joint venture opportunities in Singapore.

Security Systems

There is a potential market in Singapore for advanced security systems. The Singapore Ministry of Defence has budgeted C\$350 million for the next three years to upgrade existing security systems in all its military bases and the Internal Security Department of the Singapore Ministry of Defence is now sourcing advanced security systems from overseas manufacturers.

Following a recent product demonstration held at the Internal Security Department, a Canadian manufacturer was invited to install its security system at a military base for a 2-month trial.

Furthermore, a number of Singapore Statutory Boards such as the Singapore Broadcasting Corporation, Singapore Telecom and the Singapore Public Utilities Board have plans to upgrade their existing security systems in their headquarters as well as various remote stations. Recently, a Canadian manufacturer was specially invited by the Singapore Broadcasting Corporation to participate in bidding a "closed" tender worth C\$700,000.

Transportation Systems, Airport Equipment, Components and Services

Current airport projects in Singapore include upgrading of Terminal One Building and construction of a third terminal building as well as one additional runway at the Changi International Airport to keep pace with the expected huge growth in air traffic well beyond year 2000. Requirements for these projects include baggage handling equipment, monorail systems (transferring passengers and luggage from one terminal to another), passenger

check-in facilities, security systems, airport signs and displays, boarding ramps, airport and runway lighting, navigational aids, service vehicles, cargo and maintenance facilities, etc. The total cost is estimated in the region of C\$500 - 700 million.

In addition, the Civil Aviation Authority of Singapore and Singapore Telecom are currently sourcing foreign suppliers of vessel height measuring system (VHMS) to replace an existing system installed in 1986. The project is estimated to cost approximately C\$5 million.

Defence Programs and Products and Services

Singapore's expenditure on defence is estimated to be 6 percent of GDP. Although this percentage figure is not expected to change, the actual dollar value of defence product purchases is expected to rise over the next several years. Between 1980 - 1990, the market for defence equipment grew from C\$1.0 billion to C\$2.0 billion.

The market for defence equipment is divided into three categories - equipment replacement, training equipment and new technologically advanced equipment.

The replacement market is one that is difficult to penetrate despite the market being open to technological improvements and upgrades. Difficulties arise from replacements/upgrades having to be compatible with existing equipment and systems. The U.S.A. and the U.K. are major traditional suppliers. Price is a major consideration in this market as is the growing role of Singapore based defence industries in supplying the national market either as prime or sub-contractors.

In contrast, there is significant potential for Canadian suppliers of training equipment. Because of the limited geographic size of Singapore, maintenance (e.g. technical training) and tactical systems (e.g. computer aided instruction systems and aircraft simulators) are used extensively. There is also an on-going move from simple technical training to utilization of more advanced tactical systems.

The market for new and advanced equipment, like that of training equipment, offers potential for Canadian suppliers. However, this area is very competitive and involves a substantial amount of R&D and capital investment by Canadian suppliers.

SYDNEY, AUSTRALIA

Introduction

Australia is a country roughly the size of the USA but only has a population of some 17 million people. Nevertheless it is Canada's 13th most important trading partner importing close to \$1 billion of Canadian products annually. 78% of those exports are manufactured or semi fabricated materials, a figure exceeded only by our exports to the United States.

A significant portion of these exports contain a high degree of Canadian technology. They include aircraft (28.5 million), auto parts (24 million), telecommunications equipment (15 million), bovine and dairy genetic material (12 million). Our advanced technology exports amount to about \$35 million.

Australia like Canada is principally a producer of primary products. The agriculture and mining sectors lead the way, but forestry and fisheries are also active sectors. In general, the investment in R & D by these industries has been modest resulting in a poor level of productivity which until recently was compensated for by large tariffs. The lowering of protection over the last few years has thus created a need for new technologies to improve productivity that is only partially met by indigenous supply. The manufacturing sectors have also been protected for some time by high tariffs and as a result have been slow to adopt modern methods. Very few firms have adopted CAD/CAM for example.

Australia's advanced technology products and services imports amount to some \$1 billion per annum but Canada only has a 3.5% share. There is plenty of room for improvement and a ready acceptance of Canadian high technology products. Some Canadian companies have done extremely well in this market, many using Australia as a base for operations into South East Asia. It is therefore surprising that other Canadian hi-tech firms have paid little attention to this market.

The Australian Government is trying to address its productivity problems through a program of micro economic reform to strengthen the international competitiveness of Australian firms. Deregulation and privatization of its aerospace, defence and telecommunication industries has recently opened up these markets to competition forcing local firms to upgrade their technology and productivity to compete against new companies entering the market. The telecommunications market is particularly dynamic with the decision to allow a second network to compete against Telecom Australia.

Technology Needs

Australia represents a developing market for those Canadian high tech firms that can improve industrial productivity and offer unique products and services, especially if they are interested in joint ventures with a growing number of small to medium size entrepreneurial firms which do not have a broad enough technical base. In some cases this is a requirement since Government Regulations in certain sectors require a percentage of Australian production, R & D, and/or export in order to sell equipment (eg PABXs) or for sales to the Government (contracts over \$ 10 million).

Like Canada, Australia is a big country with a small population widely dispersed. Its transportation sector is not as well developed however. Its automotive market is highly protected and relatively inefficient. If Government plans to reduce tariffs are implemented, new technologies will be required. Australia is seeking the technology to improve the mass transport situation with major projects for very fast trains, airport upgrades and modernization of its urban transportation facilities. Conversely, its communications sector is quite well developed and expanding rapidly in terms of satellite communications, mobile communications, and improvements to its telecommunication capabilities. ISDN services are available nationally and recent decisions allow for resale of network facilities and the establishment of private networks. A second national mobile cellular network will be established in 1992. The present network is growing at 8% per month.

The Australian defence technology requirements are somewhat a reflection of Canada's in that, with the exception of two major projects to build submarines and frigates, most activity is concerned with upgrading existing facilities. The industry is small and until recently was very inward looking and protected. It is now exposed to international competition and more willing to seek out strategic alliances with foreign firms and to adopt new technologies for both product and process.

We are currently monitoring 39 projects worth more than \$400 million which Canadian companies may be interested in. Most of these projects will involve offsets in the form of transfer of technology, local manufacture, and/or exports.

In terms of the environment, Australia is just beginning to realize the problems created by its neglect of this important area particularly in the matter of waste disposal and recycling. Major capital projects are just now getting under way to deal with these problems and Australia is actively searching for the technology required.

Technology Transfer

Australian industrial R & D is dominated by the CSIRO, an organization similar to Canada's NRC except that it is responsible for all Government R & D activity. It must also get 30% of its revenue from non-government sources so it is very open to forming joint ventures with industry, and many of these have been quite successful. Like Canada,

Australia's industrial R & D is addressed to niche markets and is particularly strong in the I.T. field especially in telecommunication including space communication and optoelectronics. CSIRO, Australian universities and R & D intensive firms are more open to licensing their technology to Canadians since there is less fear of "big brother" taking over.

In biotechnology, the major applications are in the agriculture sector. The lack of venture capital and the small market in Australia have frustrated many of these entrepreneurial firms and they are seeking joint venture partners to assist in the development and marketing of products.

Conclusion

By international standards, Australia is not a large market but it is a receptive market for Canadians. The similarity of language, culture, legal system and economy make it an easy place to do business and develop stable partnerships. It is closer to the developing markets of South East Asia and therefore makes a good jumping off point for Canadian firms that establish themselves here. Since Australian firms have traditionally had difficulty entering the US market they will consider partnerships with Canadian firms to take advantage of the free trade agreement. More information on opportunities in each sector is available from the Consulates in Sydney and Melbourne.

TOKYO, JAPAN

Electronics Industry

Estimates for total production of ¥25.6 trillion by the Japanese electronics industry for 1991, representing a 5.7% increase from the previous year. This is slightly lower than earlier forecasts due to the poor economic performance worldwide. 1991 estimates called for a 5.6% rise, for industrial electronic equipment production, to = ¥12.5 trillion. Production of electronic components and devices was expected to advance 6.1% to ¥8.8 trillion, and an 8.5% increase, to ¥4.8 trillion, in consumer electronics. As world economic recovery remains sluggish, 1992 forecasts call for a 5.6% increase in this sector, to ¥27 trillion, being supported by domestic consumption from within a strong economy. Leading demand within these sectors will be for mobile communications equipment. Demand for computer equipment and related software will increase, as will corporate demand information systems and office automation equipment.

Informatics/Software Market

Imports by the information service industry in Japan have shown an average annual increase of 35% from approx. \$2 billion CDN in 1984 and is estimated to exceed \$23 billion in the year 2000, while Japan's exports are expected to increase by just over \$13 billion. Software imports are at the core of this import surplus, and is attributed in part to a critical shortage of software developers in Japan.

Utilization of packaged software in Japan continues to be rather limited, and such software packages which are not translated into Japanese have little demand. Also, because of the competing rather than standardized operating systems in Japan, along with the cost to Japanese software, this makes market entry for packaged application software very expensive. Still Canadian software products continue to do well in Japan in the areas of: developmental, CASE including support tools, graphics, computer animation, CAD/CAM, relational data bases, scientific, MIS, CIM and industrial processing software.

GIS

It is estimated that Japan is 5-7 years behind North America in the use of GIS technology. This presents a growing market in Japan as the industry catches up to utilize RASTER based GIS systems. A recent market study shows market opportunities in the domestic market for forestry management, as well as opportunities for third country sales. Also, growth is foreseen for GIS products with applications in urban, transport, resource and environmental planning and management. Japanese companies and institutions familiar with Canada's GIS capability recognize it as world class.

Telecommunications Industry

The telecommunications system in Japan underwent systematic reform in April 1985. The primary components of that reform were introduction of the principle of competition to all areas of domestic and international telecommunication; privatization of the then Nippon Telegraph and Telephone Public Corporation (NTT), which has been the exclusive provider of domestic telecommunications services in Japan; and liberalization of the terminal equipment market.

Currently, telecommunications carriers in Japan are categorized as either Type I carriers or Type II carriers. Type I carriers provide service by setting up their own telecommunications circuits and facilities, while Type II carriers utilize the circuits of Type I carriers to provide services. The two categories are covered by different regulatory systems.

These two systems have allowed many new carriers to enter a variety of telecommunications fields. In addition to NTT and KDD, there were 67 other Type I carriers in Japan as of October 1, 1991, they include ten companies providing telephone and leased-line services through their own networks; three companies providing satellite-based leased-line services; 52 companies providing land mobile radio telephone, maritime mobile radio telephone and personal pocket paging services; and two companies providing international telecommunications services.

Concerning international telecommunications, until liberalization, KDD had been Japan's only international telecommunications carrier. Now, there are two additional international carriers - IDC and ITJ. The result has been keen competition between the three carriers, with the two new entries attaining a 10% share of the market in 1991.

Japan's production of communications equipment in 1990 was ¥ 2.65 trillion yen, a 13.2% increase over the previous year. Wire communications equipment grew by 10.2% and radio communications equipment grew by 24.5%. Cellular telephones, portable phones and pagers showed remarkable growth. Japan's export of communications equipment in 1990 was ¥ 821.2 billion, a 2.3% decrease from the previous year (decrease attributed to worldwide economic slow down). During the same period Japan's imports of telecommunications equipment was ¥ 116.7 billion, an increase of 32.9% over the previous year. Since the liberalization of telecommunications in Japan, particularly since 1987, imports of equipment have increased an average of 38.5% per year.

Areas of market opportunity in Japan include networks, PBX, digitization, high speed systems, and multi-media systems.

Defence Market

Japan continues to pay close attention to the qualitative improvement of its defence equipment that can match the technical standards of foreign countries. As a consequence a large amount of the Ground Self Defence Force equipment is designed and produced in Japan, but most of the vital defence equipment used by the Air and Marine Self Defence Forces is US standard equipment locally procured under license or under FMS sales programs.

In line with the FY 1991-95 Medium-Term Defence Program which allocated ¥22.75 trillion (\$227.5 billion at \$1 = ¥100) for the 5 year plan, the Japanese Government has authorized ¥4.5518 trillion (\$45.5 billion) for defence in 1992. This amount equals an increase of 3.8% over last years, and represents 94% of the projected GNP for the year. This reflects Japan's cautious approach to the dismantelling of the Soviet Union as they wait to assess the impact on stability in the region. This years program continues to put emphasis on improving quality, and on improvements of logistic support such as communications, quality of life for defence personnel, and to strengthen air defence and sea lane defence capabilities.

Canadian defence exports to Japan have been either unique high tech products or components incorporated into US defence exports to Japan, or spare parts for US equipment used by the Japanese Self Defence Forces.

Aerospace Industry

Japanese aircraft industry, employing some 27,000 people, produced ¥756.5 billion-worth of aircraft, engines and their components during FY 1989. The 1989 output represents a 7.1 percent increase over the previous year. Defence Agency is the single major market for the industry. Over 80 percent of total sales had been to JDA in the past years. But in fiscal 1989, the figure decreased to 75.6 percent, due to a significant increase in exports.

Japan's aerospace export sales rose by 48.1 percent to ¥98 billion, increasing its share in total sales from 10.6 percent to 13.0 percent. Export growth is attributable to increased deliveries of components for the Boeing 700 series, McDonnell Douglas, Fokker and V2500 engine. When added to the sales of the space sector, Japanese aerospace industry output for fiscal 1990 exceeded for the first time the ¥1 trillion mark for the first time.

Over the last 30 years Japan's aircraft industry has been mainly involved in the production of equipment and materials for the Defence Agency, with many items being produced under license from the U.S. manufacturers. However, the Japanese aerospace

industry is moving to significantly increase its activities in the commercial/civilian aerospace sector. This move is spurred in part by foreseeable cuts in defence spending, and is bolstered by a Government policy which promotes international collaboration on aerospace projects.

Canada is a major international participant in aerospace. Canadian companies with unique and competitive products in the areas of avionics, electrical sub-systems, structural composites, aero-engines, simulation and training, and service, repair and overhaul may wish to seek areas for sales and collaboration in Japan.

EUROPE

BRUSSELS, BELGIUM

Trade and Economic Overview

Belgium's small size does not reflect its real importance in commercial and economic terms. The first country after the U.K. to be industrialized, Belgium is again being transformed by the strong economic forces currently reshaping Europe. Belgium is at the very heart of the E.C. and it is one of the E.C. countries which is benefitting most from the construction of the European single market. Its annual GDP growth reached 3.9% between 1988 and 1990 and, despite the current slowdown of the world economy, Belgium's GDP is set to grow by 2.4% in 1991 and 2.7% in 1992.

The development of the E.C. single market gives Belgium the opportunity to fully capitalize on the comparative advantages that it draws from its geographic location at the heart of Europe's most densely populated and wealthiest region (75% of the E.C. purchasing power lies within 350 km of Brussels), its longstanding industrial tradition, the strong R&D capabilities of its private sector, its multilingual and cosmopolitan population and the legendary openness of its economy.

For these reasons, Belgium is one of the most relevant European countries for Canadian industrialists in their efforts to position themselves in the E.C. market. There are currently some 70 Canadian firms established in Belgium, a country in which Canadian investments have been multiplied by 10 over the last five years. Canadian and Belgian firms have similar industrial environments and similar challenges in common: they are both export oriented (Belgium exports 65% of its GDP), they are well experienced and successful in their respective regional markets and they are of comparable sizes which facilitates the formation of balanced partnerships.

With a population of merely 10 million people, Belgium looks small. But size can be deceptive for Belgium is a large market: 6th largest importer in the E.C., it is Canada's 4th largest client in the E.C. (The Benelux countries, with a population of 25 million is Canada's second largest market in the E.C. after the U.K.). The market of this highly industrialized country is very open. Belgium presents the advantage of being a compact country and a microcosm of the single market which makes it a unique test market and the ideal point of entry in the E.C. market for the full range of competitive Canadian products and services. Brussels is also the starting point for companies wishing to pursue E.C. research projects and NATO contracts.

Canadian firms should not overlook Belgium because of its relatively small size. They would be well advised to seriously investigate the market and strategic ventures opportunities in the areas of telecom, datacom, space, aerospace, defence products, informatics, geomatics, and instrumentation. Belgium is considered to be one of the most North American of European countries. Belgium firms are generally interested in forging

strategic alliances with Canadian firms with a view to capitalizing on niche market opportunities in both the European and North American markets.

In addition, an alliance with a Belgian firm could open the doors to E.C. research projects and to NATO contracts since Belgian firms are closely connected with the major E.C. and NATO institutions headquartered in Brussels.

A. TELECOMMUNICATIONS

1. Market profile

The Belgian telecommunications sector will be undergoing a major transformation and modernization over the next five years. The old Régie des Téléphones et des Télégraphes (RTT) will cease to exist as of December 31, 1991.

Under the direction of Dutch born businessman, Mr. Bessel Kok, Belgacom, Belgium's telephone company will take over the core activities of the RTT and begin competing against the private sector for value-added services in January 1992. Belgacom might also open up its equity to a minority participation by a major foreign telephone operator. The regulatory aspect of telecommunications will be transferred from the Ministry of Communications to the new Belgian Institute of Telecommunications.

Belgium is currently lagging behind its neighbours in terms of public and private telecommunications but the government is determined to turn this situation around. The creation of Belgacom, the massive investments (some 8% of GDP on an annual basis) in the country's telecommunications infrastructure, the opening of value-added services to competition and the interest of medium-sized Belgian firms in entering in collaborative marketing, R&D, production arrangements with foreign suppliers all contribute to offer Canadian firms a unique opportunity to enter the Belgian/European market through direct sales, investments and strategic ventures. A few Canadian telecommunication firms are already present in Belgium through sales and distribution offices.

The total number of telephone subscribers in Belgium in 1991 is 4,010,544 (end of June) or some 48 telephone sets per 100 inhabitants. The RTT has a monopoly on first connections for each subscription. The second and the following sets and cordless sets may be purchased from the RTT or on the market. In January 1992, PABX equipment will become freely available on the market. The digitization of the network is well underway. The long term objective of the RTT/Belgacom is a complete replacement of electro-mechanical exchanges by the year 1998. The introduction of the narrow band integrated digital network services with nationwide commercial service is being strongly promoted.

A new mobile telephone network of the second generation (cellular techniques) was put into service June 1, 1987. Of a total capacity of 50,000 subscribers, already 35,000 are being used. This market is mainly controlled by five big brand names: Autophon (20%),

Siemens (20%), Philips (18%), Mobira (15%) and Cetelco (8%); the RTT/Belgacom holds only 3% of the market.

The DCS network is a monopoly of the RTT and the new Belgacom will retain this service in its monopoly while value-added telecommunications services will be provided in competition with the private sector.

2. Best Market Prospects

There are plenty of opportunities for Canadian companies in this market. There are just a few Belgian companies which are interested only in distribution of foreign products. Although the Belgian telecom market is not specifically protected, local presence is still a prerequisite for being taken seriously.

Best sales opportunities will continue to be for product lines related to the newest technology applications in end-user equipment:

- Wireless telephone
- Telephone sets with special capabilities
- Terminal equipment
- Antennas for mobile radio systems
- LAN/WAN equipment and solutions
- Fax plug in cards and new fax technology
- Value added services.

3. Trade Promotional Activities 1992

The Canadian Embassy in Brussels will participate in 1992 in the TMAB (Telecommunications Managers Association of Belgium) Exhibition (Brussels - April 1992) with a booth of some 192 sq.m. which it will share with Northern Telecom and Gandalf Data. The Investment Canada Consultant who prepared the Telecommunications kit will be present on the stand promoting strategic alliances between Canadian and Belgian firms. DOC will provide assistance for Canadian participation in the conference programme of TMAB, Belgium's most important telecom promotional event. Finally, a study on Belgium's telecommunications sector commissioned by the Embassy under the Going Global European Initiative Fund will be released mid-March. It will provide Canadian firms with a strategic view of Belgium as a place to start in the European Telecom market.

B. DATACOMMUNICATIONS

1. Market profile

The Belgian market for Datacommunication Services and Equipment is relatively small but it should be seen in the context of a larger European market.

Major clients are the Belgian Government, the numerous international organisations (EC, NATO, etc.), and the Belgian government, and multinational companies (SWIFT, GM, VOLVO, Texaco, IBM,...) established in Brussels/Belgium. Belgacom is making efforts to attract datacom centres from large companies. They have also started the construction of a teleport centre in Brussels at the Trade Mart, a permanent exhibition centre.

There are hardly any statistics on the Belgian networking market. In 1988 the Belgian hardware market equipped with UNIX was estimated at 140 million US\$. The UNIX market share in Belgium is expected to reach 40% of the market in 1991. MICROSOFT still is the main reference for PC's.

There are many Belgian companies involved in system engineering and software development for data applications (e.g. Devlonics (datacom - OEM with Siemens, Philips, Epson,...). Trasys (software development), Stesid (software and interfaces), BIM (SUN distributor, soft and hardware distribution and integration), Telindus (manufacturer of tele and datacom equipment)...

2. Best Market Prospects

The most promising market is for the LAN. The major PC importers are IBM, Olivetti, APPLE, Compaq, HP, Toshiba. In the networking, SQL seems to be gaining market dominance.

The European Telecommunications Standard Institute is working towards a European ISDN network, in which Belgium actively participates. Alcatel and Siemens are the most active companies in that area.

Another promising area is that of integrated multimedia communication (videotext, videoconferencing) and the fax server business.

3. Trade Promotional Activities 1992

As mentioned earlier, the Canadian Embassy in Brussels will participate in 1992 in the TMAB Exhibition. The Embassy has also hired a marketing bureau to conduct a market/sector study on telecommunications in Belgium.

Finally, the Embassy, together with a few Canadian companies will have a booth at the InterElec Trade Show, Brussels, November 1992. InterElec is the most important trade event in electronic hardware.

C. AEROSPACE

1. Market Profile

The Belgian space and aerospace industries are active in civil aviation (participation in the Airbus industry), space programs (substantial participation in the Ariane, Hermes and Columbus projects), defence aviation (related to the F16 and Mirage offset programs) and general maintenance and repair in the aerospace/avionics sector. The industry is represented by two groups: FLAG, the Flemish Aerospace Group, which consists of 100 industrial companies of different sizes possessing various capabilities including mechanical engineering, metal treatment, electronic components, communication equipment, airport construction, electro-optical equipment, etc., and GEBECO, the French speaking group which includes SABCA and SONACA, the two leading aerospace companies in Belgium. The industry has a significant level of foreign participation (SABCA being owned by Dassault and Fokker; FN Moteurs by France's SNECMA and America's Pratt & Whitney) and a focus on collaborative programmes (F16 multinational program; Airbus; Mirage program, etc.). Defence spending in the aerospace sector in the next few years will be mainly concentrated on upgrade programs such as those for the Mirage and the Hercules 130. Belgian companies are therefore trying to make up for the loss of defence contracts by concentrating on civil aviation and the European space program.

Space is a sector in which Belgium has been following a consistent European policy for the last 25 years. It has invested heavily in the European Space programme to a point where its contribution is close to 5% of the ESA's budget. Belgium's contribution to the ESA budget reached CAD 200 million in 1991. It is engaged in three major projects: the Ariane 5 rocket (for 6%), the space shuttle Hermes (for 5.8%) and the space station Columbus (for 5%).

2. Best Market Prospects

Market opportunities for Canadian space and aerospace companies in Belgium consist mainly of sub-contracts on Belgian defence contracts as well as on Belgian participation in European civil aerospace and space programs. These opportunities would in our view, be best pursued through the strategic partnering route whereby a Canadian firm is given access to the Belgian/European market in return for facilitating a similar access to the North American market for its Belgian counterpart. Belgian firms occupy niche markets and they are very open to this type of cooperative arrangements. Additionally, given the current rationalization of the industry, there may be possibilities of establishing a presence in the market through mergers, acquisitions and/or joint ventures.

3. Trade Promotion Activities

The Canada-Belgian MOU on Industrial Cooperation in the Defence and Related High Technology sectors offers one way of investigating some of the market and investment

possibilities in this area. A steering Committee Meeting of the MOU is expected to be convened in 1992. The best approach however is the assessment of strategic venture opportunities by individual firms, a process in which the Embassy could provide substantial assistance.

D. INFORMATICS (HARD AND SOFT)

1. Market Profile

On a European scale, it is generally recognized that Belgium is lagging behind its neighbours in the field of informatics. Some 1.7% of the GNP is spent on computers as compared to 2.4% in the Netherlands. However, experts forecast a very strong growth of the demand over the next five years.

The PC market will be one of the fastest growing segments. A growth of 80% is expected between 1989 and 1994. IBM has the leadership in PC sales (20%), followed by Olivetti (12%), Apple, Compaq, Dell, Commodore, Toshiba and Philips.

As for software, some 38% is customized software developed by numerous small software houses in Belgium. Belgium's standard software market is distributed as follows: 32% in system software and utilities; 37% is simple and 31% is specialized application software (e.g. dbms, etc.). Belgium is a net importer of standard hard- and software.

The trend in the distribution sector as a whole is integration of hard- with software. Major importers operate more and more on a pan-european scale, while others tend to be more specialized geographically on a few products basis.

2. Best Market Prospects

Belgium is very much dependent on imports to satisfy its needs. The market is very competitive but opened. Clients are very conservative, e.g. they are reluctant to support "new" products without a proven record and they request full after-sales support.

The educational sector grows by some 15% annually; advice, consultancy and implementation is another booming segment with an estimated annual growth of 16%.

The hardware market is saturated but demand for value-added products for printing, fax server environment, etc. is likely to remain strong.

Most of the growth is expected to take place in the software business. Consultancy, system integration, CAD/CAM, GIS, DTP and related industries, UNIX applications and the advanced software business. In most of these fields, strategic partnering is the most practical approach.

3. Trade Promotion Activities

The Canadian Embassy in Brussels will participate at the Software Automation Trade Show (Kortrijk - March 92 - Advanced Software). It will be assisted there by an Investment Canada consultant who will promote the formation of strategic alliances in the areas of advanced softwares, system engineering and system integration.

E. GEOMATICS

1. Market Profile

GIS, Geomatics and related fields received attention only recently in Belgium. With the regionalization of Belgium (divided in three regions), the regional authorities are increasingly preoccupied with the accuracy of their geographic information data. Insurance companies are also in need for detailed data on the facilities of large companies. Finally, the growing public concern over the safety of some industries (especially for the important petrochemical industry) have all contributed to generating an interest and a demand for GIS.

In Flanders, the company Cardib was recently asked to digitize the geographic data of that part of the country. While in Wallonia, it is the company Bicar which is doing their work. Cadaster and similar services are not yet using computerized data.

There is a growing demand for facility management systems on the part of private sector companies. Large companies have begun to use a GIS of their plants. The electric utility company, Electrabel, is apparently the most advanced in this area.

Eurosense Belfotop is a world wide known remote sensing company. They are active around the world and are at the forefront of technological developments.

Tractebel is the biggest European engineering company. They often use third parties for GIS applications (e.g. in Africa).

2. Best Market Prospects

The main competition in this field comes from The Netherlands and the USA. The German company Siemens also has a fair share of the market. There will be however numerous opportunities in the future especially for facility management systems. The best approach is through strategic partnering with local companies. As in most cases, but certainly for Geomatics, Canadian companies must be prepared to make the necessary human and financial investments.

3. Trade Promotion Activities

In collaboration with the Canadian Embassy in The Hague, the Embassy in Belgium will invite a few Belgian companies to the Canadian GIS conference scheduled to take place in the Netherlands in March 1992.

F. INSTRUMENTATION

1. Background

Belgium is an importer of instrumentation products. Some domestic production exists but Belgium relies on imports especially in the fields of test and measuring, electronic instrumentation and robotics.

2. Best Market Opportunities

In most fields of instrumentation there are opportunities for those companies that can offer leading edge technology and technical support. Success is possible for companies that are willing and able to invest the time and money required to adapt their marketing approach to requirements of the European market and to patiently demonstrate their seriousness and their determination. The most suited distribution channels for overseas companies are local importers/distributors.

3. Trade Promotion Activities

The Commercial Division together with a few Canadian companies will participate in the InterElec Trade Show (November 92). InterElec is the most important trade event in Belgium in the fields of electronic hardware, instrumentation and electricity. It is well attended and open only to professionals.

G) DEFENCE PRODUCTS SECTOR

1. Market Profile

With the end of the cold war and the collapse of the USSR, the Belgian government has started a process of reorganizing its armed forces and trimming down their budget. The coming years will see a change in role emphasis by the Belgian armed forces as they concentrate on the development of small, mobile intervention units which can be deployed rapidly and on defense (surveillance) rather than the traditional ground attack role. Although the plan of adjusting Belgian force levels and expenditures to meet restricted budgetary revenues was conceived by the coalition government defeated in November 1991,

it is not expected to be altered radically by the new government being formed. The previous government set a total defence budget for 1992 at some BF 101.7 billion (approximately \$ CAD 3.4 billion).

Until the new government is formed, detailed expenditures of the armed forces will not be known. However, it is expected that the main capital equipment expenditures will relate to the acquisition of Agusta A109 helicopters; the mid-life upgrade program for the Hercules 130 transporters; the Mirage safety improvement program, and the BELMILCOM/BELMILDAT secure communications program.

Small arms manufacturing and aerospace and electronics form the basis of the Belgian defence industry. The industry has been experiencing difficulties due to global arms reductions and defence budget cut-backs. Foreign investment, mergers and acquisitions have become more common in this sector.

2. Best Market Prospects

There are opportunities for Canadian companies in regard to both Belgian national defence contracts as well NATO projects contracted in Belgium. Despite the reduction in defence spending, Canadian companies have been recently very successful in competing for Belgian defence contracts.

The long term trends in the Belgian defence spending and the rationalization and "Europeanization" of the defence production industry suggest that Canadian companies will have to maintain a presence in Europe in order not to be excluded from the European defence products market. This may be possible through merger, acquisition and/or joint ventures. It would seem to be an ideal time for companies in the Canadian defence products industry to examine possibilities for strategic partnering/industrial cooperation.

3. Trade Promotion Activities

Signed in 1987, the Canadian-Belgian MOU on industrial cooperation in the defence and related high technology sectors is perhaps the most appropriate vehicle through which to explore possible avenues for trade and industrial cooperation. A Steering Committee meeting of this MOU will be held in 1992 at which time the defence products requirements of each country over the next few years will be thoroughly examined with a view to encouraging the creation of mutually beneficial strategic ventures between Canadian and Belgian firms.

COPENHAGEN, DENMARK

Key Economic Indicators

Area:	43,100 sq km
Population:	5.1 Million
GDP:	CDN \$147 Billion
Inflation:	2.7%
Unemployment:	10%
Canadian Exports to Denmark, 1990:	CDN \$167 Million
Danish Exports to Canada, 1990:	CDN \$248 Million
Member of European Economic Community (EEC), OECD and NATO.	

Economic Outlook for 1992: Favourable. Positive balance of payments, low inflation, high industry productivity - no improvement in unemployment.

Government: Minority coalition (Conservative - December 18, 1990)

Advanced Tech/Informatics

Computer Hardware

- In overall European context, Denmark is one of the smaller PC markets. However, in terms of both computer penetration, (applied computer resources per capita), and accumulated computer experience. Denmark enjoys leader status in Europe. Overall, number of PC's in Denmark is estimated at 600,000 and this is expected to increase to 1 million by 1995.
- High level of IBM brand loyalty reflecting high sales of IBM compatible computers. PC's for business/professional use are 386 or SX, 286 machines now only purchased for consumer use.
- Hardware vendors including dealers are under pressure due to declining prices and deterioration of the traditional distribution channels (Hi-Fi stores, supermarkets, photo shops, etc.)
- IBM minis and mainframes dominate in the public sector as well as in the banking and insurance communities. AS/400 system very popular here. DEC successful in the private sector with technical oriented users.
- LAN sales have experienced solid growth rates in recent years. Popular brands are Novel, 3-COM, and 10-NET.

- Also market here for PC add-on/enhancement products, communications products, voice response, LAN cards, fax, teleconferencing, emulation, imaging and graphics boards.

Software

The overall Danish market in 1990 is estimated to have been approximately CDN \$500 Million and is expected to grow to CDN \$660 Million in 1992. Packaged PC software accounts for approximately CDN \$105 Million of the total Danish software market. Annual projected sales growth rates are between 30% and 40%.

In very rough terms there is market in Denmark for practically all types of software other than accounting/administrative software and to a certain degree AGL products.

90% of the installed Danish PC base runs on DOS: OS/2 only 3% and Apple Macintosh 2%. Unix on PC's accounts for approximately 2%.

There is a good market potential for:

- Communications software
- Applications under WINDOWS
- DTP software (DOS and Apple)
- Graphics software
- Utility/systems improvement software
- GIS software
- Technical software
- Imaging software
- UNIX is popular in Denmark both in the private and business sectors.

Data and Telecommunications

Danes are aware of Canada's strong sector capabilities in telecommunications and data-communications and there is definite positive attitude towards Canadian products and services. The telecommunications sector will continue to grow in the coming years as Danes complete digitalization of the telephone network and introduce ISDN. Deregulation on the equipment side has already taken place followed by the likely liberalization of data communications and other services and the possible liberalization of the telephone network.

The Danish telecommunications industry is significant by international standards in some niche areas and the main product categories are: cellular equipment, radio (mainly marine), fiber optic cables and telephone switching equipment.

Some expected growth areas are:

- 2MBIT Data-Communication: substantial demand from Danish industry to lease 2MBIT lines.
- X.25: Denmark has public X.25 Service but users remain few (due to lack of aggressive marketing). As integration with EEC progresses, we foresee increased usage of X.25.
- Cellular: two new national cellular services will be introduced in 1992 based on the GSM standard. One service will be privately operated and the other operated by the Danish Post & Telegraph.
- Increased sales of PABX's and data communications equipment.
- Ditto voice response systems.
- With the deregulation of public telephone network and data communication services, there will be increased demand from new service vendors for intelligent routing and billing systems.
- EDI (Electronic Data Interchange) and VANS (Value Added Network Services).

The key players are the Danish Post and Telegraph (Telecom Denmark A/S) and the four telephone companies: KTAS (Copenhagen Telephone Company), JTAS (Jutland Telephone Company), FT (Funen Telephone Company) and Tele Soenderjylland (Southern Jutland Telephone Company).

A private chain, Telepunkt, has recently been established by private investors as an alternative to the telephone companies, with respect to the supply of telephone set, PABX's data communications products, etc., to Danish end-users. This reflects general optimism with regard to future growth of the Danish telecommunications market. Other major Danish wholesalers/distributors of telephone products are Semco, Nordisk Solar and Louis Poulsen.

At present, there is also extensive interest in telephone automation products, ie. voice response systems, automatic attendants, teleconferencing products, etc. Finally, Telecom Denmark and the telephone companies are involved in a number of projects. The following is a brief overview of these projects:

- o Radio/Satellite: GMDSS (Global Maritime Distress and Safety System); Inmarsat C&A services (B&M services are still upstream); maritime VHF and MF radio/telephone services with direct dialling based on DSC; Skyphone for aeronautic

communications; Intelsat is used for transatlantic communications. Denmark's single earth station is situated in Blaavand, however, Denmark also has part ownership (as do the other Scandinavian countries) of the EIK earth station in Norway.

- Cable System: Introduction of a national Synchronous Digital Hierarchy (SDH) transmission system is expected in 1992/93. ISDN international traffic with Great Britain, France and Germany was established in 1990/91, following successful testing of Denmark's international ISDN exchange. An international exchange was opened in 1990 for 2MBIT's switching (Megamet) in connection with a trial network between Sweden, Switzerland, Finland and Denmark.

4) Other Electronics

Today electronics are applied to an ever increasing number of industrial and scientific applications. Danes are typically receptive to electronic solutions in new areas. Canadian companies with specialized electronic products are encouraged to contact the Embassy in Copenhagen for an assessment of their specific product.

5) Strategic Partnering

Danish industry in general is characterized by small to medium-sized enterprises which excel in niche-oriented products. Significant potential exists for Canadian suppliers of equipment and services to establish strategic partnering arrangements with them, for the EC Internal and Nordic markets and in the future Eastern Europe and the USSR. Similarly, Canadian suppliers also provide potential for Danish firms to focus on the North American market. This is reinforced by the many similarities in approach to business and social/cultural values shared by Danes and Canadians.

6) Defence Sectors

Defence Budget:

Overall budget: Approximately CDN \$2.7 Billion

Procurement Portion of Budget: Approximately CDN \$450 Million

Offset: Normally 100% (administered by the Ministry of Industry in communication with the Federation of Danish Industries).

IEPG Member: Yes

Possible Upcoming Projects

A) Airforce

F-16 update: will consolidate fighter capacity with additional F-16's, no decision yet on regarding new, used or leased from USA; MLS: new onboard

system to be purchased through NATO system and funding; Short range ground air missile system for 1995: needs range of ten miles plus; Update control/report system (ACCS);

The Airforce might also be purchasing Ammo/weapons for fighters (AMRAAM) (1997); New NATO identification system; Anti-radiation missiles (1996); and NAVSTAR satellite positioning system. †

B) Army

Light tank M41 Reliability Increase Programme; 50 armoured personnel carriers with machine cannon; New signal material; Training/simulation equipment for "Stinger" missile launchers, Training/simulation equipment for tank gunnery/tactical tasks; small arms training simulators; Antitank weaponry for Homeguard; 115/155 mm ammunition; gas masks; Night vision equipment (goggles and night driving viewers).

C) Navy

Bulk of Navy spending over the next few years will be related to completing "Stanflex" and fisheries inspection vessel programs. "Stanflex" is unique Danish/Scandinavian vessel concept with emphasis on high level of multi-role flexibility. Vessel design is modular allowing for rapid replacement of task related modules. For instance, ASW module can be replaced by mine sweeper module, etc. Danish Navy will be equipped with 17 Stanflex vessels.

Other Navy projects include: Renovation of helicopter operating from fishery inspection vessels; New series of sea mines; Mine sweeper module for Stanflex vessels; Light anti-ship missile defence system (LASMD) for patrol boats and mine sweepers (to fit existing 20/20 mm gun mounts).

LONDON, UNITED KINGDOM

Overview

The UK is Canada's largest market in Europe, accounting for one-third of Canadian exports to the EC, and will continue to be the preferred access route for Canadian trading interests into Europe. The existence in London of familiar support apparatus is the predominant reason why some 250 Canadian companies have chosen the UK to establish a European presence. The support apparatus includes Canadian banks, lawyers, accounting firms, similarity of law, relatively hassle-free acquisition/investment, mergers and monopolies policies, and of course language. Stimulus for this activity has undoubtedly been EC-92. With the expansion of the European marketplace to include the EFTA countries, market opportunities will increase, but so will competition. As a market for Canadian products and services, 1992/93 should see the UK coming out of recession resulting in increased demand for imports from Canada.

An increasingly important facet of doing business in the UK in most sectors, is quality assurance represented by BS5750 certification. UK customers are seeking assurance that their suppliers meet the highest standards of quality control in their operations. The UK leads the world with BS5750 in 1979, the first quality control standard, since widely copied and reissued in 1987 as the ISO9000 series of quality control standards.

Telecommunications

The UK telecommunications market is one of the largest, most developed and liberalised in the world, with spending estimated at \$5.9 billion in 1990, a rise of 60% over the previous five years (Source: TRC). It is estimated that the UK is the largest market for Business Telecoms in Europe, excluding basic public network services, at \$1.3 billion (Source: CIT Research). In mobile communications the UK is the largest cellular market in the world with over 1.3 million subscribers and it is estimated that revenues of about \$2.5 billion will be generated from mobile communications in the UK in 1991 (Source: CIT Research).

Traditionally, BT has been the major purchaser of UK manufactured equipment, taking 70% of total UK shipments, but this figure is falling as competitive pressures force BT to seek the best and cheapest equipment wherever it is manufactured. In addition new service providers have broadened the market for equipment. There are few large UK owned manufacturing companies, most being under foreign control and there are opportunities throughout the sector for innovative Canadian telecoms products and services.

In 1991 there was a further liberalisation of the market, allowing the entry of new long distance telephony operators. In addition UK Cable TV operators, many of them Canadian owned, were permitted to offer telephony services directly to their customers. At the same time British Telecom (BT) was tightly regulated to permit this new competition to flourish.

The UK does not use North American telecom standards, but CCITT, ETSI (European Telecoms Standards Institute) and BSI (British Standards Institute). The approvals body for most equipment is the British Approvals Board for Telecommunications (BABT). BABT Approvals can only be held by a UK registered company and it is strongly advised that Canadian companies do not use their distributor as approvals holder, but form their own UK company for that purpose.

Computing

The UK is one of the largest and most developed markets for computer products and services in Europe, with a strong local supplier industry in most sectors including mainframe computers (ICL-now owned jointly by Fujitsu-80% and Northern Telecom-20%). The UK market researcher, Ovum, has estimated that the UK "Information Technology" (IT) market was worth about \$23 billion in 1990, of which roughly 33% represented hardware. Billings of software and services in 1990 were over \$8 billion according to the UK's Central Statistical Office (SDQ9 Fourth Quarter 1990), whilst the Economist Intelligence Unit in March 1991 estimated the UK Packaged PC Software market at over \$680 million in 1990.

As in North America, the PC market has been one of the fastest growing sectors. Significant changes are occurring in UK distribution channels for PC hardware and software, mirroring developments in the USA. The first UK PC Supermarket, PC World, opened at the end of 1991 with support from major suppliers like IBM, Dell, Apple, Hewlett Packard, Microsoft, Lotus etc. Increasingly resellers are having to add value to the hardware and software which they sell, in order to compete with direct sales.

The best opportunities in the UK are for specialist vertical market software packages, with some unique features, running under Windows or UNIX, specialist computer peripherals, including multi-media and data communications equipment and devices.

Commercial Electronics

Total sales of electronic components to OEMs (Original Equipment Manufacturers) in the UK are approximately \$Cdn 5.5 billion per year, of which 30% is through distributors and 70% direct from manufacturers. The major suppliers are the US and Japanese multinationals. The highest-value components are semiconductors, which account for almost 40% of the total. Other significant items are connectors, valves and printed circuit boards, each making up around 15%. There are now few UK-owned electronics companies, of which the largest is the GEC Group.

Most companies in the commercial electronics sector have a clear view of the likely impact on their businesses of the Single European market at the end of 1992. However, some think it will have less of an impact than has been suggested, as developments have already been widely anticipated and the move into Europe is part of a well-established trend. Many electronic equipment manufacturers and component distributors have established subsidiary companies, or joint ventures in other European countries in preparation for the implementation of the Single European Market Act, or they are part of larger groups which already have an international focus.

The opportunities in the commercial electronics sector are mainly for specialist electronic equipment and sub-systems, especially anything related to environmental control which is becoming an increasingly important issue. The main standards used are ISO and CENELEC rather than North American, CSA/UL.

Instrumentation

The UK market for sensors, control equipment, measuring devices etc. is well-developed and sophisticated, and has withstood the effects of the recession relatively successfully. All types and sizes of company are present in the industry - manufacturers, distributors and importers, from multinationals to firms employing fewer than ten people. There are good opportunities for manufacturers of high-quality products at reasonable prices.

An important factor to bear in mind for mains-operated equipment is the difference in supply voltage between North America and the UK - it is 240V, 50Hz, and products that are fully adapted (and tested) will stand a greater chance of success than those that require additional transformers etc. Electro-magnetic compatibility (EMC) is also a significant issue. The European Commission's EMC Directive is due to come into force officially in January 1992, but this has been recognised as impractical under present conditions. A proposal has been made that a four-year period is introduced during which compliance will be optional; in addition, a draft interpretative document has been produced which is intended to clarify some grey areas.

Aerospace and Space

The primary focus of the UK space effort is on remote sensing. This is where the bulk of the UK's European Space Agency (ESA) contribution is allocated and POEM and the polar orbiting platform associated with the space station are the chief voluntary programs in which the UK participates. Even in this area the focus is on the use of the data which is collected. The UK has a number of very sophisticated users which have a world-wide interest and who would be valuable clients for any Canadian company. The UK involvement in communication satellites is focused on the payload as part of one of the

emerging European consortia. The UK has a long record of participation in Space Science experiments, primarily by building systems or detectors to be part of other's missions. Astronomy has been an area of particular interest.

The major UK company in the sector is British Aerospace, which at the time of writing was negotiating the merger of its space activities with Matra Marconi Space. These talks reflect the growing consolidation of the European space and satellite industry around two groups (Aerospatiale, Alcatel and Alenia are grouped with Mitsubishi and Ford Aerospace in Loral). Matra and Marconi are also in advanced negotiations with ANT, the space subsidiary of Bosch of Germany, to join their space group.

Defence

Britain is NATO's second largest spender with an annual budget of about \$45 billion. Nearly \$21 billion will be allocated to defence equipment procurement during 1991/92. This level of spending is expected to decline roughly 6% by 1993/94. Because of cost consciousness and the desire to provide the best possible equipment in the face of rising prices, current UKMOD procurement themes continue to be:

- promotion of competitive procurement
- reduction of over-elaboration on UK equipment requirements
- promotion of international collaboration and/or joint ventures among industrial teaming partners.

In calling for competition, the MOD is looking for value for money by stimulating enterprise and encouraging new ideas for the solution of defence problems. Incentive pricing will be used increasingly where it is realistic and cost effective to do so.

As the UK is now the free world's second largest arms exporter, there is a strong bias on behalf of the UKMOD procurement executive to source domestically; however, the recent calls for more value for money has created new market opportunities. It is now estimated that Britain imports about \$2 billion of defence equipment. Canadian exports of defence equipment to the UK in 1991 were about \$40 million. A favourable exchange rate should provide aggressive Canadian high technology companies with a unique opportunity to penetrate the sub-contract market. Britain's large defence industry requires high quality components and sub-systems that are world standard in terms of technology and price.

In September 1991, IBM won the largest British defence contract yet placed with an overseas company, with its successful bid to manage production of new Helicopters for the Royal Navy. The bid worth around \$3 billion, was made in association with Westland, which has developed the Merlin EH101 airframe with Agusta of Italy. The Merlin contract is of special interest to Canadian companies as negotiations for Canada's requirement for a New

Shipborne Aircraft (NSA), based on the EH101 airframe, are due to be concluded by March 1992. There are opportunities for Canadian companies to become suppliers on both programs.

In November 1991, bidding began on Bowman, a \$2 billion UK combat radio project which is expected to be the biggest military communications deal this century. Siemens Plessey Defence Systems has linked with Racal Electronics as sub-contractor. GEC-Marconi has teamed with the French state-owned contractor, Thomson-CSF to launch its bid and these two consortia are expected to be front-runners, alongside ITT of the USA. Bids are due to be in by February 1992 and two groups are expected to be selected in 1993 for a "demonstration" phase, partly MOD funded. A production order, expected to involve up to 60,000 radio sets, including UHF ground-to-air radios, is not expected until the late 1990s.

MUNICH, GERMANY

Market Facts

The German market for telecommunication products is the third largest market worldwide (ranking only behind the U.S. and Japan). The creation of the Single Market of the European Community (EC), the liberalization of the telecoms in general in the EC, and particularly in Germany, the unification of the two Germanies, and the need to upgrade telecommunication facilities in Germany, all combine to increase the demand for communication equipment and to make Germany a strong potential market for Canadian suppliers.

Canadian firms must commit themselves - senior management and resources - to the German market. They must be prepared to work with an organization (the Bundespost Telekom) that is transforming itself from a state monopoly to something akin to a private sector organization; and they must undergo the time-consuming and rigorous certification process to become a Telekom supplier. For those firms that are ready to undertake all of this, the potential rewards will be worth the effort.

Because of the variety of products and services, the massive job of creating a new telecommunications infrastructure in the old East Germany, and the (still unknown) factor of privatization, it is difficult to estimate the total size of the market. Nevertheless, the following figures provide some order of magnitude.

Market size:

1990:	old FRG	\$ Cdn 9100.00 million
1991:	Germany (total)	\$ Cdn 11000.00 million
1992:	Germany (total)	\$ Cdn 13000.00 million

The Bundespost Telekom which retains its state monopoly on networks plans to invest approximately DM 55 billion (\$ Cdn 39 billion) in the new provinces until 1997. In addition to that public investment, the private investment on telecommunication will increase the market size in Germany remarkably.

The current share of the German market by Canadian companies still is very small; total purchases in 1992 will be \$ Cdn 114 million, 2½ times the exports in 1990. However, the important fact is that Canadian companies are developing a reputation as developers and suppliers of world-class telecommunications products.

The process of liberalization of the telecommunications industry in Germany is proceeding slowly, but the German government is committed to it. The Telekom is being directed to act in a more 'free market' manner, and it is 'privatizing' some of its own

divisions. An early example of the new approach is the private mobile radio network (D2) awarded to Mannesmann Mobilfunk, the first private operator in Germany. Mannesmann also received a license for its own microwave network. Another example is in the change (since July 1990) permitting customers to purchase terminal equipment from private retail stores, provided that the Telekom had approved this equipment for use. Prior to 1990, equipment could be obtained only through the Telekom. These examples are typical signs of the direct influence of the demands of the market on the liberalization process of the German telecommunication market.

The further development of the Single Market of the European Community should lead to common European standards for telecommunications equipment. For Canadian firms this should mean that equipment approved in one Member State will be accepted automatically in all other countries of the EC.

The following short list indicates the most promising sectors for Canadian companies in Germany. It is based on Canada's recognized expertise, and is not meant to be all-inclusive nor to exclude other product areas. Because of Canada's reknown in telecommunications, Canadian companies should be well-received in Germany.

- ° Data telecommunication
- ° Digital telecommunication products
- ° Mobile radio
- ° Satellite communication

Market Access

Due to the liberalization policy of the Deutsche Bundespost Telekom, the access to the German telecommunication market for Canadian companies is already less complicated than ever, even if the Bundespost Telekom will remain the major customer for telecommunication equipment in Germany. To be successful in doing business with Telekom, it is necessary to present your company and your capabilities to their technical headquarters (FTZ - Telecommunication Engineering Centre - for all equipment except mobile radio; ZFM - Central Office for Mobile Radio - for mobile radio); but as well to meet with the Telekom management at its headquarters in Bonn.

The approval process for all kinds of telecommunication equipment will be handled by the ZZF (Central Office for Approvals), which is no longer an authority of the FTZ, but a ministerial authority. Canadian companies can contact the ZZF directly to obtain information on the approval procedures. A newly established ministerial authority, the BAPT (Federal Office for Post and Telecommunication) is responsible for technical specifications and frequency allocations. To facilitate the approval process, especially for foreign companies and following EC regulations, private test laboratories will be licensed by the BAPT in the near future to do the approval testing. The ZZF would be responsible only for confirmation and certification.

All tenders of the Deutsche Bundespost Telekom are published in the official journal of the European Communities. Interested companies also can receive this tender information through an on-line service.

The Consulate General strongly recommends that Canadian companies cooperate with German companies to market their products in Europe's largest market. The use of such a German company is considered to be a necessity as the Telekom has a strong preference for working with a 'German' company, with people who speak German, are familiar with the Telekom in Germany, and are readily available for questions, consultations, etc. Canadian firms can partner themselves with existing German companies or can establish their own independent presence in Germany.

Companies seeking to market terminal equipment should enter into a cooperation agreement with regional distributors, always remembering that these German partners will expect marketing and technical support from the Canadian supplier.

Trade shows are an important element of marketing in Germany. There are a number of potential shows in Germany in the telecommunications sector; however, special attention should be drawn to CeBIT. All Canadian companies marketing and selling in Germany should participate in CeBIT, either independently, or with their local partners.

The German Computer Market

Market Facts

The German market for computer hard- and software is the largest market in Europe and the third largest worldwide. As such it offers excellent opportunities for Canadian companies who have recognized products and are prepared to devote the required resources to marketing.

The German market for computer hardware and software can be presented statistically as follows:

Market size:

1991:	Germany (total)	\$Cdn	32000.00 million
	- hardware	\$Cdn	18000.00 million
	- software	\$Cdn	14000.00 million
1992:	Germany (total)	\$Cdn	38000.00 million
	- hardware	\$Cdn	20000.00 million
	- software	\$Cdn	18000.00 million

Canadian market share is very small, given the dominance of the large U.S. companies in both the hardware and software fields. Nevertheless, Canadian companies are expected to sell approximately \$90 million in 1992, a 50% increase over the sales figure for 1990.

It is important to note that 70% of the products sold in Germany are imported. German users are accustomed to this fact and therefore are receptive to non-German computer products.

As the new states that previously comprised East Germany are economically and industrially integrated into the new Germany, the market for computer products will expand accordingly. (Approximately 21% of Germany's total population lives in the states of the old East Germany.) New companies in the east will be seeking the most current technologies to ensure competitive and world-class production. In (the old West) Germany, the trend towards greater computerization will continue. German firms are faced with rising production costs, competition from other countries within and outside the European Community with lower costs, and a Single Market in which competition is anticipated to be even fiercer than at present. In order to meet these new challenges, German firms must be better and computerization is seen as one of the ways to stay on top.

The German market for computer products especially for software and services will be growing significantly (approx. 20% a year). The hardware sector which showed a slower increase in (the old West) Germany during the last two years will be pushed by the demand from the Eastern provinces.

Major promising sectors for Canadian companies

The following list is by no means all-inclusive. In the computer sector, Canadian companies can expect to be well-received if the products are of leading edge technology, well-priced, and supported by a local company. This list represents areas where Canadians are perceived as being among the best in the world and where Canadian firms already have established some market credibility.

- Software (e.g. UNIX-Systems, Document-Management Software, System Integration)
- CAD/CAM Systems
- Networking products (LAN/WAN)
- PC add-on products
- Peripheral equipment

Market Access

There are no legal or regulatory barriers to the importing, marketing or selling of computer hard- and software into Germany. However, there are technical standards which regulate primarily electrical safety and radio frequency noise reduction. If the product is

connected to telecommunication networks, a special approval by a state authority is required. Meeting these standards and specifications requires time, patience, and preferably local assistance. The regulations to achieve the approvals have been liberalized and simplified. Also the liberalization and standardization policy of the Single Market of the European Community should open the German market further as the standards will apply in all Member countries. A product approved in one EC country should be accepted automatically in all of the other states without further testing or certification.

Marketing in Germany is not a simple undertaking. In addition to the language differences, the market operates quite differently from North America. Germany is highly decentralized, and the business cultures vary from region to region. Canadian firms should tackle (and succeed in) the U.S. market before coming to Germany. The rough and tumble of the U.S. marketplace will be good experience for Germany; and success in the U.S. is a good selling point in Germany.

Canadian firms are strongly recommended to establish an identifiably German presence either through teaming with an existing German firm or by establishing an independent German subsidiary. Many Canadian software firms have adopted this latter option despite the higher initial costs. By doing so they have clearly indicated their commitment to the German market (a move much appreciated by German customers), and have established an organization that will be dedicated to the company's interests. Teaming with a local organization also can be successful; however, the Canadian company must work closely with the German partner to ensure the products are properly promoted and the German company gives the Canadian company due consideration.

German clients will expect that marketing, contractual, and technical documents all be in the German language. A local presence can ensure that the translations are done properly and in accordance with German laws and business practices.

Germany is very decentralized industrially. There is no single centre of the German computer industry. The states of Bavaria (capital: Munich) and Baden-Wurttemberg (capital: Stuttgart) are both recognized throughout Germany as having concentrations of German and foreign firms in the computer sector. Munich is the home of two major computer trade shows - SYSTEC and SYSTEMS. Canadian firms seeking a location for their German office may wish to choose one of these two cities (Munich has direct air links with Canada), or another city in Germany close to a concentration of their major customers (e.g. Frankfurt's financial centre).

Trade shows are important features of the German computer scene. Canadian companies should choose carefully in which shows they will exhibit, but exhibit they must as the German customers expect foreign firms to show their commitment to the market through such participation.

As the copyright protection of software is still a problem in Germany, it is recommended to formulate the license contract accordingly with the assistance of an experienced lawyer. It is planned that a regulation of the EC will help to solve this problem in future. The Consulate General in Munich is in a position to assist Canadian companies in identifying experienced lawyers to help Canadian companies work out suitable contracts.

Defence

The Federal Republic of Germany is Canada's second largest market for defence related products. Like many of its allies, however, the German government is drastically cutting its defence budget. As a result Canadian firms will find the German market much more difficult to penetrate in the future.

The German government has recently decided to realign its defence acquisitions to meet the priorities of the developing European security posture. In doing so, priority will be given to those elements of capital acquisition which will improve mobility, deployability and command and control.

Following, are the changes to the German military acquisition plan expected to lead to a reduction of DM 43.7 billion between 1993-2005.

Projects continuing at present level funding

- NATO-Air Command & control system (ACCS)
- Army command and information system
- Bundeswehr military intelligence analysis system
- Airforce command & information system
- Radar & command equipment for air space observation in the new Eastern provinces
- Bundeswehr message system including an automated command and message net for the airforce, a tactical radio net for the navy and an automated corps trunk net
- Army air defence reconnaissance command system
- Small airborne target locating system (army drone)
- NATO identification system
- Electronic reconnaissance and command system for all three branches of the military
- Mine clearance tank
- Parts of the artillery command and information system (target acquisition & passive location system)
- Anti-armour missile system, medium range
- Ammunition for artillery rocket systems
- Product improvements to army Roland system
- Product improvements to Gepard AAA system
- F4-F Phantom replacement (NFA 90)
- Tactical air defence system (TVS)
- Modular stand-off weapon

- Air to air missile medium range
- Close in air defence weapon for ships and boats
- Frigate 124 (phase 1)
- Mine hunter boat 332
- Navy support ships
- Navy helicopter
- Marine patrol aircraft (MPA 90)
- Anti-ship missile cormorant
- Torpedo - DM 2A3 (Sea pike)
- Anti-ship missile
- NATO helicopter (NH 90)
- Simulation for all branches of the services including weapons and shooting simulators, training and flying simulators, tactical simulators etc.
- Army training centres (maintenance and development)
- Decontamination equipment for NBC defence
- Family of un-armed (soft skinned) wheeled vehicles

Substantially reduced but continuing projects

- Reconnaissance vehicles
- RECCE drone (CL-289)
- RECCE equipment (TORNADO)
- LAPAS RECCE system
- Anti-armour-long-range (PARS 3 LR)
- Product improvement Main Battle Tank LEO 2
- Armoured fighting vehicle MARDER 2 improvements
- Armoured howitzer 2000
- Anti-armour helicopter (PAH-2)
- Army drone (reduced and delayed)
- Product improvement to Roland (airforce system)
- Tornado (reduction of planned improvements)

Projects with Decisions Pending

- Recovery vehicle tank (Buffalo)
- U-212 Submarine 1st phase reduction
- Army logistic bridge
- Product improvement bridge layer AVLG beaver
- Ammunition for all branches of the service
- Delay in phases 2&3 of U-212 submarine and new fast patrol boat until after 2000

Projects Cancelled

- Airforce RECCE drone
- Tank destroyer Panther
- Product improvement PAH-1 (night flight capability)
- Army mine laying system (DAVID)
- Product improvement HAWK-1
- Product improvement ROLAND (Navy)
- Anti-radar drone (Air force)
- Defence research ships
- Large general purpose defence engineering ship

The German defence market is best developed through partnerships with appropriate German firms rather than through agents or sales reps. Future prospects in Germany will by necessity demand Canadian participation in the early stages of R&D.

Aerospace

Germany is a major player in the European aerospace industry, its involvement in Airbus, ESA and a number of other European defence aircraft are witness to its growing strength in this industry. Since 1975, the German aerospace industry has registered the highest sales and employment growth rates of all manufacturing industries and 20-30% growth rates are projected through 1993.

Generally speaking, Canada is a relatively small player in the German aerospace industry with exports hovering in the \$200 million range (1990 - \$205,830,000); for January-September 1991 - \$126,685,000) mainly accounted for by aircraft, aircraft and engine components and flight simulation equipment.

At the present time however, Canadian firms have an excellent opportunity to become involved in major new aircraft development projects. BMW/Rolls-Royce Aero Engines are actively looking for Canadian component suppliers to become involved in the development of its new BR700 series of jet engines. Deutsche Airbus is planning to subcontract many of the components for the airbus fuselage to companies that accept payment in dollars, and the new DASA, Aerospacial Alenia consortium is currently looking for suppliers for its DAA92 (87-94 passenger) and DAA 122 (117-127 passenger) regional jet.

Canadian firms interested in pursuing these opportunities must be prepared to dedicate a significant amount of time, effort and money in working with the German firms in the development phase of these projects.

NATO

Commercial Opportunities through NATO

Introduction

NATO strategy, security policy and defence planning continue to be subject to detailed study as the consequences of the end to the Cold War work their way through the organization. The pace of change is making for difficult decisions in agencies which have control of commercial bid opportunities due mainly to uncertainty over budgets and future military requirements. The information to follow will give useful detail on programs and contacts. The identification of worthwhile bid opportunities and the progress of projects to the contract stage will, in the next few years, be problematic. The risk should, however, be manageable since most Canadian firms involved in NATO projects work at the sub-contract level.

Understanding the NATO Opportunity

It is important to note that the vast majority of military equipment purchasing is done by nations and not by NATO. Thus, while nations, for reasons of national sovereignty, control acquisition for their own forces, they have agreed to finance the purchase of certain systems through NATO. This equipment generally falls into the category of systems and facilities needed by NATO as a whole rather than for the benefit of a particular nation. It also includes purchases and works needed to meet broad military requirements.

Nations contribute funds to three NATO budgets: Civil, Military and Infrastructure. The first two finance occasional projects of commercial interest to Canadian firms, but the consistent opportunities of interest to Canadian industry are to be found in the Infrastructure program.

Realistic Opportunities

The rules governing NATO bidding are contained in document AC/4-D2261 (1987 edition) dated April 1, 1987. A review of this document gives the appearance of objectivity and fairness. In fact, while it defines a necessary set of ground rules, it cannot cover the multitude of practices used by nations to circumvent them. European nations have used procedural, administrative and rule manipulation to their own ends. This is particularly so for projects managed by geographical Host Nations given that a number of years can pass in the conceptual, planning and initial structuring of a project before it even enters the NATO system. Once in the system, it is difficult for nations with limited staff resources (such as Canada) to identify potential projects early enough to counter a well structured Host Nation industrial strategy. Even if we are successful in having projects go to International Competitive Bidding (ICB), we are often faced with standards, specifications

and procedural rules which amount to sole or limited sourcing. Canadian firms can often only break into this sophisticated process at the sub-contract level and then only if they possess the right product at the right price and if they have built and nurtured a relationship with a competitive prime contractor.

The process is much fairer and open when the Host Nation is an Agency such as NACISA or NAMSA, but even here early identification of projects and intimate familiarity with project details are essential in order to have a prospect of winning contracts or sub-contracts.

The ability of Canadian industry to win sub-contracts is enhanced where a Production Sharing (PS) agreement is in place. The best example is, of course, the NATO Integrated Communications System (NICS) Agreement.

In the past few years Canada has been instrumental in seeking to have an Industrial Benefits (IB) Agreement put in place for the Air Command and Control System contract. The final details of the Agreement are being discussed and should be operative by mid-1992.

TABLE OF INFRASTRUCTURE PROJECT CATEGORIES

- | | |
|----------------------------------|--|
| 1. Airfields | 8. Training Installations |
| 2. Naval Bases | 9. Surface-to-air Missile Installation |
| 3. Petrol Oil, and
Lubricants | 10. Surface-to-surface Missile
Installations |
| 4. Communications | 11. Ammunition Storage |
| 5. Navigational Aids | 12. Forward Storage Sites |
| 6. Warning Installations | 13. Reinforcement Support |
| 7. War Headquarters | 14. Anti-submarine and Surface Vessel
Warning Installations |

Communications, Command and Control

Of special interest to Canadian electronics companies, communications as a category covers strategic communications media and PTT long distance systems which include such items as cables (both underground and submarine), microwave radio links, optical fibre cables, troposcatter and meteor-burst links, satellites and satellite terminals, HF broadcasts and maritime links, and other mobile communications facilities. Some parts of the NATO communications system (for example, the ACE HIGH Troposcatter chain and the SATCOM satellite communications facilities) are operated by NATO-assigned military forces. Otherwise the facilities are operated by the country in which they are located.

Two other electronic categories of importance are navigation aids (which includes fixed and mobile TACAN stations and naval navigation aids), and radar warning installations (which includes early warning radar for air defence and coastal and mine-

watching radars with all associated communications links). As part of the Warning Installations category is the NADGE reporting system for the air defense of Allied Command Europe. Warning installations also form the main category for the NATO Air Command and Control (ACCS) program, a major update of the NADGE.

In the infrastructure environment a number of essential facts should be carefully noted:

- i) The buyers of equipment and services for the projects programmed under Infrastructure are agencies of the participating member nations, or are agencies of NATO itself; these acquisition entities are referred to as "Host Nations" even if they are not, literally, nations but are only NATO agencies (for example, NACISA or NAMSA).
- ii) The Infrastructure programme is administered by a pair of NATO committees, the Infrastructure Committee (policy and programming) and the Infrastructure Payments and Progress Committee (authorization, monitoring, and acceptance of projects); all participating nations have representatives on these committees and all decisions are required to be unanimous (i.e., any one country can stop any project).
- iii) These committees operate under carefully agreed, procedural rules as to the host nations, who must conduct the bidding and contracting of assigned Infrastructure projects in a way that does not contravene the rules on international competitive bidding (ICB).
- iv) The ICB rules are designed to create an environment of equality for firms from the different nations; provisions are made for any foreign firm to receive a hearing, at NATO, on any act by a host nation that appears to the firm's government to be biased and, if proved, the host nations must change their decision or act to conform to the decision of the NATO committee (or in extreme cases, to the decision of an arbitration panel).
- v) The ICB rules also require that, among the foreign competitors, prices must be compared free of all duties and taxes (even if they are, in some cases, paid by the host nation), and the exchange rates used for this comparison must be those in effect on the due date of the proposals regardless of when the award is finally made.
- vi) The quality of the materials or services proposed cannot be offset against price; thus no credit for superiority is possible; on the other hand, the bidder must be 100% compliant with all requirements of the specifications, otherwise he may be found unacceptable without appeal.

NATO does not take the position of being a systems integrator if it is possible to avoid it. Projects are therefore large and all-inclusive and the contractor must take responsibility for the final performance of the entire contract scope. This situation means that NATO itself does not issue a large number of small contracts; in consequence of this, specialty manufacturers must seek potential prime bidders in order to participate. Despite this indirect position, however, many such sub-contractors have been very successful because they know how to help the primes with their proposals and they lock themselves to the primes with sub-contracts that prevent the primes from substituting other, cheaper suppliers after winning the contract.

Where to Find Information in NATO Projects

NATO itself publishes no journal or other outside publication which advertises projects, materials or services that are to be purchased. O & M items are procured using lists of eligible firms maintained by the purchasing offices; a prospective seller must supply these offices with the necessary data on, and prices of, his catalogue products. NATO Infrastructure projects are planned by the member nations jointly with the NATO commands in their territories. When these projects are defined they are submitted to the relevant Major NATO Command (MNC). Currently, the MNCs are SHAPE in Central Europe, SACLANT for the Atlantic area, and CINCHAN for the NAVAL area surrounding the British Isles. If the MNC agrees that the project is necessary and has high enough priority, it is submitted to the NATO Staff and the International Military Staff for screening. If acceptable to these staffs and their associated Committees (Infrastructure and Military), the projects are made part of an annual programme called a "Slice".

A book with complete descriptions of these programmed projects is published for each Slice. Since it is classified it can be seen only by cleared industry personnel in their national delegations to NATO or in their MODs. This "Slice Book" is an important source of information on NATO projects since it shows what should be appearing for bidding in the next year to 18 months.

A more indefinite publication also exists called "ACELIP" (for SHAPE projects) and "MARCLIP" (for SACLANT and CINCHAN Projects). These together, which are soon to be rolled together in a "NATOCLIP", show the MNCs intentions over the next 5 to 8 years in the various categories. Since the items listed therein are not yet programmed, nor recommended for any given Slice, they represent a much lower probability of becoming addressable business than do the projects in a Slice book. They are, nevertheless, useful for the strategic plans of firms who like to plot more effectively their future activities. Since these books are also classified they must be viewed in an official location of a firm's government.

Projects listed in a Slice book show which nation is responsible to prepare the specifications, assemble the invitation for bidding (IFB) documents, solicit proposals, award the contract, administer the contract, and accept the final works from the contractor on behalf of NATO.

Once a project is included in an approved Slice, the Host Nation (or NATO Agency) must submit a detailed description of the entire project, which contains accurate estimates of its final cost, to the NATO Infrastructure Staff for analysis of its technical and financial viability. When this analysis (or "screening") is completed the finally recommended project is submitted to the NATO Payments and Progress Committee for funds authorization and approval to sign a contract.

The Host Nation uses a method of selecting the Contractor which is in consonance with the NATO rules.

How the NATO Nations Form A Bidders' List

At some point, usually before funding authorization, the host nation forms a bidders' list by notifying the embassies of the participating nations in the national capital of the host nation that they intend to let a NATO Infrastructure contract. The nations respond with a list of qualified, national firms. The notification from the Host Nation contains much useful information to a prospective bidder. Most of the nations receiving this notice advise their national industries of the opportunity. The government must certify for each firm on the submitted list that the firm is qualified both technically and financially to bid on the advertised project, and has the requisite security clearance.

As previously noted, NATO military headquarters normally buy operational and maintenance (O&M) spares and supplies from their own lists of suppliers.

Eligibility of Firms to Work for NATO

In addition to being located in a participating nation, firms wishing to bid on NATO contracts may have to meet other requirements. Normally a firm must have background experience and a reputation established in the skills or categories of equipment being bought. For larger projects firms must also have the financial resources commensurate with the size of a project. In some cases the project may have a military classification, or the performance of the project may require access to military facilities or information. In these cases the firm and all participating personnel must have national military clearances with a NATO supplement.

Marketing

Beyond the basics of eligibility are the nuances of how to market to NATO, i.e., how to win NATO contracts. The first problem encountered is where to find out what items are

needed and by whom. After this, a determination needs to be made of the degree of compliance of the firm's products or services to the NATO requirements. Thereafter it must be decided what would be the cost of pursuing the business and whether the potential profits justify the effort. Such a determination, as in other business activities, can only be established if the company acquires a knowledge of the NATO environment, the characteristics of the agencies which purchase the NATO supplies and services, and the bidding regulations.

Since it is always important to learn as much as possible about a project's details before the IFB is mailed, it is often desirable to visit the responsible agency in the host nation. It is not always possible to learn everything that could be desired there, but NATO itself (in the form of the headquarters staff and the delegations) is not involved in the specification-writing process and consequently cannot furnish much useful information about a project once it has been authorized.

Bid Procedures

The Infrastructure (project) procedures are all similar in the final step: the proposal is evaluated technically and, if compliant, is eligible for an award if its corresponding price is the lowest. The prices are always in separate packages from the proposals.

For simple projects the prices may be opened first. Thereafter the proposal with the lowest-price bid is evaluated; if compliant, it is awarded the contract. If not compliant the next-lowest-price bid is evaluated, and so on.

For complicated or large-scale projects NATO Infrastructure rules have two other, more elaborate methods. The less involved of the two is the "Optional Preliminary Bidding Procedure". Stated simply, this approach allows a first round of technical discussions and exchanges between the Host Nation agency, which is preparing the final specifications, and the prospective bidders of the official list. The most complicated NATO procedure is called the "Three-Step Bidding Procedure". This approach has not yet been used.

In both the latter methods the final step is the same as the normal procedure; the proposals are evaluated and those that are acceptable (i.e., compliant) have their price documents opened; the lowest price wins. Prices are not modified or offset by quality grading of the technical proposals or any other factor.

Operation and Maintenance Purchases

Materials and services for operation and maintenance purposes which are funded by the NATO Military Budget are bought mostly by the NATO military headquarters themselves or by NAMSA. The rules used depend on the size of the purchase. For simple items, the buyer needs only to get three quotations from suppliers of his choice. As the amounts increase the rules specify increasingly more formal procedures; written

specifications, sealed bids, etc. Generally a firm which produces business or technical equipment and related spares and expendable supplies, must be sure that the procurement offices and buyers at the military headquarters and at NAMSA have up-to-date information on their products and capabilities. For smaller items catalogues should be furnished with valid pricing included.

How the Canadian Delegation to NATO Can Help

Two sections of CANDELNATO can assist you in your quest for NATO business. The Finance Section sits on various Infrastructure Committees and can help track projects as they proceed through the approval process. The Defence Production and Armaments Section, headed by a trade commissioner supported by two military officers, can help to put your name on bidders lists and will generally represent your interests in NATO. For procurements effected by national authorities, we suggest you contact the trade commissioner in the Canadian mission in the relevant country.

For further information please do not hesitate to contact us.

PARIS, FRANCE

Introduction

In terms of industrial production and exporting, France stands fourth among the world's countries. It is primarily a high technology country with remarkable successes in telecommunications (CGE/Alcatel/Minitel), aeronautics (Aérospatiale, Snecma, Dassault), chemistry (Rhône Poulenc, Air Liquide), road and rail transportation (Renault, Peugeot, Michelin - TGV), and electronics, both public and military (Thomson). Its share of world markets represents 14% of the glass industry, 12% of the aeronautical, 10% of base organic chemicals, iron and steel and pharmaceutical products.

Because of the above, France has long had the reputation of being a market difficult to penetrate; however, with the globalization of the European market and the advent of large markets such as the NAFTA and Asia, French industry is growing increasingly flexible on account of its desire for competitiveness. The country's nationalistic spirit is being held in check to some extent by market realities. During the last quarter of 1991, for example, the French government decided to purchase water bombers from Canadair, and Air France purchased A340-A330 simulators from CAE Electronics Ltd, for the first time in more than 15 years.

Success on the French market usually requires involvement with local companies through cross-representation, development or joint production agreements, technology exchanges, joint ventures, etc. This usually involves a significant effort in terms of time and money, which one must be prepared to pay even if the Canadian product or service has a comparative advantage, which is also a necessary condition for penetrating this market. France is looking mainly for high-technology products or services from other countries with special or unique characteristics.

The Defense and Aerospace Industry

The French industry is a leader among Western countries in terms of the people employed (300,000) and its turnover (more than C\$20 billion). Its characteristics include concentration (the 10 leading companies account for 75% of the turnover in the sector) and specialization (aeronautics and electronics represent 54% and 26% of sales in the defence sector). In France, there is a close connection between military and civilian areas, especially in the aerospace and electronics industries. This industry concentrates heavily on exporting (60% in aeronautics) and is often owned by the French government either directly (as in the case of DGA) or by government corporations (Aérospatiale, Snecma, Thomson, etc.). French industry is continuing its efforts to regroup extensively, and for some years has been

restructuring in order to more effectively face European and other competition when the market opens in 1993. The end of 1991 saw the emergence of a few new groups in the electronics sector from the merger of existing companies (Thomson-CEA); a few others are in the works for early 1992 in the military and EDP sectors.

France is not immune to budget cuts, especially in the military sector. It must therefore see that its industry adjusts to this new reality at home and abroad. Thus the future for the French industry rests increasingly on cooperation with other developed countries; this will require a change in the supply policy, which in turn will lead to greater receptivity and more opportunities for our exports.

France is actively seeking partners for joint undertakings, as seen in particular with the countries of the European Community, where numerous military and civilian projects are in progress.

EDP

1. Equipment

In 1990, the market for EDP equipment totalled C\$22 billion. The figure will reach \$70 billion by 1994.

The total number of units is 200,000. Of these, 1.29% consist of large computers, 2.9% medium-size, 51.9% minis and 43.99%, small systems. In 1989, 750,000 micros were purchased, 80% of them by companies. Since most of the companies are equipped, most of the growth in the sector will occur in software development.

Among the large systems, 65% of the market is owned by IBM, Fujitsu and NEC. Among the mini systems, IBM and DEC have 33%. As for the micros, IBM has 25%, Apple 11% and Compaq 5%.

2. Software

On the basis of turnover, the French software industry stands first in Europe and second in the world. More than half of the market is developed by SSII (Société de Service et d'Ingénierie en Informatique); 32.5% by the builders themselves, and 16% by universities or independents.

There are more than 4,500 SSIIs in France; they have about 60% of the total turnover in the French software services market, which is valued at C\$12 billion, an increase of 16% over 1989; the work force numbered 70,000 in 1990. The largest companies were Cap Gemini Sogeti, No 1 in Europe and No 6 in the world, Sligos, CGI Informatique, and Métrologie.

France also has more than 3,500 vendors of software packages with varied profiles, including importers, French affiliates of foreign companies, and manufacturers. Of the software packages available on the French market, 78% were developed by French companies, 17% by American or Canadian companies, and only 5% by European companies. At present there are 59 software packages developed by Canadian companies being marketed in France.

Under the auspices of Ottawa, the Embassy has had a study conducted on the software market in France which has revealed possibilities in this market in the following areas: 4GL, LAN and WAN networks, GIS, utility, object oriented products and health systems. This study is available either from our offices or from EXTOTT/RWM and TAE.

At present, the best fair of interest to Canadian companies is the PC Forum, which is held each February in Paris.

The Electrical and Electronic Industries

With a turnover exceeding C\$60 billion in 1989, the distribution of production is highly diversified. Capital equipment represents about 80% of the turnover in the intermediate and consumer goods category, each of which represent about 10 per cent.

One special characteristic of this sector lies in the large number of companies involved: there are more than 1,500, employing a total of 400,000 people. However, 65% of the sector's turnover is produced by 38 companies, led by two powerful groups:

- CGE (C\$25 billion, 205,000 employees)
- Thomson-CEA-Industries (formed in 1992; C\$18 billion).

In electronics, four leading markets afford promising outlets for various applications. These are civil aeronautics, telecommunications, machine tools and automotive.

The distribution market, which lies at C\$6 billion, should increase with that of components. However, concentration should be accelerated by "Eurodistribution," a possible option between specialization and localization.

There is a growing thrust in imports of electronic capital equipment (professional electronics, EDP and telecommunications). Most of these imports are from the FRG (35%), the USA (10%) and Japan (6%). Canada exports about C\$200 million in this sector. The range includes printed circuits, integrated circuits, and miscellaneous signalling and security equipment.

The Salon International des Équipements et Produits pour l'Électronique "PRONIC" is a useful source of information and promotion: ELEC/PRONIC November 30 - December 4, 1992 PARIS.

The Market for Geographical Information Systems in France

On an emerging local market having a value of some C\$60 million with some 50 commercialized software packages, large-scale geographical information systems (GIS) lag somewhat behind in France in relation to the European neighbours, where digitalized geographical data are already available for large portions of territory (FRG, the Netherlands, the UK). The main categories of partners involved in this area are the following:

The territorial communities

Since 1982, the decentralization laws have given them the budgetary authority to manage heritage matters for cities and towns, tax administration, water purification and even road traffic and emergencies. In 1991, more than 100 communities were using GIS, while a few medium-size cities and towns were using operational urban data banks (UDBs). However, prospecting for a potential market of 3,000 municipal corporations and communities requires local referenced representation, which is available from Esri, Eurecart or Prosys.

National producers of geographical information

Include le Cadastre (computerized Cadastral plan), the National Geographical Institute (IGN) for topographical data, or surveyors.

Network management agencies

Including the national electricity or gas utilities (EDF-GDF Distribution), cartography for France Telecom, the postal system and the waterworks system.

Builders and assemblers of EDP systems

These are usually the engines for GIS applications. They include firms such as Clemessy, Siemens Nixdorf, Prime France, Intergraph, Icorem, Urbimap and Geomatique. The Americans are very strong in this area, having developed 36% of the software packages being marketed in France. Geomarketing, which includes follow-up of trade results and assistance in decision-making, is emerging as another area suited to GIS applications.

Finally, in remote sensing, exploitation of the data provided by space imagery also has a GIS application. The only independent space activities in France are being conducted by the Spot Image and France Telecom corporations. Spot Image (C\$44 million in 1991), an affiliate of the Centre National des Études Spatiales, covers the full range from space technology to servicing and commercial applications.

In sum, the GIS are a going concern. Their various applications have made this a very promising market, even though services to accompany the products are essential. The following trade fairs are valuable sources of information and promotion: MARI, April 1-3, 1992, Paris; SIG-GIS EUROPE 92, September 22-24, 1992, Paris.

TELECOMMUNICATIONS - FRANCE

Summary

There are major changes occurring in the French telecommunications marketplace. The key areas of competition in 1992 will be mobile services and private corporate networking - particularly in the multinational client market where offerings include LAN interconnect and facilities management. The new climate will encourage restructuring, reduced response time for product delivery, and increased innovation and cost reduction across all business areas.

France Telecom

France Telecom (FT) is state-owned and the monopoly provider of public voice services, although value-added services and mobile communications are now in a competitive arena. The provision of products and services is made possible by an unusual horizontal grouping of independent subsidiaries under a holding company that is 100 per cent owned by FT.

Minitel and Transpac

France Telecom's undoubted public success in the nonvoice arena remains the Minitel, the data terminal that uses the Teletel videotex services provided by the Transpac network. FT is now introducing a policy directed at raising revenue by making developmental upgrades to Minitel and finding new applications for it. For example, FT plans to maintain ISND (Numeris) compatibility with a new generation of Minitels and to provide additional interface devices such as smart card readers for them.

Minitel has stimulated the growth of France Telecom's data communications arm, Transpac. Transpac has already entered the large-scale value-added services stage in France. Transpac's efforts and market will change during 1992 with greater reliance placed on newer services, like EDI and X.40 networks that Transpac is introducing, and less on the basic but well-established X.25 services.

Mobile Communications

With the massive congestion on France's present systems, which are widely acknowledged as inadequate, mobile communications is set to explode in the next few years. To relieve congestion FT appears the most enthusiastic operator in Europe for both new

GSM digital cellular and Pointel telepoint-like digital cordless services, both of which are scheduled to start this year.

Dividing the two markets segments of cellular and cordless will be a consistent policy of FT in the foreseeable future to avoid the dangers of market confusion. Paging, also an important area for development and two way services, began last summer.

Conclusions

During 1992 the restructuring of the industry, guided by the requirements of EC directives on communications, will move into high gear. These changes should result in an increasingly competitive sector, more open to imports.

PRAGUE, CZECHOSLOVAKIA

Telecommunications

The modernization of Czechoslovakia's outdated telecommunications infrastructure is a priority of the CSFR government and is one of the areas targeted for World Bank and EBRD funding. Joint venture arrangements are in place with Bell Atlantic and U.S. West to establish data packet switching networks and a cellular telephone system. In addition, Alcatel and Siemens have been selected to provide approximately 60% of switching and transmission hardware for provision of digital overlay network, which will be the major telephone project in the CSFR for the next decade. Opportunities may exist for Canadian suppliers of peripheral equipment for data packet switching network. Because CSFR is eager to ensure technology transfer in the telecom sector, the degree of local content and technology transfer will be important factor in selection of future major suppliers.

Datacom

See above comments concerning data packet network.

Computing/Software

This will continue to be an area of significant growth, as ministries and enterprises move to introduce automation and modern information systems. Opportunities appear strong for Canadian producers of "niche" software or computer related materials suitable for the Czechoslovakia market. Desktop publishing, accounting systems, banking automation and records are all in process of development. In addition, the need to extend or improve the use of EDP (for public as well as financial services) creates a need for specialized software. Larger Canadian software or systems integration firms who are able to situate experienced personnel in the CSFR (ideally Czech or Slovak speaking) should do well, if they move quickly to take advantage of emerging opportunities in CSFR.

Instrumentation/process controls

This sector offers increasing opportunities as CSFR companies introduce more advanced industrial technologies and processes. Apart from possible export opportunities of instrumentation/process control products in a wide range of industrial sectors, Canadian firms could find opportunities for possible JVS or technology transfer to CSFR companies in this area.

Geomatics

Various opportunities exist in this sector, particularly given the high quality of Canadian products. A substantial remote sensing/GIS project recently approved by a task force on assistance to Eastern and Central Europe could provide an important reference

point for Canadian technologies, if supplemented by active marketing on part of Canadian firms. Opportunities will exist for advanced information gathering software, (particularly as CSFR users become increasingly aware of limitations of some of arcinfo and intergraph programs presently being purchased). The CSFR military is also interested in developing new line of maps. In addition, strong potential exists for processing of third country data within CSFR, given skilled Czechoslovak professionals are paid well below Canadian levels.

Aerospace

The CSFR has a significant and successful aerospace industry. The firm Aero manufactures the LET 410, LET 610 (35-seat commuter aircraft), and the L39 military training jet. As Aero seeks western markets for its products, opportunities could arise for Canadian component suppliers.

Defence and Commercial Electronics

There is strong interest in converting many aspects of CSFR defence industry from defence to civilian production, with foreign participation in such conversion welcomed. Canadian defence electronics firms with "dual-use" orientation may find joint venture opportunities here. Commercial electronics firms are currently undergoing process of privatization and are seeking to become internationally competitive. CSFR firms recognize foreign partners as important sources of capital, modern technology and management techniques, with excellent opportunities existing for partnerships through JVS and/or technology transfer arrangements.

ROME, ITALY

Overview

1991 was a year of mixed results for the high-tech sector in Italy. The worldwide computer crisis also affected the Italian market which experienced a marked slow down from previous years. In line with trends in other industrialized countries, Italy's computer hardware manufacturers suffered the most, (Olivetti alone laid off 6,000 workers in October, 1991) while on the other hand, the Italian software and services industries continued to grow, albeit at a slower pace. Concurrently, Italy's defence and aerospace electronics sectors also suffered from East-West disarmament trends while telecommunications and space activities, sustained by massive government investment, continued to post strong gains.

The overall information technologies sector (encompassing computer hardware and software, datacom and telecom, VAS, robotics and electronics) is valued at \$US48 billion or 4.6% of domestic GNP with per capita expenditures of US\$231 (versus \$374 in France, \$437 in Germany and \$612 in the U.S.)

Italian information technology is almost the same size as the Italian chemical industry (\$56 billion) and not that far from the highly successful clothing industry (total turnover \$69 billion). Item: The Fiat Group posted a \$53 billion turnover in 1991.

The Italian telecommunications sector grew 16.9% in 1990 and 13% in 1991 and now represents 56% of the entire information technology sector. All subsectors of telecommunications continued to grow: Value-added services (VAS) were up 14.8%; public telecommunications apparatus and services grew 14.4% and 12.1% respectively; private telecom systems showed an increase of 12.8%.

Massive government investment expenditures for the SIP Europa Plan for the updating of the national telecom network along with national spearhead programs in fibre optic cabling, digital telecom technologies, multimedia communications etc. should assure continued double digit growth into the 90's.

Aerospace Products, Instrumentation and Services

The principal firms in the Italian aerospace industry are Alenia S.p.A, Agusta S.p.A, Aeronautica Macchi S.p.A., Fiat Avio S.p.A. and Piaggio S.p.A. Alenia, Agusta and Aermacchi are all owned by the Italian government. Fiat Avio is of course a member of the Fiat Group, while Piaggio is an independent private firm.

Of the aerospace activities particular interest for Canadian industry are the ATR turboprop commuter aircraft produced by a consortium that includes Alenia and the French company Aerospatiale.

Alenia (formerly Aeritalia and Selenia) is involved in a number of other construction activities that offer the potential of industrial cooperation with Canadian industry. Alenia is a world leader in the construction of large composite structures and indeed is a participant in the MD11 program with McDonnell Douglas and in the 767 program with Boeing. The company is seeking cooperation with Canadian firms with respect to a number of aerospace projects, especially those involving composites.

Opportunities

The most promising opportunity at present for Canadian firms to engage in industrial cooperation with Italian companies in the aerospace sector derives from the New Shipborne Aircraft (NSA) Program of the Canadian Forces. Agusta S.p.A. together with Westland of the U.K. has established E.H. Industries Ltd. (EHI) in London which manages the EH-101 helicopter project. EHI is currently seeking the contract to supply the EH-101 as Canada's New Shipborne Aircraft. Under the NSA Program, E.H. Industries would take on very substantial obligations regarding industrial and regional benefits to Canada. Those obligations would ultimately be discharged by Westland and Agusta, through the purchase of goods and services from Canadian businesses. Agusta S.p.A. manufactures helicopters, fixed wing aircraft and a number of other aerospace products as described above.

Space Products and Instrumentation

Sector: National Space Budget 1990-1994: \$Cdn 6 billion + of which \$1.4 billion for 1992.

Trends:

Despite the current economic slowdown in Italy, and despite government concern over the public deficit which is approaching 100% of GNP, Italy continues to increase its investment in the space sector. This year's portion of the \$6 billion 1990-1994 Italian Space Agency National Plan (actual outlays must be approved by Parliament on a yearly basis) constitutes a 10% increase over 1990 and confirms Italy's position as third most important player in the European space panorama after France and Germany. The end of Communism and of East-West military confrontation, along with concern over Italy's role in the Open European Market of '93, has provoked renewed support to the country's high-tech sector and to industry's efforts to diversify away from traditional defence and aviation electronics. To this end, in addition to massive investments in telecommunication (see above), the government is continuing in its policy of strong support of the Italian Space Agency and of Italy's activities in international and national programs.

Opportunities

While remaining fully committed to ESA and to participation in ESA programs, Italy has recently increased its efforts to join in non-EEC space activity through bilateral space agency agreements targeted at specific projects.

Principal example of this is the ASI (Italian Space Agency)-NASA collaboration for the Saturn reconnaissance mission, CASSINI, for the logistics aspects of the Freedom Space Station, for the TTS (Tethered Satellite System), and for the X-SAR radar program mentioned above.

Other bilateral agreements are with Holland for the SAX astrophysics program on high energy X band propagation, with Russia for Astelit, the Telespazio/Italcable telecom satellite system, and with Germany for X-SAR.

Talks are underway for similar ventures with Japan and China.

The Italian Space Agency recently manifested strong interest in a similar accord with Canada and studies are underway to identify specific areas of cooperation.

Computer Hardware

Sector: Cdn\$9.6 billion

Principal Trends:

Increased global competition, rapid technological advances and reduced product life cycle as well as the consolidation of open systems procurement all contributed to reduced prices and profits for Italian hardware suppliers in 1991.

Italy's small and medium sized companies are now adequately computerized and have slowed down their hardware expenditures.

The huge Italian government public administration sector which in other countries serves as the catalyst and locomotive for domestic industry (France, Japan) in Italy has no coordinated informatics strategy and is only now beginning to harmonize its procurement initiatives.

The gradual move towards client/server environments along with the acceptance of international standards for open systems and datacom and telecom applications, have contributed to the marked increase in the number of Italian turn-key systems integrator companies offering everything from hardware brokering and installation to general and specialized software and telecom engineering services and instruction.

The 386, 486 and RISC processors have continued to cut into the mainframe and mini market and have increased the PC marketshare for high power technical and scientific processing. At the same time, Unix and Xenix continue to grow in Italy with now over 30% of the installed base.

Laptop and notebooks constituted 19% of all PC sales in 1991 with strong growth forecast for 1992.

Opportunities

The mass hardware market in Italy is highly saturated with all the major international players either present or represented here. Opportunities exist in highly specialized applications such as image processing, mapping, graphics etc. where Canadian companies linked with a suitable local partner have a chance at marketing a total hardware and software solution package along with the necessary support.

Computer Software

Sector: Basic and application software of the pc, mini and mainframe markets.

Trends:

While Italy is in great part self-sufficient in basic application software which must cater to local cultural and regulatory requirements, largely untapped markets exist in a variety of areas which are only now beginning to show rapid growth:

The need for CASE, CAD, CAD-CAM and specialized testing and technical software solutions is growing steadily due to the availability of increased processing power. The increasing popularity of UNIX and icon based graphic user interfaces and well funded government R&D programs in broadband communications (ISDN) and multimediality are sparking interest in 4th generation languages, object oriented programming, X-Windows CASE software and testing/control applications.

In banking and finance, investment is ongoing in electronic fund transfer applications, distributed-information client/server applications in wide area networks, and integrated PC based systems under Windows incorporating scanning, marking and signature-recognition capabilities.

In retail distribution, POS systems are beginning to appear in larger outlets incorporating label scanners, electronic fund transfer peripherals, laptops, and cash register capabilities offering inventory, cash-flow, personnel and security control in one package.

The Italian public administration sector is beginning to make concerted efforts at synchronizing and harmonizing the automation of government services. Currently, a big push is being made towards the optimisation of red-tape bureaucratic processes in which Italy is seriously behind. Projects are at various stages of development for the computerization of large data archives and the interconnection between databanks of various government archives and agencies. The concern over the huge public deficit and over controlling the underground economy have resulted in efforts to develop a national informatics strategy aimed at standardizing the citizen-government bureaucracy relationship around the social security number as in the U.S. Large government software companies have been formed within the major state holding groups to implement these strategies as well as to continue on parallel projects for the automation of territorial management, of the electoral process, of education, health care etc.

In almost all these areas, Italy remains years behind its major EEC partners (France and Germany). The modernization of Italian public administration has yet to really begin and remains dependent on the ongoing debate over the overall reform of Italy's institutional and political structure. There is no question, however, that it must happen soon if Italy is to keep its place in the open European market of '93.

Opportunities

As described above, opportunities abound for qualified Canadian suppliers willing to make the necessary commitment to the market. Such a commitment usually means teaming up with a local partner and cultivating the market over time. This is especially true when selling to the Italian government where procurement practices and relationships can be daunting for the uninitiated.

Telecom/Datacom Systems and Services

Sector: \$Cdn 3.4 billion of which 60.9% public services. Up 12.9% from 1990.

Trends:

As mentioned above, Italy is pouring sizeable resources into the upgrading and modernization of its telecommunications network.

SIP, the national telephone company is investing more than \$Cdn 43 billion in the next five years to achieve 66% digitalization of the Italian telephone network. Also, the Italian telecommunications sector is undergoing a process of unification and rationalization in preparation for the step by step EEC liberalization of a wide range of telecom products and services.

Opportunities

Major opportunities in high-speed data, wideband transmission, videoconferencing, ISDN products and services, telecom testing and control products and services, mobile services etc. exist for Canadian companies willing to establish a local presence in Italy or team up with an Italian company. To be successful in the Italian telecom market, it is not enough to have a winning product. Key elements are also perceived commitment to the market and strong political connections.

An in-depth market study of the Italian telecommunications market is available from either the Canadian Embassy in Rome or the Canadian Consulate General in Milan.

Value-Added Services (VAS)

Sector: Cdn\$.4 billion (+ 14.8%)

Trends:

1991 was marked by the reorganization of all public telecommunication services under one company, SARITEL, and by the advent on the scene of British Telecom and Cable & Wireless which operate on the market for international services catering to large private customers.

Overall the VAS market in Italy is finding it difficult to get off the ground due to a combination of immature demand, an as yet insufficient telecom infrastructure and high rates in a highly regulated sector.

The market in services for specialized sectors (aviation, insurance, banking, etc.) and for on-line data bases grew 14.1% in 1991 although companies that did best were those that could count on the guarantee of a totally or partially captive market. Value added services are one area sure soon to be deregulated in line with EEC directives. Preparation for what promises to be a lucrative market could already be seen at this year's SMAU, Italy's foremost telecom trade fair at which Pacific Telesis, Bell Atlantic, Sprint and other major players all participated.

Defence Products

Ninety percent of the overall requirements related to production and repair of armament material of the Italian Armed Forces (about 80% of production and 100% of repairs) are supplied internally by State military factories and civil industry.

Principal Trends

With the dissolution of the Warsaw Pact, and the removal of the cold war era threat of land invasion over its northeastern borders, the Italian armed forces are forced to totally rethink their deployment and equipment strategy.

While the emphasis was in the past on the development of a large tactical force of MDT's, support troops and ground attack fighters, recent events have focused attention on Italy's central role in the mediterranean and its ties to North African and Middle Eastern countries, requiring a stronger and more high-tech navy and air force, as well as upgrades in communications and EW.

At the same time, budget cuts in military spending in recent years have severely reduced available resources. Of present funding, over 50% is needed to cover personnel expenses, and 20% for maintenance, training and facilities, leaving only 30% for new weapons systems. Combined with the extremely low level of defence spending (1.75% of GNP compared with 3.8% in France, 4.2% in the UK and 6% in the United States), this makes the prospects of restructuring even more difficult.

STOCKHOLM, SWEDEN

General Background

Geographical Data: Population 8.5 million
Area: 187,900 sq. miles (486,661 sq. km), including territorial waters
Length from North to South: 978 miles (1,574 km)
Greatest Width: 310 miles (500 km)
Total Length of Coastline: 1,680 miles (2,700 km)
Territorial Limit: 12 nautical miles
Land Frontiers: Swedish-Norwegian border 1,025 miles (1,650 km)
Swedish-Finnish border 335 miles (539 km)

Swedish Industry

Mining and manufacturing employ nearly 1 million of Sweden's labour force of 4.4 million. Private companies account for 85% of industrial employment, national government (the State) less than 10% and producer or consumer co-operatives 5%.

More than 40% of the people in the industrial labour force work for one of the country's 20 largest companies.

Engineering, the largest sector of Swedish industry, accounts for more than 45% of industrial production and about 50% of Sweden's merchandise exports.

Electrical Engineering and Electronics

Sweden's electrical engineering and electronics industry accounts for only about 8% of the total output of the manufacturing industry. For 1987 the sales value of this whole sector's production was SEK 41,996 million, with exports accounting for approximately 70% of this total. The number of employees was 79,426.

These figures conceal a high-quality and highly specialized branch of manufacturing where the heavy electrical industry dominates, yet where the element of sophisticated electronics in various forms is becoming more and more evident.

The most important product groups are telecommunications products and telephone systems, electric generators, transmission equipment and electric appliances for industry including automation products, computer hardware and software, military and space electronics, domestic appliances, electrical consumer goods such as TV and stereo sets, and electric and electronic components.

The Structure of the Industry

The Swedish electrical engineering and electronics industry is dominated by a few large, internationally known firms with wide global ramifications. They are still fairly small compared with, say, American enterprises. Even so, it should be pointed out that of the six largest manufacturing firms in Sweden, three are active in the fields of electrical engineering and electronics.

ASEA AB (incl. ASEA Brown Boveri AB), which also owns Fläkt AB, had, in 1988, a turnover of SEK 108,775 million and a total of about 72,900 employees, of whom around 36,800 work abroad. In 1988 ASEA AB merged with the Swiss company Brown Boveri and formed one of the largest electrical engineering company in the world, ASEA Brown Boveri (ABB). ABB is a manufacturer of heavy electrical equipment specializing in electric motors, generators, transformers and switch gear, but it also produces electronic equipment for instrumentation and industrial robots.

The Ericsson Group which manufactures telecommunications systems, had a turnover of SEK 31,297 million in 1988 and employs about 70,900 persons, of whom 50% abroad.

Electronic Industry

To safeguard its neutrality Sweden invests large sums in maintaining a national defence establishment. Since the greater part of the necessary defence equipment is made domestically, the spin-off effect is at a very high level of know-how in such fields as military electronics. A typical example is the multi-role combat aircraft JAS 39 that is to be built in Sweden. A large part of the costs incurred in building this plane is due to its exceedingly sophisticated and robust electronic components.

The step from exacting military electronics to even more exacting space electronics is a natural one for a high-technology society.

One big step into the space age was taken in 1986 when the Swedish satellite, Viking, was launched. It is a magnetospheric research satellite designed to measure electric and magnetic fields, waves, particles and ultraviolet emission from auroral forms.

Another Swedish satellite, Tele-X, for direct television broadcasting and new specialized data and video services have been launched in 1989. Individual households in the Nordic countries equipped with small dish antennas will then be able to receive the television transmissions.

The overall program responsibility for marketing Tele-X data and video services lies with the Swedish Space Corporation. The major Swedish development work was carried out by Saab-Scania and Ericsson in cooperation with Norway and Finland.

Sweden takes part in European space efforts by being a member of the European Space Agency (ESA). Thanks to the ESA cooperation the Swedish industry has been able to develop special antennas and generators, microwave transmitters, dataprocessing systems including onboard computers and telemetry, tracking and command systems.

Swedish specialization in electronic sectors is also noticeable in the component sphere. Two companies, ABB-Hafo AB and Ericsson Components AB, have for years been developing and manufacturing custom-design integrated circuits which are used both in Sweden and abroad.

In cooperation with other Eureka countries, Sweden is a participant in a score of projects, chiefly within the fields of information and communications technology and materials science. Volvo, Saab-Scania, Ericsson and Electrolux are some of the larger concerns represented in Swedish project leadership.

In June 1987, the Swedish Government took the decision to launch a national information technology program for the development of modern computers, communications, and control technology. Participants include ASEA, Ericsson, Nobel Industries and Saab-Scania from the private industrial sector and from the public sector the Swedish Telecommunications Administration (Teli), the Defence Materiel Administration, and the National Technology Development Board. Investment during the coming three-year period is budgeted at SEK 1,100 million.

Defence

Security Policy:

Sweden has elected to be non-aligned and has not fought a war for nearly two centuries. In the event of hostilities, Sweden would be neutral. By guaranteeing that no foreign powers can gain military access to Swedish territory, Sweden aims to contribute towards security and defence in the Nordic area. This policy can only be credible by Sweden demonstrating its capacity to defend itself; hence Sweden has a strong, integrated defence system, based on the resources of the entire community.

Total Defence:

A thinly populated country such as Sweden has to mobilize the whole community to resist threats and attack. Sweden has a so called Total Defence System, the military and civilian parts of which are mutually supportive. The aim is for this system to be so strong that the advantages to be gained by an attacker would not be worth the necessary loss of time and resources.

Expenditure:

Every five years, following comprehensive studies by a parliamentary committee on defence, the Swedish Parliament passes a resolution on the aims and financing of the total defence system. In view of recent events in Eastern Europe, the five year period is being reduced to three and a major debate is under way on the level of defence expenditure to be set for 1992-1995. Present total defence expenditure is about CAD \$7 billion, of which 90.8% goes to military defence. Total defence accounts for an estimated 2.8% of GDP.

The Defence Industry

Sweden's defence industry contributes towards the credibility of the country's neutrality policy, by enabling the Swedish defence establishment to equip itself without risk of political commitment. 85% of the value of defence contracts is placed with Swedish suppliers, who in turn make foreign purchases for about 15% of the value of orders received. Current projects include a new armoured combat vehicle, the BILL anti-tank missile system, STYX (anti-tank) smart mortar system, a night version of the RBS 70 anti-aircraft missile, a new Västergötland generation of sterling engine submarines, land-to-sea and air-to-sea versions of Naval Missile 15, the 39 Gripen aircraft, and new base and combat control systems for the Air Force.

Marketing in Sweden

Without a Swedish representative, it is almost impossible to obtain the kind of inside information which is essential to selling defence equipment in Sweden. Background information on military operational requirements is not normally available and in addition to attending bid opening and pursuing commercial aspects of the military procurement process, a local representative with Swedish security clearance can provide invaluable guidance, without of course, divulging classified details to their foreign principal(s).

As noted above, Sweden places considerable importance on being able to assume (armed), neutrality in the event of a major European conflict. As a corollary of this, the country's military inventory must be locally maintainable, and many of its major systems have been designed and built by Sweden's 12 major prime contractors.

These prime contractors are naturally interested in maximizing their in-house development work and Canadian companies negotiating with Swedish companies would be well advised to involve their Swedish representative/consultant in such discussions to ensure a good balance between prime contractor desire and prime customer (FMV = Swedish Defence Material Administration) demands.

The list of foreign firms represented or having branch offices in Sweden is a virtual "Who's Who" of the world's high technology industries. Furthermore, there is a high positive correlation between companies who don't win contracts and those without representation.

Those phenomena underline the importance of the role played by local representatives on the Swedish market.

Non-Defence

The typical Swedish company is heavily dependent on trade for its continued prosperity and Sweden's total exports of goods and services account for about 35% of GDP. Sweden's exports, to a greater extent than most members of the OECD, mainly to Western Europe and North America. More than half of Swedish merchandise exports goes to five countries: The Federal Republic of Germany (FRG), the United Kingdom (UK), the United States (US), Norway and Denmark. Sweden's exports also differ somewhat from those of other OECD countries in that a large proportion consists of forest products and other basic industrial goods.

Sweden buys most of its foreign goods from Europe and North America, with the FRG and the UK alone accounting for about 25% of merchandise imports. Imports of machinery and equipment account for about 20% of the total. In recent years the overall volume of imports has climbed rapidly. Japanese cars have shown a particularly sharp rise in popularity and now account for nearly 30% of foreign-made passenger vehicles sold in Sweden.

Industrial and R&D co-operation with other European countries has intensified in recent years. In 1988, Parliament approved a government bill establishing guidelines for Sweden's policy with regard to European economic integration, especially the reforms that the EC plans to implement by 1992. The goal of this policy is to strengthen Sweden's role in European economic co-operation and an application from Sweden to join the EC has been made. EC membership is expected to be granted as early as the Fall of 1993.

Industrial Investment

During the 1980's, Swedish industry has shown a strong innovative spirit. This applies to relatively new sectors such as industrial robots, computers and biotechnology as well as more traditional specialists such as telecommunications, aviation, high-voltage technology and paper production. A few employees of R&D efforts over the past decade are Volvo's industrial environment projects, Saab-Scania's commuter airliner (the Saab 340), Ericsson's AXE digital telephone exchanges and mobile telephone systems, numerous development projects at Swedish pharmaceutical and biotechnology firms, research in semiconductors at ABB Hafo and Rifa, Siemens-Elema's advanced medical hardware and Mölnlyke's new paper and plastic-based hospital products.

Selling to Sweden

As with defence products, a Swedish representative is normally required, e.g., a commission agent, importer/distributor or wholesaler. Swedish companies avoid buying through export agents. Quotations should be made on International Chamber of Commerce (INCO) terms.

**ADDITIONAL INFORMATION ON THE ADVANCED TECHNOLOGY SECTOR
MARKETS WILL BE AVAILABLE ON SITE.**

THE HAGUE, NETHERLANDS

Canada-Netherlands Overview: A "High Tech" Perspective

In 1990, the Netherlands was Canada's seventh largest export market and the fifth largest investor in Canada. It is an increasingly important source of high technology and joint venture partners. Canadian exports to the Netherlands in 1990 reached Cdn \$1.45 billion, with imports from the Netherlands declining to \$721 million. Import and export statistics up until September 1991 indicate another strong year, with exports at \$1.3 billion and imports at \$450 million.

While a significant percentage of Canadian exports to the Netherlands are commodities, an increasing proportion of exports are manufactured end products, including computers and office equipment, machinery, and a variety of "high tech" equipment.

It is widely thought that the telecommunications sector offers excellent potential for outside suppliers, especially in view of the relaxation of national monopolies and the Single European Act which will open up the whole European market. In the Netherlands, the restructuring process has already begun with the deregulation of the PTT's monopoly of the customer premise equipment market. Manufacturers exporting customer premise equipment to Europe can base their designs on uniform telecommunications standards.

There have already been many Canadian successes in the telecommunications field in the Netherlands. Canadian companies have been successful in supplying voice mail equipment to Dutch PTT, facsimile switching equipment, and taxi dispatch systems, while others are aggressively pursuing opportunities in data acquisition and control systems.

The Total Dutch market for computer hardware, software and services in 1991 is estimated at between Dfl 17 and 18 billion (\$10.5 to 11.1 billion), representing an increase of some 6% over 1990. Sale of software and services, estimated at Dfl. 10 billion (\$6.2 billion), represented over 50% of the total. In the area of computer hardware, as in other markets, the larger mini-computers are being replaced by increasingly powerful PC's. Many Dutch companies now work with a multiplicity of either stand-alone or networked PC's. There are good opportunities for PC-related hardware, mainly peripherals and add-ons, particularly in relation to the increasing use of PC's in data communications, i.e. LAN and WAN products. Many brands of IBM-compatible PC's are already on the market. Sales of laptops made a relatively slow start in The Netherlands, perhaps because of the high degree of 'personal' PC ownership, but are now growing.

Both hardware and software sales have seen decreasing growth rates in recent years. While the computing sector as a whole is still enjoying growth of some 6% a year, sales in 1992 are expected to be some 4% above those in 1991 and growth rates in 1993/94 are expected to level off further to between 1 and 3% p.a.

Most software on the Dutch market is imported, mainly from the USA, although the domestic industry is growing. In view of different accounting procedures from North America, domestic suppliers are particularly strong in the standard business package sector. Use of UNIX is growing rapidly, which augurs well for overseas suppliers of UNIX-based hardware and software products. Market opportunities also exist in specialized technical software (e.g. graphics and CAD/CAM, desktop publishing, expert systems). Documentary Information Systems (DIS) and Electronic Data Interchange (EDI) are two important growth areas. The domestic software industry has, up to now focused on the Dutch market rather than on exports. It is also 'light' on R&D expenditures. In view of a more difficult local market, however, there are signs of increasing interest in expanding activities abroad - in Europe and elsewhere. Particularly the larger software developers may represent good potential for strategic alliances and other forms of technical and/or marketing cooperation.

The Netherlands is considered one of the most mature markets in Europe for Geographic Information Systems (GIS). There is substantial capability in this area within the local industry and, while this can sometimes be an impediment for overseas GIS suppliers, it means that there are good opportunities in The Netherlands for identifying strategic partners. The geographic and demographic differences between The Netherlands and Canada have resulted in different emphases in GIS expertise; while Canada leads the field in hard- and software for mapping large areas, The Netherlands excels in computer models for environmental monitoring and physical planning, for example, so that technologies developed in The Netherlands may usefully 'complement' those developed by Canadian companies. Many Dutch universities are active in GIS research and the University of Utrecht is the largest GIS research centre in Europe. There is a high level of cooperation in GIS development between various universities, the globally renowned International Institute for Aerospace Survey and Earth Sciences (ITC) and private sector software companies. The Netherlands Centre for Expertise in GIS (NexpRI), a joint venture between a number of universities and the ITC, aims to support and promote the use of GIS. It has an extensive databank on institutions with a major interest in geographic information handling, on GIS projects and sources of GIS expertise. A Canadian-Netherlands GIS Roundtable event will be organized on 30 March 1992 in Noordwijk, The Netherlands, immediately following the "EGIS" Conference in Munich (23-26 March).

Annual sales of Instrumentation are estimated at some Dfl. 6 billion (\$3.7 billion). The rate of growth, while still a healthy 7% p.a., has levelled off somewhat over the past three years. During the course of the 80's, sales in this sector doubled, as did the number of members of the influential instrumentation trade and industry association, "Het Instrument". Increased sales are mainly evident in industrial automation (around 10% annual growth) and laboratory instrumentation (8%). The growth rate for instrumentation for the medical sector is currently around 5%. The sector is characterized by a mixture of manufacturers, traders and, increasingly, combinations thereof. Most companies are smaller, specialized organizations. In total, some 600 companies employing 12,500 people are active in this sector. There are relatively few companies which are solely manufacturers and these represent only 6% of total sales; many companies combine manufacture and

import/distribution. Imported equipment accounts for some 70% of total sales, Japan, USA, Germany and Switzerland being key sources of supply. Some 6,000 foreign manufacturers are represented on the Dutch market. An increasing number of trading companies are starting to manufacture or assemble at least part of their range. While 75% of sales by Dutch companies in this branch are on the home market, exports, both in purely "Dutch" equipment and in equipment assembled for foreign manufacturers in The Netherlands, are increasing. Over 50% of all exports are within the EC. In this technologically sophisticated, competitive market, good opportunities exist for suppliers of high quality instrumentation, particularly for industrial automation and process control applications, industrial electronics and (industrial) laboratory use. Increasing environmental concerns indicate a promising market for environmental monitoring instruments. The increasingly export minded local companies, often combining manufacture of their own products with import, distribution and sometimes assembly of foreign-produced instruments, can represent good opportunities for strategic partnerships and other commercial alliances of markets additional to The Netherlands itself. A Federal trade mission of some 10-12 Canadian instrumentation manufacturers will be organized to coincide with this year's key instrumentation trade fair, "Het Instrument" (6-10 April 1992).

In terms of major projects in the defence sector, the Netherlands is a member of the Independent European Program Group (IEPG) which publishes its military requirements and awarded contracts with a value of one million ECU's or more in regular bulletins. The Dutch Ministry of Defence screens or prequalifies its potential bidders, and requests certain information about a company before it will be registered as a potential supplier. A company's reputation, financial status, and capabilities are usually verified, and enquiries may be made about past performance. To register, a Canadian company must send a request to an Issuing Branch, which in the Netherlands is: Ministry of Defence, Directorate-General of Materiel, DMLB/MVG/IEPG/Focal Point, Attn: Th J. de Grood, P.O. Box 20701, 2500 ES The Hague, The Netherlands. Projects or anticipated supply requirements of interest to Canadian companies include: simulators, TACAN project, remotely piloted vehicles, sonars, minesweeper systems, NBC equipment, communication masts, small arms and ammunition, gas masks, as well as a variety of related components and electronic equipment. There have been modest reductions in the Dutch defence budget in the past year, and a Defence White Paper delivered in March 1991 outlines the restructuring of The Netherlands' military services. A major emphasis on this restructuring and procurement is to ensure the flexibility and mobility of the forces. It is also expected that there will be much greater emphasis on cooperation with NATO allies in research and development projects, as defence funding grows leaner.

Holland's aerospace industry is a concerted, national enterprise, centered around the independent commercial aircraft manufacturer, Fokker. Fokker has produced more than 1300 short-to-medium haul commercial airlines in the past 3 decades, initially the F27 and F28 and more recently the F50 project and the F-100 fanjet. One of the partners in the Fokker 100 program is Bombardier Shorts (wings), and a major subcontractor of the Fokker 50 program is Pratt & Whitney Canada (engines). Since 1987, Fokker has been a European

co-producer of the F-16 fighter aircraft for the Royal Netherlands and the Royal Norwegian Air Forces. Besides Fokker, there are some 50 small to medium-sized companies in the aerospace field operating in specialized design, production, repair and overhaul of various aerospace systems, components and parts. Canadian companies wishing to approach the Netherlands aerospace market would be well-advised to work through the Netherlands Agency for Aerospace Programs (NIVR) or the Netherlands Aerospace Group (NAG), both of which work closely with the industry.

The Netherlands has some 425 companies in the electrical/electronics industry, including the major player Philips, as well as subsidiaries of well known multinational manufacturers such as Siemens, AEG, Texas Instruments, Foxboro. The industry as a whole focuses more on finished electronics products and sub-assemblies than on components. In view of recent cut-backs in Philips manufacturing activity and to a smaller extent cut-backs by others, it is questionable whether great market opportunities exist for components within the short term. On the other hand, the Netherlands' stronger base in manufacturing telecom equipment, high-value electro medical equipment, some office equipment and military electronics may create opportunities for specialized components manufacturers.

Dutch capability in "high tech" industries, which are usually well-integrated with the 300 plus firms as well as universities and institutes which undertake research and development, make the Netherlands an important partner for joint technology cooperations as well as a source of technology. The Netherlands also maintains a strong role in EUREKA, ESPRIT and other pan-European technology programs. Biotechnology is an area where active cooperation is being pursued through a pilot project. Advanced industrial materials and the environment appear to be the most suitable possibilities for joint projects in telecommunications, language and image processing, new production systems, transportation and logistics systems.

UNITED STATES

ATLANTA, GEORGIA

The territory covered by the Atlanta office includes Georgia, Florida, North and South Carolina, Tennessee, Alabama, Mississippi, Puerto Rico and the U.S. Virgin Islands.

Electronics

Demand for printed circuit boards and allied components continues to soften. However, there is still significant business especially on the mil-spec side. Major players are located in Huntsville, Alabama and include Teledyne Brown, Avex Electronics, SCI and Boeing Corporation. Additionally, AT&T Federal Systems in Greensboro, North Carolina is a major buyer of mil-spec printed circuit boards and components.

Unless a firm is prepared to visit the territory on a bi-weekly basis, Post feels appointment of a commission based manufacturers representative is of paramount importance. The Post is in the process of preparing a major study of printed circuit board buyers in the southeastern United States and will make it available to interested Canadian manufacturers upon completion and upon their request in June 1992.

Telecommunications

Growth in this sector continues despite the recession albeit at a slower pace.

Except for the Regional Bell Operating Companies, BellSouth being the largest in North America, Canadian companies should not attempt to sell directly to telephone operating companies or interconnects but rather they must establish themselves in the classic telecommunication distribution channels i.e. telecom supply houses. Two telecom distribution companies with nationwide offices and warehouses are headquartered in the Atlanta Post territory. These are Alltel Supply in Atlanta and Power and Telephone Supply in Memphis, Tennessee. Although Anixeter, Graybar and North Supply have warehouses in Post territory, all their buying is done at headquarters located outside of the southeastern territory.

Product specific categories incurring growth phases include ISDN, Compatible, Customer Premise Equipment, and Lan to Lan Interfacing Products such as Frame Relay. X.25 packet switching demand is declining as the migration towards Frame Relay continues. Additionally, BellSouth continues the migration towards fiber optics in the central office and subscriber loop. AT&T has its international procurement office in Greensboro, North Carolina but as a result of Post activity several years ago, they set up a procurement office in Toronto to procure Canadian telecommunication products. Therefore, Canadian firms should contact Sandy Lyle, a procurement manager at AT&T's Toronto office at (416) 756-5018.

Computers

Although all distribution supply houses have warehouses in the southeastern territory, all do their centralized purchasing in California. The three largest distribution supply houses in the computer distribution business are Merisel, Ingram MicroD and TechData. It is essential that Canadian computer vendors establish their products with one or all of these distribution houses, otherwise selling expenses and credit risks will overwhelm the Canadian vendors especially small ones. The trend in these products for the PC side continues to include emphasis on GUI (Graphical User Interface) as well as the migration towards the 486 CPU.

In software, a strong demand continues in basic applications such as word processing and accounting. Specialized application software may be marketed directly in vertical markets and this would include high end scientific and engineering applications. Orlando, Florida and Huntsville, Alabama are major centers for this type of application software.

Significant growth in the workstation environment will continue as the installed base of Sun Microsystems workstations continues to proliferate. Application systems (AS 400 mid-range applications) appeared to have minimal growth. The supercomputing trend "mini-super computers" is significant. Canadian firms should look at the application software in this downsized parallel processing environment. The rapid growth of multimedia continues unabated and also presents significant growth opportunities.

Within the seven (7) state region, there are several centers of concentration of high technology industry including the following:

- Atlanta, Georgia - Aircraft and Missile Production and Procurement
- Huntsville, Alabama - NASA, SDI, U.S. Army Missile Command. Research and Development and Procurement
- Raleigh, North Carolina - Research Triangle Park, Research and Development, Production of Electronic Systems and Components (generally telecom and environment related).
- Oakridge, Tennessee - Environmental Research and Development and Procurement.
- Bay St. Louis, Miss. - Research and Development of Ocean Technologies; Research and Development and Production of NASA Program-Related Systems and Components.

Major military commands within the area include the Warner Robins Air Logistics Center in Warner Robins, Georgia which procures a wide variety of electronic, aircraft,

missile and vehicle parts and components; U.S. Army Missile Command and U.S. Army Strategic Defense Commands, both located in Huntsville, Alabama which undertake significant research and development activity (approximately \$10-14 billion US).

Significant defence and high technology prime contractors located in the Post territory include:

LOCKHEED - GEORGIA, COMPANY, Marietta, Georgia
VF-22 and C-130 Aircraft and C-17 Wing Production;
Electronic Countermeasures Components Production;
Advanced Radar Test Bed R&D, Flat Cockpit Displays

ROCKWELL MISSILE SYSTEMS DIVISION, Duluth, Georgia
Air - To - Ground Ordinance

NORTHROP CORPORATION, Perry, Georgia
Aircraft Component Assembly (plant under construction)

DUPONT - SAVANNAH RIVER PLANT, Augusta, Georgia
Nuclear R&D, Waste Water Treatment, Biotechnology

RAYTHEON MISSILE SYSTEMS DIVISION, Bristol, Tennessee
R&D and Production

AVCO AEROSTRUCTURES TEXTRON, Nashville, Tennessee
Aircraft Structures, B-1 Bomber Wings

BOEING AEROSPACE, Huntsville, Alabama
Space Station Work Package I

SCI SYSTEMS, Huntsville, Alabama
Electronic Component Systems Manufacture and Assembly

INTEGRAPH, Huntsville, Alabama
Computer Graphic Systems R&D and Production

INGALLS SHIPBUILDING - DIVISION OF LITTON INDUSTRIES, Pascagoula,
Mississippi
Arleigh Burke Guided Missile Cruiser

MARTIN MARIETTA, Orlando, Florida
Aerospace and Missile Systems

GRUMMAN AEROSPACE, Huntsville, Alabama

Aerospace and Missile Systems

FORD AEROSPACE, Huntsville, Alabama
Aerospace and Missile Systems

G.E. AEROSPACE, Huntsville, Alabama
Aerospace and Missile Systems

MCDONNELL-DOUGLAS, Huntsville, Alabama
Aerospace and Missile Systems

NASA has three of its five major installations in the region:

MARSHALL SPACE FLIGHT CENTER, Huntsville, Alabama
Engineering Primary Procurement and R&D

STENNIS SPACE CENTER, Gulfport, Mississippi
Atmospheric Studies, Engine Development

KENNEDY SPACE CENTER, Orlando, Florida
Space Port Operations

BOSTON, MASSACHUSETTS

Telecommunications and Data Communications

Telecom and datacom represent two of the fastest growing subsectors in the economy of New England providing many opportunities for Canadian companies in the form of OEM agreements, collaborative product development and joint marketing.

The most active local companies are: Wellfleet Communications, Bedford, MA (LAN and WAN software and hardware), CrossComp, Marlborough, MA (LAN and WAN bridges and routers), Cabletron Systems, Rochester, NH (local and remote bridges, network interface cards and associated software), PictureTel Corp., Peabody, MA (Videoconferencing systems), Chipcom, Southborough, MA (broadband, fiber optic based LANs), Banyan Systems, Westborough, MA (network operating system software), New England Telephone, Boston, MA (long distance telecommunications services), and Zoom Telephonics, Boston, MA (Telephone network interface devices and modems).

Computing - Hardware, Software and Geomatics

Hardware

New England, once the world minicomputer center, has experienced a sharp decline in its computer hardware industry. DEC, Wang, Bull and others have had steadily declining profits over the past two years and the entire industry is in a restructuring phase. Several companies, most notably Data General, Westborough, MA (AViion workstations), Thinking Machines, Cambridge, MA (massively parallel supercomputers) and Stratus Computer, Marlborough, MA (fault tolerant super minicomputers), have outperformed the industry and represent good targets for Canadian companies with compatible technologies. OEM agreements with all hardware vendors are possible if a Canadian company can supply a strategic technology.

Software

As hardware profits have fallen, most of the large computer companies have focused larger parts of their organizations on systems integration and services. In this arena Canadian companies with software and technology in specific vertical markets (e.g. transaction processing, reengineering, CASE and associated technologies) are favoured.

The New England software industry continues to grow and flourish. Partnerships and subcontracting arrangement on large systems integration contracts represent the best bets for Canadian companies. Also, companies with industry specific application for banking, financial services insurance, environmental and medical, will find a ready market in New England.

Geomatics

The best markets for geomatics products are Woods Hole Oceanographic Institute, Woods Hole, MA (marine and environmental), the Naval Underwater Systems Center (NUSC), Newport, RI (marine), various universities (MIT and the University of Rhode Island), and state and local governments.

Instrumentation

New England is a rich market for instrumentation companies. All of the major hardware and telecom companies described above represent a slice of the market as do highly diversified companies such as Thermo Electron and EG&G. Particularly interesting opportunities exist for medical instrumentation at hospitals and medical research centers and environmental instrumentation mostly related to environmental monitoring.

Defense Electronics

Defense electronics spending by the U.S. Department of Defense (DoD) in FY92 has been budgeted at approximately the same level as the previous year (\$278.3 billion). According to a recent article in Defense Electronics, the wave of the future in defense electronics will be in areas such as product miniaturization (power supplies and sensors) stealth/counterstealth technologies, cockpit night vision, high-performance computing and advanced electronics manufacturing techniques to name just a few.

New England defense electronic firms in a position to facilitate these requirements are: Lockheed Sanders (Nashua, NH), Raytheon Company (Lexington, MA), Sikorsky Aircraft (Stratford, CT), Pratt & Whitney Aircraft (E. Hartford, CT), G.E. Aircraft Engines (Lynn, MA) and GTE (Needham, MA).

CLEVELAND, OHIO

(OHIO, KENTUCKY, WEST VIRGINIA AND WESTERN PENNSYLVANIA)

Trade development and promotion in the foregoing territory is the responsibility of the Canadian Consulate in Cleveland and its three satellite offices in Cincinnati, OH, Pittsburgh, PA and on the Wright-Patterson Air Force Base near Dayton, OH.

Trade Overview

The population in the territory is nearly the same as in Canada. Of the 50 states, Ohio is the 2nd largest exporter to Canada and 5th largest importer of Canadian products, accounting for 64% of Canadian exports to the territory. Fifty-seven "Fortune 500" firms are located in the territory. In 1990 total trade was \$19.58 billion, which is greater than that of France, UK, Germany and Italy combined!

Total Canadian exports to the territory in 1990 were \$7.96 billion of which the main categories were transportation equipment (27%), metals and minerals (30%), forest products (24%), chemicals and plastics (15%). Total Canadian imports were \$11.62 billion, of which transportation equipment, including autos and parts, were by far the largest product sector, followed by coal, minerals and alloys, plastics and consumer goods.

During the past decade, the region has lost much of its traditional heavy industry (steel making for example) but has more than replaced the jobs lost with new firms in such sectors as computer software, new "transplant" auto factories, medical research and treatment and other high-tech service industries. Traditional heavy electrical firms in the region, such as Westinghouse, are doing much more outside sourcing of components and assemblies and the multitude and variety of telecommunication suppliers has led to a much more fragment market than existed during the Bell monopoly. In Pittsburgh alone, over 700 new high tech firms have started up over the past 10 years and all are much less tied to traditional suppliers than the older generation of American companies. What is left of traditional heavy industry is finally making new investments in updated plants (often in partnership with foreign firms) so some niche markets exist for specialized industrial machinery and consulting services.

In general, we think the Cleveland territory offers excellent opportunities to firms in nearly all sectors, especially as a second market to companies who perhaps have a "toehold" in the region just across the border from their Canadian location and are wondering where to go next. In many cases, coming to the Cleveland territory may be a better move than deciding to head off to the more complex markets of New York or Los Angeles. Highlights of the main technology sectors are described in the following paragraphs.

Software Development

Software development in Pennsylvania has been a leading high-technology industry from day one. The world's first electronic computer was created at the University of Pennsylvania - thirty tons of hardware that could perform amazing feats and split-second computations.

Today's organizations, such as the Pittsburgh Super Computing Center (home of the Cray Y-MP 5th generation computer), the Software Engineering Institute, and the Carnegie Mellon Artificial Intelligence Center, are world leaders in their respective fields. Pennsylvania is a US center for software and datacom development. With over 500 software related firms across the state, southwest and central Pennsylvania serve as home to approximately 55% of them. Pennsylvania is home to more than 5% of the nation's 9,600 companies which have indicated an involvement in software and/or hardware.

There is interest throughout the state of Pennsylvania in looking at and working with software developments through technology transfer avenues. It is important to develop these strategic alliances as opportunities arise.

There are often opportunities for software development programs for the US Air Force at Wright-Patterson AFB near Dayton, Ohio, for application to new aerospace and avionics products and for logistics support. Most of these require the contractor to have key contacts for the contract within a 25 mile radius from the base. For this reason, teaming arrangements (strategic alliances) are strongly recommended, to compete successfully.

Technology Transfer Opportunities

Sources of technology in the territory are primarily in Ohio and Western Pennsylvania for industrial products and processes in the sectors described in the overview. In addition, the equine industry in Kentucky is a potential source of specialized technology related to this industry.

Note that technology development organizations (eg: "Edison Centers" in Ohio) are heavily supported by State funds, there may be restrictions on technology transfer outside the State concerned. The same is true for certain technologies available from NASA organizations (Lewis Research Center near Cleveland, U of Pittsburgh), however there are fewer restrictions on technology developed by individual labs of the Federal Laboratory Consortium, such as the Wright Laboratories. Some of the larger universities have technology licensing offices and do certain technology development under contract (e.g. U of Dayton had \$35 million in research contract in 1990).

Instrumentation/Western Pennsylvania

The instrumentation sector in Pennsylvania and Ohio is an ongoing reflection of the industrial manufacturing equipment and supply needs in the region.

The regional chapter of the Instrument Society of America (ISA) holds an annual trade event in Pittsburgh.

As industrial manufacturing across all sectors modernize and expand, the need for new instrument and control equipment will also expand. However, expansion and need in this sector is directly tied to economic recessionary pressures. The area of specific growth within the sector is in R&D and instrumentation for environmental quality control. This would include air and industrial waste water control mechanisms.

Defence Market

The gross defence market in Ohio is approximately US \$20 billion annually. This includes major multi-year procurement programs at Wright-Patterson AFB such as F22, F15, F16 and other aircraft, missile programs, etc. These have limited opportunities for foreign participation, except as subcontractors to US prime contractors, most of which are located outside the territory. Aeronautical Systems Division funding for RDT&E (Research, Development, Test and Evaluation) plus procurement was \$14 billion for FY 91. Of this, approximately \$2 billion were contracts to Ohio industry. In addition to Acquisition by ASD and R&D contracts from Wright Laboratory, another important market at Wright-Patterson AFB is the Wright-Patterson Contracting Center (WPCC). WPCC issues contracts for approximately US \$1.5 billion annually, for requirements of base maintenance, laboratory supplies and Air Force Logistics Command (AFLC) requirements. On July 1st, 1992, the AFLC and ASD will be merged into Air Force Materiel Command.

For the year ending December 1989, Canadian defence exports to the Consulate's territory totalled \$49 million, of which over 90% were sold to Ohio industry, military bases and Defense Logistics Agency Supply Centers (DCSC, and DESC). Sales to West Virginia were negligible. Because of cuts in personnel at all military establishments, but a continuing need for development tasks, technical services, contracts and logistics supplies (i.e. build to print) for military products currently in service, it is estimated that a realistic market for qualified Canadian manufacturers is \$400 million, or ten times current sales.

The greatest opportunities for development contracts, and technical services contracts are at the Aeronautical Systems Division Program Offices and Wright Laboratories located on Wright-Patterson AFB, near Dayton, OH. WPAFB ASD authorized manpower is approximately 10,000 people of which 25% work in the Wright Labs. Contracts to industry range from "body shop" personnel to multimillion dollar

development contracts. Similar contracts, to a lesser extent can be won at NASA-Lewis Research Center (near Cleveland). There are frequent possibilities for new software systems, although a local "presence" is usually a condition of the contract.

Opportunities for build-to-print contracts and for sales of some proprietary items are found at the DLA Supply Centers in Dayton (DESC) and Columbus (DCSC), as well as the defence and other manufacturers in the territory.

DALLAS, TEXAS

Trade between Canada and the southwest (Texas, Louisiana, Arkansas, Oklahoma, Kansas & New Mexico) has continued to increase at an extraordinary rate; two-way is trade up 12.8% to \$10.6 billion in 1990. More importantly, Canadian exports grew 26.3% to \$4.8 billion. Major export sectors included motor vehicle parts; aircraft and parts; and telecommunications equipment. Texas, the economic engine of the southwest, accounted for 60.4% of total trade and bought 58% of Canadian exports.

Although the Texas economy has diversified, the oil/gas industry is still paramount, accounting for 15% of the gross state product. Texas continues to attract new and relocated industry. Examples range from Exxon Corp. to Grayline Sightseeing with Texas ranked third in expansions and relocations after California and Florida. The Southwest has gained added prominence as a high-tech focus with the rapid development of the \$8.5 billion Superconducting Super Collider, which is now well under way with more than 1500 permanent staff. This, together with the opening of the Microcomputing Consortium to Canadians - (Northern Telecom is the first non-US member) a direct consequence of the FTA - lends added emphasis to the area as a science and technology target. The proposed CDA/US/Mexico tri-lateral FTA negotiations which could be concluded this year, will have an increasing effect on the Southwest economy as a major focus for three-way free trade.

NASA

Johnson Space Center (JSC) in Houston is one of the three largest NASA Centers and is the focal point of the US manned space flight activities. The JSC mandate includes: spacecraft development, manned space flight control (including the shuttle program), crew training, space flight operations and related medical research and life sciences. The center has program responsibility for lunar science, space science (including major elements of the Space Station program), earth resources technology and is involved in advance planning for missions to other planets. JSC employs 20,000 and receives approximately 25% of NASA's procurement budget. The Consulate is initiating a program to attempt to introduce new potential suppliers to NASA and particularly to Prime and Major Subcontractors of which about 60 have Houston area operations. To this end, we are organizing a mission to JSC during mid-March and expect to participate in the Space Exploration Show sponsored by the NASA alumni in October 1992.

High Technology

The Dallas Consulate has compiled a list of some 1,000 companies in the southwest that are primes, sub-contractors or service operators actively engaged in the high technology sector. Specific sectors include Superconducting Super Collider (SSC),

Telecommunications, Informatics (computer hardware and software), Instrumentation, Remote Sensing, Semiconductors, Research Laboratories and Electronic Components.

Aerospace/Commercial

The southeast is an extremely strong center for commercial aviation, second only to in West Coast combination of California and Washington state Wichita, Kansas is the home of Boeing Wichita, Beech Aircraft, Cessna Aircraft, Learjet and Piaggio Aviation and has produced more commercial aircraft than the rest of the world combine. In addition, Texas is the headquarters for the world's largest airline, American Airlines (AMR Corp.-Ft. Worth) and two other major commercial airlines: Continental Airlines (Houston) and Southwest Airlines (Dallas).

The Dallas post recently organized an aerospace mission to the Wichita firms listed above and to Tulsa to the American Airlines maintenance facility, McDonnell Douglas-Tulsa and Rockwell International North America Aircraft Operations. American Airlines will soon be opening an additional maintenance facility at the new Alliance Airport located just outside of Dallas/Ft. Worth. The repair of 757's and 767's will be moved from Tulsa to Alliance and the A-300 and Fokker 100 (short-haul jet) will be moved into Tulsa.

It is becoming most apparent that whether defence or commercial related, increasing numbers of manufacturers are reducing dramatically their number of vendors in order to achieve higher quality control standards. Implication: Canadian suppliers will have to supply a noticeable price and/or quality standard or new technology to significantly penetrate this market. Dallas will be organizing a national exhibit in the National Business Aircraft Association (NBAA) show in Dallas in September 1992.

Aerospace/Defence

The USAF Air Logistics Centers (ALC's) in this area perceive a significantly increased long term emphasis on repair and overhaul versus replacement, Albeit with short term budget and particularly personnel cuts to absorb. The immediate impact on Canadian suppliers bodes well when one considers current and anticipated offset requirements which have stimulated enthusiasm farom at least four major primes (Electospace, LTV, UTL, Optic Electronics) and cooperation in new Canadian source development on the part of both Kelly and Tinker ALC's. Electospace is actively pursuing Canadian sources. The Bell/Boeing V-22 Osprey program still remains intact despite Administration insistence it be cancelled. LTV anticipates continued success with products like MLRS, TACMS and VIT systems which conform to the projected "light military" concept. The B-2 Stealth Aircraft production program will be terminated early although authorization has been given for continued funding for an additional four places. General Dynamics, Ft. Worth plant produces the F-16, a project which is being kept alive through successive export orders and recent unexpected orders from US DoD.

There have been continuing cutbacks in personnel and restructuring at Kelly and Tinker ALC's. There is continued strong demand for surveillance, command, control and electronic warfare systems and devices; such systems (electronic upgrades) are not presently affected by budgetary reductions. Local primes continue to diversify into commercial related products and applications.

The Dallas Consulate co-chairs the USAF Space Systems Div DDSA Working Group with Kirtland AFB in Albuquerque and is actively engaged with SSD in identifying critical technology areas, particularly technology deficient areas, in which Canadian suppliers might participate in development projects. Efforts so far have included one supplier mission to New Mexico and two industry tours in Canada by SSD officials.

Superconducting Super Collider

The development of the \$8.5 billion SSC is now well underway in Waxahachie, 20 miles south of Dallas, where the Magnet Development Lab, Refrigeration Building and Accelerator String Test Building are virtually complete. Work is underway on the first exploratory shaft as an initial step towards actual tunneling for the 87 kilometre circumference SSC ring. The Dallas Consulate has been actively engaged in promoting the potential opportunities for Canadian suppliers to the project and two sourcing/information missions of SSC technical/procurement officials have toured Canada in the last 18 months. The Consulate, in cooperation with the BC and Ontario Governments, will be participating, with a group of about 20 companies, in the SSC sponsored International Industrial Symposium on the Super Collider in March as part of an ongoing promotion program. The Canadian Commercial Corporation (CCC) is in the final stages of establishing a MOU with the US Department of Energy to facilitate SSC procurement in Canada.

Informatics

Texas has become the third most important locus for informatics related industry and development after Silicon Valley and Route 123 and is gaining momentum as the critical mass of projects, incubators, customers and companies to service them grows. Among technology incubators, Texas is home to the Microcomputing Consortium (MCC), Sematech, and Semi-sematech in addition to the Superconducting Super Collider. These together with such defence/hitech giants as Texas Instruments, EDS, and GTE comprise a powerful Informatics core.

Defence

The Air Logistics Centers (ALC's) in this area perceive a significantly increased long term emphasis on repair and overhaul versus replacement, albeit with short term budget and particularly personnel cuts to absorb. The immediate impact on Canadian

suppliers bodes well when one considers current and anticipated offset requirements which have stimulated enthusiasm from at least four major primes (Electrospace, LTV, UTL, Optic Electronics) and cooperation in new Canadian source development on the part of both Kelly and Tinker ALC's. Electrospace is actively pursuing Canadian sources. The Bell/Boeing V-22 Osprey program still remains intact despite Administration insistence it be cancelled. LTV anticipates continued success with products like MLRS, TACMS and VIT systems which conform to the projected "light military" concept. The B-2 Stealth Aircraft production program will be terminated early although authorization has been given for continued funding for an additional four planes. General Dynamics, Ft. Worth plant produces the F-16, a project which is being kept alive through successive export orders and recent unexpected orders from US DoD. There have been continuing cutbacks in personnel and restructuring at Kelly and Tinker ALC's. There is continued strong demand for surveillance, command, control and electronics warfare systems and devices; such systems (electronic upgrades) are not presently affected by budgetary reductions. Local primes continue to diversify into commercial related products and applications.

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Computer Hardware

Personal computers and work station sales are expected to continue to play a dominant role in world systems marketing, accounting for about 52% of computer hardware sales. Texas reportedly ships more than 50% of the PCs in the US - 20% of the world's desktop systems - and is home to a number of the industry leaders such as Compaq, Dell, Tandy, CompuAdd and TI. The post is active in assisting potential suppliers to the industry and will participate in the October 1992 NetWorld Trade Show with a national stand. NetWorld remains mainly focused on LANs but is now including Enterprise-wide and wide area networking together with the full range of interconnect and peripheral hardware.

Computer Software

With it's PC leadership, the Southwest has become both a hot bed of software development activity and a growing target market. Some of the Texas industry leaders are Big D, Omaton, Micrographx, and Simulation Sciences. Universities, particularly Rice, Texas and Texas A&M, have developed reputations for their software development collaboration with industry. The Dallas Consulate is actively supporting software marketing in the territory and has mounted a number of software missions to the area.

We are in a position to assist firms in identifying appropriate VAR's and are increasing our data base on a full range of reps and distributors.

Telecommunications

As home to GTE, Fujitsu US, Texas Instruments, Rockwell/Network, ElectroSpace, a major Northern Telcom manufacturing site and Southwest Bell, the Dallas territory has become one of the two most significant (after Atlanta) telecommunications centers in the US. The market features procurement centers, other than the above majors, of such large communications users as American, Southwest and Continental Airlines, J.C. Penney, Walmart, Frito Lay and most of the major US oil and gas companies such as Exxon, Shell, Phillips, as well as a multitude of exploration and service companies with extensive operations worldwide. The next major upcoming trade promotion event in the territory will be Entelec in Dallas during March, 1992 which features the full gamut of telecommunications hardware, software and services including mobile communications, and supervisory control services. The Consulate is planning a marketing mission to the territory in the Spring of 1992.

Electronics - Commercial/Defence

The Southwest is rich in opportunities for suppliers of electronic components, assemblies and services. Major defence contractors throughout the area, as elsewhere, are intent on diversifying increasingly into commercial areas and our marketing missions to the territory (generally 3 or 4 per year) increasingly reflect this trend. Sector targets of high interest are electro-optics, digital signal processing, microwave, and avionics. Major contractors headquartered or with major operations in the area include: Texas Instruments, LTV Aerospace and Electronics, General Dynamics (F-16), Boeing Wichita, Bell Helicopter, E-Systems, Cessna and IMO\Varo. The Consulate will be participating in the MidCon trade show in Dallas, September 1992.

Geomatics

It is a truism that Houston is the center of the world of oil and gas exploration and exploitation and, while perhaps less true than was once the case, it is still valid. A substantial portion of the world's major oil and gas companies are headquartered in or operated from the territory and this presents a wide array of opportunities for Canadian geomatics suppliers. There are worldwide opportunities for remote sensing, aerial surveying, geophysical services and environmental surveillance. In addition to the major oil and gas companies, major companies in the area include: Halliburton, SEDCO\Forex\Slumberjay, The Offshore Company, Zapata, Atwood Oceanic and

Baker\Hughes. The Consulate supports company marketing activities through participation in major industry trade shows including: the Offshore Technology Conference (May 92), Society of Exploration Geophysics (Oct 92) and Society of Petroleum Engineers. We are also able to assist in developing contacts in a variety of third country procurement organizations whose principal operations are in Houston.

LOS ANGELES, CALIFORNIA

Overview of Aerospace Armaments, Marine, General Defence Products and Services

The average real decline in the DoD budget, subsequent to this year, will be in the order of 3% GNP, equivalent to 18 percent of total Federal Government outlays. In terms of base year 1992, the total annual national defence budget will be \$295 billion through 1996. It is worth pursuing by Canadian companies who have their sights set on programs for 1993.

In terms of money, probably something in the order of \$20 billion will be administered through this region in any one year for at least the next three years.

It must be clear that Canadian business attempting to obtain orders from California manufacturers is going to have to fight a bloody battle in order to succeed. Within the hi-tech framework, the electronics industry is virtually the only exception to the foregoing, and that market sector is expected to be attractive for highly skilled competitors.

As with 1990, Canadian companies not yet involved in the aerospace market, must allow a two year introductory period for either phasing into defence needs or laying groundwork for participation in the continuing developing hi-tech industry.

This office is co-located with the Defense Contracts Management District-West, which currently manages about 95,000 contracts, valued at \$204 billion, some \$20 billion of which is being spent in Southern California in any one year. We are witnessing the production of the B-2, C-17, some work on the advanced technology fighter, design and proposal work on the A-12, and the AP-73 radar, together with a host of other weapon system maintenance programs. While it is the subject of almost daily speculation as to the ultimate fate of these programs, they nevertheless seem to be secure for the time being. Given global uncertainties concerning defence threats, and counter-strike requirements, even the B-2 in some version is likely to receive a favourable hearing.

Commercial Aircraft Manufacturing

The economic strength of the region is exemplified by the existing back-logs in commercial aircraft continuing to be formidable. In the case of McDonnell Douglas, the firm back-log remains at approximately \$30 billion. Northrop continues to milk their "cash cow" in the shape of Boeing 747 fuselage panels, Rohr Industries enjoys healthy business from all manufacturers, both American and European, and General Dynamics similarly is involved in the manufacture of the MD-11.

There has been a significant change suggested in the operation of McDonnell Douglas, Long Beach, in that it is proposed to sell a 40% equity position in Douglas Aircraft Division to a Taiwanese concern. In order to accomplish this, the C-17 Division, together with any other military operations, will be separated and the resultant Sino/American organization will concentrate on the next generation medium and long-range commercial aircraft. It is not known if manufacture of the MD-80 and MD-11 will be included in the new arrangement, but certainly it is to be expected that the MD-90 series and the MD-12X series will be jointly manufactured. Simultaneously, any manufacturing operations, not directly connected with final assembly, will be "spun-off" to some other facility, either in a facility such as Salt Lake, Macon and Tulsa, or overseas to either PRC or Taiwan.

Space Activities

Space Exploration

The entire range of activities forecast is truly enormous. This includes specifically:

- 1) A permanent presence on the moon
- 2) Exploration of the solar system
- 3) A manned voyage to Mars.

These programs will augment the current Space Station "Freedom" project and the Hubble Telescope Program. The NASA budget had increased 36% in 1990 and is expected to increase by 23% in 1991, by 16% in 1992 and by 10% in 1993.

Communications

The future of communications satellites does not of course depend on the large boosters referred to above, but can depend equally on smaller launch vehicles such as "Pegasus" and others of like-type. Examples proliferate, including the "Iridium" project of Motorola which envisages a 72 satellite polar-orbit system established on a global basis before the turn of the century. Other companies such as Hughes are interested in smaller projects.

It should be observed that all of the foregoing programs are vigorously supported in this region in addition to industry in Arizona and that major companies involved have been in the process of systematically reducing their dependence on the defence market during the last 5 years.

Reports of the demise of the aerospace industry of Southern California, Arizona and Nevada are greatly exaggerated. The region has about half the reliance upon aerospace and defence today as compared to the recession of the early 70's. Despite

budget cuts threatened, but not yet activated (except for the P-7A), there is still a very large market. By any standards, the space industry is flourishing and will probably benefit from the peace dividend. With increasing commercial travel in Europe and Asia, together with the advent of Europe '92, a flourish commercial aircraft market of all types will probably persist for the balance of the decade.

Telecommunications and Information Technology

The United States market is the largest and most open in the world. The market in Southern California for telecommunications products and services is highly competitive, very active and at the same time open to new technologies. The United States operates on the same standards as Canada, which makes acceptance and licensing easier than any other country in the world.

The main competition is from U.S. companies, many of which are large well known conglomerates. Canadian companies are no strangers to this geographic area. This market is growing even in a slowing economy. Large investments are being made, especially by the telephone operating companies and long distance carriers. Also the large financial institutions, insurance companies, universities and public transportation authorities are worthy of attention.

Revenues for the sale of telecommunications equipment in the United States will more than triple from \$20.1 billion in 1990 to \$60.9 billion in 1996. Telecommunications equipment includes, but is not limited to, on premise switches, facsimile, automatic call distributors, voice and data processing systems and modems.

Opportunities exist for products and services that are directed towards local and wide area networking, voice and data transmission, security systems, software enhancements to existing products and services, integrated services digital networks, and fibre optics, to name a few.

The following product areas are expected to achieve high growth for the next five years:

- 1) mobile data equipment and services
- 2) radio pagers
- 3) cellular phones
- 4) information imaging
- 5) computer network products
- 6) electronic data interchange
- 7) data management.

Companies will do well that can provide a unique product, undertake aggressive marketing programs and form strategic alliances with U.S. companies. Local representation is a must for successful market entry.

Defence Programs

It should be noted that following the Challenger launch disaster, USAF promoted, with full speed and vigor, a series of launch capabilities involving:

- 1) DELTA II/PAM (McDonnell Douglas)
- 2) ATLAS II/AGENA (G.D.)
- 3) TITAN 4/CENTAUR (Martin Marietta)

Of the first category, some 30 launches are currently ordered and the second category involves 30 to 40 launches. TITAN 4 is projected at 75 launches. In addition to the foregoing, there will be an ALV Program (Advanced Launch Vehicle), capable of putting 25 tons into the near-earth orbit.

Defence Electronics

The deployment of half a million military personnel during the Persian Gulf War will only temporarily delay the central trends in defence spending. Annual defence outlays will be reduced declining in real terms by about 20% over the period or by more than \$50 billion by fiscal 1996.

Most of the fiscal 1991-1996 spending reductions will come from personnel and operations and maintenance budgets. Spending for R&D will remain steady. Appropriations for military personnel and operations and maintenance will account for \$137 billion of the total \$157 billion reduction proposed for defence over the next five years.

The worst of the cut-backs in the defence manufacturing sector have occurred already. Over the course of the coming decade the prospects for U.S. investments in defence and particularly spending for defence electronics, are optimistic.

The good news for defence manufacturers is that the military services' willingness to cut forces will cushion the blows of budget cuts on defence industries. Procurement and R&D will increase steadily after 1993 to around \$170 billion by fiscal year 2000. By the end of the decade the Army, Air Force, and Navy should each have one major tactical program in full production and a second completing development. Sharp increases are projected in aircraft, space systems and communications.

The overall effect of these prospective changes in R&D and procurement programs is to increase the relative value of the electronics content of defence appropriations. The total budget for defence electronics should increase from around \$40 billion 1991 to about \$77 billion in fiscal year 2000, or real growth of 5% per year.

Areas where increased electronic content are likely are avionics, missile systems, space systems, naval electronics, computing systems, simulation and trainers, and command, control, communications and intelligence (C3I).

Despite the negative trends, California still retains a large and competitive industry, receiving the largest share of DoD prime contracts and employing the largest number of workers. In short California has many great assets: skilled labour, specialized facilities, and a supporting subcontractor base.

Defence electronics companies are well established in California. Of the top ten integrated circuit manufacturers four (National Semiconductor, Advanced Micro Devices, LSI Logic, and Integrated Device Technology) are located in California. Two additional top-ten companies are located in Arizona.

NEW YORK

Computer Hardware

Reduced domestic demand and intense price competition among suppliers was the theme during 1990-91 in the United States. Sales of mainframes, minicomputers and personal computers slowed down, but sales of disk storage devices grow stronger and workstations, laptop computers and local area network (LAN) equipment remained strong. Efforts to reduce the federal budget deficit, especially via cuts in defence spending, dampened demand for computer systems.

Total U.S. imports increased by 8 percent in 1990 vs. 1989 to approximately US\$25.2 billion with heavy emphasis in the growth of imports of peripherals and parts.

Imports of peripherals and parts from Canada jumped by 59 percent. According to the latest figures available from the U.S. Department of Commerce, Canada's overall share of U.S. imports in computers and peripherals was 7 percent in 1989 on expenditures of US\$1.5 billion.

(See list of computer shows attached).

Software

The U.S. packaged software market was US\$18 billion in 1990, representing 42 percent of the global market. This market was quite robust, with new products presented over a wide range of applications. The software market for packaged product was US\$17.3 billion in Europe and US\$3.9 billion in Japan over the same period. It is estimated that by 1995 the world packaged software market could approach US\$100 billion, with the U.S. and European markets leading.

(See list of computer shows attached).

UNIX is the operating system of choice in scientific and engineering applications and continued to grow for business and communications applications. UNIX represents approximately 10 to 12 percent of the U.S. market, whereas DOS and OS/2 had approximately 25 to 30 percent of the operating systems market. Apple Computer's operating system (MacIntosh line of PCs) was 5 to 10 percent of market share.

Space and Aerospace

The space and aerospace industry which once thrived in New Jersey and Long Island is facing difficult times. GE Astro had announced that it will lay off 600 employees, and Harris Corp. will consolidate its aerospace activities in Florida.

Grumman, a long-time customer for Canadian products has no new programs and is concentrating on long-term space and short-term make-work aircraft programs. The two military commands in the area in this sector are the Naval Air Engineering Center in Lakehurst, New Jersey and the Naval Air Propulsion Test Station in Trenton, New Jersey. The Lakehurst facility sources Canadian products but the future of the Trenton Station is not clear as the U.S. military downsizes.

Geomatics

The post's territory is geographically small but very densely populated. (New Jersey has the highest population density in the U.S.) Therefore the market for geomatics services is mainly federal, state, municipal and utility customers. Because of the various "Buy America" laws governing much of the procurement, it is advisable to find a local geomatics company, deficient in areas where your company excels, and form a joint venture. Because of the nature of the area, much of the geomatics firms wishing to investigate this territory should participate with the Consulate in the Annual New Jersey Environmental Expo in Edison, New Jersey in October.

Instrumentation

There are 700 research establishments in New Jersey and 10 percent of all R&D money spent in the U.S. is spent in that state. In addition New Jersey is a leading state for the manufacture of chemicals and along with Long Island is home to the majority of the U.S. pharmaceutical and cosmetics industry. Factored against this potentially lucrative market is a local industry (350 manufacturers of analytical and scientific instruments in New Jersey) that is strong and benefits from the large R&D establishment.

The potential customers (pharmaceutical, chemical, cosmetic) are large and well known. They may be approached directly or through their Canadian affiliates. A joint venture with a local instrumentation company with complimentary lines could also provide an entrée to this market.

Two suitable trade shows are:

1. Chem Show - New York
2. Interphex - New York, Annually - end of March, early April

Telecom and Datacom

The market for this equipment and services is projected to remain strong despite the continuing recession. The NY/NJ/Connecticut area is dominated by the financial service industry. There will be opportunities for companies with niche products catering to this sector. There is also a strong communications equipment industry and a

considerable amount of R&D. This affords a wide variety of opportunities for component sales, joint ventures and product licensing.

Notes

For many of the products and services covered by this overview the Consulate in New York has suitable facilities where the products can be demonstrated. Many Canadian software companies, have successfully entered the New York market by using these facilities.

Defence Electronics

The U.S. Army has two major R&D Commands in New Jersey. CECOM (Electronics & Communications) at Fort Monmouth has development programs in the following sectors:

- 1) Command, Control and Communications
- 2) Electronic Warfare/Reconnaissance, Surveillance and Target Acquisition
- 3) Night Vision and Electro Optics
- 4) Signals Warfare
- 5) Software Engineering (acting as a support group for other product sectors)
- 6) Space Systems (ground link only)
- 7) Electronic Integration (Aircraft Electronics)

CECOM has an international co-operation group which will assist you to make contact with the project managers. Most of these projects are large and will be won by major U.S. prime contractors. The role for Canadian defence electronics contractors will be as suppliers to the U.S. prime.

ARDEC (Armament Development and Engineering) at Picatinny Arsenal is doing research and engineering in two areas which rely heavily on electronics:

- 1) Smart Mines (radio controlled)
- 2) Fire Control

This Command also has an international co-operation group that can tell you if your product or service is relevant to their development projects.

Also located in New Jersey are:

Naval Air Engineering Center, Lakehurst, NJ
Naval Air Propulsion Test Station, Trenton, NJ

The best opportunities for sales to the prime contractors are in the electronics sector with such companies as Grumman Electronics, Unisys, Loral and GE Defense Electronics. Sales of components and electronic related products such as cabinets, investment casting, cable harnesses etc. can be made by direct approach. To sell sub-systems it is difficult to become a supplier if you did not participate in the development of the original system.

The easiest way to test the electronics market in New York/New Jersey/Connecticut is to exhibit at the Subcontractors' Exhibition sponsored by External Affairs and International Trade Canada in Toronto on June 3, 1992.

New York Territory Trade Shows

Computer Software and Hardware FY 1992-93

1. Accounting Show and Conference
4-6 May 1992
Sheraton Hotel, New York
2. PC Expo
23-25 June 1992
Javits Center, New York
3. Unix Expo International 1992
22-24 September 1992
Javits Center, New York
4. PC/East
27-29 October 1992
Javits Center, New York
5. Computer Graphics Show 1993
26-28 January 1993
Javits Center, New York

PHILADELPHIA, PENNSYLVANIA

The Philadelphia territory of responsibility includes most of Pennsylvania and Maryland, Delaware and Virginia. Within this territory there are over 50 Department of Defense Procurement Centers and over 200 prime contractors and first tier subcontractors. The two facets of the defence market in this territory represent a buying power of approximately \$7 billion (US) of which Canadian industry receives contracts valued at approximately \$200 million (US) annually.

Of all the DoD total procurement centers and prime contractors in the territory, the Canadian Defence Production Office (CDPO) deals on a routine basis with seven of the major centers and 107 prime contractors. Although the DoD procurement budgets have generally decreased, and more at some centers than at others, the reorganization of procurement responsibilities makes many of these centers an increasingly important market for Canadian manufacturers. Commencing in April, 1991 and continuing over a three year period, the management and procurement responsibility of some one million separate items will be transferred from the single services to the Defense Logistic Agency procurement centers. Consequently, consumable products which were previously purchased by Army, Navy, and Airforce Centers across the USA will be concentrated at the five DLA hardware centers. Of these five Centers, three are located within the Philadelphia area of responsibility and the remaining two are located with the Cleveland area of responsibility. The three Centers in the Philadelphia territory are: the Defense Industrial Supply Centre (DISC), the Defense Personnel Support Center (DPSC), and the Defense General Supply Center (DGSC).

DoD Procurement Centers

DEFENSE INDUSTRIAL SUPPLY CENTER (DISC) - DISC procures and manages vital industrial hardware and aerospace items for use by the armed services throughout the world. The Center presently manages approximately 857,000 separate items and components used in repair and maintenance of equipment and weapons systems. However, the Center is expecting to receive some 400,000 additional items following the transfer of procurement responsibilities from the three services. Items purchased include bearings, block and tackle, chains, rigging and slings, ropes, cable and fittings, fasteners, hardware, packing and gasket materials, springs and rings, metal bars, sheets and shapes, electrical wire and cable, and aeroengine components. Within this last category aeroengine components, 200,000 items are being transferred making DISC a primary market for aeroengine component manufacturers.

DEFENSE PERSONNEL SUPPORT CENTER (DPSC) - DPSC procures items which serves the "personal" requirements of the members of the armed forces. As such, DPSC provides food, clothing, and medical materiel at the wholesale level to meet these requirements on a worldwide basis. The Center is divided into four separate

directorates: Subsistence, Clothing and Textile, Medical Materiel and Manufacturing. Due to legislative restrictions, Canadian industry are virtually prohibited from selling anything except medical materiel and pharmaceuticals to the Center. Unlike the other DLA Centers, DPSC is not expected to receive additional procurement responsibilities following the transfer of procurement activities from the three services.

DEFENSE GENERAL SUPPLY CENTER (DGSC) - DGSC is responsible for the supply and management of assigned items and distribution of these items for the services worldwide. DGSC procures a variety of item categories of a general nature including non-powered material handling equipment, rubber fabricated materials, plastic fabricated materials, photographic supplies, measuring instruments, batteries, safety equipment and rescue equipment, electrical equipment including transformers and motors, electrical hardware and supplies, industrial chemicals, and aircraft components and structures. DGSC presently manages and procures approximately 800,000 items, however, this level of procurement activity is expected to increase by some 250,000 items being transferred from the three services, the most important of which is Federal Stock Classification 560 (aircraft structural components), and 1680 (aircraft accessories and components). This transfer of procurement responsibility makes DGSC the most important market for manufacturers of aircraft components.

In addition to the three major DLA Centers in the territory, there are numerous research and development centers and two major United States Navy Procurement Centers. The two US Navy Centers, called inventory control points, are the following.

AVIATION SUPPLY OFFICE (ASO) - ASO is responsible for the procurement, inventory control, and distribution of all Naval and Marine Corp. aviation spare parts, systems, and related equipment. As such, it has the responsibility to forecast spares requirements of the total aviation fleet of the USN and of those foreign governments which use USN type aircraft in their fleets. Although the ASO procurement level is approximately \$1.0 billion (US), many of these items will be transferred to DISC and DGSC. However, ASO will retain procurement responsibility for all repairable and critical parts and only consumable parts will be transferred to the DLA Centers. In addition ASO is now contracting R&O to the private sector, rather than using USN repair depots solely, and is actively pursuing Canadian sources.

SHIPS PARTS CONTROL CENTER (SPCC) - The procurement responsibility of SPCC has decreased dramatically over the last year with the decline in the DoD budget. However, this trend is expected to level out this year and level off at approximately \$400,000 million (US). However, procurement responsibility for consumable items will be transferred to the DLA, primarily to the Defense Construction Supply Center (DCSC).

CDPO Services to Industry

In order to provide the Canadian defence and high technology industry with precise and valuable marketing assistance in a timely manner, the Canadian Defence Production Office provides both computer-based and non computer-based marketing assistance which is vital in entering either facet of the defence industry: the DoD market, or the prime contractor market. These services include:

DOD PRICE HISTORY DATA BASE - The CDPO subscribes to a DoD-Wide procurement data base system which contains complete details on all procurement activity including procurement history and trends, prices paid for the product over a number of years, quantities of the product purchased, details of the prime contractor which supplied the product, as well as information as to the buying agency. In order to access this data base, Canadian firm's should subscribe to the CIS outlined below.

PRIME CONTRACTORS DATA BASE - The CDPO has developed a data base of prime contractors from across the USA. The data base provides tombstone data, contact information, and details of what products are purchased by the firm. In order to access this data base, Canadian companies should subscribe to the CIS outlined below.

US GOVERNMENT SOLICITATION DATA BASE - The CDPO electronically processes the Commerce Business Daily (CBD) in which all US Government defence and non-defence solicitations are advertised. By accessing this data base on a weekly bases, Canadian firms can obtain solicitation details of products and services in any of 55 pre-selected product categories. To access the data base firms should subscribe to the CIS outlined below.

MIL SPECS AND STANDARDS - The Naval Publication and Printing Service Office located in Philadelphia has the responsibility to maintain and to warehouse all military specifications and federal standards used in the DoD. Because of its proximity to this facility, the CDPO is able to obtain, on a relatively fast turn around, copies of these specifications and standards necessary for Canadian industry to provide quotations against DoD solicitations.

DEFENCE CONTRACTORS INFORMATION SYSTEM (CIS) - The development of the CIS was undertaken to create a system to provide a greater degree of assistance to vendor level firms in their defence and high technology marketing activities. The CIS provides for direct access to market intelligence data bases. By accessing the system, Canadian firms have access to the above three data base systems: the Defence Contractors Data Base (DCDB), and electronic processing the Commerce Business Daily (CBD).

The CIS is a user-friendly marketing tool which goes far beyond providing the industry with the usual list of contacts. It enables users to identify agencies or firms that purchase a particular product and where those purchasers are located. It provides daily exposure to the major US contracts solicited and awarded to the defence industry, and it provides a complete "exposure" to DoD procurement trends and price history of items purchased. For more details, please contact the Canadian Defence Production Office in Philadelphia.

SANTA CLARA, CALIFORNIA

(Includes SILICON VALLEY, COLORADO, UTAH, HAWAII, and SAN FRANCISCO)

Californian Market

Population: 27 million
Size of Economy: 6th largest in world

The Bay Area

Population: 5.5 million
Market size: 4th Biggest in USA
Major Firms: Over 28 firms over one billion in revenue
27 Fortune 500
85 Of Businessweek
1000 Headquartered in Post Territory
14/100 NASA's Top Contractors

Market Opportunities

Data Communications

While Silicon Valley is noted for its semi-conductor and personal computer firms, there are many data and local area network companies located here. In fact over 25% of the USA's telecommunications and data communications companies are headquartered in California. Some of the key players in our post territory are listed below:

3COM, NOVELL, ATALLA, SYNOPTICS, OCTEL, PACIFIC BELL, VMX,
BRIDGE, ROLM, LINEAR, HUGHES LAN, CISCO, DAVID SYSTEMS,
NETWORK GENERAL

Computer Hardware

Silicon Valley is the world center of semi-conductor, local area networks (LANs), and personal computer design and manufacture. Canadian firms with peripherals, add ons, etc, should come to Silicon Valley to negotiate OEM and distribution agreements with the major vendors. Of particular interest are firms with sub-components for PC systems.

Major High Tech Firms

SILICON VALLEY

	STAFF
APPLE	13,500
HP	75,000
TAMDEM	20,000
SUN	20,000
GRID	1,000
NATIONAL SEMI	23,000
AMD	20,000
INTEL	30,000
IBM	18,000

Software distribution

Silicon Valley is the home of several major software distribution firms. A sample of these firms is listed below. Also, many Canadian software producers have forged joint marketing alliances with the major hardware vendors. The Post has written a guide to US Software Distribution that is available free of charge.

Major software distribution firms:

BUSINESSLAND, COMPUTERLAND, 800 SOFTWARE, MERISEL,
SOFTWARE PUBLISHING

Venture Capital

Silicon Valley is the source of about 30% of the high tech venture capital invested in the United States. While distance makes this capital difficult to source for Canadian firms, the post has good connections with a few firms willing to travel or coventure on an exceptional deal. Experienced management is key to accessing this capital. A list of VC's and their area of specialty is available from the post.

Research and Development

Silicon Valley is a major center for R&D. Such organizations as UC Berkeley, Cal Poly Tech, San Jose State University, University of San Francisco, Stanford, Stanford Research Institute (3500 researchers), Lawrence Livermore Lab (8000 researchers), Xerox Park, IBM-St. Theresa Labs (2000), and over 1500 other private research centers

make this a good market of high tech and biotech research. If you need to search for new technology or cooperate on state of the art research, the Bay is a good place to start.

Defence Electronics

While defence may be in the doldrums, many of the defence electronics firms are still very active in such projects as Star Wars, Space Station, etc. Since many of these firms are also looking to diversify, Canadian firms with diversification plans may find willing corporate partners among Silicon Valley defence firms. Regular defence work is also an opportunity. Santa Clara is the largest per capita recipient of defence spending in the USA.

Key Space/Defence Electronics Firms

	<u>Staff</u>
Lockheed Missiles/Space	22,000
Avantek	2,000
Westinghouse Marine	2,000
ESL	3,000
Dalmo Victor (CAE)	500
Loral	2,000
FMC	5,000
Aerojet	
Thiokol	

Contact Information

Brian P. Casey
Consul and Trade Commissioner
Canadian Consulate Trade Office
4677 Old Ironsides Dr. #270
Santa Clara, California 95054
Tel: (408) 988 8355
Fax: (408) 988 6315

Upcoming Post Programs

HIGH TECH

Software Publishers Association Annual Conference September 1992

DATA COMMUNICATIONS

Information Booth at Interop, San Jose Convention Center, October 1992

GENERAL SYSTEMS

Government Procurement, Sacramento May 1992

ENVIRONMENT

Waste Water Show, March 1992

SEATTLE, WASHINGTON

Overview

The overall economic outlook of the Seattle mission territory of Washington, Oregon, Idaho and Alaska continues to be fairly positive in spite of strong national recession and economic woes. The Pacific Northwest is maintaining its 30 year trend as the fastest growing region in the United States.

Key to this area's strong economy is Boeing's current backlog of commercial jet aircraft worth US\$100 billion and its recent plans to build a new 777 wide-bodied airplane; expanding biotech and software industries led by Immunex and Microsoft; and expanding Japanese and European investments in high technology manufacturing.

The Pacific Northwest is well positioned to benefit from three worldwide economic trends of the 1990s; increased Pacific Rim trade, rapid expansion of the services sector, and the hi-tech boom.

Aerospace and Defence

After the major cutbacks enacted by Congress in 1991, Boeing Defense and Aerospace Group as the 9th largest defence contractor in the United States, appears to have the bulk of its major contracts still intact. Although the cutbacks could affect 2500 employees out of a total of 44,000, Boeing still has approximately 25 defence projects, including substantial partnerships in the B-2 Bomber, V22 Osprey and the Advance Technical Fighter programs, and has recently received approval to provide the flight-rated hardware for the Freedom Space Station. Boeing's healthy commercial aircraft business which represent 70% of its total revenue, allows it to invest in the up-front costs of defence programs in order to take advantage of future defence contracts and possible technology transfer. Last year, Canadian aerospace sales to the Boeing Company in Seattle amounted to \$400 million, the major portion representing sales to the Commercial Airplane Group.

Construction of the U.S. Navy's home port at Everett, Washington is proceeding on schedule. The Naval Supply Center located in Bremerton, Washington, continues to operate under tighter budget conditions. Last year, the Supply Center purchased nearly \$15 million of Canadian product. There may be additional opportunities as the U.S. Army relocates new divisions from bases which are being down-sized in other regions of the U.S.

Technology Transfer

Although no definitive figures are readily available on actual R&D expenditures in this territory, given the nature of the principal types of industries located here ie. aerospace, software development and biotechnology, it would appear to be above national averages. The Boeing Company which accounts for 105,000 employees in Seattle alone, employs over 15,000 engineers and 13,000 technicians.

Contrary to popular opinion, the private sector in the Pacific Northwest is the least organized of all the potential players in the technology transfer arena with the notable exceptions of Boeing and Weyerhaeuser. Most companies do not have a formal department of technology transfer, licensing executives, or well-documented catalogues of technologies available for transfer.

Academic institutions like the University of Washington play a key role in technology transfer. Research grants approach US\$400 million. Their staff make it their business to document, catalog, and publicize technologies for commercial transfer. They are clearing houses for their own technologies and have a good understanding of what is available in the private sector.

Opportunities

The major procurement, technology transfer and joint venture opportunities in the Pacific Northwest territory can be found in all aspects of commercial/defence aircraft manufacturing; electronic/avionic systems integration; space based radars; space station; application software development; operating software systems; electronic test equipment; telecommunications systems.

Key Organizations

Boeing Commercial Airplane Group, Boeing Aerospace and Defense Group, Boeing Computer Services; Microsoft; Aldus; Immunex; Microrim; Paccar; Tektronix; John Fluke Manufacturing; Mentor Graphics; Intel; Weyerhaeuser; Battelle; Teledyne; Viox; University of Washington; Fred Hutchinson Cancer Research Center; U.S. Naval Supply Center; Bonneville Power Administration; National Oceanic and Atmospheric Organization; Seattle's Metro; Morrison Knudsen; ARCO; Exxon; and Yukon Pacific Corporation.

Reports

More specific information on procurement, technology transfer and joint venture opportunities in the Pacific Northwest is available through a series of reports produced by the mission in Seattle, including:

1. Procurement at the Boeing Company
2. America's Pacific Northwest High Technology Market
3. Technology Transfer Opportunities in America's Pacific Northwest
4. American Government Procurement in the Pacific Northwest.

Currently under development by the mission in Seattle is a guide to assist Canadian firms to market environmental products and services in the states of Alaska, Oregon, Idaho, and Washington.

WASHINGTON, D.C.

Overview of Opportunities

Nearly all major U.S. government purchasing departments and agencies are headquartered in Washington, D.C., therefore, most major technology and systems acquisition decisions are made there. (Actual purchasing is normally done through government acquisition centres around the U.S.). Because of these decisions, subcontracting opportunities exist not only to the few U.S. prime contractors in the Washington area but across the U.S.A.

The Free Trade Agreement, Defence Sharing Arrangements and special arrangements with agencies such as the National Aeronautical and Space Agency, (NASA) generally provides access to competition from Canadian companies. The Buy American Act and certain legislation can provide restrictions in this sector, however, much of this multi-billion dollar market is open to Canadians either as prime or subcontractors.

Technology sectors invariably have their own peculiar procedures for solicitation, qualification and contracting; for this reason, Canadian companies are invited to contact their Trade Commissioners in the Regional Offices, Ottawa and in the U.S. Posts for advice and assistance.

Point of contact:

Canadian Embassy
501 Pennsylvania Avenue, N.W.,
Washington, D.C. 20001
Tel: (202) 682-1740
Fax: (202) 682-7795

LATIN AMERICA

CARACAS, VENEZUELA

Telecommunications

Privatization of national telephone company, Compañia Anonima Nacional de Telefonos de Venezuela (CANTV) has now been carried out with the awarding of the concession to a consortium headed by the American GTE. With this having taken place, the market will be open to suppliers of numerous types of telecom equipment. New operator had to commit itself to an annual investment in the order of USA \$300 million. Primary areas of interest will be: a) cellular telephones with main competition coming from Motorola and Ericsson, b) data communications with emphasis on the banking sector, c) international business systems, d) rural telephone and mobile radio communications, e) satellite communications: as applied to telephone and TV as well as fax communications improvement, f) fibre optic cables. That being said, it must be kept in mind that in all above areas competition will be stiff. However, there is no reason why Canadian companies could not get their share of the business. With regard to public communication service, contact should be made with the new operator: GTE. Canadian companies will also have to seriously consider a local representation. There is also a market for UHF, FM and AM transmitting systems, cable TV as well as for repeating stations and satellite TV transmission.

Hardware/software informatics market

This is a highly competitive market especially in the hardware portion. American (IBM is firmly in control) and firms from Japan, Korea and Taiwan are becoming strong players in the market. There are however possibilities for Canadian firms in the area of modems, switching networks and data networks, and interconnecting banks and credit card systems. Possibilities for Canadian companies also lie in the area of sophisticated software for the petroleum industry (including petro-chemical, natural gas and plastics industries). These would also include the areas of quality and process control, warehouse inventory etc. Another area of great interest would be software applicable to environmental studies, forestry, agriculture and transportation. Again, the success of Canadian companies will depend a great deal on their local representation. Canadian total exports to Venezuela related to this sector remain relatively small, but is growing.

Instrumentation

This is another area where Canadian companies could find a niche. Areas of particular interest would be: a) metering devices of all types, b) instruments used for security purposes such as drug detection, contamination control, quality control etc., c) sophisticated alarm systems and anti theft devices. It is however a very competitive market and Canadian companies will have to be prepared to commit necessary resources to break in.

Defence, Aerospace and Space Technologies

These areas hold very limited potential for Canadian companies. The government has slowed down on purchases of military equipment for numerous reasons which cannot be elaborated here. There could be however a market for some radio communications equipment and data systems.

MEXICO

Overview

No doubt that telecommunications is the sector that offers the best opportunities in advanced technology in this market era.

Post foresees opportunities for systems, equipment, components and spare parts in following: telecommunications - rural telephony, satellite earth stations and communication systems to operate in C. KU and L. Band, central switching and PBX equipment, cellular telephony, digital fibre optic transmission networks and microwave systems.

In datacom specifically we foresee good opportunities for radio based data communication systems and related equipment, however opportunities exist as well for standard datacom equipment.

In computing, opportunities are mainly concentrated in software for special areas of application, oil industry, utilities and service areas, security applications, fleet management, material handling. In the geomatics sector opportunities for software exists in the following applications: hydrographic and municipal mapping, forest, environmental, water and municipal management, mining and mineral exploration. Regarding hardware; opportunities arise for PCs and minicomputers, components and peripheral products.

For consumer electronics: we do not foresee clear opportunities for Canadian products, since Mexico is oversupplied mainly by Asian trademarks which are very competitive in price and heavily supported with advertising.

In the defence sector, detected potential opportunities for military tactical communication equipment.

In remaining areas such as aerospace and space technologies opportunities are not clear so far.

SANTIAGO, CHILE

Economic Overview

Chile, often offered as the example of a Latin American economic success story, is currently entering its ninth year of consecutive economic growth. A recent International Monetary Fund study, published to coincide with a high-level study mission to Latin America in November 1991, described Chile as Latin America's best model for economic development.

The annual real GNP growth rate has averaged 5% per annum since 1984. The 1991 inflation rate is under 20% (good by Latin American standards); unemployment is averaging 7%; the fiscal budget remains balanced; and foreign investment has reached a record of approx. (U.S.) \$1 billion. Chile is also becoming increasingly competitive in the global market. Chilean exports should achieve a value of (U.S.) \$9 billion in 1991 (growth of 60% over 1985 exports), and continue to diversify away from the traditional reliance on copper (copper represents only 40% of Chilean exports in 1991 vs 80% in 1980). Chile's healthy balance-of-trade surplus has allowed it to consistently meet foreign debt obligations on time.

Expectations for 1992 are equally promising. Current predictions estimate that GDP should grow by 6%; inflation will be reduced to 15%; unemployment will remain at 7%; and foreign and domestic investment will increase slightly to a level of 20% of GDP.

HIGH-TECHNOLOGY SECTOR

Telecommunications

While Chile's economy continues to register impressive records of growth and investment attraction, it is still largely based upon resource extraction. Mining, forestry and agriculture continue to account for over 85% of Chilean exports, and over 20% of Chilean GDP. This resource based economy, though prospering due to the wealth of resources in Chile, is limited by the minimal infrastructure support. The far-flung nature of these industries (mining in the deserts of the far-north; forestry in the southern third of the country) makes high-technological support all the more important. This is especially true of communications. With the decision-makers based in Santiago and the operations in the provinces, Chilean companies are demanding ever-more sophisticated communications systems. Chile's two major telecom operators ENTEL and CTC, are both currently engaged in major expansion plans to meet this increased demand:

Entel

ENTEL, a 100% private-sector Chilean firm (20% owned by TELEFONICA DE ESPAGNE), enjoys a quasi-monopoly of the Chilean long-distance and international market. ENTEL recently signed a contract with AT&T for the installation and supply of US\$15 million of fibre optics between the cities of Santiago and Chillan. This contract will provide the foundation of ENTEL's two-year US\$50 million expansion program designed to provide Chile with state-of-the-art telecom technology. Other elements of ENTEL's plans include:

- installation of a national fibre-optic network connecting Puerto Montt to La Serena;
- connection of Chile's fibre optics and traditional copper-wire based trunk lines to the telecommunication networks of Chile's neighbours, especially Argentina (talks are already underway between ENTEL and TELINTAR Y TELEFONICA DE ARGENTINA), and to global network's such as UNISUR, AMERICAS I and COLUMBUS II;
- ENTEL further plans to continue consolidation of its satellite transmission facilities (ENTEL retains national monopoly on satellite signal transmission); and
- expansion of rural microwave telephony capabilities.

CTC

La Compania de Teléfonos de Chile (CTC), is Chile's dominant supplier of local telephone needs. CTC is also launching an aggressive expansion plan aimed at increasing the ratio of Chileans to telephones. Currently, only 8 in 100,000 Chileans have a phone. The major elements of CTC's US\$1.5 billion 4 year expansion program are:

- to bring ratio of Chileans to telephones to 1 in 8-10,000 or the installation of one million new telephone lines;
- to expand cellular phone systems;
- to use CTC's base among local phone-users and strength in cellular phone systems to break into ENTEL's traditional long-distance domain; and
- to develop better-attuned corporate service (i.e., to large data transmission users such as banks, multi-national companies and government departments).

Both CTC and ENTEL are facing increasing competition for slew of small cellular

communications technology, who are for the most part backed by foreign capital and funds. CIDCOM CELLULAR, for example, which is owned by PACIFIC BELL of the USA, recently purchased over \$12.5 million in Northern Telecom cellular switching equipment. Other smaller firms such as VTR CELLULAR and VALDIVIA CELLULAR also continue to claim telecom market share from two majors.

Chilean Ministry of Transportation and Communications is also struggling with definition of new telecom law, which may scrap legislative monopoly bestowed on ENTEL for exploitation of long-distance market.

Data Communications

Chilean demand for data and text transmission, electronic and voice-based is also a function of robust economic growth. With centralization of decision-making in Santiago, and far-flung operations, data transmission is a growing necessity. Banks with widespread offices are in particular need of data-transmission facilities, and several have already developed their own networks (based on public and private telecom facilities). There is strong domestic competition for data services, CTC, TELEX-CHILE and VTR all offer data transmission services within Chile. SATEL (an affiliate of ENTEL) and TELEX-CHILE also provide satellite-based data transmission services to corporate clients who need steady access to international data transmission.

Telecom/Datacom Summary

a)	<u>Market Data</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992f</u>
	Market Size	120	160	200	250
	Cdn. Exports	10	15	20	25
	Cdn Mkt Share	8%	9%	10%	10%

b) Major Competing Countries:

Japan, USA, Spain, Germany

c) Products/Services for which there are strong market prospects:

Rural telephony, Fibre Optics, Trunk Line Accessories (switching equipment, boosters, etc.), Data Communication Equipment, Engineering Services and Niche Products.

Computing

The Chilean computer industry is characterized with an abundance of highly advanced computer hardware and a relative shortage of leading-edge software. While

the Chilean market is highly sensitive to hardware developments on the international stage, the lack of local offices and support services of the major software firms means that Chile lags behind the more developed countries with respect to software applications. This is equally true for the mainframe, mini-computer and micro-computer sub-sectors. The two chief results of this are:

- (i) opportunities exist in Chile for Canadian software exporters; and
- ii) Chile has developed a strong local software design capacity.

The specific areas where software demand is greatest are:

1. The Mining Sector: Chile's highly developed mining sector lacks dedicated software for its control systems, operations planning, reserve calculations, prospection and engineering simulations and processes. The world leader in mining software MINCOM of Australia recently recognized the potential in Chile and is presently moving to open a Chilean branch.
2. Geographic Information Systems: Remote surveying has many attractive applications for Chile's resource based economy. Geology, forest exploitation control, water table management and fisheries and agro-industrial investigation can all be aided by GIS software. At present the only significant supplier to the market is ARC-INFO of the U.S.
3. Financial, Industrial and Governmental Institutions: There is also growing demand for dedicated and custom designed data-base and operation planning and programming software in Chile.

Other important factors taken into account by the market study include:

- a) The legal and accounting framework for the importation of software into Chile. Recent additions to Chilean copyright laws are improving the integrity of foreign supplied software, and although pirating remains a problem it is neither as serious as elsewhere in Latin America, nor should it be viewed as prohibitive to the interests of exporters. The relevant parts of Chile's tariff regime are also examined.
- b) The importance of the provision of after-sales service is also highlighted. It is the lack of technical support, manifested through the absence of local offices of the major global software producers, that has caused Chilean software supply to lag behind the available hardware. As a result local software development is quite advanced. Future exporters of software to Chile, need not see the local industry only as competition, but could use them as partners to develop the necessary local technical support.

- c) The strength of the local industry could also allow software exporters to develop local partnerships with the aim of supplying third country Latin American markets.

Finally, the recent commissioned software market study incorporates various statistical analyses of the Chilean software market; Chilean software imports; and their estimated growth rates.

Computing Summary:

a) <u>Market Data</u>	<u>1990</u>	<u>1991</u>	<u>1992f</u>
Market Size (software)	90	110	130
Cdn. Exports	5	10	15
Cdn. Mkt Share	6%	9%	12%
Market Size (hardware)	180	200	200
Cdn. Exports	5	5	10
Cdn. Mkt Share	3%	3%	5%

- b) Major Competing Countries:

USA, Mexico, Japan and Germany

- c) Products/Services for which there are strong market prospects:

Custom-designed software for GIS, Process-Control and Database applications.

- d) Canadian Companies established in Chilean Telecom Market:

None

Instrumentation

Chilean demand for instrumentation will inevitably follow chief areas of upcoming investment in Chile, namely in the Mining, Energy, Pulp and Paper and Telecom sectors. Chile's largest industrial association SOFOFA recently made the following estimates regarding investment in Chile between 1992 and 2000.

- MINING \$2.2 BILLION U.S.
- ENERGY GENERATION \$1.8 BILLION U.S.
- PULP AND PAPER \$3.3 BILLION U.S.
- TELECOMMUNICATIONS ... \$2.1 BILLION U.S.

All of these investments will require substantive plant and capital expenditures. While there is no estimate of the related demand for "instrumentation", the large plants associated with mining operations (mines, smelters, etc.); power plants (hydroelectric and conventional fuel based); pulp and paper mills; and telephone utility switches, all require instrumentation on a large scale.

Geomatics

Interest in Chile for Geographic Information Systems is very strong. Each of Chile's strongest sectors (Mining, Forestry, Fishing and Agriculture), and many of the major social challenges facing Chile (environment and resource management) all look to GIS technology as a powerful tool.

Mining prospection, forestry exploitation, fish stock surveillance and control, and soil and water management all beg GIS applications.

Collection of Chilean cartographic information is currently under exclusive control of the Instituto Geografico Militar (IGM), which is therefore the monopolistic supplier of raw geographic data to Chile. The IGM will be holding a congress from August 17-21, 1992, in which Canadian companies have been invited to demonstrate their GIS technology. Given the strong similarities between Canadian and Chilean economies (i.e., resource-extraction based), the excellent reputation of Canadian firms in this area and strong Chilean interest, Canadian participation in this event is sure to lead to concrete commercial ventures.

Two Chilean delegates, one from CONAF (Corporacion Nacional Forestal) and one from the Ministry Natural Resources, will be attending the GIS '92 conference being held in Vancouver later this month (February 1992):

Presently there is only one foreign firm active in the Chilean GIS market, ARC-INFO of the USA, which sells its software package for approx. \$60,000 per unit.

Aerospace and Space Technologies

Canadian participation in upcoming March 08-15 FIDAE avionics trade show, will provide more information on size and prospects for this market.

In November 1991, the Direccion General de Aeronautica Civil of Chile, announced its development plan for 1992 to 1996. The plan revolves around the construction in Chile of two new airports (one in Punta Arenas in extreme south of Chile and one in Chile's Antarctic zone), plus major expansion of Santiago International Airport. While no firm estimates exist for amount to be expended in this development program, estimates range from \$100 million to \$600 million.

Development plan includes procurement of air traffic control systems (DME, VOR) and actual airport construction/expansion. Interested companies should have their local agents contact:

Direccion de Telecomunicaciones Electronica e Informatica
Edificio de la DGAC
Miguel Claro 1314, Piso 4
Santiago de Chile

Defence and Commercial Electronics:

While military products must conform to Canada's Export Control mechanism, recent experience suggests that only the most offensive-type weaponry will not be allowed exportation to Chile. Sales of component electrical parts, to both defensive and offensive military equipment, have recently been approved.

Chief opportunities in this sector lie in military sector as domestic industries are fully capable of supplying most civilian requirements. For Canadian firms, of particular interest is the recent contract won by POLARIS DESIGN of Vancouver to lead construction of five naval coast-guard vessels. Contract is valued at \$65 million, a large portion of which is devoted to procurement of on-board electrical components.

On the avionics side, Canada will be participating in FIDAE '92, South America's largest air and avionics trade show, March 08-15, 1992. We will, at that time be able to gain a better appreciation not only of the Chilean, but also of the Latin American market for avionics equipment. A post-FIDAE report will be prepared and available to all interested parties.

SAO PAULO, BRAZIL

Brazil, the fourth largest country in the world, a population of 150 million people, and an economy ranked 9th globally, continues to be a country of great proportions and potential; yet, its equally profound contradictions (largely systemic/structural in nature) give rise to divergent and contentious views of its future. The territory covered by this Mission, covering the states of Sao Paulo, Rio de Janeiro, Parana, Santa Catarina, Rio Grande do Sul, Mato Grosso and Mato Grosso do Sul, represents 60% of the country's population and its industrial output accounts for 75% of Brazil's total GDP.

When the Collor administration took power (March 90), Brazil was suffering from serious structural problems, hyperinflation, imbalances, inefficiencies staggering foreign debt, a dangerous dependence upon indexation, and a debilitating depression. It has been daunting to stymie this momentum and move Brazil from 1950's statism to 21st century liberalism. The attempts being made are marked by successive failures. Despite a second stabilization programme, Collor Plan 2 (end January 91) and a new economic team (May 91), the Government's rigid commitment to high interest rates and tight monetary policy has damaged some segments of the productive economy and has failed to bring Brazil's expectation driven inflation to its knees.

While stated as a government priority, the privatization process has been slow to begin and fraught with difficulties. Notwithstanding the liberalization of trade, less than 10% of the Brazilian economy is involved in international trade. While exports from 1978 to 1984 exploded at an average annual rate of 13%, from 1984 onwards this plunged to 2.5% (failing to keep up with dollar inflation let alone competition driven by the "Asian Tigers"). Yet, Brazil still manages to enjoy the world's third largest trade surplus (USD 6.2 billion for January-June 91 compared USD 4.6 billion for 1990 and USD 6.9 billion in 1989). While the annual cost of fully servicing Brazil's current foreign debt was less than 3% of Brazil's GDP and roughly equal to its trade surplus, Brazil has failed to come to an agreement with the IMF. This has forced commercial banks and ECA's (including EDC) to virtually suspend financing.

The dismantling of market reserve, import control systems, and select lowering of tariffs has exposed production inefficiencies and high prices to international competition. To survive internationally, Brazilian business is in critical need of increasing attention to quality, productivity enhancement, and competitiveness. This will require access to higher technologies and manufacturing processes as well as rationalizing domestic production. The profile of exports is becoming more diversified to include consumer items and higher value-added items. Both the number of solid inquiries as well as Canadian business visitors and participants increased opportunities for joint ventures and technology transfer arrangements upon which to build commercial sales. There is also greater interest in Canada as a destination for tourism and investment.

Advanced Technology Sector

Advanced Technology Sector has suffered restrictions and market reserves for the past eight years, new Governmental determinations have reduced import barriers to minimum necessary to protect developing local industry. There are several Trade Fairs in specialized sectors which will take place during 1992. Post would like to call special attention to Comdex-Sucesu '92, 14-18 Sept '92 - Sao Paulo. It is the principal exhibition in Brazil for computer hard and software, telecommunications, equipment, systems etc. Canadian pavilion has been confirmed. The presence of Canadian companies is highly beneficial to market development strategies.

Informatics

The sector has been protected from foreign competition over last eight years to enable growth of incipient local industry. Market reserve ends in 1992, and industry now preparing itself to face competition, principally by acquiring state of the art technologies from abroad. Opportunities exist in all areas, including: remote sensing, geomatics, process control systems, etc...

Telecommunications

Lack of government investment over past decade has caused chaos to be synonym of Brazilian telephone and communications network. Opportunities exist in all areas from consulting services to manufacture and sale of complete systems. Deregulation and privatization of certain services to date considered as government monopoly offer opportunities for investment (up to 49%) in specific areas such as mobile cellular communications; CATV; Data Networks; etc...

Electronic Components

Electronic components, like all other electronic equipment have been protected for the last years. With the opening of the Brazilian market, opportunity exists for sale of components in general, as well as for O.E.M. equipments under contract. Specialized instrumentation for scientific and industrial uses, non destructive testing equipment, etc. can all be considered as having good market potential.

Defence

Brazilian defence sector has been the object of severe budgetary restraints during the decade of 1980. Programs like the Navy's Frigates and Corvettes construction and modernization programs, upgrading of the Minas Gerais Aircraft Carrier, Airforce's Mirage and F-5's modernization and Army's Electronic Warfare Centre have had their implementation postponed many times due to lack of resources. Furthermore, the export of Brazilian Military equipment was drastically reduced in the last two years.

Opportunities in the near future shall be concentrated mainly in the above Navy and Airforce programs, although with a slow implementation chronogram, since the priority is, in the content of the existing budgetary problem, to maintain a minimum level of operational conditions.

**EXTERNAL AFFAIRS AND
INTERNATIONAL TRADE CANADA**

EXTERNAL AFFAIRS AND INTERNATIONAL TRADE CANADA

ADVANCED TECHNOLOGIES DIVISION

External Affairs and International Trade Canada (EAITC) has the primary federal government mandate for assisting Canadian industry in its efforts to market products and services internationally. The Advanced Technologies Division (TAE) within EAITC is responsible for facilitating the international marketing of advanced technology products and services. The Division also serves as the focal point for the sector within EAITC.

Trade Commissioners assigned to TAE provide global marketing expertise and support for the fields of telecommunications, computer-based technologies, instrumentation and electronics, as well as a broad knowledge of world market activities and opportunities in these sectors.

The Division is charged with keeping abreast of technologies and the challenges presented by the international marketplace, which for the information technologies and electronics sectors is expanding at a rapid rate. Canadian advanced technology exporters are provided counselling and assistance in identifying and accessing appropriate markets.

In cooperation with Trade Commissioners from Canadian trade posts abroad and the geographic trade divisions within EAITC, TAE organizes and coordinates export promotion activities including industry participation in international trade exhibitions, foreign market exploration missions, incoming buyers missions, seminars and conferences. For promotional use abroad, the Division produces sectoral publications and diskettes highlighting the capabilities of Canadian companies.

ADVANCED TECHNOLOGIES DIVISION (TAE)

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EXTERNAL AFFAIRS AND INTERNATIONAL TRADE CANADA

AEROSPACE AND DEFENCE PROGRAMS DIVISION (TAG)

This is one of the four divisions which make up the International Marketing Bureau. Its primary role is to help Canadian industry to export defence and commercial aerospace, space, electronics and marine products to world markets. TAG also manages formal government-to-government defence economic relationships including the Canada-U.S. Defence Production/Development Sharing Arrangements; the defence research development and production agreements with Western European countries and NATO infrastructure procurement.

Canada - U.S. Defence Production Sharing Arrangements (DPSA): These arrangements give Canadian manufacturers the opportunity to provide defence supplies and services to the U.S. military and to U.S. defence contractors.

Under this program, Canadian firms can compete effectively because, in most cases, the U.S. government has waived customs duties and its Buy America Act. The program aims to improve market access for Canadian businesses but does not provide financial assistance.

Canada - U.S. Defence Development Sharing Agreement (DDSA): This program, a companion to the DPSA, enables the Canadian Government to share in the cost of a U.S. Department of Defense development project. Qualified Canadian companies act as prime contractors for approved projects.

RDP Agreements: Canada maintains bilateral defence Research, Development and Production (RDP) Agreements with European partners (Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Sweden and the United Kingdom). The objective of these agreements is to find projects of interest which warrant bilateral support under an RDP. Defence economic cooperation represents a strong element of RDP's. Industrial cooperation is encouraged for the mutual benefit of our defence industry bases. Canada also has a defence industrial cooperation agreement with Spain.

The NATO Market: As a member of the North Atlantic Alliance, Canada contributes to NATO infrastructure projects and cooperative armaments projects. These projects require a wide range of goods and services, and present opportunities for Canadian companies to participate.

Other Defence Markets: TAG also provides assistance to companies selling defence products to other world markets as permitted by Canadian export controls policy.

Civilian Aerospace and Marine Markets: TAG also provides a full range of marketing support to exporters of civilian aircraft, space, marine and security products. The division is helping to organize, for example, the Subcontractors Conference which will be held in Toronto on June 3, 1992 and space equipment mission to Houston and Montreux, Switzerland in March 1992 and to Vandenburg Air Force Base in July 1992.

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