

HD9711.5
.C32
A34

Industry Canada Industrie Canada

1994 c.2

IC



AEROSPACE AND DEFENCE-RELATED INDUSTRIES

STATISTICAL SURVEY REPORT 1994

**Industry Canada
Aeronautics Branch
October 1994**



This report is the 1994 annual survey of the Canadian Aerospace and Defence Industry, collected and conducted on behalf of the industry by the Aeronautics Branch of Industry Canada.

Enquiries or comments on this report can be made through the individuals in Industry Canada listed below. In making enquiries please note that the information contained in the survey is provided in aggregate form for the industry as a whole. Specific company data, or data that could reveal specific company performance will not be divulged or discussed.

Jim House (613) 954-3795 or Roger Saberton (613) 954-3292

*Propulsion and Aircraft Systems Directorate
Aeronautics Branch
Industry Canada
235 Queen Street
Ottawa, Ontario
Canada
K1A 0H5*

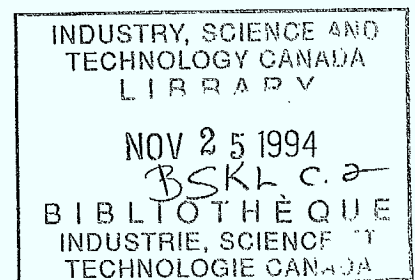




TABLE OF CONTENTS

Introduction	Page 1
Summary of Survey Results	Page 5
Specific Survey Results	Page 9
Gross Sales vs Gross Output	Page 9
Order Backlogs	Page 10
Inventories	Page 11
Net Sales vs Gross Sales	Page 13
Gross Output vs Value Added	Page 15
Canadian vs Export Sales	Page 16
Sales By Customer	Page 18
Civilian vs Defence Sales	Page 19
Sales by Sub-sector	Page 20
Sales by Product Category	Page 22
Regional Sales	Page 24
Employment by Category	Page 25
Regional Employment	Page 27
Labour Productivity Indicators	Page 28
Industry Costs	Page 29
Imports vs Domestic Suppliers	Page 30
New Investments By Category	Page 31
Sources of Investment	Page 33

Tables	Page 37
Gross Output vs Gross Sales	Page 37
Year End Order Backlog	Page 37
Opening Inventories	Page 38
Gross Sales vs Net Sales	Page 38
Gross Output vs Value Added	Page 39
Sales by Geographic Area	Page 39
Canadian vs Export Sales	Page 40
Foreign Sales (Excluding U.S.)	Page 40
Gross Domestic Sales	Page 41
U.S. Sales	Page 41
Sales by Customers	Page 42
Sales to Governments	Page 42
Civil vs Defence Sales	Page 43
Sales by Sub-Sector	Page 43
Spare Parts	Page 44
Sales by Product Category	Page 44
Regional Distribution of Sales	Page 45
Import of Parts, Components, etc.	Page 45
Industry Costs	Page 46
Labour Costs	Page 46
Material Costs	Page 47
Total Employment	Page 47
Employment by Category	Page 48
Regional Distribution of Employment	Page 48
New Investment by Category	Page 49
IC Support	Page 49
R&D Funding by Customers	Page 50
DIPP Repayments	Page 50
Sources of New Investment	Page 51
Annex	Page 55
Definitions and Notes	Page 59

Introduction

The 1994 annual report on Canada's Aerospace and Defence Industries marks the 10th anniversary of the department's annual survey of this industry sector. In recognition of this, the 1994 report is a special report that includes not only the statistics on the past year's performance as well as the five-year forecast normally provided, but also incorporates historical information collected by Industry Canada and its predecessor departments since 1984. The publication of these historical figures along with the latest survey results is made possible with the co-operation of the participating companies and the ongoing support of the Aerospace Industries Association of Canada (AIAC).

The addition of the historical perspective in this year's report follows a major internal review by Industry Canada officers of all survey information collected by the department over the past 10 years. Each officer responsible for an individual company or a group of companies reviewed the data on those companies to verify its accuracy. Where data gaps or inaccuracies were identified, officers contacted their companies directly to obtain appropriate revisions. As a result of this quality control exercise, there were a number of amendments to the data held on individual companies.

In addition to revisions resulting from the review noted above, the historical series in this report also incorporate the results of some previously unpublished data resulting from late survey returns (i.e. a few company returns usually arrive each year after the survey report has been published). Consequently, the historical series shown in this latest publication are revised figures and will not correspond exactly with the results published by the department in previous annual reports.

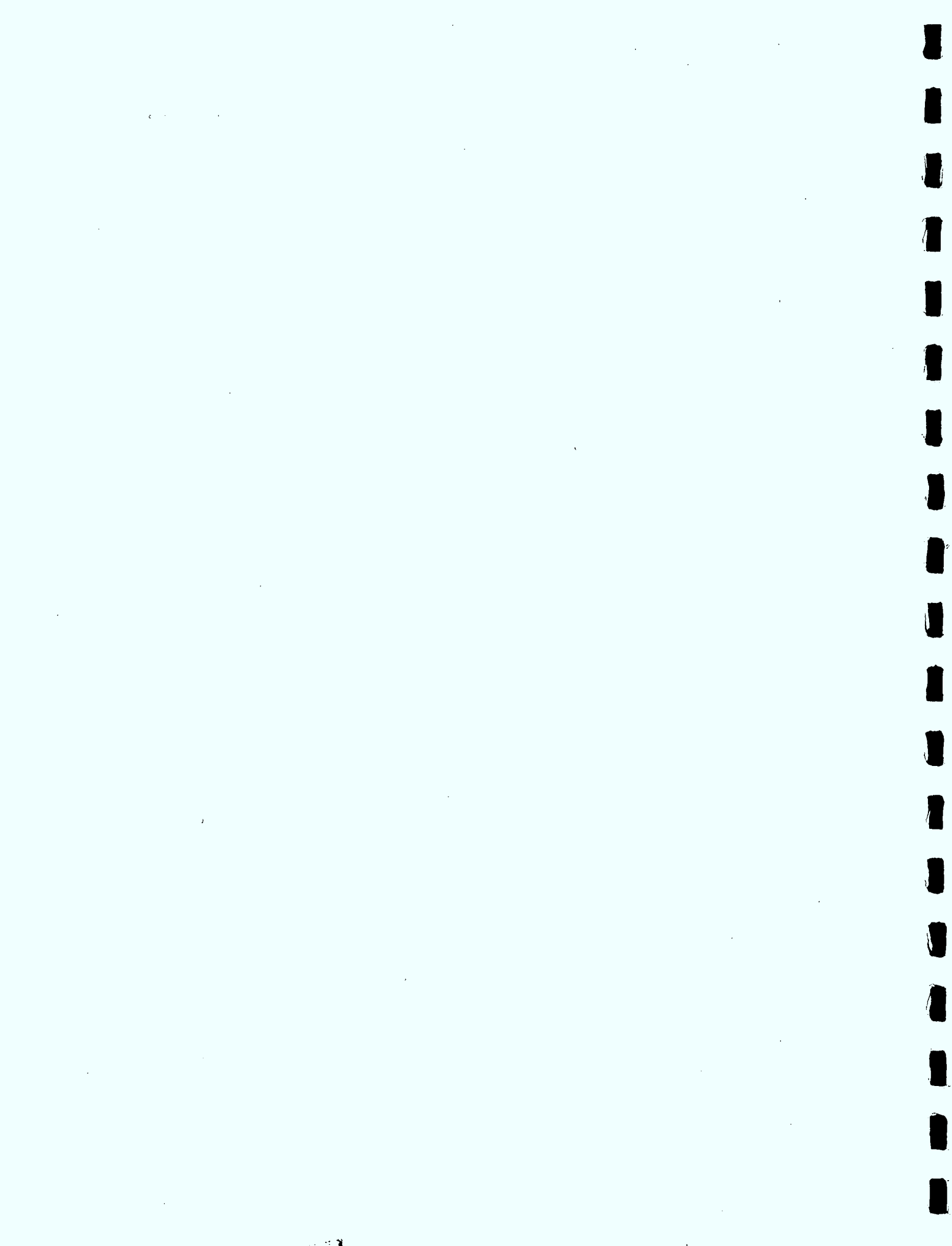
One of the benefits of incorporating revised historical data in the latest report is the usefulness of this data to those clients who wish to evaluate current and future developments in a longer term context. It also facilitates assessment of trends and cyclical movements in the data and makes it easier to identify structural changes that may be occurring in the industry.

For the 1994 survey, forms were sent to 78 Canadian Aerospace and Defence-Related companies with sales in excess of \$10 million annually. Data for this year's survey were collected over the period February 1994 through April 1994. Complete and partial responses were received from 75 companies. Measures were taken within Industry Canada to compensate for missing data through reference to other data sources or by contacting companies. Allowance has also been made for the small business element that was not captured directly in the survey.

As in previous years, companies have been assured that their individual returns will be held in strictest confidence within Industry Canada and the data will be employed and released in aggregate form only.



SUMMARY OF SURVEY RESULTS



Summary of Survey Results

The latest survey returns indicate that during 1994 the Aerospace and Defence Industry expects to pull out of the throes of a recession that has gripped the industry since 1991. Initially, however, the recovery is expected to be somewhat uneven and in some sub-sectors a recovery is not expected to get under way until 1995.

For the sector as a whole there were further large declines in output and sales in 1993; however, there were also some signs that the worst may be over, and that 1993 marked the bottom of the recession. A key harbinger of impending recovery was an upturn in year-end order backlogs in 1993. This was the first increase in three years, and is a precursor of further improvements in demand for the industry's output. Manufacturers appear to have been encouraged by the signs of a turnaround in demand and began to cease the de-stocking of inventories that had been particularly evident between 1991 and 1992. Beginning inventories moved up in 1993 for the first time since 1991. These developments are believed to presage a recovery in demand that will set the stage for a positive rebound in sales and output between 1994 and 1998.

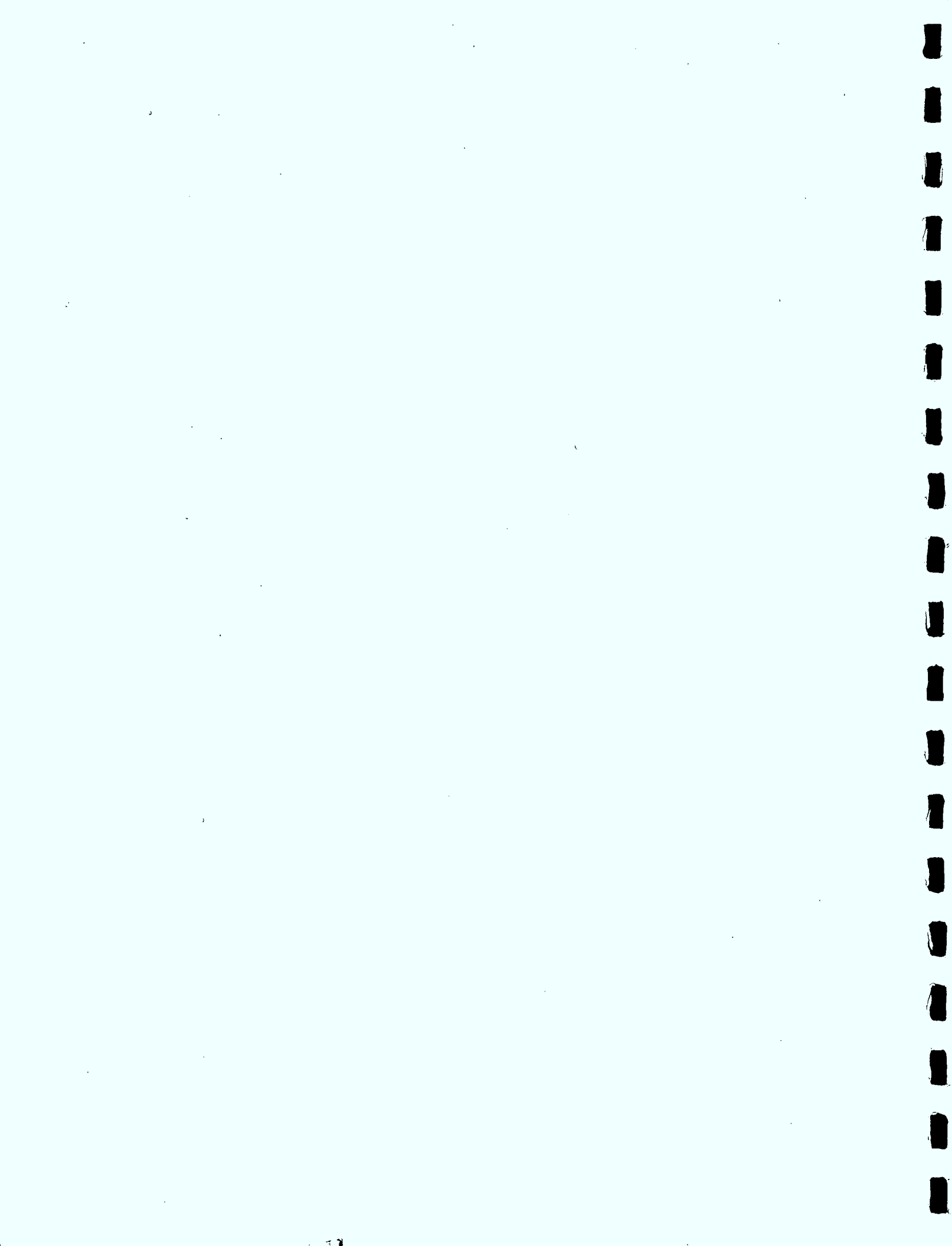
As the recovery proceeds, the industry will be looking back on what has been a fairly severe contraction in demand for the sector's output. Revised data show that total sales fell more than 5% in 1993 (following a 4% drop in 1992), while employment losses were particularly severe. More than 12,000 jobs were lost between 1991 and 1993. Investment spending also suffered in the recession and by 1993 had declined to the lowest levels in five years.

Looking forward, industry is forecasting an export-led recovery. Total sales are forecast to rise 54% between 1993 and 1998, and exports are expected to account for more than 87% of this growth. The strongest export growth is expected to come from customers outside the Aerospace and Defence manufacturing sector itself such as airlines and other corporations. In contrast, export sales to higher tier Aerospace and Defence manufacturers, which were particularly hard hit during the recession, will be somewhat slower to recover, but they too are expected to contribute to the recovery and by the end of the forecast period are anticipated to be above pre-recession peak levels.

In contrast, investment and employment growth are forecast to both fall short of the rate of growth in sales and output during the recovery. The result will be a significant improvement in output per worker, but employment is not expected to regain pre-recession levels within the forecast period. Growth in investment spending is not expected to be as strong during the 1994/1998 recovery as it was during the period leading up to the recession. This suggests that the industry will have some difficulty maintaining the high pre-recession levels of growth in spending. As a result, the industry's R&D/Sales ratio is expected to move lower during the forecast period even though the level of investment spending, in absolute terms, will remain significant.



SPECIFIC SURVEY RESULTS



Specific Survey Results

Background

The survey returns enable the following specific survey results to be analyzed and presented in this report.

Gross Sales vs Gross Output

The growth in gross sales¹ and gross output² in the sector are shown in Chart 1. The chart provides an indication of the impact of the business cycle on the sector even though the historical series does not extend far enough back in time to capture the full extent of the previous recession which occurred around 1982/83. Nevertheless, the period 1984 through 1991 captures much of the upswing in the business cycle from the previous recession and thus provides a gauge against which to compare the latest industry forecasts for recovery.

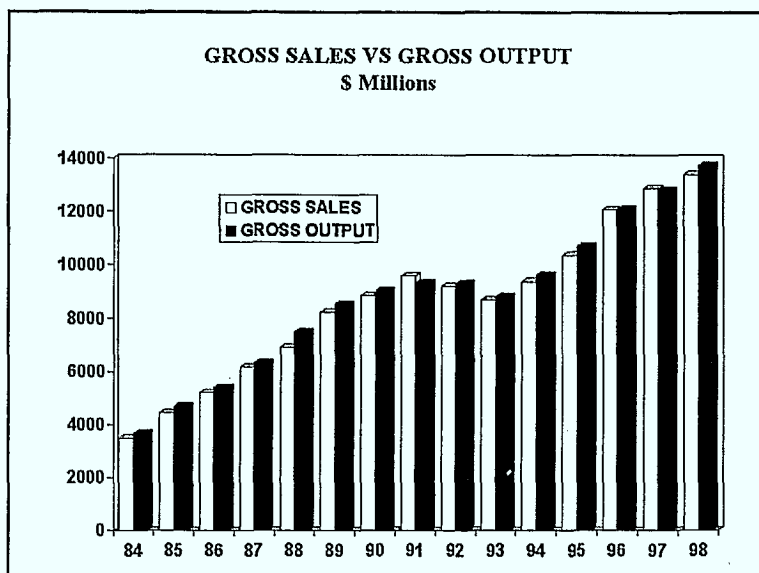


Chart 1

The important thing to note about the period 1984 to 1991 is that it was a period of unusually rapid growth in the industry. Between 1984 and 1991 industry sales increased more than \$6 billion or at an average compound annual rate of 16%. Gross output increased more than \$5.6 billion over the same period or at average compound annual rate of 14%.

By 1991 the Canadian economy, as well as the economies of a number of Canada's major trading partners, had entered recessions. Concurrently, as most international defence budgets were reduced, defence sales were also in decline. As demand contracted, sales of Aerospace and Defence products weakened. Industry responded by reducing output and drawing down inventories. Between 1991 and 1993 gross sales fell 9.5% while gross output fell 5.7%.

During the forecast recovery, industry anticipates gross sales to be 54% higher in 1998 than their recessionary lows of 1993. Gross output is forecast to jump more than 55% over the same period. While these appear to be reasonably hefty gains, the average annual compound

rate of growth in gross sales (9%) and gross output (9%) over the forecast period will be more modest than that experienced during the recovery from the last recession in 1982/83.

In conclusion therefore, industry is expecting reasonably robust rates of growth in sales and output over the next five years, but during the forecast period it does not expect a return to the unusually high rates of growth experienced in the 1980's.

Order Backlogs

Changes in order backlogs are an early indicator of changes in demand for the industry's output. Generally speaking output responds with a lag to changes in demand because of the lead time required to increase or decrease production in response to changes in demand. The existence of this lag means that output may initially continue to rise in the initial stages of a cyclical downswing, or conversely, continue to decline in the early stages of a cyclical upswing.

Such a pattern is clearly evident in the data shown in Chart 2 which compares the year-end order backlog with the gross output for the sector. The chart indicates that the industry's order backlog grew rapidly from 1984 until 1990 at which point the rate of growth began to slow indicating a weakening in demand for the output of the industry. As demand continued to weaken in 1991, the order backlog began to decline.

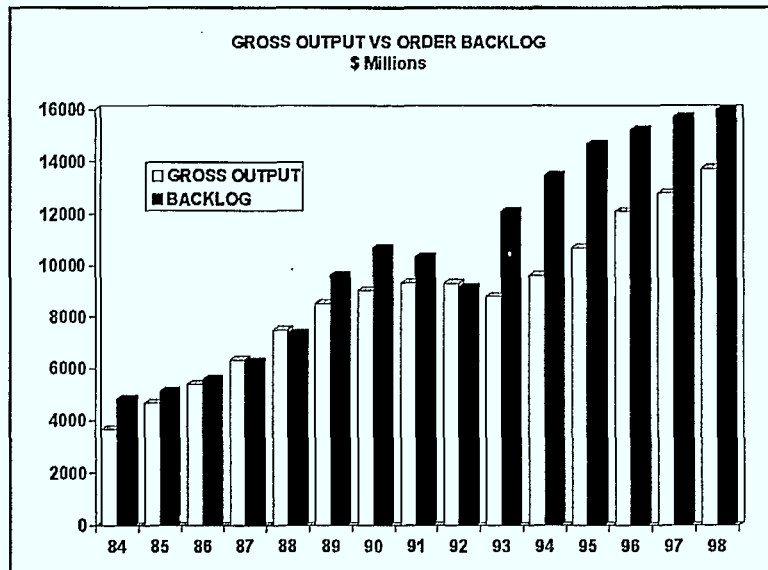


Chart 2

Industrial production responded to the falling order backlog with a lag, and gross output continued to rise in 1991.

Order backlogs continued to decline in 1992, but by then industry had begun to respond by cutting back production to bring output closer into line with the reduced demand requirements. Output continued to fall in 1993, however, the order backlog began to turn around and by year-end exhibited the first increase in three years.

The strengthening in the order backlog in 1993 appears to be the precursor of a recovery in demand. In fact, the forecast indicates that industry is expecting sustained growth in order

backlogs throughout the 1994 through 1998 forecast period. Reflecting the strengthening in demand, industrial output is forecast to begin recovering in 1994 and continue to rise over the forecast period.

Inventories

Other evidence of a recovery comes from changes in inventory holdings, even though the existence of an inventory cycle in this sector is becoming increasingly difficult to detect. Conventional wisdom holds that an inventory cycle arises because a lagged response in production to changes in demand generally impacts inventory holdings. Because of the long lead times and sizeable order backlogs in the Aerospace and Defence sector, one might expect output to continue rising during the onset of recession resulting in an unintended or unplanned inventory build-up. Such an inventory accumulation would prompt manufacturers to cut production to bring output closer into line with the reduced demand requirements. If manufacturers expected the recession to continue they would continue to cut production and reduce inventories further. This process would continue until manufacturers expectations about the future direction of demand began to change. Once, manufacturers foresaw signs of a recovery in demand, they would begin to increase production and begin inventory restocking to position themselves for the expected turnaround.

Although there is some evidence that inventory holdings in the Aerospace and Defence sector follow the conventional wisdom outlined above, the survey results are somewhat ambiguous. For instance, the survey uncovered increases in the inventory/sales ratio in 1989 and 1990 (Chart 3), but this occurred prior to the onset of the 1991/93 recession not in the early stages of the recession. It would be difficult, to claim that this was an unintended inventory accumulation. On the contrary most of the demand indicators in 1989 and 1990 continued to exhibit

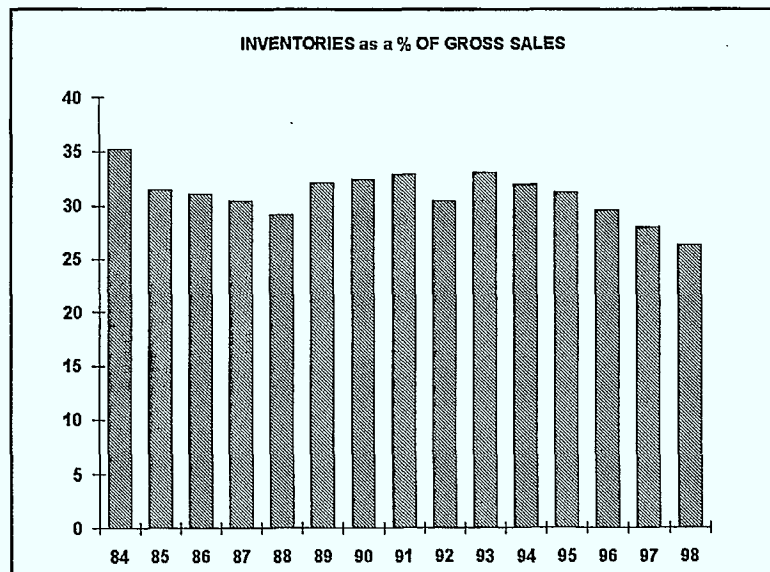


Chart 3

strength. However, as the sector began to move into recession in 1991 the inventory sales ratio continued to rise exhibiting the type of cyclical pattern that conventional wisdom suggests one might expect in the early stages of a recession. As the recession continued into 1992, production continued to rise indicating the lagged response to the weakening demand (See chart 1). Normally one might have expected inventories to continue to rise in the face

of continued production increases in 1992, but it would appear that manufacturers moved to reduce inventories sharply in 1992.

This somewhat unusual pattern of inventory holdings during the onset of the recession may be the result of a structural change in inventory practices in the sector super-imposing itself on the normal cyclical demand influences. It will be noted from Chart 3, for instance, that there is a general downward trend in inventory holdings over the whole period shown. This is the type of trend one might expect given that more and more manufacturers are moving to increase the use of just-in-time-inventory (JITI) practices to reduce costs and improve competitiveness. It may be that this general downward trend in inventory/sales ratio's is tending to dominate the cyclical demand influences on inventory holdings and obscuring the traditional cyclical influences.

Nevertheless, it would appear that cycle factors have not entirely succumbed to structural changes. In 1993, for instance, beginning inventories edged up for the first time since 1991. This is the type of turnaround one might expect following a period of inventory liquidation. It suggests that manufacturers perceive signs of a recovery in demand. The evidence of recovery is encouraging, however, the forecast indicates that after 1993 the inventory/sales ratio is expected to decline steadily. This, as noted above, may be an indication of a continuing structural change in the industry as more and more manufacturers continuously improve inventory practices and processes.

Net Sales vs Gross Sales

Net sales³ for the sector are defined as gross sales minus sales to domestic Canadian Aerospace companies (i.e. sales to the sector by firms in the sector itself). Net sales have traditionally been estimated in previous survey reports to present a sales figure, which in aggregate, avoids double counting of sales among domestic Aerospace and Defence manufacturers.

A comparison of net and gross sales, is presented in Chart 4. This comparison is useful in helping to shed light on the performance of sales among domestic Aerospace and Defence manufacturers. Although the chart indicates that over the period 1984 to 1991, there was rapid growth in both gross and net sales, gross sales actually grew slightly faster than net sales and the share of net sales in total sales declined slightly over this period.

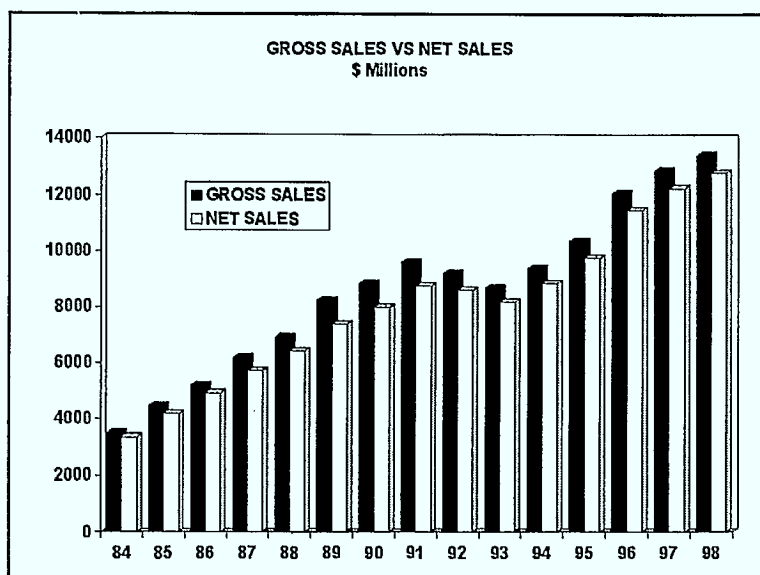


Chart 4

Reductions in the share of net sales in gross sales over this period indicate that sales among firms within the domestic Aerospace and Defence sector grew faster than sales to firms outside the domestic sector and is an indication of the growing capabilities of the domestic firms within the sector to supply the requirements of the sector itself.

During the recession between 1991 and 1993, gross sales fell 9.5% while net sales declined by 6.6%. The relatively steeper decline in gross sales, particularly in the early stages of the recession, indicates that inter-firm sales among domestic firms in the sector were generally hit harder by the contraction in demand than sales to other customers. There are a number of possible reasons for the divergence in growth rates. In the initial stages of the recession, firms may have engaged in labour hoarding (i.e. attempting to retain skilled workers) by repatriating work that might otherwise have been contracted out. Bringing work in also helps to spread overhead cost over a greater number of units of output and helps reduce average costs. These types of behaviours may explain the larger declines in gross than net sales.

Over the recovery period from 1994 to 1998, both net and gross sales are expected to increase by similar magnitudes. However, net sales are anticipated to recover at a faster pace than gross sales initially because of the strength in export sales. Nevertheless, as the recovery proceeds, gross sales will begin to gain momentum. Overall, the rate of growth in both net and gross sales over the recovery phase of the business cycle will be less rapid than the rates of growth experienced in the recovery from the previous recession in 1982/83.

Gross Output vs Value Added

While gross output measures the value of the products and services produced by the Aerospace and Defence manufacturing sector, another useful indicator of the contribution of the sector to the economy is the value added⁴ produced by the sector.

Estimates of gross output and value added for the sector are compared in Chart 5. It will be noted from the chart that value added generally accounts for more than half of the gross output of the sector. In fact, the Aerospace and Defence Sector is one of the highest value added manufacturing sectors in Canada.

The chart also shows that, both gross output and value added rose rapidly during the period 1984 to 1991. Gross output increased at an average compound annual rate of growth of 14% over the period while value added increased at a somewhat slower 12% compound average annual rate.

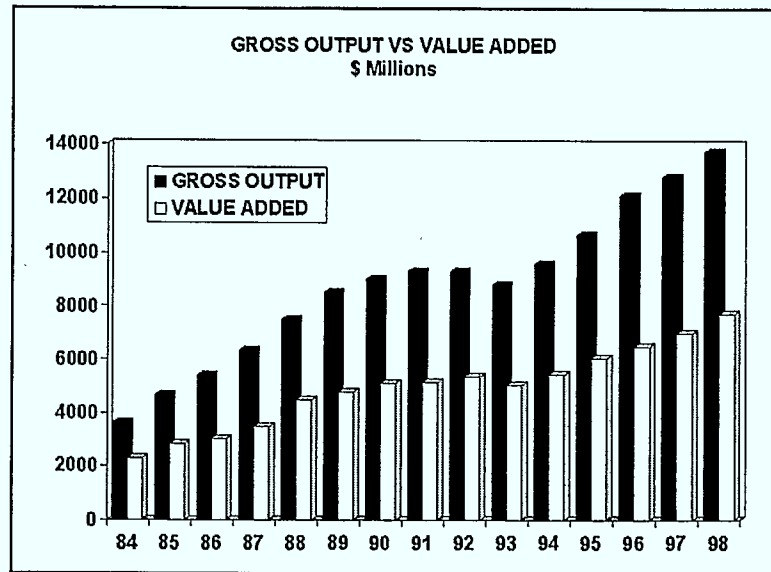


Chart 5

During the 1991/1993 recession both gross output and value added declined. Gross output turned downward in both 1992 and 1993, but value added continued to rise into 1992 and did not begin to decline until 1993. The differences in the performance of the two indicators during the recession, may be due to the fact that material input costs, which are included in gross output (but not in value added), fell more rapidly than labour costs, which are included in both gross output and value added, during the early stages of the recession. However, as demand continued to weaken and the recession progressed, widespread employment layoffs eventually began to reduce labour costs sharply, and this, along with declining profits, pushed value added lower in 1993.

Over the forecast recovery period 1994 through 1998, both gross output and value added are expected to resume upward growth. Both are expected to increase at average annual compound rates of growth of about 9%. These rates of growth are below the average rates of growth experienced in the period 1984/1991 which captured much of the recovery from the previous recession in the sector.

Canadian vs Export Sales

Growth in sales to the domestic and export markets by Canada's Aerospace and Defence Industry are presented in the chart opposite. The chart highlights the fact that the industry is heavily export market focused. In fact, export markets have traditionally accounted for between 63% to 75% of total industry sales.

Throughout the period 1984 to 1991 exports accounted for an increasing proportion of the total industry sales. In fact, over 60% of the growth in total sales of \$6 billion between 1984 and 1991 were accounted for by exports.

The U.S. market has always been the primary foreign market for Canadian exports. Sales to U.S. Aerospace and Defence manufacturers and to other U.S. customers (primarily airlines) were the main destinations for the output of the Canadian Aerospace and Defence Industry. Direct sales to the U.S. government accounted for a much smaller share of the Canadian exports to the U.S. It is interesting to note from Chart 7 that during the 1991 to 1993 recession in the sector, sales to U.S. Aerospace and Defence manufacturers declined sharply relative to sales to other customers.

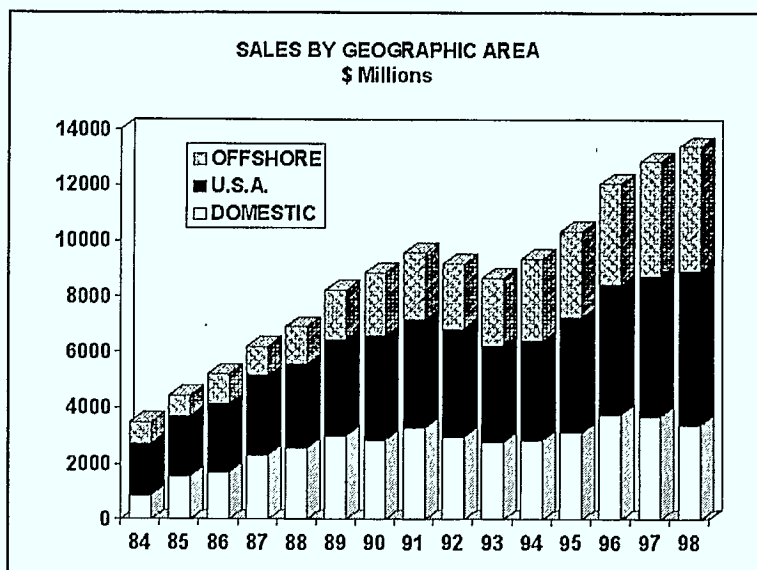


Chart 6

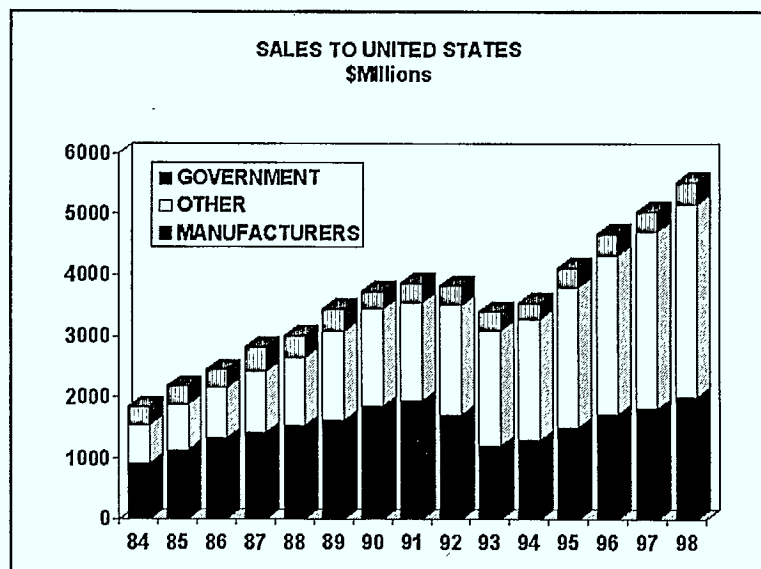


Chart 7

While the U.S. was the primary destination for Canadian exports over the period 1984 to 1991, the relative importance of offshore markets increased steadily, particularly sales to customers outside the Aerospace and Defence manufacturing sector, such as, airlines. As can be seen from Chart 8 offshore customers other than Aerospace and Defence manufacturers and Governments are expected to be a source of growth over the forecast period.

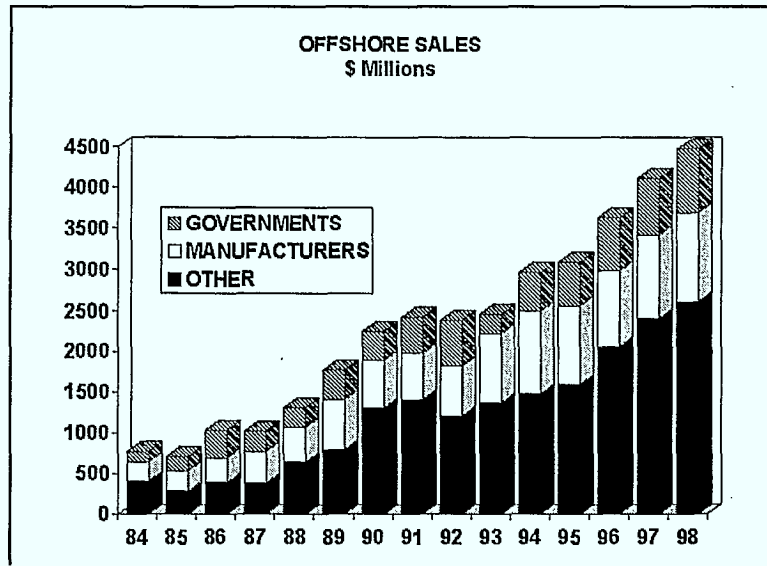


Chart 8

On the domestic front, (see Chart 9), governments were by far the major customers, accounting for more than half of the increase in domestic sales between 1984 and 1991.

During the 1991 to 1993 recession, exports fell by 7%, but domestic sales dropped even more (15%) and accounted for over 53% of the overall drop in total sales. Sales to domestic aerospace manufacturers exhibited the largest declines followed by other domestic customers.

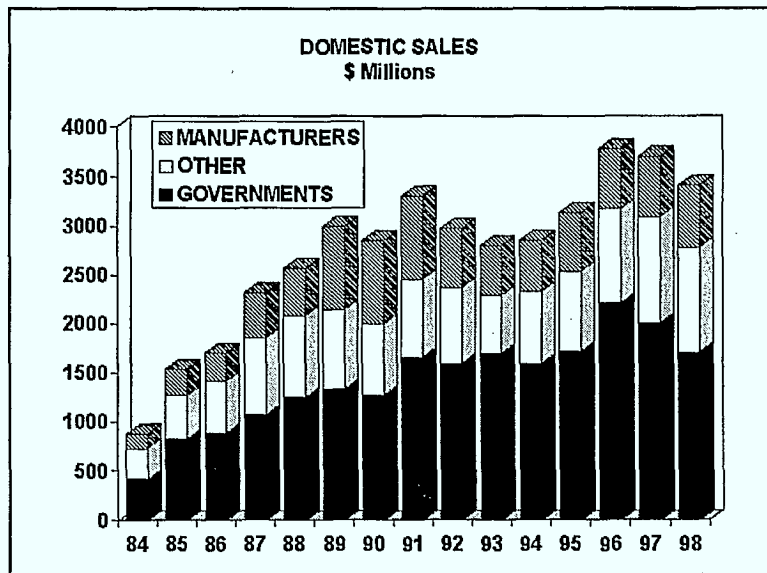


Chart 9

A major contributor to the decline in export sales during the recession was a 38% drop in sales to U.S. Aerospace and Defence manufacturers (Chart 7). However, there was also a sharp 44% drop in sales to offshore governments during this period (Chart 8).

The recovery from the recession is expected to be an export led recovery. The primary drivers are forecast to be customers outside the Aerospace and Defence manufacturing sector itself in both the U.S. and Offshore markets. The anticipated recovery in the domestic market will also depend largely on growth in sales to customers outside the Aerospace and Defence manufacturing sector (i.e. airlines and corporations). The growth in sales to customers in this category reflects the fact that the Canadian industry is becoming increasingly focused on sales of its own proprietary products to final users.

In both the domestic and the U.S. markets, the growth in sales to Aerospace and Defence manufacturers is anticipated to be a smaller factor in the forecast recovery than in the recovery from the previous 1982/83 recession.

Sales By Customer

Chart 10 summarizes the breakout of gross sales into three major customer categories; namely, sales to governments, sales to the Aerospace and Defence manufacturing industry, and sales to "Other Customers" (e.g. non-government and non-Aerospace and Defence manufacturing customers, such as, airlines and corporations).

The chart shows that sales in all three categories increased rapidly during the period 1984 to 1991. In the early years of this period, the dominant customer category was Aerospace and Defence

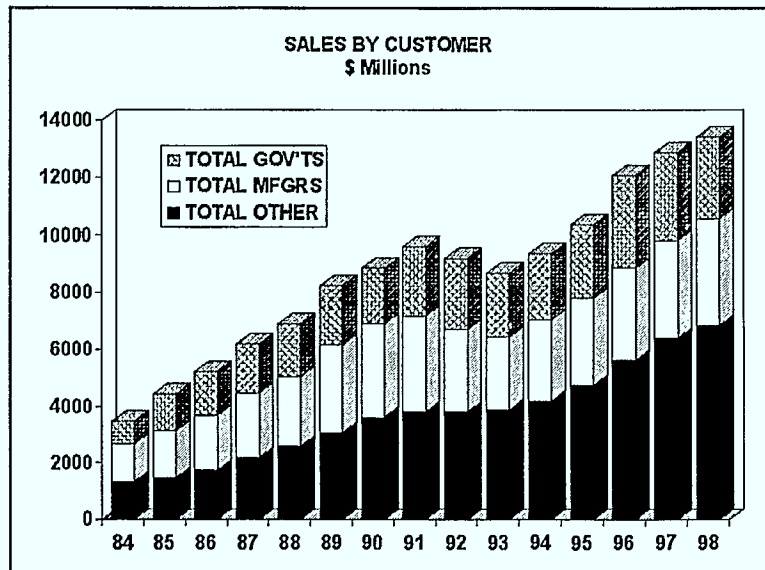


Chart 10

manufacturers. However, sales to "Other Customers", increased somewhat faster than sales to Aerospace and Defence manufacturers and by 1991, sales to "Other Customers" had overtaken Aerospace and Defence manufacturers as the dominant customer category. Sales to governments also increased faster than sales to Aerospace and Defence manufacturers during this period and also saw an increase in market share. In terms of contributions to overall sales growth between 1984 and 1991, sales to "Other Customers", accounted for 41% of the overall sales growth while sales to Aerospace and Defence manufacturers accounted for 33% and Governments accounted for 26%.

During the recession between 1991 and 1993, total gross sales declined 9.5%. Most of this decline (about 88%) was attributable to a 24% drop in sales to Aerospace and Defence

manufacturing customers. Sales to governments fell 7% during the recession and also pushed the overall sales of the sector downward. In contrast, sales to "Other Customers" edged up about 1% during the recession and helped to partially offset the overall drop in sales.

The primary driver in the recovery from the recession between 1993 and 1998 is expected to be the growth in sales to "Other Customers". Sales in this customer category are expected to account for 63% of the overall growth in sector sales forecast between 1993 and 1998. Sales to Aerospace and Defence manufacturers are also anticipated to improve during this period, but will account for only 24% of the overall growth in sales. Sales to governments are expected to exhibit the weakest growth of all three customer categories and contribute only 13% to the forecast overall growth. Despite the anticipated recovery in sales over the forecast period, none of the customer categories is expected to achieve growth rates comparable in magnitude to those achieved during the 1980's.

Civilian vs Defence Sales

A breakdown of total sales between defence and civilian markets is presented in Chart 11.

It will be noted from the chart that the Canadian Aerospace and Defence Industry is primarily oriented towards civilian markets, and it is becoming increasingly so. Throughout the period 1984 to 1991 the average annual compound rate of growth in defence sales was 12% compared with 16% for sales to civilian markets. As a result the share of defence sales in total sales fell from about 34% in 1984 to 28% in 1991.

After weakening in 1990, sales to defence markets rebounded in 1991, but growth subsequently slowed and by 1993 defence sales began to move downward. Over the 1991-1993 recession as a whole, defence sales fell 5%. In contrast, sales to civilian markets peaked in 1991 and then fell sharply during the recession. Between 1991 and 1993, sales to civilian markets dropped almost 12%.

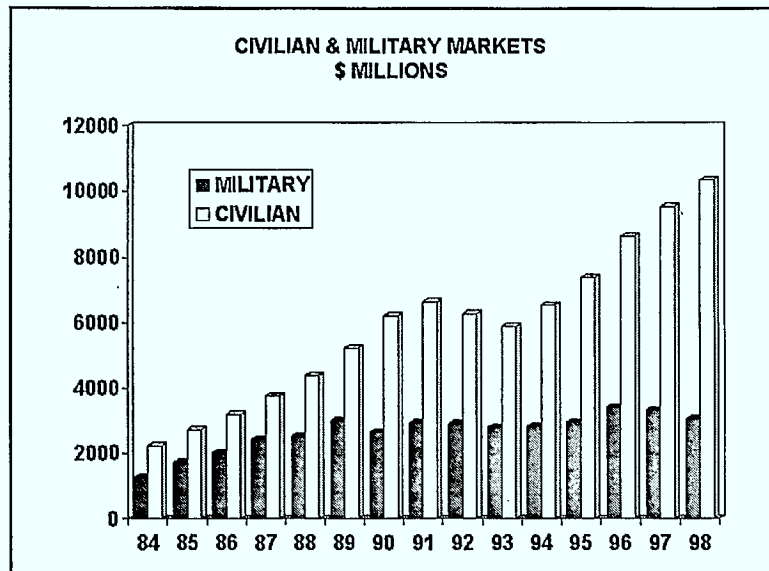


Chart 11

As the industry moves into the recovery phase of the business cycle in 1994, the growth in sales to civilian markets is expected to lead the way. In fact, sales to civilian markets are expected to account for 91% of the growth in total sales that the industry anticipates between 1993 and 1998. Throughout this period civilian sales are expected to climb at an average compound annual rate of about 9%. In contrast, sales to defence markets are expected to grow at an average compound rate of only 2% over the same period, presumably reflecting the decline in western countries' defence budgets as a result of eased East-West tensions.

Sales by Sub-sector

A breakdown of total sales into six sub-sectors namely; Airframes, Propulsion Systems, Avionics, Defence Electronics, Space, and "Other"⁵ is presented in Chart 12. The chart clearly shows that the sector's sales are dominated primarily by the Airframe and Propulsion sub-sectors followed by the Avionics, Defence Electronics, "Other", and Space sub-sectors.

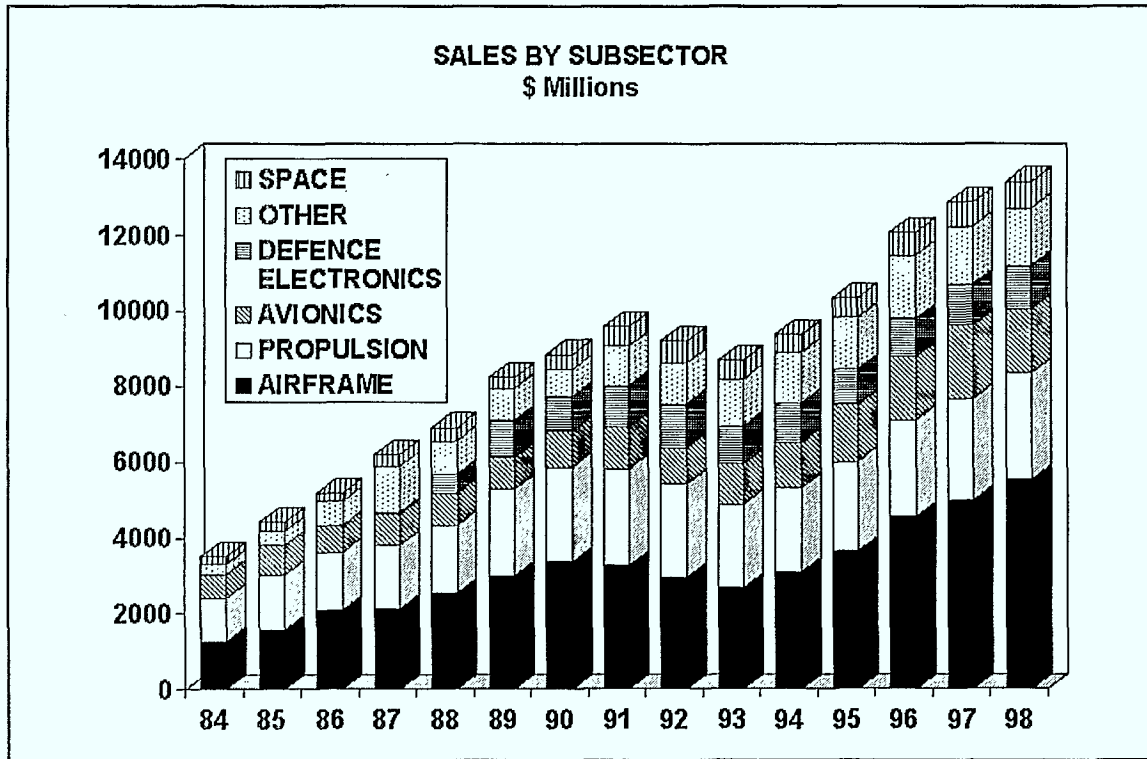


Chart 12

Traditionally Airframe sales have ranged between 30% to 39% of total sales while sales of the Propulsion Systems sub-sectors have ranged between 27% to 32% of total sales. Avionics sales have ranged from 12% to 18% of total sales while Defence Electronics have accounted for 11% to 12%. The "Other" sector tends to be more volatile. It generally

ranges in the 8% to 12% range but peaked at 19% in 1987. Space sales have held a fairly steady share of total sales in 4% to 6% range.

Throughout the 1980's, sales increased in all sub-sectors, although more than half of the overall sales growth was accounted for by the Airframe and Propulsion sub-sectors.

During the economic downturn between 1991 and 1993, sales declined in all sub-sectors except the "Other" sub-sector. The Airframe sub-sector, which moved into the recession as early as 1990, was particularly hard hit accounting for 65% of the overall decline in sales between 1991 and 1993. Declines in sales in the propulsion sector accounted for a further 35%. Declines in these and other sub-sectors were partially offset by gains in sales in the "Other" sub-sector.

The Airframes sub-sector is expected to play a major role in the forecast recovery from the recession. Over the forecast period, airframe sales are expected to achieve rates of growth exceeding those experienced during the 1980's. In fact, airframe sales are expected to account for more than 60% of the overall growth in the sector's sales between 1993 and 1998.

Avionics sales are also projected to rebound from their recessionary lows — achieving rates of growth only slightly below those attained during the 1980's. The Propulsion, Defence Electronics and "Other" sub-sectors, on the other hand, are expected to grow more slowly over the forecast recovery than they did during the 1980's. The Space sub-sector is anticipated to show somewhat better growth than some sub-sectors, but will not achieve pre-recession rates of growth.

Given the pattern of sales growth among sub-sectors, the Airframe (and to a lesser extent the Avionics sub-sector) will see improvements in their share of total sector sales during the forecast period. The Propulsion and Defence Electronics sectors will see corresponding declines in their shares.

Sales by Product Category

The survey gathers information on sales across five product categories namely; Proprietary Products, Sub-Contracts, Agency Sales, Repair and Overhaul, and Services. It also breaks out the percentage of Spare Parts in total sales. These breakouts are shown in Charts 13 and 14 respectively.

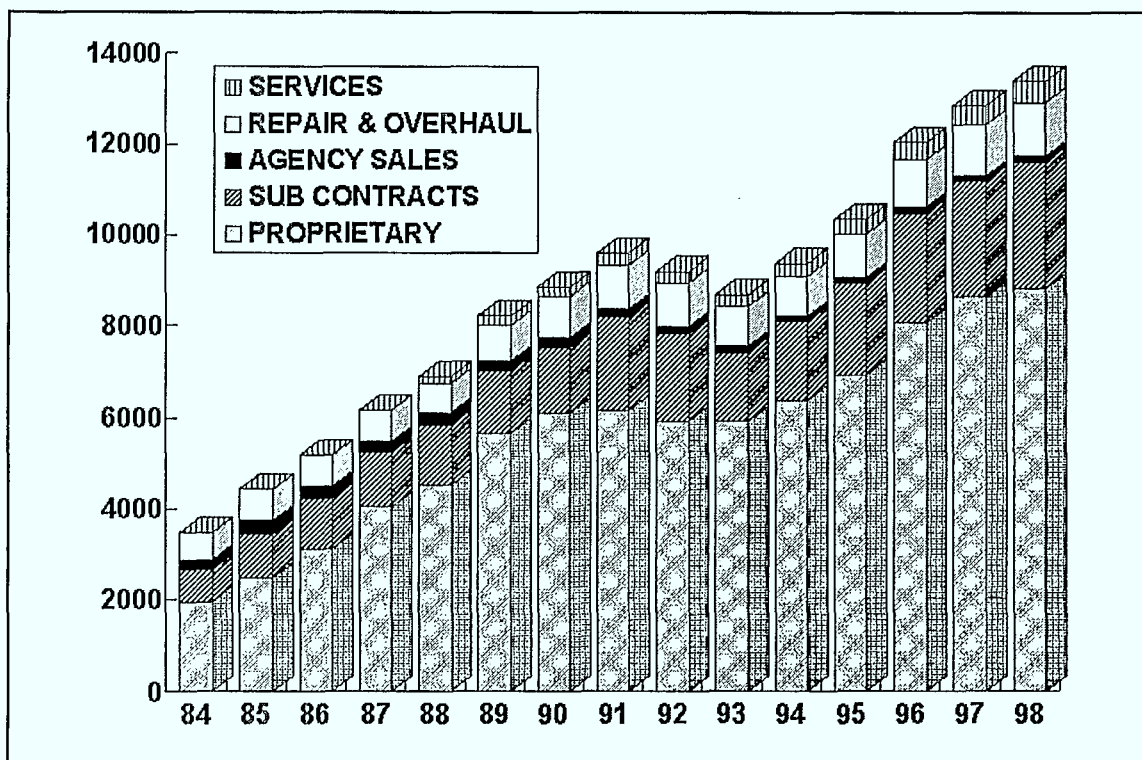


Chart 13

Chart 13, presents the product breakout. It indicates that sales of proprietary products account for almost 2/3 of the total sales of the Aerospace and Defence manufacturing sector. Sales of sub-systems and components under sub-contracts (i.e. to a design or specification controlled by others), and repair and overhaul sales account for most of the remainder of the sector's sales. Agency sales and sales of services are of relatively small importance in terms of total sales.

Looking at the movement in product sales over time, it can be seen that throughout the 1980's sales increased in most product categories. Sales in proprietary product and sub-contract categories showed the most rapid increases. Between 1984 and 1991, for instance, proprietary product sales accounted for 69% of the overall growth in sector sales while sub-contracts accounted for a further 22%. The share of spare parts in total sales (shown in Chart 14) also increased during this period.

During the downturn in demand for the sector's output between 1991 and 1993, sales declined in all product categories, however, more than 60% of the decline in overall sales during this period was accounted for by reductions in sales in the sub-contracting category. Lower sales of proprietary products accounted for only 25% of the overall decline. Comparing the declines in sales by product category with the declines in sales by sub-sector category (discussed in the previous section in this report), suggests that the recession fell relatively more heavily on lower

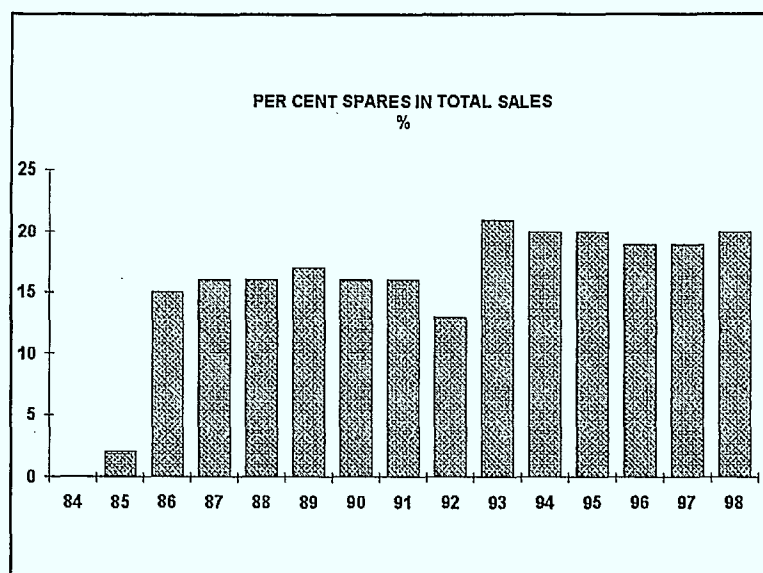


Chart 14

tier suppliers (i.e. sub-contractors) than higher tier suppliers and in particular on sub-contractors in the Airframe sub-sector, and, to a lesser extent, in the Propulsion sub-sector.

Sales of spare parts also fell off sharply during the early part of the recession, but came back strongly in 1993. The weakness early on in the recession may be indicative of customers postponing purchases of spare parts to keep inventories down until signs of recovery in demand for their own products became evident — Chart 14.

The anticipated recovery from the recession in 1994 is expected to be led by strong rebounds in sales in the proprietary products and sub-contracting categories. Over the forecast period as a whole, sales of proprietary products are expected to increase at an annual average compound rate of growth of 8% and account for 61% of the expected growth in overall sales.

Sub-contracting sales are also expected to mount a recovery increasing at an average compound annual rate of growth of 14% between 1993 and 1998 and account for 28% of the overall anticipated growth in sales. Sales of services, will also show respectable growth, and are expected to maintain their relatively modest shares of overall sales. Sales in the repair and overhaul and agency sales categories are also expected to grow during the recovery period, but at relatively modest rates and will continue to see an erosion of their share of total sales.

The percentage of spares in total sales is also expected to increase during the recovery and remain at levels above those prevailing in the 1980's.

Regional Sales

The distribution of sales by region is presented in the Chart 15. It will be noted from the chart that the sales in the Aerospace and Defence sector are largely concentrated in Ontario and Quebec.

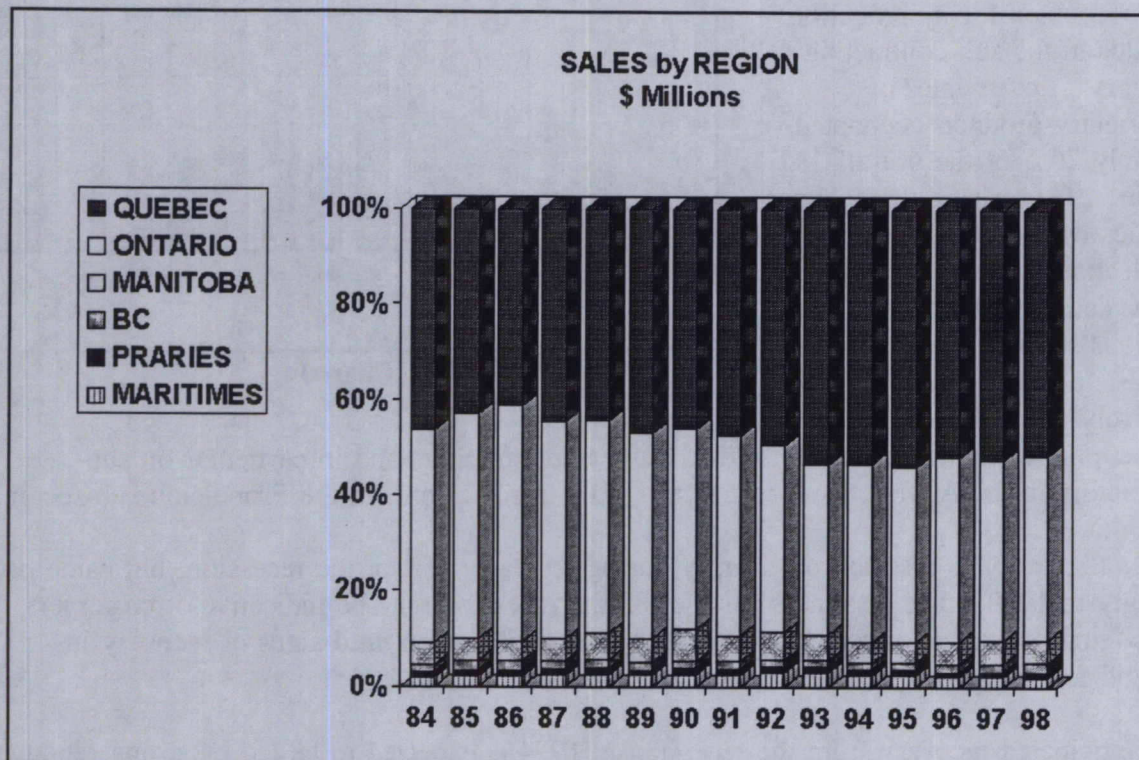


Chart 15

During the period 1984 to 1991, sales of Aerospace and Defence products increased rapidly in all regions. In fact, sales in some regions outside the central provinces; most notably, British Columbia, Manitoba and the Prairie Provinces, increased relatively faster than sales in Ontario and Quebec, but from a much smaller base. As a consequence the share of sales held outside the central provinces increased slightly over the period. Within the central provinces the growth in sales in Quebec outstripped those in Ontario and Ontario saw its share of total sales decline while Quebec experienced an increase.

With the downturn in demand for the sector's output between 1991 and 1993, sales declined in most regions. Ontario was particularly hard hit, losing almost a billion dollars in sales and accounting for more than 90% of the overall losses of the sector. British Columbia, Manitoba and the Prairie provinces also suffered losses. Quebec firms experienced both gains and losses during the recession, but gains more than offset losses leading to an overall net gain in sales during the recession. As a result of these developments, Quebec's share of

total sector sales increased during the recession from 47% in 1991 to 53% in 1993 while Ontario's share fell from 42% to 36%.

Ontario and Quebec are expected to lead the sector out of the recession with a strong rebound in sales anticipated between 1993 and 1994. Sales in the Prairie Provinces and British Columbia are also expected to begin improving in 1994, but positive gains in the Maritimes and Manitoba are not anticipated until 1995. Over the forecast period as a whole, all regions are expected to participate in the growth in sales. However, no region is expected to achieve the rapid pre-recession rates of growth experienced in the 1980's. The fastest growth in sales over the recovery period as a whole are expected in British Columbia, followed by Ontario and Quebec. Smaller gains are expected in the Prairies and Manitoba. In the Maritimes only modest growth is forecast for the recovery period.

Slightly faster growth in Ontario than Quebec over the recovery period will see Ontario regain some of the share of total sales lost in the recession. Nevertheless, Ontario is not expected to reclaim the share of total sales held in the 1980's. Quebec will continue to be the dominant region for Aerospace and Defence manufacturing in Canada.

Employment by Category

As can be seen from the Chart 16, employment in the Aerospace and Defence sector increased almost 50% between 1984 and 1991.

Rapid growth in sales and output enabled the sector to increase employment from 44,041 in 1984 to 65,615 by 1991. Employment growth began to weaken in 1990 in response to slower growth in output, but even as the sector began to slip into recession in 1991, total employment in the sector stood more than 21,500 above 1984 levels. More than half the jobs created between

1984 and 1991 were on the production line, however, the sector also hired more than 5,000 "Other" employees (i.e. management, administration, clerical, etc.) and almost 4,500 engineers some of whom are production line oriented.

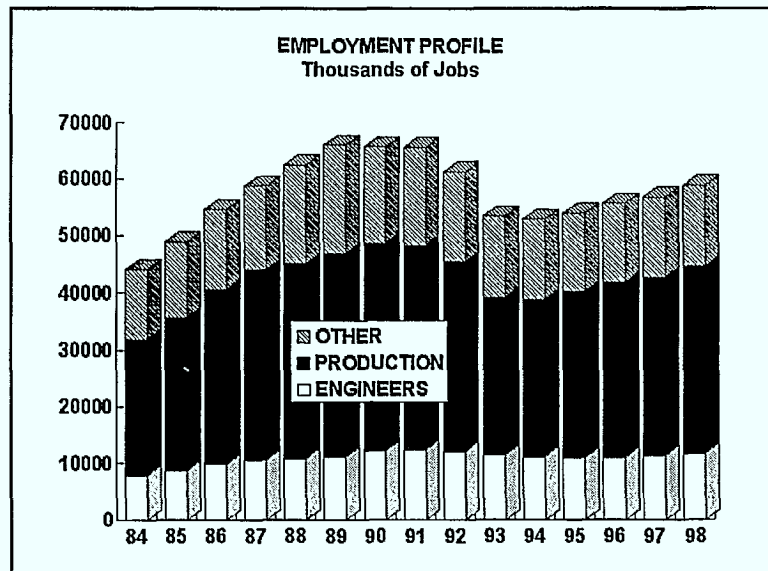


Chart 16

The contraction in demand for the sector's output during the 1991/93 recession resulted in heavy employment losses. Revised data for the period 1991 to 1993, indicate that total employment in the sector fell by more than 12,000. Workers on the production line felt the brunt of the lay-offs as manufacturing employment fell by 8,000 and accounted for 66% of the total job losses. Lay-offs of "Other" workers (i.e. management, administration, clerical, etc,) totalled more than 3,000 while engineering employment fell about 980.

As the sector moves out of the recession, manufacturers anticipate a resumption of hiring. Production employment will show the largest gains, but the recovery in manufacturing jobs is not expected to bring production-line employment back to the levels prevailing prior to recession, at least during the forecast period. The "Other" employee and "Engineering" employee categories are expected to continue to experience some losses in the early stages of the recovery and employment in these categories over the whole forecast period is expected to be flat.

The severe employment losses in the sector, particularly in the manufacturing and "Other" employment categories reflects the severity of the contraction in demand for the sector's output. In relative terms the employment losses suffered in Canada during the recession are similar to those being experienced by the Aerospace and Defence Industries in other countries. As increasing international competition will continue to present a formidable challenge to the sector to achieve levels of growth in output and employment experienced prior to the onset of recession, employment growth opportunities over the forecast period are expected to be more limited than in the past.

Regional Employment

The regional distribution of employment in the Aerospace and Defence sector is shown in Chart 17. The chart indicates that employment (like production) is concentrated in Ontario and Quebec.

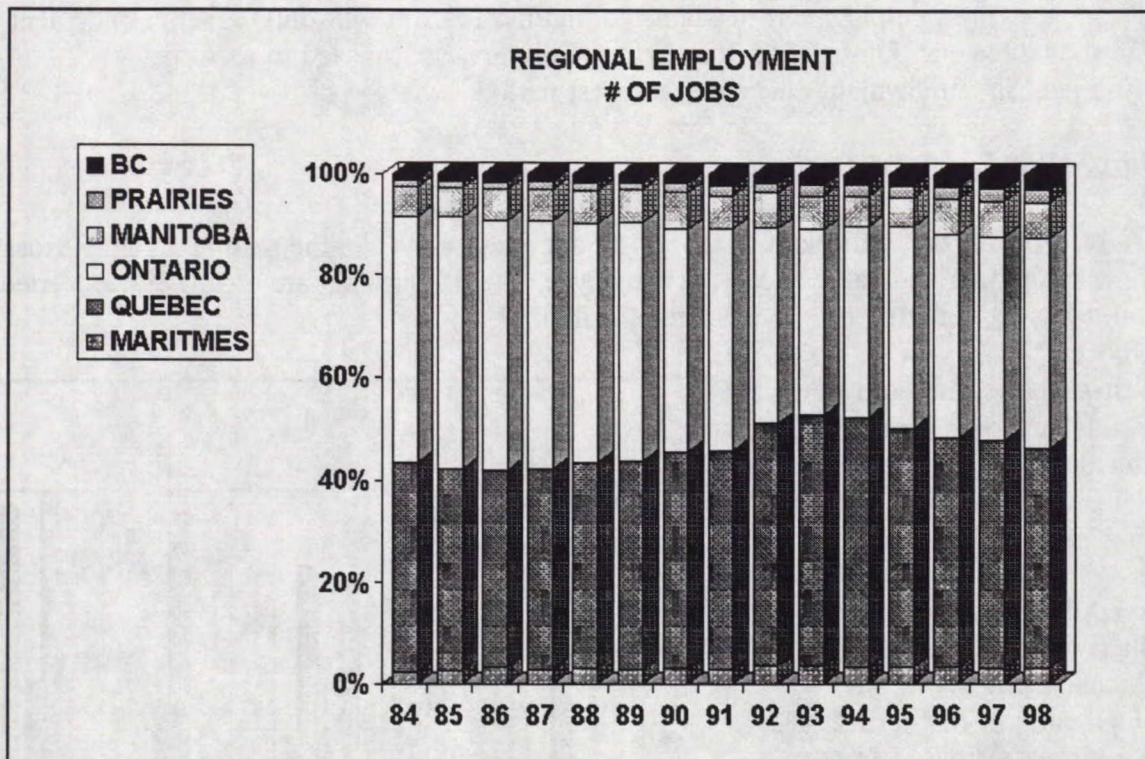


Chart 17

Total employment rose by 21,573 between 1984 and 1991. Employment growth occurred in all regions, but particularly in Quebec which accounted for 47% of the overall growth in employment in the sector between 1984 and 1991. Ontario also experienced significant gains accounting for about 34% of total employment growth during the same period. Among the regions outside the central provinces, Manitoba experienced the largest employment gains accounting for 7% of the overall growth. The remainder of the employment gains were shared almost equally by the Maritimes, British Columbia and the Prairies.

The recession in the sector between 1991 and 1993 had a particularly severe impact on employment. Overall more than 12,000 jobs were lost, including 9,000 jobs in Ontario. Quebec lost slightly under 2,000 jobs while most of the remainder were lost in the western provinces including Manitoba. Employment losses in the Maritimes were more modest.

Over the recovery period 1993 through 1998, the sector is expected to increase employment by 5,440. This gain will not compensate for the employment losses during the 1991 to 1993 recession and employment in the sector is not expected to return to pre-recession levels within the forecast period. Most of the recovery in employment over the forecast period is expected to occur in Ontario, although British Columbia, Manitoba and the Prairies are expecting gains. Quebec and the Maritimes are expected to lose some employment during the forecast period. Job gains expected in Ontario will only recover about half the jobs lost while the growth in employment in Manitoba and the Prairies will only offset employment lost in the recession. On balance only British Columbia is expected to see a net improvement in employment during the forecast period.

Labour Productivity Indicators

Chart 18 provides two indicators of labour productivity growth in the sector; namely, gross sales per employee and value added per employee. Both indicators are estimates, converted to real terms by deflating for an estimate of inflation⁶.

The chart shows that both sales and value added per employee, exhibited positive growth rates during the period 1984 to 1991 leading up to the 1991/93 recession. Throughout this period, both measures of labour productivity increased despite significant increases in employment. In real terms, sales per employee increased from \$88K per employee in 1984 to \$130K in 1991 while value added per employee rose from about \$49K to about \$61K.

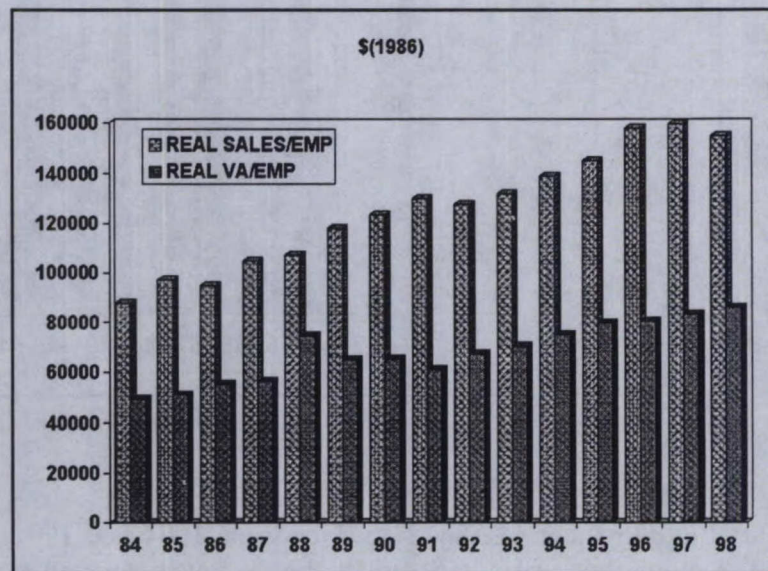


Chart 18

Responding to the weakness in demand for the sector's output, sales and value added declined during the 1991 to 1993 recession, but labour costs and employment declined by even larger magnitudes as manufacturers cut employment to bring cost and output into line with the reduced demand requirements. As a result, labour productivity as measured by gross sales and value added per employee increased even during the recession. Real value added per employee is estimated to have increased to over \$70K by 1993 from a level of about \$61K in 1991. Sales per employee are estimated to have increased, in real terms, from \$130K to over \$132K during the same period.

Over the anticipated recovery period of 1993 through 1998, further gains are forecast for output and sales per employee. Expectations of continued growth are based on industry forecasts that sales and value added growth will outstrip the growth in employment and labour costs. In real terms, sales per employee are expected to rise from \$131K in 1993 to \$155K by 1998 while value added per employee is expected to increase from \$70K to \$86K.

Industry Costs

A breakdown of total manufacturing costs is presented in Chart 19. Material costs have traditionally been the most significant component of the sector's total costs, followed by labour costs and "Other Costs" (i.e. administration, sales, overhead, etc).

During the period 1984 to 1991, the cost of production in the sector increased at an average compound annual rate of 15.8%.

The primary contributors to the increase were materials, which accounted for about half of the increase, and labour, which accounted for about 31%. However, the growth in labour costs trailed the growth in most other costs, and, as a result, labour's share of total costs declined while the shares of materials and other costs increased.

During the 1991 to 1993 recession total cost fell 8.6%. About half of this decline was due to reductions in material input costs as manufacturers cut back on the use of material inputs given the weak demand for output. Labour costs fell more that \$300 million (over 10%) during the recession. The declines reflected widespread lay-offs of manufacturing employees. Training costs, on the other hand, increased sharply during the onset of the recession as the industry moved to retrain workers.

Over the forecast period 1994 to 1998, total costs in the sector are expected to increase at an average compound annual rate of slightly over 7.5%. However, labour and "Other" costs will continue to weaken in the early stages of the recovery in large part due to further lay-offs in administrative and overhead employment. As the demand for output begins to gain momentum between 1994 and 1995 the industry will begin to rehire production workers and labour costs will begin to increase more rapidly. Nevertheless, labour and "Other" costs will not rise as quickly as material input costs over the forecast period.

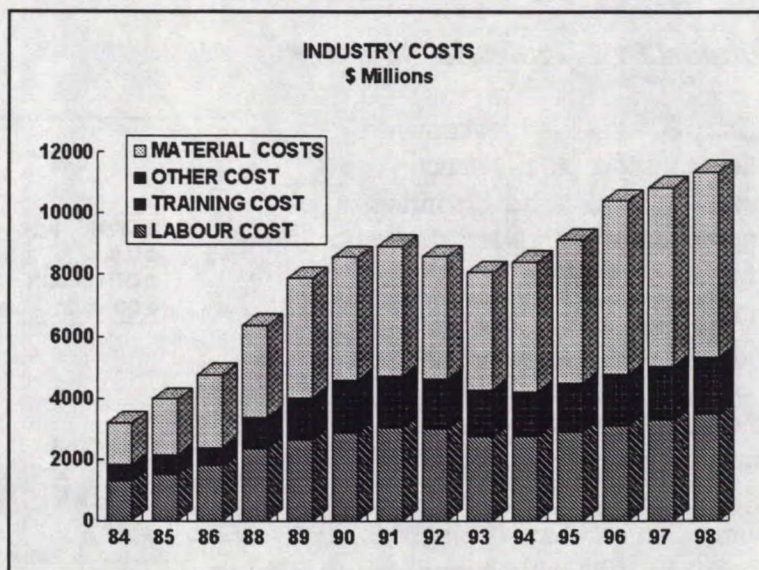


Chart 19

Looking at the period 1984 to 1998 as a whole (a period that encompasses both actual and forecast data), it seems fairly clear that the growth in labour costs in the sector have consistently trailed the growth in material costs and this trend is expected to continue in the future. Part of the reason for this is believed to be the growing sophistication and costs of the material inputs required to produce aircraft, engines and defence products. As a consequence, the share of labour costs in total costs has been declining and is expected to continue to decline as the share of material costs continues to increase.

Imports vs Domestic Suppliers

Chart 20 shows a breakdown of the Aerospace and Defence manufacturing sector's sources of inputs from foreign and domestic sources. The U.S. has traditionally been the primary supplier of materials to the Canadian Aerospace and Defence Industry. Canadian suppliers have typically held around 40% of the domestic market, but lost some of their share during the recession. Offshore suppliers have generally accounted for a small share of the Canadian market; however, their share has grown steadily in particular at the expense of U.S. suppliers.

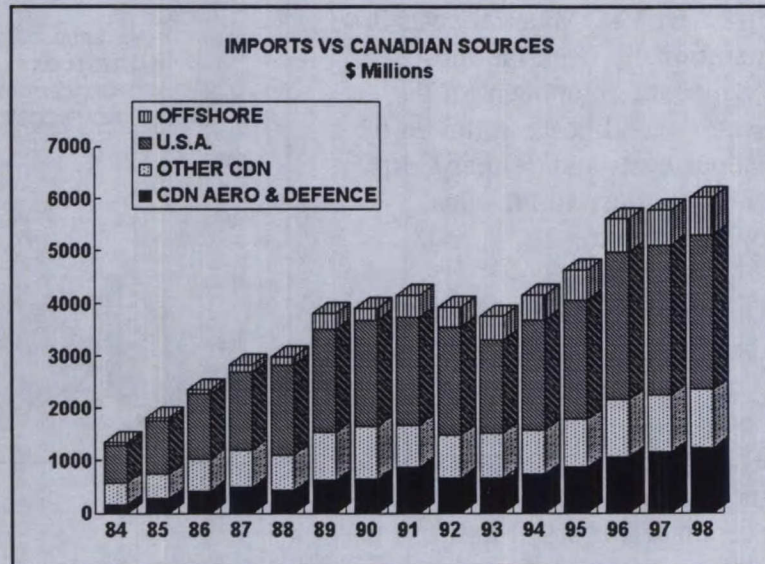


Chart 20

Throughout the 1980's, imports from the United States accounted for about 53% of the material inputs of the Canadian Aerospace and Defence sector. Canadian suppliers accounted for about 41% while offshore suppliers held the other 6%. During this period, lower tier Canadian Aerospace and Defence manufacturers began to take a larger market share. However, while domestic suppliers within the sector itself increased market share, domestic suppliers outside the sector lost market share. As a consequence, while Canadian Aerospace and Defence manufacturers gained, on balance, there was little or no improvement in the overall share of the domestic market held by Canadian firms generally.

During the 1991 to 1993 recession, purchases from suppliers in the Canadian Aerospace and Defence manufacturing sector itself plummeted 22% while purchases from U.S. suppliers dropped 13%. Purchases from offshore suppliers and domestic suppliers outside the Canadian Aerospace and Defence sector generally held up during the recession. As a consequence, domestic and U.S. suppliers saw some erosion of their market shares.

Purchases from lower tier Canadian Aerospace and Defence manufacturers, which were hit badly during the 1991 to 1993 downturn, are anticipated to lead the recovery as the sector moves out of the recession. By the end of forecast period they are expected to have regained the market shares lost in the recession. U.S. and offshore suppliers are also expected to grow in the recovery phase. The U.S. is not expected to fully regain market shares lost during the recession while offshore suppliers are expected to hold market share gains of recent years. Growth in purchases from Canadian suppliers outside the Aerospace and Defence manufacturing sector is not anticipated to increase as rapidly as purchases from other suppliers and they will continue to lose market share.

New Investments By Category

The pattern of new investment spending in the industry is shown in Chart 21. It can be seen from the chart that R&D investment spending dominates the investment spending profile of the Aerospace and Defence manufacturing sector.

Over the period 1984 to 1991 investment spending in the sector grew rapidly — rising from \$513 million in 1984 to a peak of \$1,295 million by 1990. Almost 70% of this increase was due to increased investment spending on R&D. In fact, R&D spending increased at a compound annual rate of over 16% during this period. Throughout this period, the average R&D/sales ratio stood in excess of 9.8%. Investment in machinery and plant were also positive factors in the investment performance, but accounted for smaller shares of the overall investment spending growth between 1984 and 1990.

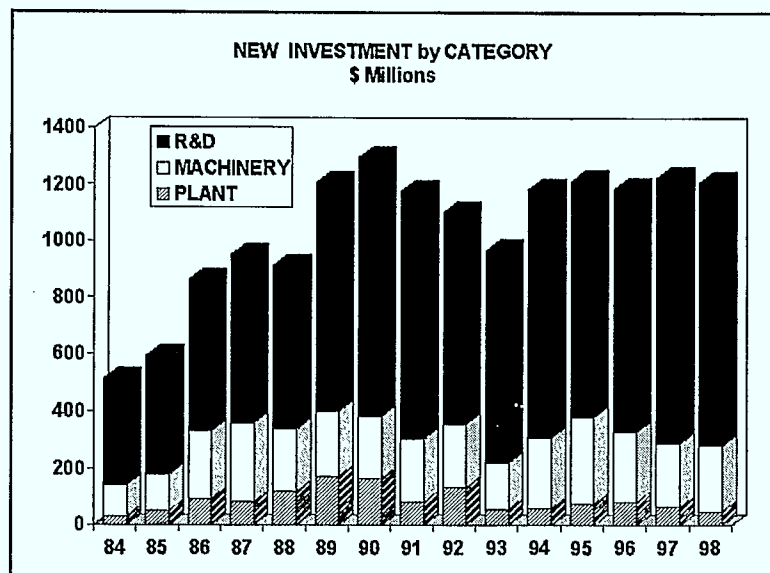


Chart 21

Total investment spending in the sector began to weaken between 1990 and 1991 and continued to fall throughout the 1991/93 downturn. Spending on R&D took the hardest hit dropping more than \$165 million between 1990 and 1993. In contrast, spending on machinery and equipment remained steady throughout the early part of the downturn, and it was 1993 before it also began to weaken. This strength in spending during the initial stages of the downturn is believed to reflect the need to continue to improve productivity and competitiveness despite the cyclical weakness in demand. Spending on plant weakened early on in the recession, but improved in 1992 before falling back in 1993.

As the sector moves out of the recession, growth in investment spending is expected to resume. However, the investment spending forecast indicates that the industry anticipates investment growth to lag the rates of growth anticipated in sales and output. As a consequence, the R&D/Sales ratio for the industry is expected to fall below pre-recession levels during the forecast period.

Even if R&D spending does not achieve rates of growth comparable to those attained during the 1980's, it is anticipated that the levels of R&D spending during the forecast period will exceed the peak levels of spending achieved in the late 1980's. In contrast, investment in plant is not expected to match the levels of spending achieved in the 1980's. New investment in machinery and equipment will be somewhat erratic over the forecast period, but on balance, should remain comparable with the levels achieved in the late 1980's. Overall, growth in investment spending is expected to be fairly flat with R&D spending being the primary area of strength. It would appear that the industry will have difficulty maintaining the levels of growth in spending experienced during the decade of the 1980's.

Sources of Investment

The sources of investment capital for the sector are presented in Chart 22. It will be noted from the chart that Aerospace and Defence companies in the sector are themselves the primary source of investment capital for the sector. Governments and the industry's customers are also important sources.

Direct government support for the sector comes primarily from Industry Canada under the Defence Industry Productivity Program (DIPP), and the Defence Industry Research Program (DIRP) of the Department of National Defence.

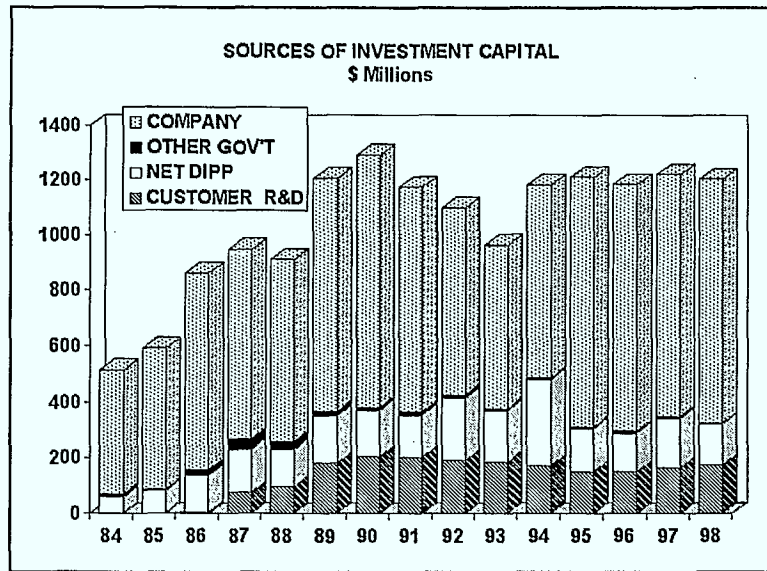


Chart 22

The breakout of NET DIPP expenditures (i.e. total DIPP received minus repayments by survey companies) between 1984 and 1993 are shown in Chart 22. The chart also presents industry's forecast of the amount of government funds it anticipates it will receive to maintain investment growth over the period 1994 to 1998. The primary customers providing investment assistance to firms in the sector are governments, higher tier firms within the sector and, to a lesser extent, firms outside the Aerospace and Defence manufacturing sector itself such as airlines.

During the period 1984 to 1991 total investment in the sector increased from \$513 million to \$1,174 million. Companies within the sector accounted for between 66% to 86% of the annual total investments made by the sector over this period while government sources accounted for between 14% and 22% and customers accounted for between 0% to 19%.

The downturn in demand for the sector's output in the 1991 to 1993 recession was accompanied by declines in investment spending in the sector. Spending by companies, customers, government departments and Industry Canada (i.e. DIPP) fell during the recession.

As the sector moves into the recovery phase of the business cycle over the period 1994 to 1998, investment spending growth is expected to be somewhat flat. Nevertheless, spending will remain at relatively high levels. The primary strength in investment spending is

anticipated to come from companies within the sector itself. Support for investment spending by governments and customers over this period is expected to account for a smaller share of total investment than in the past. However, the demand for DIPP support may increase in the future as the recovery gains momentum and companies gain more confidence and begin to adjust their product development plans accordingly. With the recent cutbacks in the DIPP program and given the industry's investment intentions and associated plans, the demand for government support will likely outstrip the funding capacity of DIPP over the forecast period.

TABLES

(All financial data are in \$ millions)



GROSS OUTPUT VS GROSS SALES \$ MILLIONS

<i>FISCAL YEAR</i>	<i>GROSS OUTPUT</i>	<i>GROSS SALES</i>
1984	3650	3482
1985	4675	4438
1986	5401	5198
1987	6344	6184
1988	7492	6902
1989	8520	8230
1990	9027	8844
1991	9325	9593
1992	9304	9196
1993	8804	8683
1994	9610	9373
1995	10687	10347
1996	12097	12067
1997	12789	12862
1998	13733	13407

YEAR END ORDER BACKLOG \$ MILLIONS

<i>FISCAL YEAR</i>	<i>ORDER BACKLOG</i>	<i>GROSS OUTPUT</i>
1984	4841	3650
1985	5115	4675
1986	5579	5401
1987	6290	6344
1988	7376	7492
1989	9625	8520
1990	10708	9027
1991	10325	9325
1992	9165	9304
1993	12103	8804
1994	13467	9610
1995	14672	10687
1996	15214	12097
1997	15709	12789
1998	15979	13733

OPENING INVENTORIES

\$ MILLIONS

<i>FISCAL YEAR</i>	<i>INVENTORY</i>	<i>GROSS SALES</i>	<i>PERCENT</i>
1984	1227	3482	35
1985	1399	4438	32
1986	1643	5198	32
1987	1877	6184	30
1988	2016	6902	29
1989	2644	8230	32
1990	2867	8844	32
1991	3167	9593	33
1992	2810	9196	31
1993	2876	8683	33
1994	2997	9373	32
1995	3234	10347	31
1996	3574	12067	30
1997	3604	12862	28
1998	3532	13407	26

GROSS SALES VS NET SALES

\$ MILLIONS

<i>FISCAL YEAR</i>	<i>GROSS SALES</i>	<i>NET SALES</i>	<i>PERCENTAGE</i>
1984	3482	3332	96
1985	4438	4166	94
1986	5198	4905	94
1987	6184	5708	92
1988	6902	6415	93
1989	8230	7373	90
1990	8844	7993	90
1991	9593	8747	91
1992	9196	8595	93
1993	8683	8171	94
1994	9373	8844	94
1995	10347	9749	94
1996	12067	11467	95
1997	12862	12254	95
1998	13407	12779	95

Aerospace and Defence-Related Industries — Statistical Survey Report, 1994

GROSS OUTPUT VS VALUE ADDED \$ MILLIONS

FISCAL YEAR	GROSS OUTPUT	VALUE ADDED	PERCENT
1984	3650	2293	63
1985	4675	2850	61
1986	5401	3026	56
1987	6344	3495	55
1988	7492	4504	60
1989	8520	4787	56
1990	9027	5107	57
1991	9325	5163	55
1992	9304	5364	58
1993	8804	5037	57
1994	9610	5448	57
1995	10687	6065	57
1996	12097	6488	54
1997	12789	7010	55
1998	13733	7716	56

SALES BY GEOGRAPHIC AREA \$ MILLIONS

FISCAL YEAR	GROSS SALES	UNITED STATES	TOTAL DOMESTIC	OTHER COUNTRIES
1984	3482	1839	871	772
1985	4438	2185	1535	718
1986	5198	2455	1701	1041
1987	6184	2827	2325	1031
1988	6902	3016	2570	1316
1989	8230	3449	3001	1779
1990	8844	3740	2851	2253
1991	9593	3860	3301	2431
1992	9196	3824	2978	2393
1993	8683	3406	2807	2470
1994	9373	3546	2859	2968
1995	10347	4114	3138	3095
1996	12067	4665	3773	3630
1997	12862	5041	3702	4118
1998	13407	5519	3413	4474

CANADIAN VS EXPORT SALES

\$ MILLIONS

<i>FISCAL YEAR</i>	<i>GROSS SALES</i>	<i>TOTAL DOMESTIC</i>	<i>EXPORTS</i>
1984	3482	871	2611
1985	4438	1535	2903
1986	5198	1701	3496
1987	6184	2325	3858
1988	6902	2570	4332
1989	8230	3001	5229
1990	8844	2851	5993
1991	9593	3301	6294
1992	9196	2978	6242
1993	8683	2807	5873
1994	9373	2859	6511
1995	10347	3138	7205
1996	12067	3773	8291
1997	12862	3702	9155
1998	13407	3413	9990

FOREIGN SALES (EXCLUDING U.S.)

\$ MILLIONS

<i>FISCAL YEAR</i>	<i>TOTAL FOREIGN</i>	<i>GOVERNMENT</i>	<i>MANUFACTURERS</i>	<i>OTHER CUSTOMERS</i>
1984	772	122	242	408
1985	718	176	261	280
1986	1041	338	310	393
1987	1031	253	386	391
1988	1316	242	429	646
1989	1779	365	610	804
1990	2253	354	589	1310
1991	2431	445	577	1409
1992	2393	572	611	1211
1993	2470	245	847	1378
1994	2968	470	1015	1483
1995	3095	526	964	1605
1996	3630	644	916	2069
1997	4118	705	998	2415
1998	4474	783	1071	2621

GROSS DOMESTIC SALES

\$ MILLIONS

FISCAL YEAR	TOTAL DOMESTIC	GOVERNMENT	MANUFACTURERS	OTHER CUSTOMERS
1984	871	417	150	305
1985	1535	820	272	443
1986	1701	884	292	525
1987	2325	1074	475	776
1988	2570	1244	486	840
1989	3001	1331	857	812
1990	2851	1272	851	729
1991	3301	1656	846	800
1992	2978	1595	600	783
1993	2807	1693	512	602
1994	2859	1596	529	734
1995	3138	1715	598	825
1996	3773	2213	600	960
1997	3702	2006	608	1089
1998	3413	1705	628	1080

U.S. SALES

\$ MILLIONS

FISCAL YEAR	TOTAL USA	GOVERNMENT	MANUFACTURERS	OTHER CUSTOMERS
1984	1839	299	926	614
1985	2185	317	1134	734
1986	2455	303	1330	821
1987	2827	409	1418	1001
1988	3016	372	1532	1112
1989	3449	374	1616	1459
1990	3740	296	1857	1587
1991	3860	306	1937	1618
1992	3824	316	1702	1806
1993	3406	306	1201	1899
1994	3546	267	1297	1982
1995	4114	316	1500	2298
1996	4665	343	1721	2601
1997	5041	338	1815	2888
1998	5519	367	2004	3148

Aerospace and Defence-Related Industries — Statistical Survey Report, 1994

SALES BY CUSTOMERS

\$ MILLIONS

FISCAL YEAR	GROSS SALES	GOVERNMENT	AEROSPACE MANUFACTURERS	OTHERS
1984	3482	837	1318	1327
1985	4438	1314	1666	1457
1986	5198	1526	1933	1739
1987	6184	1736	2279	2168
1988	6902	1857	2447	2598
1989	8230	2071	3083	3076
1990	8844	1921	3297	3626
1991	9593	2407	3359	3826
1992	9196	2482	2914	3799
1993	8683	2244	2559	3879
1994	9373	2333	2841	4199
1995	10347	2556	3062	4728
1996	12067	3200	3237	5630
1997	12862	3049	3420	6392
1998	13407	2854	3704	6849

SALES TO GOVERNMENTS

\$ MILLIONS

FISCAL YEAR	TOTAL GOV'T	CDN GOV'T	U.S. GOV'T	FOREIGN GOV'T
1984	837	417	299	122
1985	1314	820	317	176
1986	1526	884	303	338
1987	1736	1074	409	253
1988	1857	1244	372	242
1989	2071	1331	374	365
1990	1921	1272	296	354
1991	2407	1656	306	445
1992	2482	1595	316	572
1993	2244	1693	306	245
1994	2333	1596	267	470
1995	2556	1715	316	526
1996	3200	2213	343	644
1997	3049	2006	338	705
1998	2854	1705	367	783

CIVIL VS DEFENCE SALES

\$ MILLIONS

FISCAL YEAR	CIVIL	MILITARY	GROSS SALES
1984	2219	1263	3482
1985	2720	1717	4438
1986	3182	2015	5198
1987	3769	2415	6184
1988	4389	2513	6902
1989	5229	3001	8230
1990	6215	2629	8844
1991	6656	2937	9593
1992	6288	2907	9196
1993	5893	2790	8683
1994	6551	2822	9373
1995	7391	2956	10347
1996	8651	3417	12067
1997	9540	3321	12862
1998	10343	3064	13407

SALES BY SUB-SECTOR

\$ MILLIONS

FISCAL YEAR	GROSS SALES	AIRFRAME	AVIONICS	DEFENCE	OTHER	PROPULSION	SPACE
1984	3482	1261	638	0	269	1129	186
1985	4439	1548	817	0	376	1450	248
1986	5198	2088	729	1	629	1526	225
1987	6184	2106	849	39	1202	1696	292
1988	6902	2528	866	476	873	1815	344
1989	8230	2972	830	979	840	2319	290
1990	8844	3348	943	906	715	2518	414
1991	9594	3248	1095	1095	1062	2570	525
1992	9195	2939	945	1143	1099	2496	573
1993	8684	2656	1048	992	1247	2243	497
1994	9373	3087	1204	1018	1363	2232	470
1995	10346	3637	1501	946	1382	2370	511
1996	12069	4565	1706	997	1681	2520	600
1997	12863	4996	1974	1068	1531	2657	636
1998	13407	5548	1720	1137	1523	2786	693

Aerospace and Defence-Related Industries — Statistical Survey Report, 1994

SPARE PARTS

\$ MILLIONS

FISCAL YEAR	SPARE PARTS	GROSS SALES	PERCENT
1984	3	3482	0
1985	96	4439	2
1986	767	5198	15
1987	973	6184	16
1988	1110	6902	16
1989	1430	8230	17
1990	1439	8844	16
1991	1545	9594	16
1992	1168	9195	13
1993	1826	8684	21
1994	1842	9373	20
1995	2036	10346	20
1996	2331	12069	19
1997	2450	12863	19
1998	2625	13407	20

SALES BY PRODUCT CATEGORY

\$ MILLIONS

FISCAL YEAR	GROSS SALES	PROPRIETARY PRODUCTS	SUB CONTRACTS	AGENCY SALES	REPAIR & OVERHAUL	SERVICES
1984	3482	1966	698	227	592	0
1985	4439	2481	970	293	695	0
1986	5198	3129	1102	264	703	0
1987	6184	4043	1214	234	693	0
1988	6902	4542	1312	271	619	158
1989	8230	5675	1350	206	781	219
1990	8844	6131	1400	202	897	212
1991	9594	6172	2027	176	952	267
1992	9195	5942	1887	159	951	256
1993	8684	5948	1479	123	878	255
1994	9373	6394	1704	111	876	289
1995	10346	6944	1987	127	956	332
1996	12069	8075	2397	137	1056	404
1997	12863	8644	2539	134	1126	419
1998	13407	8812	2813	140	1180	462

REGIONAL DISTRIBUTION OF SALES \$ MILLIONS

YEAR	TOTAL	ATLANTIC	MANITOBA	ALTA & SASK	B.C.	ONTARIO	QUEBEC
1984	3482	61	160	46	47	1557	1610
1985	4438	99	200	54	87	2093	1905
1986	5198	114	205	66	102	2622	2088
1987	6184	155	280	75	101	2814	2759
1988	6902	174	382	97	114	3083	3052
1989	8230	199	420	83	122	3544	3861
1990	8844	229	587	108	136	3712	4073
1991	9593	224	504	120	169	4025	4552
1992	9196	276	513	102	132	3606	4566
1993	8683	252	465	102	128	3105	4631
1994	9373	233	404	109	135	3501	4992
1995	10347	239	430	123	162	3815	5578
1996	12067	255	563	128	188	4649	6283
1997	12862	265	608	136	221	4874	6759
1998	13407	265	635	141	258	5190	6917

IMPORT OF PARTS, COMPONENTS, ETC. \$ MILLIONS

YEAR	GROSS SALES	TOTAL IMPORTS	US IMPORTS	OTHER COUNTRIES	PERCENT
1984	3482	788	731	57	23
1985	4438	1074	1012	61	24
1986	5198	1349	1258	91	26
1987	6184	1634	1503	131	26
1988	6902	1881	1737	144	27
1989	8230	2281	1975	306	28
1990	8844	2273	2039	233	26
1991	9593	2491	2071	419	26
1992	9196	2459	2083	376	27
1993	8683	2254	1792	461	26
1994	9373	2582	2104	478	28
1995	10347	2847	2283	564	28
1996	12067	3444	2798	645	29
1997	12862	3529	2845	685	27
1998	13407	3658	2933	725	27

Aerospace and Defence-Related Industries — Statistical Survey Report, 1994

INDUSTRY COSTS

\$ MILLIONS

FISCAL YEAR	TOTAL COST	MATERIALS	LABOUR	OTHER COSTS	TRAINING
1984	3190	1358	1291	526	15
1985	3978	1825	1501	635	17
1986	4764	2374	1787	574	29
1987	5862	2849	2127	856	31
1988	6364	2988	2347	993	36
1989	7768	3733	2634	1371	30
1990	8534	3920	2877	1693	45
1991	8911	4162	3027	1664	58
1992	8570	3940	2999	1563	68
1993	8053	3767	2720	1537	29
1994	8383	4163	2748	1443	29
1995	9121	4622	2894	1575	31
1996	10408	5609	3095	1672	32
1997	10851	5779	3293	1746	33
1998	11357	6017	3462	1843	35

LABOUR COSTS

\$ MILLIONS

FISCAL YEAR	LABOUR COSTS	TOTAL COSTS	PERCENT
1984	1291	3190	40
1985	1501	3978	38
1986	1787	4764	38
1987	2127	5862	36
1988	2347	6364	37
1989	2634	7768	34
1990	2877	8534	34
1991	3027	8911	34
1992	2999	8570	35
1993	2720	8053	34
1994	2748	8383	33
1995	2894	9121	32
1996	3095	10408	30
1997	3293	10851	30
1998	3462	11357	30

MATERIAL COSTS

\$ MILLIONS

<i>FISCAL YEAR</i>	<i>MATERIAL COSTS</i>	<i>TOTAL COSTS</i>	<i>PERCENT</i>
1984	1358	3190	43
1985	1825	3978	46
1986	2374	4764	50
1987	2849	5862	49
1988	2988	6364	47
1989	3733	7768	48
1990	3920	8534	46
1991	4162	8911	47
1992	3940	8570	46
1993	3767	8053	47
1994	4163	8383	50
1995	4622	9121	51
1996	5609	10408	54
1997	5779	10851	53
1998	6017	11357	53

TOTAL EMPLOYMENT

NUMBER OF EMPLOYEES

<i>FISCAL YEAR</i>	<i>TOTAL EMPLOYMENT</i>
1984	44041
1985	48794
1986	54633
1987	58861
1988	62859
1989	66106
1990	65679
1991	65615
1992	61316
1993	53431
1994	52861
1995	53942
1996	55683
1997	56793
1998	58871

EMPLOYMENT BY CATEGORY

NUMBER OF EMPLOYEES

FISCAL YEAR	TOTAL EMPLOYMENT	ENGINEERS	PRODUCTION	OTHERS
1984	44041	7893	24069	12079
1985	48794	8702	26982	13109
1986	54633	9890	30726	14016
1987	58861	10554	33656	14652
1988	62859	10876	34410	17574
1989	66106	11016	35881	19211
1990	65679	12081	36510	17088
1991	65615	12375	35895	17344
1992	61316	12016	33449	15851
1993	53431	11394	27868	14170
1994	52861	11175	27712	13974
1995	53942	10901	29382	13658
1996	55683	10975	30856	13852
1997	56793	11296	31403	14094
1998	58871	11669	32849	14354

**REGIONAL DISTRIBUTION
OF EMPLOYMENT**

NUMBER OF EMPLOYEES

YEAR	TOTAL	ATLANTIC	MANITOBA	B.C.	ALTA & SASK	ONTARIO	QUEBEC
1984	44041	999	2562	606	599	21119	18156
1985	48794	1250	2801	742	685	23930	19385
1986	54633	1822	3293	999	794	26619	21106
1987	58861	1718	3696	998	867	28481	23101
1988	62859	1888	3954	1173	1049	29364	25431
1989	66106	1794	4213	1233	911	30878	27076
1990	65679	1952	4743	1320	1172	28555	27937
1991	65615	1933	4177	1535	1418	28358	28194
1992	61316	2167	4293	1206	1121	23346	29182
1993	53431	1911	3500	1214	1179	19347	26281
1994	52861	1787	3172	1142	1195	19763	25800
1995	53942	1772	3041	1319	1278	21236	25295
1996	55683	1804	3770	1514	1324	22169	25101
1997	56793	1806	3989	1736	1369	22521	25373
1998	58871	1843	4166	1938	1393	24075	25456

Aerospace and Defence-Related Industries — Statistical Survey Report, 1994

NEW INVESTMENT BY CATEGORY

\$ MILLIONS

FISCAL YEAR	TOTAL	PLANT	MACHINERY	R & D
1984	513	31	110	373
1985	591	52	125	415
1986	861	93	238	530
1987	949	83	275	592
1988	912	120	218	575
1989	1208	172	228	807
1990	1295	164	219	911
1991	1175	83	221	870
1992	1101	134	222	746
1993	966	56	163	747
1994	1182	57	250	876
1995	1213	76	302	835
1996	1184	82	246	857
1997	1224	64	223	938
1998	1206	48	231	927

IC SUPPORT

\$ MILLIONS

FISCAL YEAR	TOTAL IC SUPPORT	R & D	SOURCE ESTABLISHMENT	CAPITAL ASSISTANCE	FEASIBILITY STUDY
1984	84	70	N/A	N/A	N/A
1985	103	84	N/A	N/A	N/A
1986	153	124	6	22	N/A
1987	171	133	4	35	N/A
1988	152	105	25	19	1
1989	179	123	36	17	2
1990	180	144	22	12	0
1991	165	102	9	50	0
1992	234	187	26	19	0
1993	198	168	18	10	2
1994	326	281	8	37	0
1995	178	153	10	15	0
1996	175	158	5	11	0
1997	209	200	5	4	0
1998	188	180	4	4	0

R&D FUNDING BY CUSTOMERS

\$ MILLIONS

<i>FISCAL YEAR</i>	<i>CUSTOMER</i>	<i>TOTAL R&D</i>	<i>PERCENT</i>
1984	2	373	1
1985	2	415	1
1986	3	530	1
1987	76	592	13
1988	98	575	17
1989	183	807	23
1990	208	911	23
1991	205	870	24
1992	192	746	26
1993	187	747	25
1994	174	876	20
1995	152	835	18
1996	151	857	18
1997	166	938	18
1998	176	927	19

DIPP REPAYMENTS

\$ MILLIONS

<i>FISCAL YEAR</i>	<i>REPAYMENT</i>
1984	27
1985	22
1986	18
1987	14
1988	16
1989	10
1990	14
1991	13
1992	10
1993	13
1994	17
1995	23
1996	35
1997	31
1998	40

SOURCES OF NEW INVESTMENT

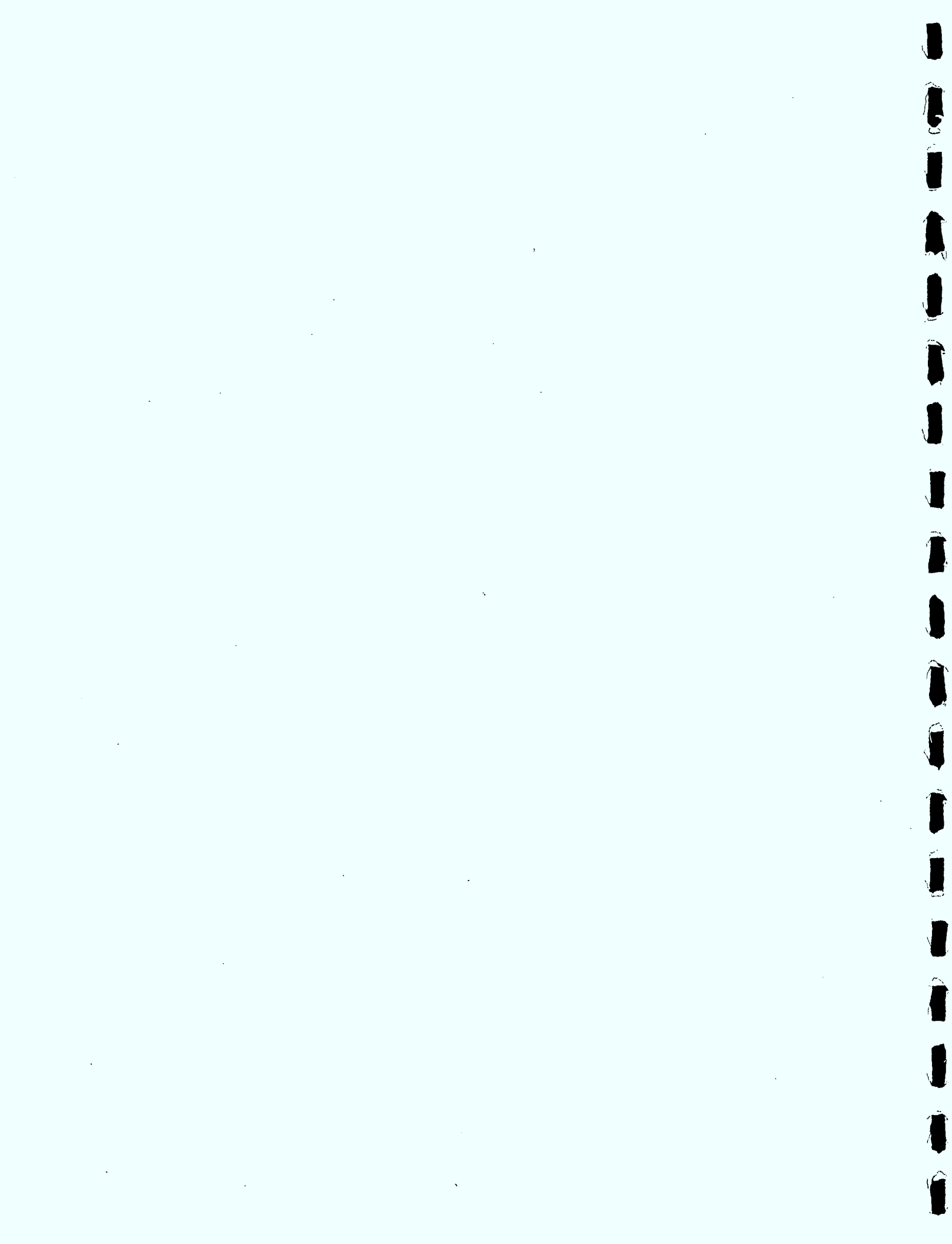
\$ MILLIONS

<i>FISCAL YEAR</i>	<i>TOTAL</i>	<i>INDUSTRY</i>	<i>CUSTOMER</i>	<i>DIPP * SUPPORT</i>	<i>OTHER GOV'T</i>
1984	514	444	2	58	11
1985	591	505	2	81	4
1986	861	703	3	135	20
1987	949	679	75	158	38
1988	912	652	97	135	27
1989	1208	838	183	169	18
1990	1295	910	208	166	11
1991	1175	807	205	151	12
1992	1102	672	192	225	13
1993	966	587	187	185	7
1994	1182	691	174	310	7
1995	1213	897	153	155	7
1996	1185	887	151	140	7
1997	1224	871	166	179	8
1998	1206	879	176	148	3

* Total DIPP minus repayments.



ANNEX



ANNEX 1

ESTABLISHMENTS THAT PARTICIPATED IN 1994 SURVEY

AIRCRAFT APPLIANCES & EQUIPMENT LIMITED
ALLIEDSIGNAL AEROSPATIALE CANADA INC.
ALLIEDSIGNAL AEROSPACE CANADA (TORONTO)
ANDREW CANADA INC.
ATS AUTOMATION TOOLING SYSTEMS INCORPORATED
AVCORP INDUSTRIES INC.
BALLARD BATTERY SYSTEMS CORPORATION
BELL HELICOPTER TEXTRON
BOEING CANADA TECHNOLOGY LTD. - ARNPRIOR
DIVISION
BOEING CANADA TECHNOLOGY LTD. - WINNIPEG
DIVISION
de HAVILLAND INC.
BOMBARDIER INC. GROUPE CANADAIR
BRISTOL AEROSPACE LIMITED
C.P.S. INDUSTRIES INC. (LES)
CAE ELECTRONICS LTD.
CAE AVIATION LTD
CAL CORPORATION
CANADIAN MARCONI COMPANY
CHAMPION ROAD MACHINERY LTD.
CHICOPEE MANUFACTURING LIMITED
COM DEV LTD.
COMPUTING DEVICES COMPANY
DERLAN AEROSPACE CANADA LTD
DEVTEK CORPORATION
DOWTY AEROSPACE MONTREAL DIVISION
DOWTY AEROSPACE LANDING GEAR - TORONTO
DY 4 SYSTEMS INC.
EUROCOPTER CANADA LIMITED
FAG BEARINGS LTD. - AEROSPACE PRODUCTS DIVISION
FIELD AVIATION COMPANY INC.
FLEET INDUSTRIES
GABRIEL OF CANADA LTD
GENERAL ELECTRIC
GENERAL MOTORS OF CANADA LIMITED - DIESEL
DIVISION
HALEY INDUSTRIES LIMITED
HAWKER SIDDELEY CANADA
HEROUX INC.
HUGHES LEITZ OPTICAL TECHNOLOGIES LTD
IMP GROUP LTD. AEROSPACE DIVISION
IMP AEROSPACE COMPONENTS LIMITED
INDAL TECHNOLOGIES INC.
INVAR MANUFACTURING
INVENTRONICS LIMITED
IRVIN INDUSTRIES CANADA LTD
JOHN T. HEPBURN, LIMITED - MECHANICAL DIVISION
LES CAOUTCHOUCS ACTON LIMITEE
LITTON SYSTEMS CANADA LIMITED
LOCKHEED CANADA INC.
LINAMAR CORPORATION
MACDONALD, DETWILER & ASSOCIATES LTD
MCDONNELL DOUGLAS CANADA LTD
MENASCO AEROSPACE LTD
OERLIKON AEROSPACE INC.
PARAMAX SYSTEMS CANADA
PRATT & WHITNEY CANADA INC.
RAYTHEON CANADA LIMITED
REMTEC INC.
ROCKWELL INTERNATIONAL OF CANADA
ROLLS ROYCE (CANADA) LIMITED
SED SYSTEMS INC.
SPAR AEROSPACE LIMITED - AVIATION SERVICES
DIVISION
SPAR AEROSPACE LIMITED - SATELLITE &
COMMUNICATION SYSTEMS
SPAR AEROSPACE LIMITED - APPLIED SYSTEMS GROUP
SPAR AEROSPACE LIMITED - ADVANCED TECHNOLOGY
SYSTEMS GROUP
STANDARD AERO LIMITED
TECHNOLOGIES INDUSTRIES SNC INC.
THORDON BEARINGS INC.
VADEKO INTERNATIONAL INC.
WALBAR CANADA INC.

TOP 20: 1993, 1994, 1998

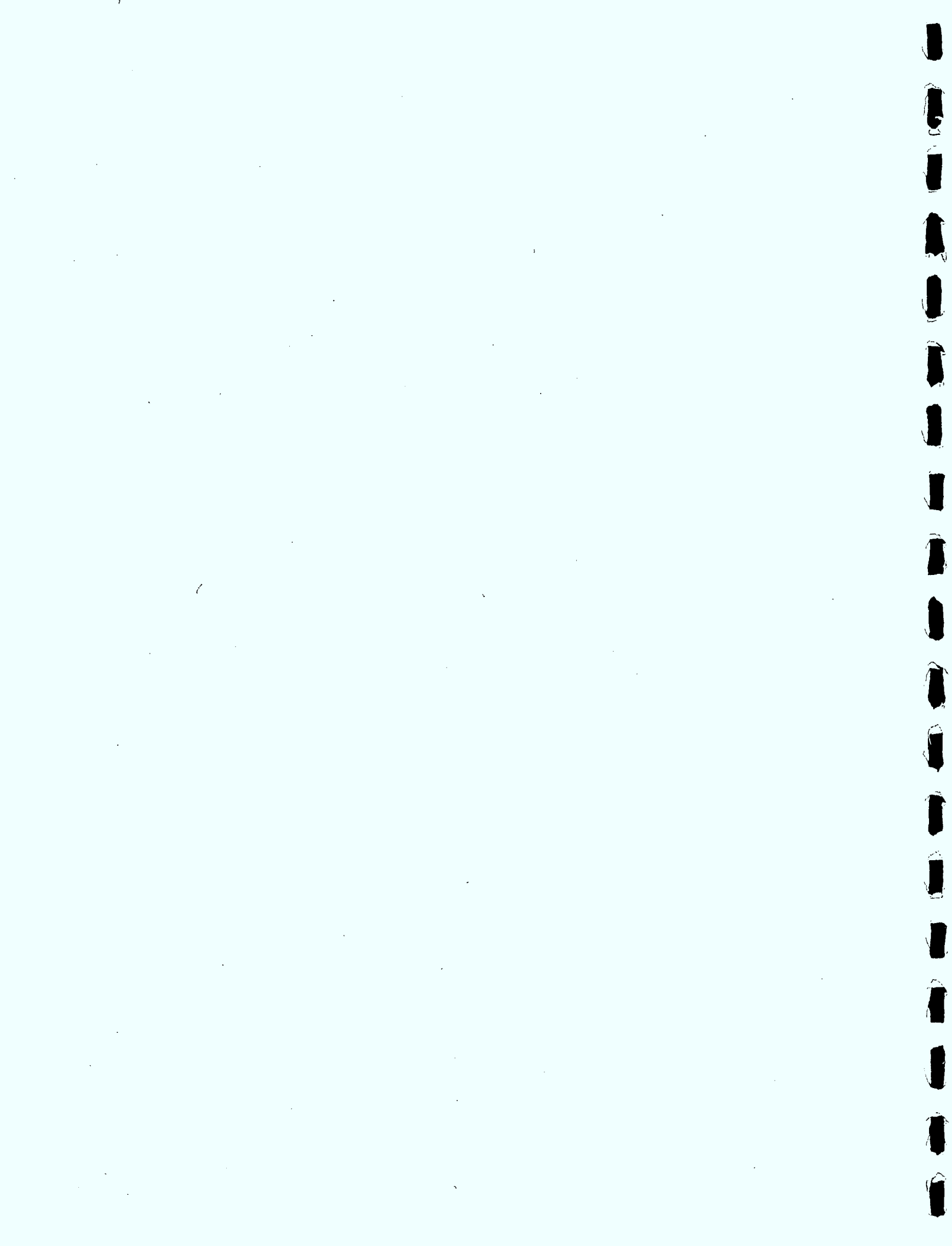
LEADING AEROSPACE AND DEFENCE COMPANIES

RANKED BY 1993 TOTAL SALES	1993	1994	1998
PRATT & WHITNEY CANADA INC.	1	2	2
BOMBARDIER INC - CANADAIR LTD	2	1	1
BELL HELICOPTER TEXTRON	3	3	4
GENERAL MOTORS OF CANADA; DIESEL DIVISION	4	4	11
SPAR AEROSPACE LTD	5	8	7
DE HAVILLAND INC.	6	6	3
CAE ELECTRONICS LTD.	7	5	6
ROLLS-ROYCE CANADA LIMITED	8	10	9
PARAMAX SYSTEMS CANADA	9	11	--
COMPUTING DEVICES COMPANY	10	9	8
MCDONNELL DOUGLAS CANADA LTD	11	7	5
ALLIEDSIGNAL AEROSPACE CANADA	12	12	10
LITTON SYSTEMS CANADA LIMITED	13	16	--
BOEING CANADA LTD	14	13	13
BRISTOL AEROSPACE LIMITED	15	17	12
CANADIAN MARCONI CO. (AVIONICS DIV.)	16	14	15
TECHNOLOGIES IND. SNC INC.	17	15	14
CANADIAN GENERAL ELECTRIC CANADA INC	18	18	19
STANDARD AERO LTD	19	19	--
MACDONALD DETTWILER AND ASSOCIATES LTD	20	20	18

DEFINITIONS

and

NOTES



Definitions and Notes:

Statistics Canada's Price Indexes used to deflate Sales and Value Added per worker are shown below.

YEAR	INDUSTRY SELLING PRICE INDEX - AIRCRAFT AND PARTS	GDP DEFLATOR - AIRCRAFT AND PARTS SECTOR
1984	0.899	1.054
1985	0.963	1.141
1986	1	1.000
1987	1.002	1.049
1988	1.026	0.959
1989	1.056	1.113
1990	1.09	1.187
1991	1.126	1.287
1992	1.176	1.301
1993	1.233	1.336
1994*	1.277	1.372
1995*	1.323	1.408
1996*	1.370	1.446
1997*	1.419	1.484
1998*	1.470	1.524

* **Note:** The indexes were projected over the forecast period by multiplying 1993 actual data with the average annual compound growth rate growth in the index prevailing between 1984 and 1993. This is equivalent to assuming that inflation in the sector over the forecast recovery period will be comparable to the rate prevailing prior to 1993. Since deflators for the defence sub-sector are not readily available, the Aircraft and Parts deflators were used. The latter do not accurately measure inflation in the defence sub-sector, but it is difficult to say whether they overestimate or underestimate inflation in the defence sub-sector. If anything Statistic Canada indexes for Aircraft and Parts generally increased faster prior to 1993 than its indexes for the "Other Electronics Sector" where some of the Avionics and Defence Electronics firms are located. In view

of this, the indexes used may overstate inflation and thus tend to underestimate labour productivity.

Compound Annual Average Rate Of Growth (CAARG)

The (CAARG) is a useful measure for comparing two rates of growth in different time periods when the two time periods of different length. Essentially it measures a rate of growth, which if compounded annually, would project the initial annual observation in a time series to the level of the last observation. The rate is an average in the sense that the same rate applies each year over the period in question. Alternatively one could compare a simple average rate of growth over two different periods, however, a simple average may over or understate the actual rates rate of growth if there are extreme values (i.e. unusually high or low values in the data).

To calculate the CAARG that would project the level of gross sales in 1984 to the level prevailing seven years later in 1991, use the following formula:

$$\text{CAARG} = \{ [(\text{Gross Sales 1991}/\text{Gross Sales 1984})^{(1/7)}] - 1 \} * 100$$

The CAARG calculated above may be compared with similar rates of growth estimated for the two year recessionary period 1991 to 1993, and the five-year 1993/1998 forecast period. Such comparisons give some idea of the relative magnitude of the recession as well as the relative strength of the recovery compared with pre-recessionary rates of growth in the industry.

**GUIDELINES AND GLOSSARY OF TERMS
PROVIDED BY FIRMS PARTICIPATING IN THE
AEROSPACE AND DEFENCE-RELATED INDUSTRIES
SURVEY — 1994**

- Company Name** The legal name of the company, and in the case of multi divisional companies, indicate the Division or Divisions/Subsidiaries to which the data relates.
- Contact Person** The person to be contacted in the event that clarification of data is required.
- Currency** Survey returns are reported in current dollars.
- Sales** Total sales of the Canadian Company or in the case of multi-divisional companies, the sales of the Division or subsidiary reporting. **It should not include** the sales of divisions or subsidiaries which are **not** involved in the Aerospace and Defence Industry, but should include sales by Aerospace and Defence oriented divisions in other industrial sectors.

1. Domestic Sales

Sales made to companies domiciled in Canada, where the products or services are delivered to a Canadian address including sales by a U.S. subsidiary to Canadian companies.

a) Sales to the Canadian Government

Sales to any Department or Agency of the Federal Government including Crown Corporations.

b) Sales to Canadian Aerospace and Defence Companies

This category covers sales to companies in the Canadian Aerospace and Defence-related sector which will incorporate the product into a higher assembly. The intention is to eliminate double counting of sales.

Example A — A machine shop manufacturing parts which are sold to a Canadian engine manufacturer would report these sales as "Sales to a Canadian Aerospace and Defence company".

If the engine manufacturer sells engines to a Canadian aircraft manufacturer these sales would be reported as "Sales to a Canadian Aerospace and Defence Company".

If, however, the engine manufacturer sells an engine to an aircraft operator such as an airline, the sale would be reported as "Sales to other Canadian customers".

c) Sales to other Canadian Customers

This category covers sales to Canadian customers who are not in the business of manufacturing and selling higher assemblies or products. It includes sales to aircraft operators, maintenance facilities and other non-manufacturing customers.

Total Domestic Sales

The sum of a), b), c) preceding.

2. Export Sales

This category covers all sales where the product or service is delivered to an address outside Canada, including sales by a Foreign Subsidiary of a Canadian company.

a) Sales to the United States Government

All sales to the United States Federal Government, its agencies, Departments, and Administrations.

b) Sales to U.S. Contractors

All sales to U.S. companies which incorporate the product into higher order assemblies.

c) Sales to other U.S. customers

All sales to U.S. companies not included in a) and b) preceding.

d) Sales to other foreign governments

All sales to federal governments, agencies, administrations, and crown corporations except Canada and the United States.

e) **Sales to other foreign contractors**

All sales to foreign companies (other than U.S.) where the product will be incorporated into higher order assemblies.

f) **Sales to other foreign customers**

All export sales other than a), b), c), d) and e) preceding.

Total Export Sales

The sum of a), b), c), d), e) and f) preceding.

3. **Total Sales**

The sum of total domestic sales and total export sales.

4. **Military sales**

Estimate: military/defence sales % of total sales

The estimated percentage of total sales which represent military and or security systems and components. This will include both domestic and export sales.

5. **Personnel Costs**

Wages, salaries, bonuses, and fringe benefits for all employees. Does not include Training Costs.

6. **Materials and Supplies**

a) **Purchased from Canadian Aerospace and Defence companies**

Includes Aerospace and Defence components, systems, and sub-systems manufactured to Aerospace and Defence standards by Canadian companies.

Does not include raw materials, commercial or industrial hardware or components.

b) **Purchased from other Canadian Sources**

All other materials and supplies purchased from Canadian companies.

c) **Imported from U.S. Suppliers**

Includes all material of U.S. origin whether procured directly from the supplier or through a Canadian agent.

d) **Imported from other foreign sources**

Includes all material not of Canadian or U.S. origin whether procured directly or through a Canadian agent.

7. **Training Costs**

The estimated cost of employee training whether carried out in house or in external institutions. Does not include that portion of training cost borne by Federal, Provincial, or other government agencies.

8. **Other Costs and Expenditures**

All other costs and expenses not defined above.

9. **Investment**

Total investment from all sources. Includes government contribution.

a) **Plant**

Acquisition or improvements to real property, acquisition, construction or improvements to buildings, and investment in services such as access to electricity, water etc. Includes construction and improvements to specialized test facilities such as test cells.

b) **Machinery**

Acquisition and replacement of machinery, tooling, and specialized equipment where it is the normal practice of the company to capitalize the costs. Includes laboratory equipment.

c) **Research and Development**

All research, design, and development. Does not include plant engineering, production engineering, or quality engineering.

Includes engineering research and development; materials and components; construction, test, and evaluation of prototypes; and such special equipment as may be required for such activities, including pre-production costs.

The percentage of R&D investment paid for by customers i.e. 3rd party revenues, to be quoted.

10. Government Support

All support in the form of grants and contributions from the Federal Government. Does not include R&D carried out under contract, but support from funded assistance programs such as DIPP, etc. is included. Repayment contributions are included.

a) **Support from Industry Canada for Research and Development**

Support for R&D under the R&D elements of the DIPP.

b) **Support from Industry Canada for Source Establishment**

Support from Industry Canada under the Source Establishment element of the DIPP.

c) **Support from Industry Canada Capital Assistance**

Contributions from Industry Canada for the acquisition of advanced production equipment to modernize or upgrade manufacturing capability.

d) **Support from Industry Canada for Feasibility Studies**

Contributions from Industry Canada under the feasibility study element of the DIPP.

e) **Support from other Departments**

Grants and Contributions from other Federal Government Departments, agencies, and or Crown Corporations.

f) **Repayments**

Repayments to the government of contributions which had been made under the DIPP.

11. Opening Inventory

Company owned inventory on hand at the beginning of the year.

12. Backlog of Orders

Firm orders on the books at year-end. Includes provisional orders (e.g., letter of intent) and excluded options to be confirmed at a later date.

13. Employment

Engineering/Scientific Employment

Engineers, scientists, and technicians involved in Design, Research, and Development. Does not include administrative, secretarial, or support staff.

Production Employment

All employees engaged in production functions, including, production engineering, quality engineering, material procurement and material handling. Excludes secretarial, administrative, and support staff.

Other Employment

All employees not covered in the preceding two groups.

14. Regional Dispersal

Breakdown (%) of corporate activity by region. The percentage breakdowns reported are used to estimate the regional distribution of sales and employment.

15. Breakdown of Sales by Sub-Sector

Airframe (Sub-sector)

All structural elements, accessories, components, systems and sub-systems which form part of an aircraft with the exception of avionics, propulsion and defence electronic systems.

Propulsion (Sub-sector)

All structural elements, components, accessories, systems and sub-systems which form part of the propulsion system of an aircraft.

Avionics (Sub-sector)

All electronics systems, sub-systems and components which are carried aboard an aircraft. Includes electrical power generation and conditioning systems. For the purpose of this survey, ground based equipment for navigation and air traffic control, and aircraft simulators are considered to be part of the Avionics Sub-sector.

Excludes spacecraft electronics which for the purposes of this survey are considered to be part of the Space Sub-sector.

Space (Sub-sector)

All structural elements, components, accessories, systems and sub-systems which form part of a space vehicle or satellite, including its payload, propulsion system, imaging radar, and remote sensing equipment.

All elements of the launch complex and earth stations for command, control of, and communication with a space vehicle, including equipment for enhancement of remotely sensed images. Does not include earth station equipment for transmission and reception of commercial telecommunications or television signals.

Defence Electronics (Sub-Sector)

All electronics systems, sub-systems and components which have defence related capabilities.

All non-Aerospace and Defence products and services provided by companies which also produce products or services defined in one or more of the preceding sub-sectors.

16. Sales of Proprietary Parts and Systems

This covers parts and systems which your company manufactures to your own design or specification.

Sub-contract Sales

This covers parts which your company produces under subcontract to a design or specification controlled by others. It includes special services such as heat treatment, impregnation, surface coating, testing, and quality assurance activities carried out under sub-contract.

Agency Sales

This covers the sale and distribution of products **not** of your own manufacture.

Repair & Overhaul

This covers repair and overhaul activities carried out under contract. It does not include repair and overhaul activities carried out by airlines or aircraft operators for their own account.

Sales of Services

These include systems engineering, consultancy and customized maintenance systems, as distinct from the sale of manufactured products.

Spares

Estimate the percentage of total sales in each sub-sector which are sold as spare parts.

Notes:

1. Gross Sales (gross sales are the total sales for the sector).

2. Gross Output was estimated with the following formula:

Gross Output = (Total Sales + Ending Inventory) - Opening Inventory

Ending inventory for 1998 was estimated with the following formula:

(Opening Inventory 1997/Order Backlog 1997) * (Order Backlog 1998).

3. Net Sales for the sector are defined as Gross Sales minus sales to domestic Aerospace and Defence manufacturing companies (i.e. sales to the sector by firms in the sector itself). Net Sales have traditionally been estimated in previous survey reports to present a sales figure, which in aggregate, avoids double counting of sales among domestic Aerospace and Defence manufacturers.

4. Value Added is an economic concept which measures the value of the output generated by a sector, but avoids double counting the value created by other sector's that supply inputs to that particular sector.

Gross Output of the Aerospace and Defence manufacturing Sector includes the Value Added produced within the sector itself, but it also includes the Value Added produced by other sectors on the inputs purchased by the Aerospace and Defence manufacturing Sector.

The Value Added produced by the Aerospace and Defence sector is distributed to the factors of production in the form of income. For instance, the income generated by adding value in production is distributed to:

- labour in the form of wages, salaries, etc.;
 - the owners of capital in the form of:
 - allowances for depreciation;
 - interest payments to debt holders;
 - profits to equity holders; and,
 - governments in the form of taxes, licence fees, etc.
5. The "Other" sub-sector consists mainly of "land and marine vehicles and equipment manufacturers", but it does not include the Canadian shipbuilders.
6. Sales data were deflated with Statistics Canada's Industry Selling Price Index for the Aircraft and Parts sector while the Value Added data were deflated with Statistics Canada's Implicit Price Index for GDP in the Aircraft and Parts Sector. These deflators are reproduced below for the period 1984 to 1993 (i.e. actuals) and 1993 to 1998 (estimates).

