



GROUNDING POTENTIAL

AN IAMAW REPORT ON
A NATIONAL AEROSPACE STRATEGY

IAM 
The Union
The Future

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A NATIONAL AEROSPACE STRATEGY

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WHO WE ARE

THE INTERNATIONAL ASSOCIATION OF MACHINISTS AND AEROSPACE WORKERS: WHO WE ARE

The International Association of Machinists and Aerospace Workers (IAMAW) is the leading union in the aerospace sector and the air transportation industry. We are the largest union in the air transport sector in Canada and in North America. The IAMAW represents over 55,000 members across Canada, of which 22,000 work in the aviation, aerospace and air transportation sector.

As many of our members work in aerospace, the IAMAW not only has a vested interest in advocating for our members but also in ensuring that the industry that sustains the Canadian economy continues to thrive in the future. Our members are at the heart of the aerospace industry; they build quality products Canada is known for and sought after. They experience the impact of high-level policy decisions, global competitive

forces, and trade deals on a daily basis, both in their workplaces and communities. This is why the vitality and strength of the industry is of a particular concern for us and gives the IAMAW a unique perspective and insight into challenges that lay ahead, opportunities and a way forward that places Canada on the path of continuing to be an influential and relevant player in the global market.

With this policy paper we aim to raise issues the industry is currently facing, the most critical being a severe labour shortage. While our members depend on jobs in the industry, the IAMAW understands the issue extends beyond this; the consequences of neglecting issues the industry is facing will have broader socio-economic repercussions. It is in the interest of labour, industry and government to work together to solve this increasingly complex problem. 

LETTER FROM STAN PICKTHALL

As a collective voice of 22,000 workers in aerospace, air transportation and aviation, the International Association of Machinists and Aerospace Workers is acutely aware of some of the challenges the industry faces. We recognize that the viability and strength of this industry is crucial for the Canadian economy.



The aerospace industry is at a critical juncture. An industry that can be the engine of the Canadian economy is at a major crossroads. Aerospace has continuously yielded profits annually contributing \$28 billion to the Canadian economy.

It employs an increasing number of highly-skilled Canadians, 208,000 as of 2017, which is more than even the auto industry.

Aerospace is also a leader in research and development (R&D), outspending all other manufacturing industries, making this industry a driver of innovation for many other sectors.

The first challenge we identify in the report is the need for 29 national aerospace strategy. The key piece of this strategy is a labour strategy, because it's the most pressing issue the industry is facing.

In a mere five years, one third of the labour force in aerospace will have retired, and it takes anywhere from two to four years to train new workers. Without a sufficient workforce, the industry will simply not be able to exist. Canada will no longer be globally competitive, and billions will be lost from the economy. A key component of the labour strategy is training and education, particularly apprenticeship programs that ensure graduates are job ready.

These problems are not insurmountable and the IAMAW believes that through cooperation of Industry: includes workers, unions, employees with the assistance of Government funding, they can be overcome. Our goal is to provide an overview of the industry and key challenges, and we ask that you support our members and all workers in this diverse industry.

A handwritten signature in black ink, appearing to read 'Stan Pickthall', written in a cursive style.

Stan Pickthall
IAMAW Canadian General Vice-President

EXECUTIVE SUMMARY

THERE'S SO MUCH AT STAKE IN THE HIGH SKIES

The IAMAW recognizes the importance of the aerospace industry to the Canadian economy, and sees it as a promising industry of the future; one that will provide highly skilled and well-paid jobs, drive innovation forward in all sectors and most importantly, an industry that can place Canada as a strong global competitor. Perhaps most importantly, the work of the industry enables technological advancements in all industries, as well as, in everyday life, and supports the work of several federal departments. The industry certainly has all of the hallmarks of success and has a global reputation for technical expertise, innovation, safety and quality.

The industry is also a major contributor to Canada's Gross Domestic Product (GDP), employing more Canadians than the auto industry. In fact, Canada relies more on the industry for revenue and employment than other countries. While the auto industry is concentrated in Ontario and Quebec, which makes investment strategies easier to coordinate, the aerospace industry is dispersed across the country involving multiple employers and many more employees. Jurisdictional delineations, in addition to a dispersed sector, make coordinated investments much more difficult in aerospace.

There are several complex issues, which not only threaten the sustenance of the industry, but also the strength and vitality of Canada's economy. If these problems go unaddressed, the challenges will become insurmountable. The issues outlined in the paper are immediate; they are a mere five years from coming to realization and require swift action.

The most critical issue is the looming skilled labour shortage, which both Canada and other advanced economies will experience in the

near future. In Canada, shortages are both due to massive retirements, where 41% of the aerospace workforce will retire leaving some 55,000 job openings- a staggering third of the existing workforce. Compounding the issue is lack of recruitment into the profession, and limited training opportunities. It may become nearly impossible to recruit and train enough workers in the next five years, if the matter is not treated with urgency. While future opportunities are limitless, Canada will have a difficult time replacing those who have retired, and recruiting new workers to meet future needs.

Air traffic is projected to increase by nine percent over the next seven years stimulating demand and opening new jobs, signalling that aerospace is a growing sector. Without a clear strategy, Canada's foothold will be lost as will billions of dollars from the economy.

The report provides an overview of the aerospace industry in Canada, including an international comparison between Canada's main competitors, and those that are emerging. The purpose is to understand common approaches that Canada can employ to protect and grow its aerospace industry. As a means of managing major obstacles, several targeted recommendations are put forward, such as those that address labour shortages, and the funding framework in the interest of growing the sector.

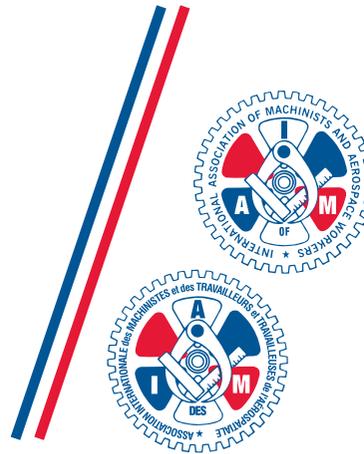
Ultimately, the IAMAW calls for a coordinated effort between provincial and federal governments, employers and labour. It is difficult for any one party to manage the issues since they are too complex, cross jurisdictional lines, and are of national importance.

There's so much at stake and little time!
Something must be done. 

KEY FINDINGS

KEY FINDINGS

- Canada relies more on the aerospace industry for revenues and employment than most other countries
- The aerospace industry annually contributes \$28 billion to the Canadian economy
- Aerospace is a source of highly paying, unionized jobs, providing more employment opportunities than the auto industry. The auto industry employs 123,395 people, whereas, the aerospace industry employs 208,000 people
- Canada ranks third in the world in research and development, making Canada a world leader in technological innovation
- The aerospace industry drives innovation forward by having multiple spill over effects, from transfer of knowledge with other sectors, support for government priorities across several departments as well as, civilian applications (the internet, microwaves, and cell phones.)
- Labour shortages are the most critical challenge for the industry requiring a multi-pronged solution. In the next five years, a third of the Canadian workforce will be retired
- Lack of training opportunities is further adding to the labour shortage
- Well-paid, stable and rewarding jobs are central to a recruitment strategy, best achieved through unionization



CORE RECOMMENDATIONS

CORE RECOMMENDATIONS

GUIDING POLICY PRINCIPLES— 4 PRINCIPLES

- Investments in R&D, particularly in defence
- Obligate companies to keep jobs in Canada, particularly those that are recipients of tax credits, tax breaks and tax incentives
- Targeted support for small to medium enterprises (SMEs)
- Take necessary steps to maintain Canada's competitiveness in the industry

SECTORAL POLICY AS DEVELOPED BY THE FEDERAL GOVERNMENT— 5 ELEMENTS

- Address sectoral fragmentation
- Increase space budgets to comparable levels of other G7 countries
- Make strategic purchases of military aircraft
- Address labour shortages in the industry
- Invest in training and education of trades people in the industry by providing adequate funding through transfer agreements to provinces 



IAMAW RECOMMENDATIONS

IAMAW RECOMMENDATIONS

1. RESEARCH AND DEVELOPMENT

- i) Increase investment in R&D, with a particular focus on defence
- ii) Government should provide direct funding for R&D and move away from indirect forms of support such as tax credits and incentives
- iii) Recipients of tax breaks, subsidies and tax incentives should be formally obligated to keep jobs in Canada
- iv) Provide targeted support for small to medium enterprises who perform the majority of work for the industry
- v) Establish an innovation fund for the aerospace industry, similar to that of the Automotive Innovation Fund

2. A NATIONAL LABOUR STRATEGY

- i) Work with provincial governments to ensure training programs are in place to train new workers who are job ready
- ii) Develop a recruitment strategy that targets youth, women and Indigenous people
- iii) Ensure jobs remain unionized, meaning they are highly paid, stable, and safe as it's a critical component of recruiting
- iv) Facilitate collaboration between industry, labour, government and training institutions to develop a recruitment strategy

3. TRAINING AND EDUCATION

- i) Earmark monies in transfer agreements for training programs in aerospace to enable institutions to provide adequate training using up to date equipment and make graduates job ready
- ii) Establish requirements that qualify provinces to receive additional funds for education and training in skilled trades

4. COMPONENTS OF A SECTORAL POLICY

- i) Increased investment in military R&D
- ii) Strategic purchases of military aircraft
- iii) Cluster policy development to address fragmentation of the aerospace sector
- iv) A national labour market strategy to address skilled labour shortages
- v) Increase to space budgets comparable to other G7 countries
- vi) Support for SMEs through ensuring a certain number of contracts are available for them 

INTRODUCTION

The Canadarm of the Space Shuttle, Dextre of the International Space Shuttle, advanced satellite communication platforms, new space radar capabilities, a world-class aerospace centre, a leader in innovation, driver of Research and Development (R&D) in Canada and globally, are just some of the features of the Canadian aerospace industry, which has a 50 year history in Canada. Undeniably, the industry is known globally for significant contributions that have placed Canada as one of the world's leaders.

The Canadian government relies more on the aerospace industry for revenue and employment than most other countries, and the sector contributes annually \$28 billion to the economy. Through turbulent economic times and volatile markets, the industry has managed to sustain itself with limited government support. While most of Canada's competitors go beyond subsidizing individual companies, and directly invest in the sector, Canada has taken a different approach, which threatens the sustainability and competitiveness of this industry. The significance and importance of the industry for the economy and national security is not lost on foreign governments.

Irrefutably, aerospace is a promising industry for a number of reasons, requiring a concerted and targeted national strategy that addresses challenges the industry is facing. The purpose of this report is to provide an overview of the industry in Canada, and emphasize key challenges the industry faces. Two issues are examined in detail, the funding framework and labour shortages, with proposed recommendations that are grouped together as part of a broader sectoral policy.

The industry's contribution to the economy is substantial, \$28 billion annually and employs over 208,000 Canadians, which is more than even the auto industry.

The first section is an overview of the industry in Canada, followed by an international comparison of leading competitors. The aim of the comparison is to determine key elements of aerospace strategies that have proven to be successful in other countries. Subsequent to this are a series of recommendations organized by topic and issue, ranging from funding, roles and responsibilities of the two levels of government, labour shortages and recruitment strategies.

1.0 A Snapshot of Aerospace in Canada

The Canadian aerospace industry can be broken down into three sub-industries; i) commercial, ii) defence and space systems manufacturing, and iii) space and communications. Each of the sub-industries consist of two main sub-activities, manufacturing and maintenance. Simply put, manufacturing includes building of parts, components and aircraft, whereas, maintenance, repair and overhaul (MRO) is the maintenance of various aircraft and components over an extended period. The commercial side of the industry brings

in the largest share of revenue; approximately 86% of sales came from commercial aerospace, 12% from defence and 2% from space systems¹.

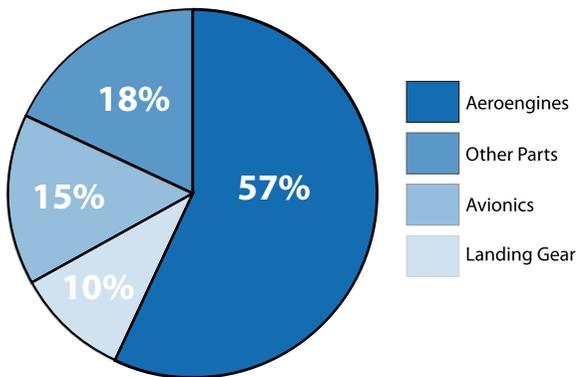
Manufacturing makes up 68% of gross domestic product (GDP), while (MRO) make up the remaining 32%². Fifty-two (52%) of employment in the industry is production related, 26% is in sciences, technology, engineering and math (STEM), an area that is increasingly employing women, and 22% in corporate functions.³

1 Canada. Innovation, Science and Development Canada. State of Canada's Aerospace Industry: 2018 Report. Pg.4
2 Ibid,pg.4
3 Ibid pg.9

Seventy-five (75%) of aerospace manufactured products were exported in 2017, making the industry heavily export oriented,⁴ the majority of products having gone to the United States, our largest trade partner. Canada’s exports are predominantly supply chain related, consisting of aero engines (57%), avionics (15%), landing gear (10%), and other parts (18%). From 2003-2017, the share of supply chain exports has increased substantially, by almost 50% in a fifteen year period. In terms of final products, the majority of exports are airplanes, rotorcraft and spacecraft (33%) and (4%) simulators.

Given Canada’s expertise, skilled labour force and creativity, we are ranked third in the world in terms of civil aircraft, engines and flight simulators. In particular, Canada leads the world in civil flight simulator production.

TABLE 1: Canada’s Supply Chain Exports by Product Category



As a whole, the industry is spread throughout Canada, with a presence in almost every province, from Western provinces, to Ontario, Quebec and the Maritimes. However, the two key superclusters are in Montreal and Toronto, with most research centres located in Ottawa. Each of the provinces specialize in different sub-industry sectors, which are outlined in Table 2.

As the table indicates, the industry is quite dispersed throughout the country. There

⁴ Ibid. pg.5

TABLE 2: Aerospace Clusters		
	Subindustry Specialties	Leading Companies
Western Provinces	Aerostructures, Composites, Airframe MRO, Helicopter MRO, Defence electronics, Space systems, Earth observation, Engines, Engine MRO, Small-aircraft manufacturing, Cold-weather engine testing	Asco Aerospace Canada, Avcorp Industries, Boeing Canada, Cascade Aerospace, Vector Aerospace, General Dynamics Canada, KF Aerospace, Magellan Aerospace, MacDonald Dettwiler and Associates, Pratt & Whitney Canada, StandardAero, Viking Air
Ontario	Rotorcraft manufacturer, Commercial & business aircraft, Satellite-payload subsystems, Landing gear, ECS, Electrical power, Engine parts, MRO, Space robotics, Display systems, Aerostructures, Gears & gears assemblies, Engines	Airbus Helicopters Canada, Bombardier, United Technologies Aerospace Systems, Honeywell Canada, Magellan Aerospace, MDA, Messier-Bugatti-Dowty, L-3 Electronic Systems Services, MHI Canada Aerospace, Northstar Aerospace, Pratt & Whitney Canada
Quebec	Aerostructures, Civil helicopters, Commercial and business aircraft, Training and simulation, Avionics, Engine components, Landing gear, engines, Engine MRO	Aerolia, Airbus, Bell Helicopter, Bombardier, CAE, Esterline CMC Electronics, GE Canada, Heroux-Devtek, LISI, Mechtronix, Pratt & Whitney Canada, Premier Aviation, Rolls-Royce Canada, Safran, Stelia, Thales Canada, Turbomeca Canada
Atlantic Provinces	Precision machining & complex assemblies, Composites, Gas turbine MRO, MRO, design and manufacturing, Engines	APEX Industries, Bluedrop, Vector Aerospace, IMP Group, Pratt & Whitney Canada, Slemmon Park

are two reasons for this; one is the funding framework, which is related to jurisdictional delineations. Provinces compete for funding from the federal government whose decisions are often shaped by political pressures. Since aerospace falls within the provincial jurisdiction, provinces make decisions without

Globally, Canada ranks as the second most attractive country for investment in aerospace, right after the United States of America. Canada's profile is similar to that of the United States in that Canada offers an educated labour force, stable costs of production which are relatively low, good infrastructure and a



coordinating with other provinces or the federal government. Considering the national scope and significance of the industry to national security, the question of developing a national framework arises and is explored further in a subsequent section.

Canada has a distinct advantage in the MRO sector mainly due to the skill and quality of its workforce.

The industry's contribution to the economy is substantial, \$ 28 billion annually and total employment of 208,000 Canadians. Note that when referring to direct, not total employment numbers, the direct total only reflects full time equivalent, and not those engaged in precarious employment in the industry, which is of a particular concern for the IAMAW.

healthy economy. However, one major area of divergence between the two markets are tax policies.⁵

It is clear that the industry is dynamic with potential to grow and create future jobs given the industry's ability to innovate leading to high-volume and diversified export activities.⁶

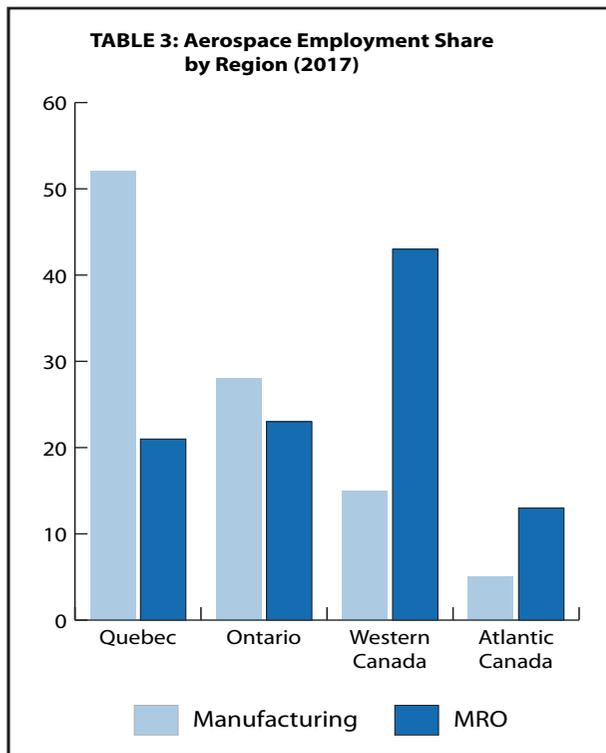
1.1 MAINTENANCE, REPAIR, OVERHAUL (MRO)

Two sub-activities constitute the aerospace industry; manufacturing and MRO. While manufacturing is significant, the MRO industry generates \$ 7.7 billion annually, and indirectly

5 PricewaterhouseCoopers (PWC). *Aerospace Manufacturing Attractiveness Ranking*. September, 2018. 1-20.

6 *Ibid.* Pg.12

employs 70,000 workers. Canada has a distinct advantage in the MRO sector mainly due to the skill and quality of its workforce. Foreign aircraft maintenance firms have recently moved to bring these skills into their supply chains by establishing themselves in Canada. AAR, a leading American maintenance provider, recently purchased facilities in Windsor, ON and Trois-Rivières, QC. Previously, Lockheed entered the market by purchasing the engine shop assets of Aveos. Table 3 below summarizes aerospace employment in manufacturing and MRO by each region.



MRO activity is significant for the economy for a number of reasons. The example of the F-18 fighter jet precisely illustrates the value of MRO. Having purchased this particular model, the Canadian government, intentionally or inadvertently, ensured jobs would be available in the future. The Canadian workforce maintained the planes for 25 years, substantially extending their “shelf” life. More importantly, MRO activity over the period of 25 years provided numerous jobs. Having worked on that particular model for 25 years, workers

developed technical skills and expertise that were unrivalled in the world, so much so, that Australia sent their aircraft to Canada for MRO. Because of the jets being repaired or

Government spending in R&D stimulates private sector spending in aerospace by a ratio of 1:5 dollars.

overhauled, the government saved money by not having to invest into a new fleet.

Canada’s skilled workforce is clearly an advantage, and one that is recognized globally. In order to capitalize on the existing infrastructure, knowledge, technical expertise and other competitive advantages a clear sectoral policy is urgently needed in the context of a national strategy.

1.2 RESEARCH AND DEVELOPMENT:

R&D is the driver of the Canadian aerospace industry, leading the way among all Canadian manufacturing industries. The majority of R&D activity in Canada comes from the aerospace manufacturing sector, where the intensity of spending is seven times higher when compared to all other manufacturing. The aerospace manufacturing sector invests some \$ 1.7 billion

Table 4. Economic and Employment Impact of Aerospace Manufacturing and MRO (2017)

TYPE	GDP	EMPLOYMENT
Aerospace Industry	\$12.6 million	85,600 jobs
Suppliers to the aerospace industry	\$6.8 million	58,400 jobs
Consumer spending by associated employees	\$5.1 million	44,500 jobs
Total	\$24.5 million	188,500 jobs

Source: State of Canada's Aerospace Industry 2018 Report

into the Canadian economy. In addition to significant expenditures, the aerospace sector overall engages in higher, “research intensity”, which means a substantial portion of its total GDP is invested in R&D when compared to the manufacturing sector as a whole.

The intensity of R&D in aerospace is noteworthy because the industry outspends all others in the manufacturing sector, including the auto industry, which has received financial support from both the provincial and federal governments. The industry also has a close relationship with academia (75%), suppliers and government, which is the lowest contributor.

Among all Canadian business, Bombardier has the highest corporate spending on R&D with figures as high as \$ 1.97 billion in 2015. However, corporate investments in R&D have been declining overall, with only two companies increasing their spending in the area, CAE and Heroux-Devtek. This is problematic not only because R&D is at the heart of the aerospace industry, but also due to the fact that when corporate investments drop off, there isn’t a public source of investment to compensate research activities. Direct support for R&D in aerospace is required since the sector outspends all others and contributes more to GDP through R&D activities.

Canada is first in the world in civil flight simulator production.

It’s important to distinguish between R&D in general, and defence related R&D, which bears greatly on the aerospace industry. Aerospace directly benefits from spill-over effects from military R&D in terms of commercial aircraft applications. This is discussed in detail in section 3.0.

2.0 The Global Market: Canada and Its Competitors

When compared to other nations with robust aerospace industries, Canada ranks sixth. As a global competitor, Canada is being outpaced by the United States, the United Kingdom, France and Germany and is in competition with the European Union in MRO. The EU is taking a concerted approach to nurturing the sector, and meeting challenges affecting the industry globally. One way they achieved that goal was by injecting public funds into key areas of the industry, the result of which was the creation of the aerospace industry from national industries, since individual states did not have the necessary resources to compete with the U.S. The result of the concerted effort was the creation of Airbus, which continues to receive significant subsidies.

The United States is the largest and strongest player, followed by France, UK, and Germany. There are also emerging players, namely Russia and China, who in coming decades will be able to compete on a global scale. The focus of the section isn’t to merely highlight Canada’s international ranking, rather to also understand strategies used by other countries to foster and grow their aerospace industries. In this section, leading market players are analysed, followed by new entrants to the market.



THE UNITED STATES OF AMERICA

For a number of years and likely in the near future, the United States will continue being a world leader, despite weakened domestic manufacturing. The U.S. continuously dominates on the global market due to consistently strong investment, which amounts to well over US \$ 50 billion.⁷ Research and Development is a major area of investment, particularly in defence, with the Department

⁷ Moretti, E. et al. July, 8th, 2016. “The Intellectual Spoils of War? Defense R&D, Productivity And

of Defence contributing \$ US 2.4 billion. The U.S. has a robust mix of direct and indirect investments, through both public investment and tax credits.

Military research and development is at the heart of public investment, because in the United States, defence related R&D is, "the most important de facto industrial policy used by the federal government to affect the speed and direction of innovation in the economy."⁸ In 2016, U.S. defence related investments in military R&D amounted to a staggering \$ 72 billion.⁹ Another form of industry support are direct subsidies to R&D through NASA, Department of Defence, amongst others.¹⁰

The American government also supports the industry through tax credits and deductions for R&D, and through the EXIM Bank, which ensures working capital guarantees, export credit insurance, and direct loans at competitive rates to foreign buyers who make purchases over \$10 million.

It is clear that the Americans have a robust and diverse strategy in supporting their aerospace industry to ensure they remain leaders through consistent and robust support for the industry.

 **FRANCE**

France is the largest aerospace industry in the European Union,¹¹ being strongest in aircraft assembly.¹² France is also the sole European Union member state that has stimulated the sector through targeted funding, particularly, for defence R&D, which is, "the single most important component of government funded R&D."¹³ The industry has experienced

Spillover." University of Berkeley, Department of Economics. October 27, 2016, 0-49. Pg.7.

8 Moretti. Pg.1

9 Ibid, pg.1

10 Ibid, Pg. 7

11 Ibid, Pg.9

12 Aerospace Industries Association of Canada. *The Future of Canada's Space Sector: An Engine of Innovation for Over Fifty Years*, September 2016. 1-31.

13 Moretti, pg. 1.

consistent growth, which is a result of direct government support. The French government is a co-owner of all the largest companies, and identifies new technologies that have the potential of making domestic products more competitive in the global market. The government actively supports both civil and military research,¹⁴ and there are several national programs that support the industry, totalling 500 million Euros on an annual basis. Lastly, France' Department of Transportation directly provides repayable launch investments (RLI) for new aerospace products.¹⁵

There are also tax deductions for Research and Development and tax credit programs, which in 2010 had an approximate cost of 4.1 billion Euros and direct support for clusters through funding cooperative research funds. France ensures that existing clusters cooperate with one another and share knowledge, as opposed to funding the development of new clusters. Similar to the U.S., France has a private sector credit insurance company that manages French exports.

 **GERMANY**

The German market comprises of small but technologically advanced aerospace manufacturing companies. At the centre of Germany's aerospace industry is R&D and the state continuously invests in this area.¹⁶ Aerospace companies in Germany can deduct their R&D expenditures as business costs. A key component of the aerospace industry is the German Aerospace Centre (DLR), which operates 30 institutes at eight different locations with an annual budget of 450 million Euros. The German federal government is involved through heavy investments over a six-year period with a \$600 million Euro budget. Much like in France and the U.S., a private firm was set up to extend export credits.¹⁷

14 Ibid. Pg.64

15 Niosi, J. pg. 10

16 AIAC Pg.65.

17 Niosi, Pg.12



THE UNITED KINGDOM

In the European Union, the U.K. is the third largest competitor, with private ownership of aerospace firms. However, the government retains shares in Rolls Royce and BAE Systems.¹⁸ Britain has several large publicly funded programs, particularly for R&D, technology and innovation. Funding is also available through programs under the Ministry of Defence, and the UK Space Agency.

Notably, in the U.K. a large system of tax deductions for R&D exists as a framework to support the industry, in addition to supports to British exports of goods and services.¹⁹ In 2009, 820 million Pounds were invested in the aerospace industry and 580 million by government, and another 160 million Pounds came from other unspecified sources, totalling 1.74 billion pounds.²⁰



THE EUROPEAN UNION

With an understanding that individually countries cannot compete on the global market given limited resources, the European Aerospace Cluster Partnership (EACP) was formed. The organization has 13 members representing 43 clusters within the region, with the goal of strengthening EU's global positioning in aerospace through discussions on policy, cluster support, training and education, innovation, R&D, supply chains, and technology.

The organization has working groups to address various issues, such as harmonization of training and certification standards to allow worker mobility across borders, supply chains, cross-country cluster collaboration, technology, skills development and general human resource issues. The EU certainly recognizes Canada as a strong competitor in the area of regional aircraft, and aim to increase the EU's presence in the MRO market. Presently, the EU isn't in a position to compete directly with the U.S.,

18 Ibid, pg.12

19 Ibid. Pg.14

20 Ibid. Pg.14

however, in the area of technology such as flight mechanics and aerodynamics it is on par.

²¹



JAPAN

Japan is intricately incorporated into the United States' value chain, however, this does not mean that Japan is not supportive of its aerospace industry. The country supports the industry primarily through R&D state funded government laboratories. The Ministry of Defence is another supporter of the industry, mainly by conducting research on military aircraft with civilian applications.²² Japan also provides tax credits and tax deductions for R&D, as well as, direct subsidies.

While the U.S. dominates the Japanese market for civil aircraft, Japan is slated to launch its own regional aircraft, through a collaborative effort between Mitsubishi and Boeing.

2.1 EMERGING MARKETS



RUSSIA

Russia has experience in aerospace, particularly in the defence industry, which was developed during the Cold War. Russia's strength lies in military aerospace, rather than civil aerospace and namely, aircraft. However, the Russian government is intensifying efforts to develop expertise in this area. One hundred percent (100%) ownership of Sukhoi, an aircraft manufacturer indicates willingness of the Russian government to support and grow the civil aerospace industry. Additionally, the Russian government has developed policies that protect the domestic market from foreign competition. The ultimate objective is to ensure Russia gains a foothold for LCA and small aircraft carriers, without any major barriers to market access on the horizon.

21 ECORYS Research and Consulting. *Competitiveness of the EU Aerospace Industry With Focus On Aeronautics Industry*. December 18, 2009.

22 Ibid.pg.15



CHINA

Much like Russia, China also owns 100% of COMAC, a commercial aircraft corporation with significant government support in the form of policy and regulations. China is developing an airliner, the C919, intended to be in direct competition with Boeing’s 737 and Europe’s A320. The aircraft will be ready in 2020 with 28 customers having ordered the aircraft.²³



SOUTH KOREA

The government provides 100% funding for military projects and 50% of development costs of any commercial aircraft projects, and while figures are not always readily available, it is known that the Korean government invested \$1.3 billion US dollars into R&D. South Korea also received a \$ 1.2 billion US contract to produce wings for the A320.

South Korea’s aerospace industry thrives as a result of intense public investment, international collaboration, public and private initiatives, all of which have set South Korea on the path of becoming a strong global competitor in the future.



ISRAEL

Like the U.S., Israel has a diversified mix of policy tools to support the industry, in addition to a strategic cluster policy. The country has two main funding agencies and laboratories, where one of the agencies invests \$ 75 million US dollars in research and development, whereas, the other agency invests 10% of its \$ 1.851 billion revenues back into R&D. The industry is both government owned and controlled, and engages in international collaborative activities. In 2011, the government invested \$ US 1 billion. Israel also provides support for the industry through

23 Unknown. 2018. “ COMAC aims to obtain C919 Jet’s Chinese Certification By the End of 2020.” CNBC Business News. June 14, 2018.

tax deductions, under the condition that they locate in priority geographical areas. By pursuing this policy, Israel is targeting geographical areas that are best suited for the industry and for functioning of aerospace clusters. Heavy investments into military R&D has led to multiple commercially successful high tech start-ups in Israel, which have led to increases in productivity and growth of the country’s GDP.²⁴

Not only are emerging competitors strategically investing in their aerospace sectors, more importantly, they are not facing the same limitations established players are; an ageing society and labour shortages. More importantly, entrants into the global market are supported by public funds.²⁵ This gives these markets a major competitive advantage.

Globally, Canada ranks as the second most attractive country for investment in aerospace.

3.0 Growing the Aerospace Industry: Policies and Strategies across the Globe

While Canada is currently globally competitive, this may not always be the case. Canada’s strategy is different in two important areas from its competitors; Canada does not have “an aerospace defence industry, and government support is relatively small for space budgets,”²⁶ which includes development of global navigation systems, information and communication technologies, earth observation, all of which have applications in the civil aerospace industry.²⁷ However, another element is missing from Canada’s strategy,

24 Moretti, pg.2

25 Ecorys Research and Consulting.

26 Niosi, pg.18

27 Ibid, Pg.20

direct support for R&D, and military R&D in particular.

Canada relies more on tax credits than other means of investment when compared to its competitors, which is an indirect form of support. Canada needs to intensify direct support for R&D, just as Germany, Japan, and the United States have done. In Canada, the rate of public funding has decreased and shifted towards, "indirect support through tax breaks."²⁸ R&D tax credits cause Canada's corporate income tax rate to come in at 22.8%, the second lowest rate in the G7. While this is positive, Canada should not solely rely on tax credits as a means of supporting the aerospace industry, because R&D tax credits are rarely industry-specific,²⁹ and may not stimulate the aerospace industry to the extent that it is required.

Many technologies that are part of our daily lives are a result of military research and development; computers, the internet, radars, semiconductors, nuclear power, jet engines and GPS amongst numerous other technologies.

In terms of tax incentives, the trend has been to move away from this policy tool towards direct public funding for R&D. Combined federal and provincial tax breaks for R&D should be in the ballpark of \$ 381 million in annual tax breaks for the industry³⁰. However, recipients of tax breaks and/or subsidies must be obligated to keep jobs in Canada and hire new graduates upon completion of training. Canada for the most part has taken a distanced approach, while the trend among competitors has been to provide direct public funding for R&D.³¹ Leading competitors have diversified their strategy for the aerospace industry; it is imperative that Canada defines a funding framework under a coordinated, national policy developed in coordination with provincial governments.

28 Moretti pg.18

29 Moretti. Pg.26

30 Niosi, pg.18

31 Ibid pg.19.

In terms of direct investments, it is important that military R&D be at the centre for several reasons. Defence R&D is an effective tool at a given country's disposal to shape innovation, and results in numerous spill over effects. Consider that military research has made available numerous civilian applications, such as computers, the internet, radars, nuclear power, semiconductors, GPS and jet engines, to name a few. Moreover, the aerospace industry is the biggest beneficiary of military R&D technology, since the military and civilian aerospace industries are closely linked.

The 2018 federal budget allocated additional funding for innovation and development, through key programs, none of which provide direct and targeted support. This means that the industry is, for the most part self-reliant, aside from having some access to funding through federal programs. Two relevant forms of assistance for businesses are examined, the Industrial Research Assistance Program, and The Strategic Innovation Fund.

The Industrial Research Assistance Program targets small business owners and projects up to \$ 10 million, with an overall investment of \$ 700 million over a five-year period. This amount does not target companies in particular sectors, rather, all businesses who meet the requirements can apply for a loan. It's worthwhile mentioning that businesses in aerospace face high risks, and often require intensive investment. The operating costs and risks in the aerospace industry are unique in that they are particularly high, so businesses in the sector are not on an even playing field with those in other sectors. Stimulating the sector requires focused investment to ensure companies are able to compete, but also grow.

The Strategic Innovation Fund offers a source of financing to businesses with projects worth over \$ 10 million, but more importantly, the fund aims to foster relationships between industry and academia.³² The aerospace

32 This will likely encourage corporate influence in universities and impact academic freedom.

industry already has a robust relationship with universities, and much of its R&D capacity is through such relationships or thorough research centres.

The federal government announced in August of 2018 that the University Of Ontario Institute Of Technology for the Automotive Centre of Excellence would receive \$ 9.46 million to stimulate new R&D development jobs in the auto industry.

In 2016, the province of Ontario announced it would give \$ 7.8 million to seven companies in the Windsor area to incentivize businesses to establish their operations, and stimulate the regional auto industry.

Considering that aerospace is the driver of R&D in Canada outspending all others in the manufacturing sector, is a major contributor to the GDP, and provider of employment, it is surprising that the industry has not received direct support from governments like those that the auto industry has.

The situation for aerospace is vastly different, and it seems certain that Canada will continue to foster a competitive business environment with limited direct support for the industry. The amount of money the Canadian government has made available is accessible to all businesses from a variety of sectors, but the costs of doing business in the sector are much higher and riskier. Canada’s competitors are conscious of the various challenges and restrictions the industry is facing and are investing heavily in the aerospace industry.



3.1 RECOMMENDATIONS: R&D AND SME

- i) Make investments in R&D, with a particular focus on defence, because in most countries defence is the largest component of government funding
- ii) Provide direct public funding for R&D moving away from indirect forms of support, such as tax credits and incentives

- iii) Obligate companies to keep jobs in Canada, particularly those that are recipients of tax breaks and tax incentives
- iv) Provide targeted support for SMEs who perform the majority of work for the industry, by enabling them to compete for contracts
- v) Direct investment and support for aerospace should take a form similar to that of the auto industry, particularly the Automotive Innovation Fund

4.0 A National Strategy: Developing a Sectoral Policy

In making recommendations, the current funding framework cannot be ignored, both in terms of jurisdictional delineations, and politics driving funding through transfer agreements. Not only has the Canadian government created a highly competitive environment in the industry, the funding framework has led to competition between provinces. Aerospace falls under the provincial jurisdiction, meaning that decision making power and coordination of activities are a provincial responsibility. Provinces compete with one another for funding from the federal government, which has led to a dispersed sector. B.C. is advocating for the industry recognizing it as the fastest growing industry in an attempt to recruit newcomers, whereas, the Maritimes are positioning themselves as leaders in the military aerospace industry.

Manitoba recently received \$ 10 million dollars, half of which was given to Magellan, and the other half to Red River College, a training institution. Whether that investment was required at this time has yet to be seen, but the overarching point is that investments are made without a coordinated rationale. As a result, aerospace companies operate in a highly competitive and for the most part, private sector environment without clear direction from government. Yet, the aerospace industry is of national importance.

Political ideology has largely been the root cause of governments staying away from developing nationally planned and coordinated economic policies, as it's seen as being too interventionist and limiting to the free-market. For clarity's sake it's important to define what a nationally oriented economic policy is and its' objectives. A coordinated approach to economic policy has the effect of, "improving the business environment or alter[ing] the structure of economic activity towards sectors... that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention."³³ There are a number of policy instruments to achieve that goal, some of which are tax breaks and strategic procurement. One recent case in particular can serve as a model for a targeted sectoral policy.

Recently, Britain has aggressively pursued an industrial policy [focusing] on their defence sector.³⁴ The policy allocates a third of British defence procurement to small businesses, either directly or indirectly through supply chains by 2020. It's also noteworthy, that the industrial policy outlines the goal of training 50,000 apprentices in defence related trades by that same year. Britain's industrial policy also targets unemployment by fostering an industry that is of vital significance. France has taken a similar approach where defence R&D is, "the single most important component of government funding."³⁵

Canada has something to learn from this approach, or at the very least consider that experts are noting an urgent need for a, "focused, sector approach to economic development."³⁶ While Canada's commercial aerospace sector is developed, there is potential in the military aerospace industry, because, "defence is an area where

government has real leverage which can produce significant commercial spill-over effects that reverberate throughout the broader economy."³⁷ Military R&D has led to numerous technological civilian applications, and commercial aerospace.

AN AEROSPACE SECTORAL POLICY: THE RATIONALE AND KEY ELEMENTS

There are several reasons why aerospace should be the target of a sectoral policy. In a general sense, targeting aerospace through a coordinated and targeted sectoral policy is needed since the industry is a driver of technological advancements that have uses across industries with significant spill over effects and cross-use. There are also spill over effects in terms of practical applications of technology developed by the industry. Other spill over effects are those that enable government priorities across several departments, such as, National Defence, Environment and Climate Change, Fisheries and Oceans, Indigenous and Northern Affairs, Natural Resources, Transport, Public Safety and Innovation and Science and Economic Development. Lastly, aerospace employs more people than the auto sector, contributes significantly to the GDP, and is the driver of innovation through R&D.

More specifically, a sectoral policy should explicitly focus on military R&D, because when the government invests in military R&D, the private sector increase its investment, too. On average, for every \$1 dollar that a government invests in R&D, the private sector invests anywhere between \$2.4 and \$5.9.³⁸ This means that government funding stimulates private sector funding, targeting innovation in a given industry and raising the rate of returns for private companies.³⁹ These findings come from a study of leading competitors in

33 Xavier Vanden Boch. "Industrial Policy in the EU: A Guide to an Elusive Concept". Sept.2014. pg.11

34 "Why Canada is ripe for a new industrial policy". *The Globe and Mail*. February 26, 2017.

35 Moretti pg.1

36 Ibid.

37 "Why Canada is ripe for a new industrial policy"

38 Moretti pg.4

39 Moretti, pg.24

aerospace, the U.S., France, United Kingdom and Germany.

Out of the cohort, the U.S. has the highest proportion of defence related R&D (57%), followed by Britain (35%) and France (29%). Canada's proportion of spending on defence related R&D is 7.53%. An increasing amount of research also shows that R&D is a key source of firm productivity growth. Some experts argue that Pentagon's hefty investments in technological innovation and R&D is directly responsible for the country's rise in manufacturing in the second half of the 20th century.

The military aerospace sub-industry in Canada is relatively small and it's unlikely it has the capacity to build military aircraft, but there is tremendous potential in defence R&D. Few companies in Canada complete military related work; L3 Communications, Rockland, Magellan, MGU, Boeing, Saffran and Ajax, and most of the work is refurbishing. Given this reality, it is vitally important that Canada is strategic about purchases of aircraft to ensure work is done in Canada.

The industry employs more workers than even the auto industry, which for many years has received financial support from both provincial and federal governments. It's noteworthy that aerospace workers are more productive than the average worker, meaning that labour productivity in the sector is higher than others. Due to their higher productivity, workers in the industry contribute more to the GDP, approximately 62% more value added when compared to all others. Studies prepared by the federal government emphasize that improvements in productivity will become even more important in sustaining income growth in the future. Given that labour productivity in

the industry is significantly higher, the industry will continue reaping benefits for the broader economy. While the government projected in 2014 that the source of growth to the Canadian economy will come from natural resources and related industries, the driver of technology, innovation and labour productivity is indeed, the aerospace sector, and its contribution to the economy should not be overlooked.

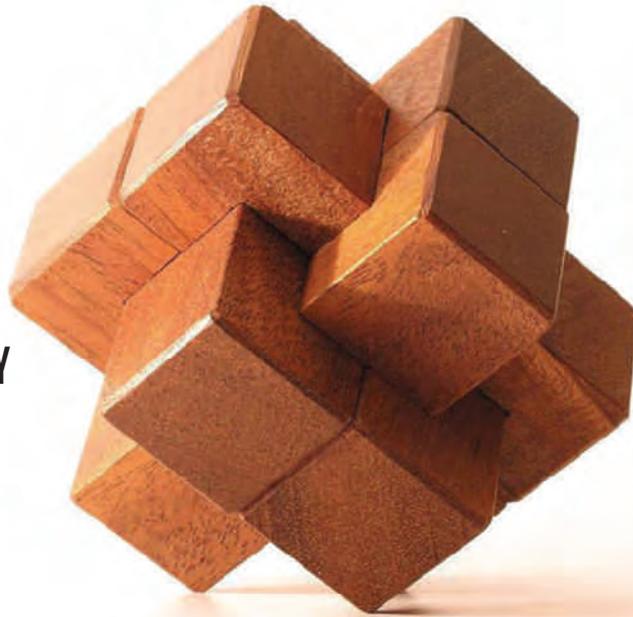
Research has shown that aerospace workers tend to be more productive than the average worker, which means they contribute more to the GDP than others.

Aerospace businesses are innovative leaders in R&D, from which there are spill over effects throughout the economy, and perhaps more importantly, the industry employs advanced technology and materials that drive the industry, and other sectors forward. Simply put, it's an industry of the future that is highly innovative with potential to contribute even more to the economy than the industry currently does.

The sectoral policy should also address the question of cluster policies. Other countries focus on specific innovative regions and encourage collaboration between them. Canada's policies diverge from this approach, and instead encourage new regional innovation systems.⁴⁰ While the aerospace industry is spread throughout Canada, the majority of activity takes place in Montreal and Toronto with research activity centred in Ottawa. Specialists advise that Canada would benefit from developing a cluster policy based on

⁴⁰ Ibid pg.21

WE NEED A COMPREHENSIVE NATIONAL AEROSPACE STRATEGY



actual regional innovation systems, with support for aerospace academic and industrial research cooperation in the Montreal-Ottawa-Toronto corridor.⁴¹ Canada can either follow the trend, or refine the cluster policy in a way that encourages collaboration between clusters that are regionally innovative. Defining innovation and growth would be done in collaboration with both industry and labour organizations.

Another component of a sectoral policy is to stimulate the aerospace industry by increasing space budgets to a level comparable to that of other G-7 countries, specifically concentrating on new materials, telecommunications and earth observation technologies, because they have direct applications in the civil aerospace industry.⁴² Collaboration between the two sub-industries would benefit both.

Developing a sectoral policy does not limit the government to solely focus on aerospace, rather, the policy can be coupled with and serve broader societal objectives, one of which are looming labour shortages. A sectoral policy could include development of specific regional policies and/or defence/security

policies, because both are related to aerospace. Nevertheless, the sectoral policy must include a labour strategy, as it's the biggest challenge for aerospace.

An equally important component of a sectoral policy is the role of small to medium enterprises (SMEs). SMEs certainly tend to be more creative, innovative and they carry out the majority of work done in Canada, which is why it's important to enable Canadian SMEs to bid and win contracts. Britain's industrial policy allocated a third of British defence procurement to small businesses. While the Industrial Research Assistance Program targets small to medium businesses, because of the nature of the industry, SMEs require additional funding. Specifically, the sectoral policy could, just as the British policy does, ensure that certain amounts of contracts are secured for SMEs, thus ensuring that work is available for Canadian firms and workers.

⁴¹ Ibid.21.

⁴² Ibid. pg.20



4.1 RECOMMENDATIONS: OBJECTIVES OF A SECTORAL POLICY

- i) Address the fragmented sector through a diversified strategy that consists of direct and indirect funding strategies for military R&D thereby stimulating the industry
- ii) Ensure the sectoral policy supports regionally innovative clusters, and that collaboration is promoted and rewarded
- iii) A sectoral policy can target broader goals, one of which are labour shortages and developing the space and military aerospace industry
- iv) Ensure purchases of military aircraft are strategic, with one of the goals to make work available on an ongoing basis for Canadian companies and workers
- v) Increase space budgets to a comparable level to that of G7 countries because there are direct applications in the civil aerospace industry
- vi) Define a clear and cohesive cluster policy, focusing on regional innovation systems
- vii) Ensure SMEs have a secured number of contracts, which could help offset the cyclical nature of unemployment in the industry

5.0 Roles and Responsibilities of Two Levels of Government

The constitution of a sectoral policy would define the roles of each level of government, which should include a mechanism for cooperation between the two governments with respect to aerospace. The federal government would need to increase funding through transfer agreements to provinces so that provinces are able to invest in training institutions and programs that adequately train workers. The IAMAW suggests that the money is conditional upon meeting of requirements, one of which are indicators of growth, and of particular interest to IAMAW is employment, quality of jobs, and training requirements. Another role for the federal government is to provide direct funding to the industry, which matches funding levels of Canada's competitors and reduce reliance on the industry. The federal government can also develop a cluster policy centred on innovative clusters.



Provincial governments on the other hand, have a clear role and responsibility in the area of training and education. It is an established fact that the industry will face massive labour shortages in the near future, and that training is sorely lacking. In order to receive funding from the federal government, provincial governments would need to provide apprenticeship programs to train future workers, such as, Red Seal training, and opportunities to upgrade skills. Red Seal programs are especially important as they allow for mobility of skilled workers across provincial borders.

The federal government could also consider the approach taken by the EU and the EACP model. In recognizing the importance of worker

from exchange of trainees to integrated transnational vocational training courses.

Canada could develop a similar system with the provinces; irrespective of Canada’s selection of a model, it is essential for colleges and training programs to be properly funded and equipped with latest technology and materials.



5.1 RECOMMENDATIONS: TRAINING AND EDUCATION

- i) Include an earmarked amount of money for aerospace training in transfer agreements to provinces
- ii) In order to receive an allocated amount of funds from the federal government,



mobility and, “Europeanization” of training and education,⁴³ EU national aerospace clusters have banded together to develop and expand transnational education and training. The Hamburg Qualification Initiative established an exchange in training between clusters across the European Union. The program has evolved

provinces must meet requirements for training and education in the form of apprenticeship programs, including Red Seal certification and engineering programs

⁴³ ECORYS, pg. 9



6.0 A Growing Problem: Labour Shortages in the Canadian Aerospace Industry

While opinions may differ on which challenges the industry is facing and the extent of their severity, there is unanimous agreement that labour shortages are the biggest obstacle. Demographics are at the crux of the problem, because, “the foundation of aerospace, the baby boomer generation”⁴⁴, is retiring *en masse*, with some 41% of skilled tradesmen retiring in the next few years.⁴⁵ In fact, the average age of IAMAW members employed in the industry is 45 years of age, which is in line with both government and industry statistics. A study completed by the Canadian Council for Aviation and Aerospace (CCAA) in March 2018 shows that the workforce within the industry is generally older than the average Canadian worker, and has half as many workers under the

44 Russell, Dave. “The Perfect Storm in Aerospace Manufacturing.” *Area Development*, 2018.

45 Ibid.

age of 25.⁴⁶ It is clear that within the existing workforce, there isn’t a sufficient number of workers to replace those who are retiring.

Retirements will incur costs both directly and indirectly, and pose more than just a recruitment challenge. Further complicating matters is that, “companies do not have any time buffer [as] new training programs are heavy investments that do not promise quick return.”⁴⁷ Colleges require anywhere from two to four years to complete, and graduates require additional time on the job to hone their skills. With retirements, the replacement rate will be higher than the growth rate, which is problematic since, “companies need to have a balance of new and experienced workers to be productive.”⁴⁸ Perhaps most concerning is that knowledge transfer, in informal and formal ways is not occurring.⁴⁹

In fact, due to retirements, 78% of hiring needs in aerospace manufacturing is comprised

46 *Aviation and Aerospace Industries Labour Market Information* Canadian Council for Aviation and Aerospace, 2017. Pg. 6

47 Russell, pg.3

48 AIAC. pg.19

49 AIAC. pg.19

of replacement demand, and only 3,200 new entrants are expected to be hired by 2025.⁵⁰ Similarly, 72% of hiring requirements for the air transportation industry are due to replacement demands, with 3,900 expected to be needed by 2025.⁵¹

By 2025 the aerospace industry will face a daunting challenge; the industry will be short 55,000 workers, which is a third of the existing workforce.

With such a large portion of the workforce retiring, and the nature of jobs changing quickly and becoming more technical, it is incumbent on provincial governments to take action and invest in training of new trades people to replace those who are retiring.

The Aerospace Industry Association of Canada (AIAC) identifies a serious labour shortage in a mere five years in four particular skill areas, including advanced manufacturing techs, MRO skilled trades⁵² and personnel. Similarly, CCAA published a study in March 2018 that quantified the number of jobs that the industry requires by 2025 in order to keep up with projected industry growth.⁵³ In less than seven years from now, 55,000 workers will be needed, which, “represents a third of the existing workforce [and] a daunting challenge for the industry.”⁵⁴

Out of the 55,000 jobs, 18,144 are needed in aerospace manufacturing, and another 12,008 in support activities for air transportation.

50 Ibid, pg.10.

51 Ibid. pg.12

52 “Fastest Growing Industries: Aviation and Aerospace”. *A guide for newcomers to British Columbia*. 2017 Pg.5 These occupations refer to aircraft structural technicians and aircraft turbine engine technicians.

53 Forrest, Ben. “CCAA Seeks National Strategy For Labour Shortage.” *Skies Mag*. April 20,2018

54 Skilled Immigrant Centre, pg.13

Specifically, the industry will require a workforce knowledgeable in avionics, structures, welders with an aerospace skill set, composites experience, NDT level 3, landing gear assembly, machinists, programmers, electricians and painters.

The CCAA projects the following occupational requirements in the industry by 2025;⁵⁵

- 5,300 aircraft mechanics
- 2,700 aircraft assemblers and aircraft assembly inspectors
- 2,000 aircraft instrument, electrical and avionics mechanics, technicians and inspectors
- 1,900 air transport ramp attendants
- 1,400 machinists and machining and tooling inspectors

In order to continue being innovative, aerospace manufacturers need to increase their employment of skilled workers,⁵⁶ which will be increasingly difficult to do. Not only is innovation thwarted, so is growth and development due to labour shortages. Without a sufficient workforce, companies cannot plan for development, and in fact, the shortage is, “stifling potential for the economy to grow.”⁵⁷ The CCAA urges the government to develop a robust, multi-faceted national strategy, “because it’s hard for any one company or region to do [this] on their own.”⁵⁸

While labour shortages are at the centre of problems facing the aerospace industry, the backdrop against which this is occurring is an increase in air travel. It is projected that air traffic will increase by 2.9% in the North Atlantic, 6.9% in the Middle East-Asia traffic and Intra-China traffic is slated to grow by 6.2%. An increase in air travel means that there’s also going to be an increase in demand for narrow-body aircraft from 14,300

55 Ibid. Pg. 13

56 State of Canada’s Aerospace Industry 2017 Report.

57 Ibid.

58 Ibid

to 23,100, which is an annual rate of 4.9%. Overall, industry experts project that air transportation will grow by 9% between 2018 and 2025. An increase in demand for aircraft invariably indicates that there will be also be an increase in MRO activity.

Canada's Transport Minister, Marc Garneau has indicated as much in a press briefing, saying, "we're flying more and more and we will continue to fly more and more... [w]e cannot afford to have labour shortages in the aviation industry."⁵⁹

The consequence is that with expected growth, which has been consistent, there will be new job openings that are unrelated to retirements. Canada not only lacks the workforce to fill retirements, but also to meet future demand.

Recognizing the problem and the urgency, Transport Canada put out a paper that underlines another issue, which is that different industries are competing for labour, and given, "lack of visibility for careers in the aviation industry due to limited post-secondary institutions offering aviation programs,"⁶⁰ the industry cannot compete effectively for labour. Enrolment in training for aerospace industry employment is low, which is related to a shortage of high-quality-training programs where machinists can advance their skills. In particular, the British Columbia Institute of Technology has not been scheduling classes for certification in the Aerostructures trade TQ, which affects workers who build sheet metal, bending and breaking of aluminium, riveting, chemically treating the aluminium and metal bonding. Presently, there are approximately twenty IAMAW members waiting to take the training. Lack of classes and opportunity for advancement are in effect, adding to the shortage of skilled workers with many turning

59 "Canada faces severe shortage of pilots and aircraft workers" *Ottawa Citizen*

60 *Ibid*, pg.3

away from the sector to areas where they are able to get the training. Consequently, some colleges have cancelled classes due to lack of enrolment.

Air traffic is expected to increase by 9% by 2025, opening new job opportunities that are unrelated to retirements. Canada not only lacks the workforce to fill retirements, but also the ability to meet future demand.

On the other hand, colleges that offer training are not able to offer the kind of "real-world" training that graduates will encounter in their workplace. This sets new graduates up on a steep learning curve,

since training institutions are not equipped with the latest technology.

The value of apprenticeship programs cannot be overstated, particularly Red Seal training. Students who complete the program develop skills through learning theoretical knowledge and applying it in a real-world setting. With a small amount of investment, Canada's colleges and apprenticeship programs can serve as the front line for training the next generation of aerospace workers. Just as Britain placed a target on training apprentices through its industrial policy, Canada could effectively do the same through a sectoral policy.

However, it's not just about the visibility of the industry as a good source of employment, there is another obstacle. The emphasis of the education system and societally is on white-collar jobs, while jobs in industrial work and trades are derided, and worse yet are, "an unwarranted mark of failure."⁶¹ Most employers prefer graduates with degrees in sciences, mathematics, and engineering, because of the assumption that the digital age only creates, "jobs that require abstract thinking rather than the hands-on skill of craftsmen."⁶² A highly skilled workforce is equated with those who are university educated, however, workers in the industry have specialized technical skills using advanced technology, which indeed, makes them highly skilled. This is supported

61 *Ibid*. pg.2

62 *Ibid* pg.2

by the fact that Canadian aerospace workers, particularly those employed in MRO, have a global reputation due to their expertise.

Transport Canada, CCAA, the Chamber of Commerce of Metropolitan Montreal, amongst others recognize that jobs in the industry are greatly misunderstood, "which has a direct impact on the number of students registered for specialized training programs, which has been dropping for the past two years."⁶³ The IAMAW holds the same view, and stresses that the best way of changing perceptions about jobs in the industry is to ensure jobs are stable, well paid and adequately remunerated. Furthermore, jobs in the industry are challenging, rewarding and contribute both to the public's safety, and national security.

Changing perceptions about work in the industry should emphasize that employment in aerospace takes place in high tech, computerized plants involving highly complex work, where jobs are highly paid, with good working conditions, and "health and safety standards that are second to none."⁶⁴ More importantly, all of the attractive features of jobs in aerospace are attributable to unionization and strong collective agreements, which is required if youth are targeted for recruitment.

Although the aerospace industry is becoming aware of the challenge that labour shortages will pose, one critical point is often overlooked. Central to recruitment of youth into the aerospace industry is quality of jobs. Offshoring, part-time, casual work adds to people's reluctance to choose a career in aerospace and runs contrary to the message the CCAA espouses in their newest report on the labour market in aerospace. If the industry, and government are serious about recruiting

new workers, the quality of jobs and stability must be maintained, which is only achieved through strong collective agreements and labour standards. Vital to ensuring a workforce exists is quality of jobs

and more importantly that the industry can compete with other industries for a limited pool of workers. A stable, knowledgeable workforce helps companies remain innovative and competitive, and it is in the interest of industry leaders, governments and labour to collaborate in addressing the labour shortage.

Industries are competing for labour, and given, "lack of visibility for careers in the aviation industry due to limited post-secondary institutions offering aviation programs," the industry cannot compete effectively for labour.



63 The Chamber of Commerce of Metropolitan Montreal. "Labour Challenges In The Aerospace Sector." April, 2017.

64 Ibid.pg 2.



6.1 RECOMMENDATIONS: A NATIONAL LABOUR STRATEGY

- i) Provincial governments must ensure that the training offered is both adequate and relevant for those entering the industry, meaning that training institutions are equipped with up to date equipment and materials
- ii) Ensure there is collaboration between industry, labour, governments and training institutions to promote employment in the industry
- iii) As a form of a recruitment strategy, ensure that jobs remain unionized and in Canada
- iv) Develop a coordinated national labour market strategy as part of a sectoral policy



7.0 CONCLUSION:

Canada has a long-standing tradition going back 50 years⁶⁵ of developing the aerospace industry and an exceptional reputation in terms of quality and safety of its aerospace products. Perhaps most notably, Canada is known for the “iconic contribution of Canadarm to the Space Shuttle and Dextre to the International Space Station (ISS)”⁶⁶, and we have continuously contributed to advanced satellite communication platforms, new space radar capabilities, including building of commercial and military aircraft and engines. We have a unique supercluster recognized as one of three world-class aerospace centres in the world, “where an entire aircraft can be assembled within a 30 mile radius.”⁶⁷ Canada ranks as the second most investment ready country globally, offering skilled labour, strong infrastructure, and a stable economy.⁶⁸ It is certain that Canada is well poised to exceed its past successes and become a world leader in aerospace.

The aerospace industry plays a critical role in the domestic Canadian economy, to the extent that Canada relies significantly more on the aerospace industry for revenue and employment than most other countries.⁶⁹ Irrefutably, the industry is important for the domestic economy, which is supported by global demand for Canadian exports. In 2016 alone, the industry generated nearly \$ 28 billion to the GDP, and sustained 208,000 jobs⁷⁰, while in 2017, the industry’s revenues increased to a total of \$ 29 billion. Despite extremely

volatile global markets, and lack of government support, the industry has maintained growth, and revenues increased by 26% in a mere five year period from 2012 to 2017.

Aerospace is also a source of well paying, stable jobs and is providing more employment opportunities than even the auto industry. The auto industry employs 125,395 people, whereas, total employment for aerospace is 208,000.

Spending in Research and Development (R&D) by the aerospace sector also contributes significantly to Canada’s economy,⁷¹ making Canada a leader in R&D. Canada ranks third in the world, which is a result of intensive investments in R&D and collaboration with universities, and suppliers. R&D is important as it has significant spill-over effects, and there is a transfer of knowledge with other sectors, such as, wind energy and marine transportation manufacturing, to name a few.⁷²

50 years’ worth of development of the industry has established a robust infrastructure, institutions and an industry that generates, “ significant socio-economic benefits and directly supports or enables government priorities across several departments, including National Defence, Environment and Climate Change, Fisheries and Oceans, Indigenous and Northern Affairs, Natural Resources, Transport, Public Safety and Innovation, and Science and Economic Development.”⁷³ The world depends on Canada’s contributions to R&D, technological expertise, innovation, creativity and a highly skilled workforce. Lets ensure things stay this way by working on a solution together.

The IAMAW is committed to working with all relevant stakeholders to make sure the industry thrives and member’s jobs are protected.

65 “The Future of Canada’s Space Sector: Innovation White Paper on Space”. AIAC, September 2016. Pg.1

66 Ibid. Pg.2

67 AIAC Phase pg.63.

68 PricewaterhouseCoopers (PWC). *Aerospace Manufacturing Attractiveness Ranking*. September, 2018. 1-20.

69 “Global Aerospace Market Outlook and Forecast”. AIAC, Deloitte and Touce LLP and affiliated entities.

70 “The State of Canada’s Aerospace Industry” 2017 Report. Innovation, Science, and Economic Development Canada and AIAC.

71 AIAC Phase 3 report. Pg.62

72 Ibid, pg.62

73 Ibid. Pg.1

IAMAW RECOMMENDATIONS

IAMAW RECOMMENDATIONS

1. RESEARCH AND DEVELOPMENT

- i) Increase investment in R&D, with a particular focus on defence
- ii) Government should provide direct funding for R&D and move away from indirect forms of support such as tax credits and incentives
- iii) Recipients of tax breaks, subsidies and tax incentives should be formally obligated to keep jobs in Canada
- iv) Provide targeted support for small to medium enterprises who perform the majority of work for the industry
- v) Establish an innovation fund for the aerospace industry, similar to that of the Automotive Innovation Fund

2. A NATIONAL LABOUR STRATEGY

- i) Work with provincial governments to ensure training programs are in place to train new workers who are job ready
- ii) Develop a recruitment strategy that targets youth, women and Indigenous people
- iii) Ensure jobs remain unionized, meaning they are highly paid, stable, and safe as it's a critical component of recruiting
- iv) Facilitate collaboration between industry, labour, government and training institutions to develop a recruitment strategy

3. TRAINING AND EDUCATION

- i) Earmark monies in transfer agreements for training programs in aerospace to enable institutions to provide adequate training using up to date equipment and make graduates job ready
- ii) Establish requirements that qualify provinces to receive additional funds for education and training in skilled trades

4. COMPONENTS OF A SECTORAL POLICY

- i) Increased investment in military R&D
- ii) Strategic purchases of military aircraft
- iii) Cluster policy development to address fragmentation of the aerospace sector
- iv) A national labour market strategy to address skilled labour shortages
- v) Increase to space budgets comparable to other G7 countries
- vi) Support for SMEs through ensuring a certain number of contracts are available for them 

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