2018

Economic Impact Study – Atlantic Canada Aerospace & Defense Industry

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DISCLAIMER

This Economic Impact Study has been prepared on a best-effort basis and reflects the conditions prevailing and information available at the time, March 2018.

The projections, recommendations, and conclusions contained in this report are, to some degree, based on opinions and assumptions that are subject to variation depending upon evolving events. Therefore, we cannot represent them as results that will necessarily be achieved but only as those that could be attained provided the opinions and assumptions relied upon remain valid.

SAINT MARY'S UNIVERSITY BUSINESS DEVELOPMENT CENTRE

MARCH 2018

Executive Summary

The Atlantic Canada Aerospace and Defence Association (ACADA) is a collaborative SME-focused not-for-profit industry association that represents over 160 members in the Atlantic provinces and is the industry's voice for information dissemination, advocacy and strategic coordination of the industry sectors represented. It is an amalgamation of four previous associations that existed in each of the Atlantic provinces and was officially created in December 2016.

Tasked with an overall goal of growing the industry in Atlantic Canada, and to fully deliver on the organization's mandate, a thorough understanding of the economic role the Aerospace & Defense sector plays in the Atlantic Canada region is required. While aggregated information about specific industry sectors is compiled by Innovation, Science and Economic Development Canada, including Aerospace and other sectors represented by ACADA, there is no regional assessment of the impact the sectors aggregately represent, nor is the information broken down at the provincial level. This information is deemed to be vital to assist the development of appropriate industry policy to enable the sectors strategic development which is one reason ACADA has sponsored this economic impact assessment project.

The Aerospace and Defense (A&D) industry is comprised of companies involved in the production of spacecrafts, commercial / military / private aircraft and manufacturers of military equipment. Unfortunately, there is no one industry category that is classified as aerospace or defense within the industry codes that are tracked by government data collection agencies. As such, the companies that make up the A&D industry are classified individually depending on the specific products or services provided.

To determine the economic impact generated within Atlantic Canada, additional analysis was required to breakdown available aggregate regional data provided by Innovation, Science and Economic Development Canada to understand the specific economic impacts at the provincial level. Ultimately, the regional and provincial level economic impact assessments were derived from determining the employee distribution of Aerospace and Defense industry participants and estimating the share each province represented of the region's total. The employment data collection and analysis consisted of four successive stages:

- identification of companies participating in the Aerospace & Defense industry
- determining employment figures for each of the identified companies
- assessing the proportion of employees in the identified companies that are directly engaged in the Aerospace & Defense industry

- calculate the pro rata share of GDP and employee levels for each of the Atlantic Provinces

The direct economic impact for each province was determined by its relative share of the total identified employees represented by each province. Indirect and induced effects were then calculated using the industry multiplier identified in the national reports to determine the total economic impact of the Aerospace & Defense Industry for each of the Atlantic Canadian provinces.

When combined the Aerospace and Defense industries contribute almost $1.3 billion in direct contribution to the region's GDP. Expanding the industries impact, through economic multiplier effects to include indirect and induced impacts, the overall economic impact on regional GDP is $2.85 billion

In terms of employment, the A&D industries combined accounted for direct employment of approximately 9,700 people and over 22,700 in total as shown in the summary table below.

Impact on Canadian GDP ($ millions)																				
	Atlantic Canada				Newfoundland &				Prince Edward Island				New Brunswick				Nova Scotia			
	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total
Aerospace	**918**	**663**	**468**	**2,049**	**132**	**95**	**67**	**294**	**104**	**75**	**53**	**233**	**37**	**27**	**19**	**83**	**645**	**465**	**329**	**1,439**
A&D	**77**	**56**	**40**	**173**	**11**	**8**	**6**	**25**	**9**	**6**	**5**	**20**	**3**	**2**	**2**	**7**	**54**	**39**	**28**	**122**
Defense	**287**	**189**	**148**	**625**	**40**	**26**	**21**	**87**	**1**	**1**	**0**	**2**	**31**	**20**	**16**	**67**	**215**	**142**	**111**	**468**
Total	**1,283**	**908**	**656**	**2,847**	**183**	**130**	**94**	**406**	**114**	**82**	**58**	**255**	***71***	***50***	***37***	***157***	**914**	**647**	**468**	**2,028**

Impact on Canadian Employment (Jobs x 1000)																				
	Atlantic Canada				Newfoundland &				Prince Edward Island				New Brunswick				Nova Scotia			
	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total
Aerospace	**6.5**	**5.6**	**3.7**	**15.8**	**0.9**	**0.8**	**0.5**	**2.3**	**0.7**	**0.6**	**0.4**	**1.8**	**0.3**	**0.2**	**0.1**	**0.6**	**4.5**	**4.0**	**2.6**	**11.1**
A&D	**0.7**	**0.5**	**0.4**	**1.6**	**0.1**	**0.1**	**0.1**	**0.2**	**0.1**	**0.1**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.1**	**0.5**	**0.3**	**0.3**	**1.1**
Defense	**2.5**	**1.6**	**1.3**	**5.4**	**0.3**	**0.2**	**0.2**	**0.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**0.2**	**0.1**	**0.6**	**1.9**	**1.2**	**1.0**	**4.1**
Total	**9.7**	**7.7**	**5.3**	**22.7**	**1.4**	**1.1**	**0.8**	**3.2**	**0.8**	**0.7**	**0.5**	**2.0**	**0.6**	**0.4**	**0.3**	**1.3**	**6.9**	**5.5**	**3.8**	**16.2**

From a tax revenue generation perspective, the cumulative economic affects of the Atlantic Canada A&D industry generated $902.4 million in tax contribution nationally. The combined provincial level tax revenue for Atlantic Canada is estimated to be $770.6 million as shown below.

Provincial Tax Revenue - Aerospace & Defense Industry (2016) ($ millions)					
Economic Impact Type	NL	PEI	NB	NS	Atl Cda
Direct	36.2	30.5	18.1	262.4	347.2
Indirect	25.7	22.0	12.6	185.6	245.8
Induced	18.5	15.6	9.3	134.2	177.6
Total	80.4	68.0	40.0	582.2	770.6

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Background

The Atlantic Canada Aerospace and Defence Association (ACADA) is a collaborative SME-focused not for profit industry association that represents over 160 members in the Atlantic provinces with the overall goal of growing the industry in the region. It is an amalgamation of the four previous associations that existed in each of the Atlantic provinces and was officially created in December 2016.

ACADA members deliver products and services to the global marketplace in land, marine, and air/space domains for both commercial and defence applications.

ACADA represents the interests of the aerospace, defence, marine and security industries in Atlantic Canada and was formed in response to the desire and need to work collectively with a "strength in numbers" approach to promote and advance the Aerospace & Defence sector development on behalf of the Atlantic region. ACADA is the industry's voice for information dissemination, advocacy and strategic coordination of the industry sectors represented.

To fully deliver on the organization's mandate, a thorough understanding of the economic role the Aerospace & Defense sector plays in the Atlantic Canada region is required. While aggregated information about specific industry sectors is compiled by Innovation, Science and Economic Development Canada, including Aerospace and other sectors represented by ACADA, there is no regional assessment of the impact the sectors aggregately represent, nor is the information broken down to the provincial level.

Purpose of the Project

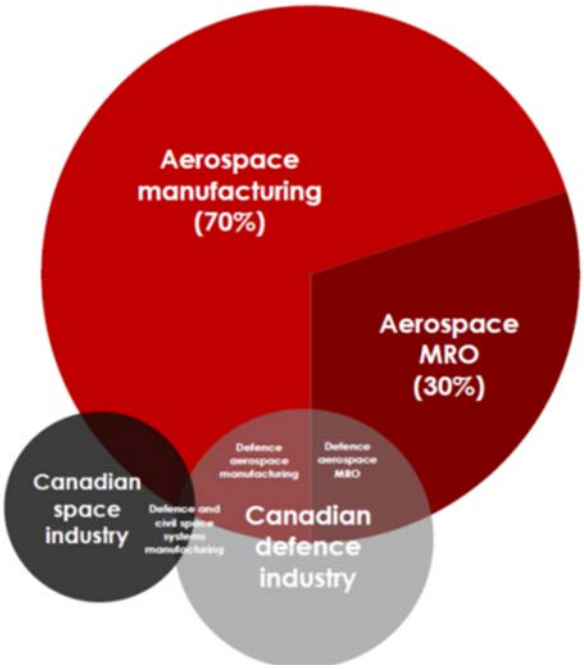
The purpose of the project is to understand the economic impact provided by the Aerospace and Defense Industry in Atlantic Canada.

This information will enable ACADA to clearly articulate, to stakeholder groups, the economic impact the industry has in the region. In addition, the resulting findings will be available to assist in developing appropriate industry policy to enable the sectors strategic development.

Structure of the Industry

The Aerospace and Defense (A&D) industry is comprised of companies involved in the production of spacecrafts, commercial / military / private aircraft and manufacturers of military equipment. The companies involved in the A&D industry may service only one of the two components or both segments. There is considerable overlap between the two and with the associated Space industry as shown in Figure 1.

Figure 1: The Canadian Aerospace Industry Ecosystem[1]



The Aerospace Industry is further segmented by differentiating between manufacturing and maintenance, repair, and overhaul (MRO).

There is no one industry category that is classified as aerospace or defense within the NAICS[2] codes. As such, the companies that make up the A&D industry are classified individually depending on the specific products or services provided. For example, a few of the subsectors that form part of the Aerospace industry are: 3364 Aerospace product & parts manufacturing, 3336 Engine, turbine and power transmission equipment manufacturing, 3342 Communications equipment manufacturing, 541510 -

[1] State of Canada's Aerospace Industry 2017 Report; Innovation, Science, and Economic Development Canada
[2] North American Industry Classification Codes

Computer Systems Design and Related Services, 334410 - Semiconductor and Other Electronic Component Manufacturing, and 541990 - All Other Professional, Scientific and Technical Services. The same type of broad range categories makes up the Defense industry component including 3366 Shipbuilding & Repairing, 3369 Armoured and Specialized Military Vehicles, 333310 - Commercial and Service Industry Machinery Manufacturing and 332999 - All Other Miscellaneous Fabricated Metal Product Manufacturing. A more complete breakdown of the business categories used by the Canadian Federal Government to identify participants in the A&D industry is provided in Appendix A.

Aerospace and Defense Industry Size and Impact

One challenge in quantifying the size of the A&D industry is that not all companies comprising an identified subsector participates in the Aerospace or Defense industry or may only be involved in one of them. Innovation, Science and Economic Development Canada is the Canadian government department that aggregates information about the A&D industry and it relies on the Statistics Canada Canadian Defence, Aerospace and Marine Industries Survey, which is conducted irregularly, to develop its profile of each of the industry segments.

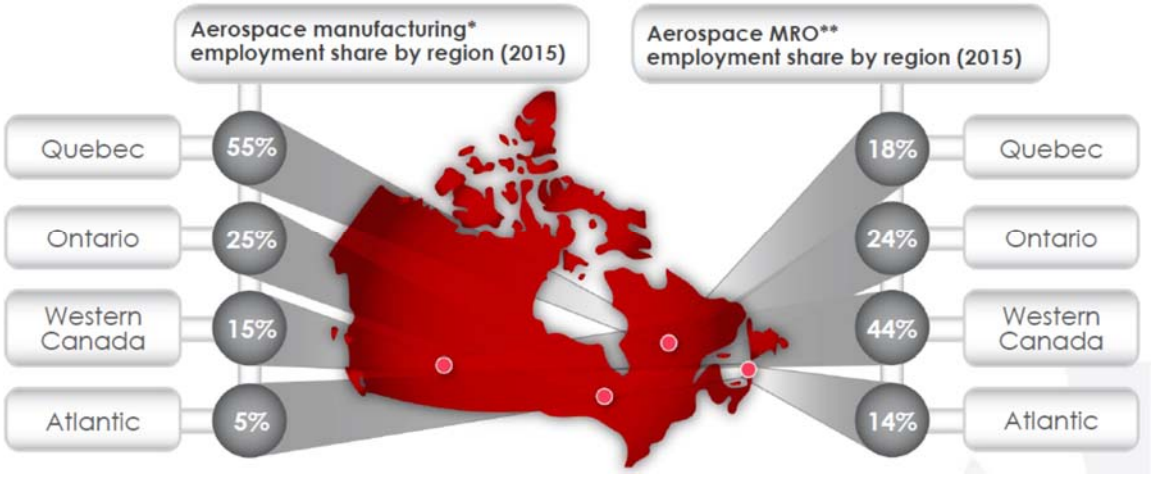
The most recent survey, conducted in 2016, indicated that the Aerospace industry generated revenue of $27.205 billion, employed 87,172 people and contributed $12.892 billion to the national GDP[3][4]. Likewise, the Defense industry had revenues of $10,088 billion and was responsible for 26,968 jobs[5].

Innovation, Science and Economic Development Canada does not break the national survey data down to the provincial level and only provides estimates with regards to the percentage of employees represented in each region. The Aerospace industry breakdown by employment is provided in Figure 2.

To determine the economic impact generated at the Atlantic Canada and individual provincial level additional analysis was required.

[3] State of Canada's Aerospace Industry 2017 Report, Op. cit.
[4] Gross Domestic Product – an indicator of the total value-added contribution to the economy
[5] Canada Canadian Defence, Aerospace and Marine Industries Survey 2016, Statistics Canada

Figure 2: Employment Distribution Aerospace Industry[6]



Provincial Level Economic Impact Determination

The regional and provincial level economic impact assessments were derived by prorating the number of employees engaged in the A&D industry in each province against the estimated total share of employment provided by the Canadian Defence, Aerospace and Marine Industries Survey. The employment data collection and analysis consisted of four successive stages:

- identification of companies participating in the Aerospace & Defense industry
- determining employment figures for each of the identified companies
- assessing the proportion of employees in the identified companies that are directly engaged in the Aerospace & Defense industry
- calculate the pro rata share of GDP and employee levels for each of the Atlantic Provinces

Company Identification and Employment in A&D Industry

The main sources of information to identify industry participants were the ACADA membership directory, Industry Canada's Canadian Companies Capabilities and online search engines. The number of employees at each company was determined from a recent ACADA survey of its membership, company websites, press articles, annual reports and online business directories. Once the number of employees for a given A&D participant company was identified, an assessment was made as to how many of their total workforce provided goods & services to the A&D industry. For example, companies designated as part of

[6] State of Canada's Aerospace Industry 2017 Report, Op. cit.

the NAICS industry code 3364 - Aerospace product and parts manufacturing all employees were considered as part of the Aerospace & Defense industry. For NAICS industry code 33271 - Machine shops, where the companies provide goods & services to multiple industry segments such as marine, forestry, general manufacturing, oil & gas, etc. only a portion of the employees would be counted as part of the Aerospace & Defense industry depending on a determination of the relative size that the Aerospace & Defense industry represents of their total revenue.

Using the employment share for the Atlantic Region for each of the segments of the Aerospace Industry, as indicated in the State of Canada's Aerospace Industry 2017 report, yields the total number of employees of 7,189[7]. The market research process identified aerospace related employment of 6,654 or 92.6% of the industries report. The corresponding Defense Industry employment assessment identified 2,480 employees versus 3,668 or 67.6%. There is significant overlay between the two segments which means there is double counting of some employees in the national data. After adjusting for the overlap, the total employment for both segments combined from the national survey was 9,676 against an identified 9,134 or 94.4%. Figure 3 shows the employment findings by province and by membership status in the ACADA.

Figure 3: Atlantic Canada Aerospace & Defense Industry Summary Employment Findings

	Aerospace				Defense			
	ACADA Members	Other Participants	Total	% Total	ACADA Members	Other Participants	Total	% Total
Prince Edward Island	614	143	757	11.4%	8	-	8	0.3%
Newfoundland	585	370	955	14.4%	318	28	346	14.0%
New Brunswick	51	218	269	4.0%	233	35	268	10.8%
Nova Scotia	4,324	349	4,673	70.2%	615	1,243	1,858	74.9%
Total	**5,574**	**1,080**	**6,654**	100.0%	**1,174**	**1,306**	**2,480**	100.0%

Economic Impact Assessment

The direct economic impact for each province was determined by its relative share of the total identified employees represented by each province. The final total employee count per province was determined by the same assessment. Additionally, provincial economic impact and employee counts were compared to previous provincial assessments undertaken by the individual provincial Aerospace & Defense Industry Associations prior to the forming of ACADA and found to be close.

[7] The State of Canada's Aerospace Industry 2017 Report identified the same employment distribution in 2016 as reported in 2015 shown in Figure 2.

Indirect and Induced[8] effects were then calculated with the general multiplier used in the national report to determine the total economic impact of the Aerospace & Defense Industry for each of the Atlantic Canadian provinces.

The relative importance of the Aerospace & Defense Industry was also assessed by comparing the industry's identified economic impact with those of the largest industry segments at the three-digit NAICS code which represents an industry subsector such as 336 - Transportation equipment manufacturing.

Atlantic Canada Aerospace and Defense Industry

The Atlantic Canada Aerospace and Defense industry is made up of more than 200 companies, most of which are small or medium sized businesses. A breakdown by company size by province for the most relevant industry subsector NAICS codes in provided in Appendix B.

The combined industries contribute almost $1.3 billion in direct contribution to the region's GDP as shown in Figure 4.

Figure 4: Canada and Atlantic Canada A&D Industry GDP (2016)[9]

Impact on Canadian GDP ($ millions)								
	Canada				Atlantic Canada			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Mfg	8,295	4,816	3,873	16,983	414.8	240.8	193.63	849.2
Aerospace MRO	3,594	3,015	1,960	8,569	503.1	422.0	274.43	1,199.6
Aerospace Net	**11,889**	**7,830**	**5,833**	**25,552**	**917.9**	**662.8**	**468.1**	**2,048.8**
A&D	**1,003**	**661**	**517**	**2,181**	**77.4**	**55.9**	**39.9**	**173.3**
Defense	**2,112**	**1,392**	**1,089**	**4,593**	**287.3**	**189.27**	**148.08**	**624.6**
Total	***15,004***	***9,883***	***7,439***	***32,326***	***1,282.6***	***908.0***	***656.1***	***2,846.7***

When factoring in the multiplier effects to determine the indirect and induced the overall economic impact effects of the combined industries GDP contribution of $2.85 billion. The evolution over time is

[8] Direct impacts are the results of expenditures by industry participants, indirect impact are the expenditures of suppliers to the industry that would not have occurred if not for the industry, induced impact is the economic activity resulting from industry employee spending their wages on purchases at the household level.

[9] The defense industry indirect and induced effects are based on the State of Canada's Defense Industry Report 2014, Innovation, Science, and Economic Development Canada, the actual numbers are derived from the 2016 Canadian Defence, Aerospace and Marine Industries Survey.

shown in Figure 5. Notice that the combined industry has declined over the two-year period between 2014 and 2016, however the 2016 estimates are 27.7% higher than in 2011.

In terms of employment impact, the A&D industries combined accounted for direct employment of approximately 9,700 people and over 22,700 in total an shown in Figure 6. The GDP / employment breakdown for each industry before the A&D overlap assessment is provided in Appendix C.

Figure 5: Canada and Atlantic Canada GDP Impacts (Selected Years)[10][11]

GDP Impact ($ millions)				
Canada (Direct Impact)		2011	2014	2016
	Aerospace Net	10,821	12,440	11,889
	A&D Overlap	1,102	1,227	1,003
	Defense Net	1,653	1,840	2,112
	National Total	13,576	15,507	15,004
Atlantic Canada				
	Direct Impact	1,070	1,516	1,283
	Indirect Impact	743	1,142	908
	Induced Impact	417	671	656
	Total Economic Impact	**2,230**	**3,329**	**2,847**

Figure 6: Canada and Atlantic Canada A&D Industry Employment Impact (2016)

Impact on Canadian Employment (Jobs)								
	Canada				Atlantic Canada			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Mfg	50,173	38,315	30,012	118,500	2,509	1,916	1,501	5,925
Aerospace MRO	28,315	26,553	15,394	70,263	3,964	3,717	2,155	9,837
Aerospace Net	**78,488**	**64,868**	**45,407**	**188,763**	**6,473**	**5,633**	**3,656**	**15,762**
A&D	**8,684**	**5,721**	**4,476**	**18,881**	**716**	**472**	**369**	**1,557**
Defense	**18,284**	**12,047**	**9,425**	**39,757**	**2,487**	**1,638**	**1,282**	**5,407**
Total	***105,456***	***82,636***	***59,308***	***247,401***	***9,676***	***7,743***	***5,307***	***22,726***

In 2016, the Canadian tax to GDP ratio was 31.7%. The individual components breakdowns are shown in Figure 7[12].

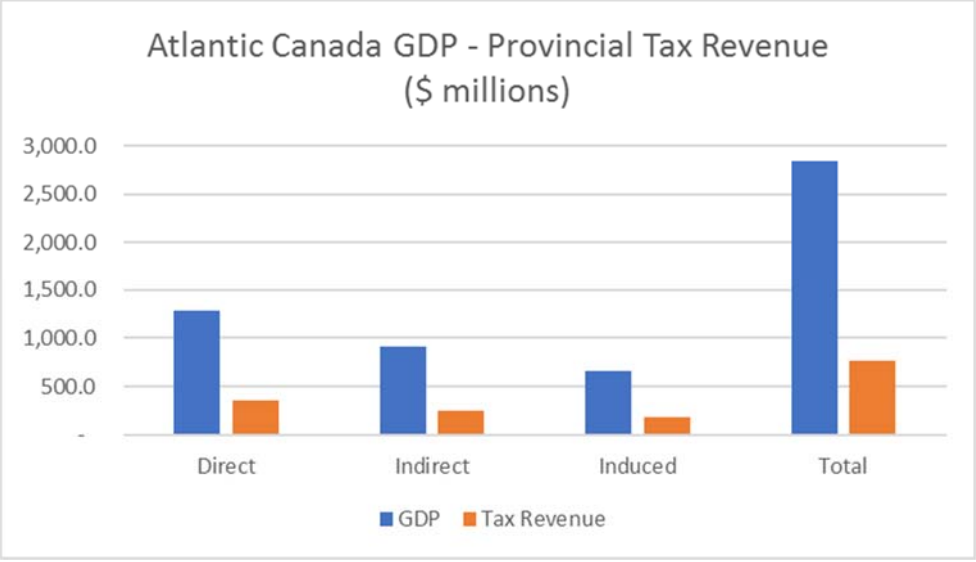
[10] The years shown are the only years in which Defense industry data was published
[11] Compiled from State of Canada's Defense Industry and State of Canada's Aerospace Industry reports
[12] OECD Revenue Statistics 2017 – Revenue Statistics 2017 Canada

Figure 7: Tax Structure – Canada (2016)

Total Tax Revenue - Aerospace & Defense Industry (2016) ($ millions)			
Tax Category	% of Total Tax Collected	Canada	Atlantic Canada
Taxes on personal income, profits and gains	37%	3,791.5	333.9
Taxes on corporate income, profits and gains	10%	1,024.7	90.2
Social security contributions	15%	1,537.1	135.4
Payroll taxes	2%	204.9	18.0
Taxes on property	12%	1,229.7	108.3
Value Added taxes / goods and services tax	13%	1,332.1	117.3
Taxes on goods and services (excl. VAT/GST)	10%	1,024.7	90.2
Unaccounted for	1%	102.5	9.0
Total	**100%**	**10,247.3**	**902.4**

Applying these ratios to the country and the Atlantic Canada Region yield total taxes collected from the cumulative economic affects of the A&D industry at $10.25 billion nationally and of which $902.4 million was from the Atlantic Canada region in 2016. Figure 8 shows aggregate summary for Atlantic Canada GDP and taxation revenue impact at the provincial level.

Figure 8: Atlantic Canada GDP Summary and Associated Provincial Tax Revenue



Aerospace & Defense Industry – Provincial Breakdowns

The provincial level economic impacts were derived from employment distribution as summarized in Figure 3. In addition to identifying the direct, indirect and induced economic impact effects on GDP and employment by province, the Aerospace & Defense Cluster group's direct economic impact is shown in comparison to the largest 10 non-governmental/health care/education industry sectors and other selected, by direct economic impact, three-digit NAICS industry subsectors in each province. The provincial tax revenues associated with each level of impact generated was also calculated. These assessments are presented in Figures 9 through Figure 24.

Newfoundland & Labrador

Figure 9: A&D Industry Economic Impacts on GDP and Employment – Newfoundland & Labrador

Impact on Canadian GDP ($ millions)								
	Atlantic Canada				Newfoundland & Labrador			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Net	**917.9**	**662.8**	**468.1**	**2,048.8**	**131.7**	**95.1**	**67.2**	**294.0**
A&D	**77.4**	**55.9**	**39.9**	**173.3**	**11.1**	**8.0**	**5.7**	**24.9**
Defense	**287.3**	**189.3**	**148.1**	**624.6**	**40.1**	**26.4**	**20.7**	**87.1**
Total	**1,282.6**	**908.0**	**656.1**	**2,846.7**	***182.9***	***129.6***	***93.6***	***406.1***

Impact on Canadian Employment (Jobs)								
	Atlantic Canada				Newfoundland & Labrador			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Net	**6,473**	**5,633**	**3,656**	**15,762**	**929**	**808**	**525**	**2,262**
A&D	**716**	**472**	**369**	**1,557**	**103**	**68**	**53**	**223**
Defense	**2,487**	**1,638**	**1,282**	**5,407**	**347**	**229**	**179**	**754**
Total	**9,676**	**7,743**	**5,307**	**22,726**	***1,379***	***1,105***	***757***	***3,240***

Figure 10: A&D Industry Tax Revenue Contribution - Newfoundland & Labrador[13]

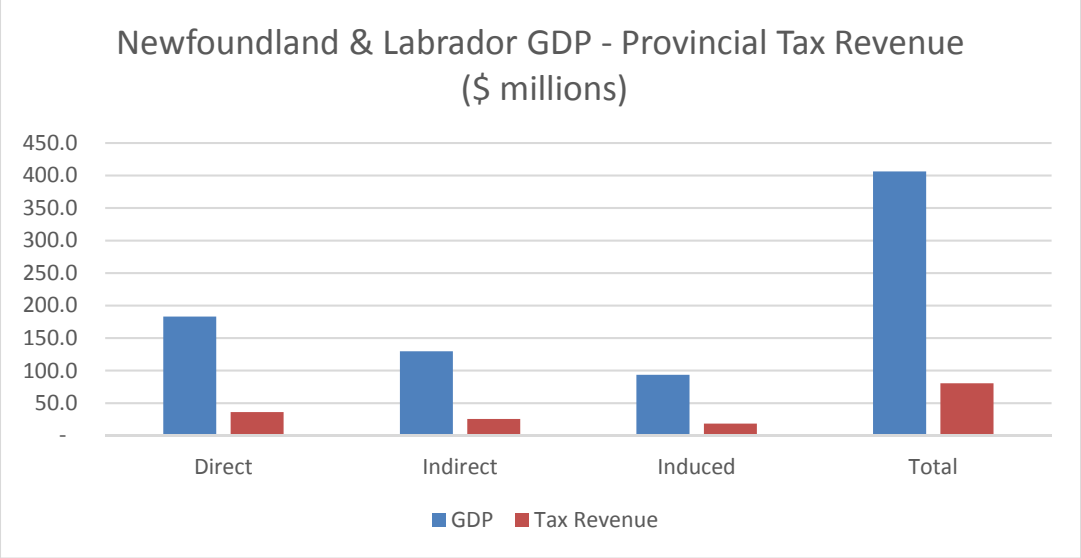
Newfoundland & Labrador		
Tax Revenue - Aerospace & Defense Industry (2016) ($ millions)		
Economic Impact Type	GDP Contribution	Tax Revenue
Direct	182.9	36.2
Indirect	129.6	25.7
Induced	93.6	18.5
Total	**406.1**	**80.4**

[13] NL Provincial Tax – GDP ratio (2016) – 19.8%, RBC Economic Reports - Canadian Federal and Provincial Fiscal Tables, www.rbc.com/economics/economic-reports/pdf/provincial-forecasts/prov_fiscal.pdf

Figure 11: Direct GDP by Selected Industry Groups – Newfoundland & Labrador[14]

Industry and NAICS code	GDP (current) $ millions 2016
Oil and gas extraction [211]	7,900.8
Engineering construction [23C]	2,731.0
Real estate [531]	2,724.4
Mining and quarrying (except oil and gas) [212]	2,009.6
Professional, scientific and technical services [541]	861.1
Telecommunications [517]	527.1
Depository credit intermediation and monetary authorities [522]	544.4
Food manufacturing [311]	386.4
Fishing, hunting and trapping [114]	314.8
Administrative and support services [561]	345.9
Aerospace & Defense Cluster	**182.9**
Accommodation services [721]	159.6
Forestry and logging [113]	52.2

Figure 12: Newfoundland & Labrador GDP Summary and Associated Provincial Tax Revenue



[14] Derived from CANSIM Table 379-0030 - Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), provinces and territories, Statistics Canada,

Prince Edward Island

Figure 13: A&D Industry Economic Impacts on GDP and Employment – Prince Edward Island

Impact on Canadian GDP ($ millions)								
	Atlantic Canada				Prince Edward Island			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Net	**917.9**	**662.8**	**468.1**	**2,223.7**	**104.4**	**75.4**	**53.2**	**233.1**
A&D	**77.4**	**55.9**	**39.9**	**173.3**	**8.8**	**6.4**	**4.5**	**19.7**
Defense	**287.3**	**189.3**	**148.1**	**624.6**	**0.9**	**0.6**	**0.5**	**2.0**
Total	***1,282.6***	***908.0***	***656.1***	***2,846.7***	***114.2***	***82.4***	***58.3***	***254.8***

Impact on Canadian Employment (Jobs)								
	Atlantic Canada				Prince Edward Island			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Net	**6,473**	**5,633**	**3,656**	**15,762**	**736**	**641**	**416**	**1,793**
A&D	**716**	**472**	**369**	**1,557**	**81**	**54**	**42**	**177**
Defense	**2,487**	**1,638**	**1,282**	**5,407**	**8**	**5**	**4**	**17**
Total	**9,676**	**7,743**	**5,307**	**22,726**	***826***	***700***	***462***	***1,988***

Figure 14: A&D Industry Tax Revenue Contribution - Prince Edward Island[15]

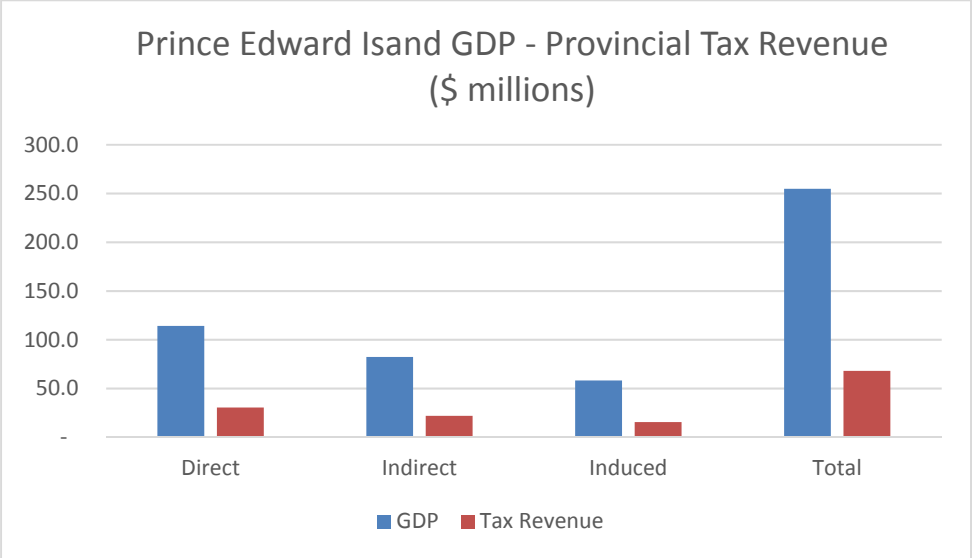
Prince Edward Island		
Tax Revenue - Aerospace & Defense Industry (2016) ($ millions)		
Economic Impact Type	GDP Contribution	Tax Revenue
Direct	114.2	30.5
Indirect	82.4	22.0
Induced	58.3	15.6
Total	**254.8**	**68.0**

[15] PEI Provincial Tax – GDP ratio (2016) – 26.7%, RBC Economic Reports - Canadian Federal and Provincial Fiscal Tables, Op. cit.

Figure 15: Direct GDP by Selected Industry Groups – Prince Edward Island [16]

Industry and NAICS code	GDP (current) $ millions	
	2014	2016
Real estate [531]	683.3	724.9
Food manufacturing [311]	229.3	224.0
Construction of buildings [236]	196.6	197.4
Depository credit intermediation and monetary authorities [522]	158.6	168.0
Professional, scientific and technical services [541]	141.7	162.8
Administrative and support services [561]	139.7	132.1
Telecommunications [517]	131.7	132.5
Crop production [111]	129.5	133.6
Aerospace & Defense Cluster		**114.2**
Food services and drinking places [722]	104.3	107.4
Animal production [112]	84.4	88.0
Fishing, hunting and trapping [114]	82.2	75.1
Accommodation services [721]	56.4	60.7

Figure 16: Prince Edward Island - GDP Summary and Associated Provincial Tax Revenue



[16] Derived from CANSIM Table 379-0030, Op. cit.

New Brunswick

Figure 17: A&D Industry Economic Impacts on GDP and Employment – New Brunswick

Impact on Canadian GDP ($ millions)								
	Atlantic Canada				New Brunswick			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Net	**917.9**	**662.8**	**468.1**	**2,048.8**	**37.1**	**26.8**	**18.9**	**82.8**
A&D	**77.4**	**55.9**	**39.9**	**173.3**	**3.1**	**2.3**	**1.6**	**7.0**
Defense	**287.3**	**189.3**	**148.1**	**624.6**	**31.0**	**20.5**	**16.0**	**67.5**
Total	**1,282.6**	**908.0**	**656.1**	**2,846.7**	***71.3***	***49.5***	***36.5***	***157.3***

Impact on Canadian Employment (Jobs)								
	Atlantic Canada				New Brunswick			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Net	**6,473**	**5,633**	**3,656**	**15,762**	**262**	**228**	**148**	**637**
A&D	**716**	**472**	**369**	**1,557**	**29**	**19**	**15**	**63**
Defense	**2,487**	**1,638**	**1,282**	**5,407**	**269**	**177**	**139**	**584**
Total	**9,676**	**7,743**	**5,307**	**22,726**	***559***	***424***	***301***	***1,284***

Figure 18: A&D Industry Tax Revenue Contribution - New Brunswick[17]

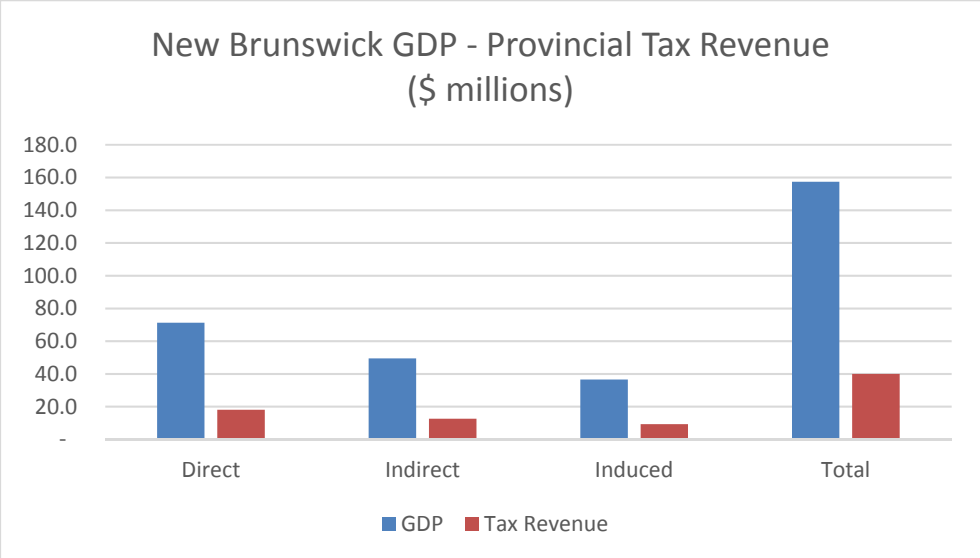
New Brunswick		
Tax Revenue - Aerospace & Defense Industry (2016) ($ millions)		
Economic Impact Type	GDP Contribution	Tax Revenue
Direct	71.3	18.1
Indirect	49.5	12.6
Induced	36.5	9.3
Total	**157.3**	**40.0**

[17] NB Provincial Tax – GDP ratio (2016) – 25.4%, RBC Economic Reports - Canadian Federal and Provincial Fiscal Tables, Op. cit.

Figure 19: Direct GDP by Selected Industry Groups – New Brunswick[18]

Industry and NAICS code	GDP (current) $ millions 2016
Real estate [531]	3,685.6
Administrative and support services [561]	1,161.4
Professional, scientific and technical services [541]	1,022.3
Utilities [221]	979.9
Construction of buildings [236]	963.0
Credit intermediation and related activities [522]	878.1
Truck transportation [484]	836.1
Food manufacturing [311]	833.6
Telecommunications [517]	650.5
Insurance carriers and related activities [524]	603.0
Mining and quarrying (except oil and gas) [212]	211.1
Forestry and logging [113]	286.2
Fishing, hunting and trapping [114]	207.3
Accommodation services [721]	154.9
Aerospace & Defense Custer	**71.3**

Figure 20: New Brunswick - GDP Summary and Associated Provincial Tax Revenue



[18] Derived from CANSIM Table 379-0030, Op. cit.

Nova Scotia

Figure 21: A&D Industry Economic Impacts on GDP and Employment – Nova Scotia

Impact on Canadian GDP ($ millions)								
	Atlantic Canada				Nova Scotia			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Net	**917.9**	**662.8**	**468.1**	**2,048.8**	**644.6**	**465.5**	**328.7**	**1,438.8**
A&D	**77.4**	**55.9**	**39.9**	**173.3**	**54.4**	**39.3**	**28.0**	**121.7**
Defense	**287.3**	**189.3**	**148.1**	**624.6**	**215.2**	**141.8**	**110.9**	**468.0**
Total	**1,282.6**	**908.0**	**656.1**	**2,846.7**	***914.2***	***646.6***	***467.7***	***2,028.5***

Impact on Canadian Employment (Jobs)								
	Atlantic Canada				Nova Scotia			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Net	**6,473**	**5,633**	**3,656**	**15,762**	**4,546**	**3,956**	**2,567**	**11,069**
A&D	**716**	**472**	**369**	**1,557**	**503**	**331**	**259**	**1,094**
Defense	**2,487**	**1,638**	**1,282**	**5,407**	**1,863**	**1,227**	**960**	**4,051**
Total	**9,676**	**7,743**	**5,307**	**22,726**	***6,912***	***5,515***	***3,787***	***16,214***

Figure 22: A&D Industry Tax Revenue Contribution - Nova Scotia[19]

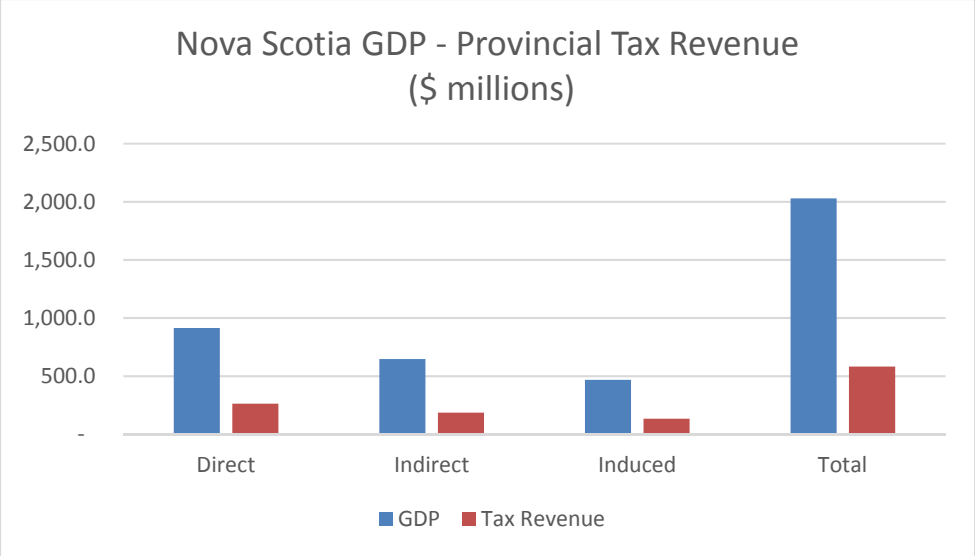
Nova Scotia		
Tax Revenue - Aerospace & Defense Industry (2016) ($ millions)		
Economic Impact Type	GDP Contribution	Tax Revenue
Direct	914.2	262.4
Indirect	646.6	185.6
Induced	467.7	134.2
Total	**2028.5**	**582.2**

[19] NS Provincial Tax – GDP ratio (2016) – 28.7%, RBC Economic Reports - Canadian Federal and Provincial Fiscal Tables, Op. cit.

Figure 23: Direct GDP by Selected Industry Groups – Nova Scotia[20]

Industry and NAICS code	GDP (current) $ millions	
	2014	2016
Real estate [531]	5,428.1	5,625.6
Professional, scientific and technical services [541]	1,509.2	1,636.9
Credit intermediation and related activities [522]	1,163.0	1,218.1
Construction of buildings [236]	1,099.7	1,094.1
Telecommunications [517]	942.5	931.6
Aerospace & Defense Cluster		**914.2**
Engineering construction [23C] (20)	519.5	823.77
Utilities [221]	807.9	776.93
Administrative and support services [561]	699.5	650.28
Food services and drinking places [722]	619.8	642.71
Fishing, hunting and trapping [114]	605.0	527.51
Oil and gas extraction [211]	380.6	293.79
Accommodation services [721]	275.3	278.40
Animal production [112]	166.6	175.48
Mining and quarrying (except oil and gas) [212]	81.6	80.80
Forestry and logging [113]	66.7	65.34
Crop production [111]	66.4	70.98

Figure 24: Nova Scotia - GDP Summary and Associated Provincial Tax Revenue



[20] Derived from CANSIM Table 379-0030, Op. cit.

Summary

The Aerospace and Defense Industry as a unified sector is a significant contributor to the economics of Atlantic Canada and each individual province, in terms of GDP, employment and tax revenue generation. Collectively the industry group accounts for $2.85 billion in GDP with total attributable employment of over 22,700. Tax revenue generated for all levels of government in 2016 was estimated to be $902.4 million with the individual provincial portion being $770.7 million. Figures 25, 26 and 27 summarizes the economic impact of the A&D industry at the provincial level.

Figure 25: Summary A&D Industry Impact on the Regional / Provincial GDP

Impact on Canadian GDP ($ millions)																				
	Atlantic Canada				Newfoundland &				Prince Edward Island				New Brunswick				Nova Scotia			
	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total
Aerospace	**918**	**663**	**468**	**2,049**	**132**	**95**	**67**	**294**	**104**	**75**	**53**	**233**	**37**	**27**	**19**	**83**	**645**	**465**	**329**	**1,439**
A&D	**77**	**56**	**40**	**173**	**11**	**8**	**6**	**25**	**9**	**6**	**5**	**20**	**3**	**2**	**2**	**7**	**54**	**39**	**28**	**122**
Defense	**287**	**189**	**148**	**625**	**40**	**26**	**21**	**87**	**1**	**1**	**0**	**2**	**31**	**20**	**16**	**67**	**215**	**142**	**111**	**468**
Total	**1,283**	**908**	**656**	**2,847**	**183**	**130**	**94**	**406**	**114**	**82**	**58**	**255**	***71***	***50***	***37***	***157***	**914**	**647**	**468**	**2,028**

Figure 26: Summary A&D Industry Impact on the Regional / Provincial Employment

Impact on Canadian Employment (Jobs x 1000)																				
	Atlantic Canada				Newfoundland &				Prince Edward Island				New Brunswick				Nova Scotia			
	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total	Dir	In	Ind	Total
Aerospace	**6.5**	**5.6**	**3.7**	**15.8**	**0.9**	**0.8**	**0.5**	**2.3**	**0.7**	**0.6**	**0.4**	**1.8**	**0.3**	**0.2**	**0.1**	**0.6**	**4.5**	**4.0**	**2.6**	**11.1**
A&D	**0.7**	**0.5**	**0.4**	**1.6**	**0.1**	**0.1**	**0.1**	**0.2**	**0.1**	**0.1**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.1**	**0.5**	**0.3**	**0.3**	**1.1**
Defense	**2.5**	**1.6**	**1.3**	**5.4**	**0.3**	**0.2**	**0.2**	**0.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**0.2**	**0.1**	**0.6**	**1.9**	**1.2**	**1.0**	**4.1**
Total	**9.7**	**7.7**	**5.3**	**22.7**	**1.4**	**1.1**	**0.8**	**3.2**	**0.8**	**0.7**	**0.5**	**2.0**	**0.6**	**0.4**	**0.3**	**1.3**	**6.9**	**5.5**	**3.8**	**16.2**

Figure 27: Summary A&D Industry Impact on the Regional / Provincial Tax Revenue

Provincial Tax Revenue - Aerospace & Defense Industry (2016) ($ millions)					
Economic Impact Type	NL	PEI	NB	NS	Atl Cda
Direct	36.2	30.5	18.1	262.4	347.2
Indirect	25.7	22.0	12.6	185.6	245.8
Induced	18.5	15.6	9.3	134.2	177.6
Total	80.4	68.0	40.0	582.2	770.6

APPENDICES

APPENDIX A: Aerospace and Defense Industry Defined

APPENDIX A: Aerospace and Defense Industry Defined[21]

Aerospace enterprises are those which reported a value of greater than zero from sales of any of the following in 2016:

Civil Aerospace Categories

- Aircraft and Related Propulsion Systems, Structures and Components
- Unmanned Aerial Systems/Vehicles (UAS/V)
- Landing Gear Systems and Components
- Avionics Airborne Electronics and Simulation Equipment Systems and Components
- Maintenance, Repair and Overhaul Services
- Commercial Systems Deployed in Space, Space Launch Vehicles, Land-based Systems for the Operation, Command and Control of Space Launch Vehicles or Systems Deployed in Space; and Related Components
- Government Non-Military Systems Deployed in Space, Space Launch Vehicles, Land-based Systems for the Operation, Command and Control of Space Launch Vehicles or Systems Deployed in Space; and Related Components
- Other Civil Aerospace

Aerospace Defence Categories

- Military Systems Deployed in Space, Space Launch Vehicles, Land-based Systems for the Operation, Command and Control of Space Launch Vehicles or Systems Deployed in Space and Related Components
- Primarily Airborne Electro-Optical, Radar, Sonar and Other Sensor/Information Collection Systems; Fire Control, Warning and Countermeasures Systems and Related Components
- Primarily Airborne Communications and Navigation Systems; and Other Information Systems (Including Processing and Dissemination), Software, Electronics and Components
- Aircraft Fabrication, Structures and Components
- Military Aircraft Maintenance, Repair and Overhaul Services
- Unmanned Aerial Systems/Vehicles (UAS/V) and Components
- Simulation Systems for Aircraft

[21] Canadian Defence, Aerospace and Marine Industries Survey, 2016, Op. cit.

Defence enterprises are those which reported a value of greater than zero from sales of any of the following in 2016:

- Ammunition, Missiles, Rockets and Related Components
- Firearms and Other Weapons
- Military Systems Deployed in Space, Space Launch Vehicles, Land-based Systems for the Operation, Command and Control of Space Launch Vehicles or Systems Deployed in Space and Related Components
- Primarily Airborne Electro-Optical, Radar, Sonar and Other Sensor/Information Collection Systems; Fire Control, Warning and Countermeasures Systems and Related Components
- Primarily Land-Based or Man-Portable Electro-Optical, Radar, Sonar and Other Sensor/Information Collection Systems; Fire Control, Warning and Countermeasures Systems and Related Components
- Primarily Airborne Communications and Navigation Systems; and Other Information Systems (Including Processing and Dissemination), Software, Electronics and Components
- Primarily Land-Based, Man-Portable or Non-Platform Specific Communications and Navigation Systems; and Other Information Systems (Including Processing and Dissemination), Software, Electronics and Components
- Naval Ship-Borne Systems Mission Systems and Components
- Naval Ships' Structural Elements, Platform Systems, Parts and Components (Excludes: Ship-Borne Naval Mission Systems)
- New Naval Vessels Constructed by Shipyards, and Naval Conversions
- Naval Ship Maintenance, Repair and Overhaul
- Combat Vehicles and Components
- Combat Vehicles Maintenance, Repair and Overhaul
- Aircraft Fabrication, Structures and Components
- Military Aircraft Maintenance, Repair and Overhaul Services
- Unmanned Aerial Systems/Vehicles (UAS/V) and Components
- Simulation Systems for Aircraft
- Simulation Systems for Naval Vessels
- Simulation Systems for Land Vehicles or Other Applications
- Military Training Services — Live, Virtual and Constructive
- Military Personal Protective Equipment, Load Carriage Systems and Operational Clothing
- Other Defence

APPENDIX B: Company Size Breakdown

APPENDIX B: Company Size Breakdown (2016)[22]

Aerospace Industry

Aerospace Product and Parts Manufacturing - 3364						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	10	3	3	3	3	1
New Brunswick	4	1	2	2	0	0
Newfoundland and Labrador	1	1	0	1	0	0
Prince Edward Island	0	0	1	2	1	0

Engine, Turbine and Power Transmission Equipment Manufacturing - 3336						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	3	0	2	1	0	0
New Brunswick	1	0	0	1	0	0
Newfoundland and Labrador	0	0	0	0	0	0
Prince Edward Island	2	2	1	0	0	0

Motor Vehicle Electrical and Electronic Equipment Manufacturing - 33632						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	0	0	0	0	0	0
New Brunswick	1	0	1	0	0	0
Newfoundland and Labrador	2	0	2	0	0	0
Prince Edward Island	1	1	0	0	0	0

Communications Equipment Manufacturing - 3342						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	6	1	1	3	2	0
New Brunswick	2	1	2	0	0	0
Newfoundland and Labrador	0	0	0	0	0	0
Prince Edward Island	0	0	0	0	0	0

[22] Compiled from Canadian Industry Statistics; Innovation, Science and Economic Development Canada online database, https://www.ic.gc.ca/app/scr/app/cis/search-recherche, accessed February 2018

Other Chemical Product Manufacturing - 3259						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	5	2	0	5	0	0
New Brunswick	2	2	0	1	0	0
Newfoundland and Labrador	1	3	0	2	0	0
Prince Edward Island	2	2	0	0	0	0

Support Activities for Air Transportation - 4881						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	14	26	5	8	1	0
New Brunswick	18	17	7	11	0	0
Newfoundland and Labrador	22	13	7	13	2	0
Prince Edward Island	2	2	1	4	1	0

Defense / Security Industry

Ship and Boat Building - 3366						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	55	36	18	33	3	1
New Brunswick	4	8	2	2	0	0
Newfoundland and Labrador	15	7	2	11	2	0
Prince Edward Island	4	4	3	4	0	0

Aerospace Product and Parts Manufacturing - 3364						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	10	3	3	3	3	1
New Brunswick	4	1	2	2	0	0
Newfoundland and Labrador	1	1	0	1	0	0
Prince Edward Island	0	0	1	2	1	0

Automobile and Light-Duty Motor Vehicle Manufacturing - 33611						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	mediu m (100-499)	large (500+)
Nova Scotia	2	0	0	2	0	0
New Brunswick	0	1	0	0	0	0
Newfoundland and Labrador	0	0	0	0	0	0
Prince Edward Island	1	1	0	0	0	0

Other Transportation Equipment Manufacturing - 33699						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	mediu m (100-499)	large (500+)
Nova Scotia	0	2	0	0	0	0
New Brunswick	3	3	2	1	0	0
Newfoundland and Labrador	1	0	1	0	0	0
Prince Edward Island	0	0	0	1	0	0

Defense Services - 9111

	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	mediu m (100-499)	large (500+)
Nova Scotia	2	0	0	1	0	1
New Brunswick	2	0	0	1	0	1
Newfoundland and Labrador	2	0	0	1	0	1
Prince Edward Island	0	0	1	0	1	0

Explosives Manufacturing - 32592						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	mediu m (100-499)	large (500+)
Nova Scotia	1	0	0	1	0	0
New Brunswick	1	0	0	1	0	0
Newfoundland and Labrador	2	0	0	2	0	0
Prince Edward Island	0	0	0	0	0	0

Semiconductor and Other Electronic Component Manufacturing - 33441						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	3	3	0	2	1	0
New Brunswick	1	0	0	0	1	0
Newfoundland and Labrador	1	0	0	1	0	0
Prince Edward Island	0	0	0	1	0	0

Navigational, Measuring, Medical and Control Instruments Manufacturing - 3345						
	Employers	non-employer or indeterminate	micro (1-4)	small (5-99)	medium (100-499)	large (500+)
Nova Scotia	11	5	2	8	1	0
New Brunswick	7	2	1	5	1	0
Newfoundland and Labrador	9	0	2	7	0	0
Prince Edward Island	1	1	0	1	0	0

APPENDIX C: Aerospace and Defense Industry Aggregated Data

APPENDIX C: Aerospace and Defense Industry Aggregated Data

Impact on Canadian GDP ($ millions)								
	Canada				Atlantic Canada			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Mfg	8,995	5,222	4,216	18,433	449.8	261.1	210.80	921.7
Aerospace MRO	3,897	3,269	2,134	9,300	545.6	457.7	298.76	1,302.0
Aerospace Total	**12,892**	**8,491**	**6,350**	**27,733**	**995.3**	**718.8**	**509.6**	**2,223.7**
Defense	**3,115**	**2,053**	**1,606**	**6,774**	**423.7**	**279.16**	**218.41**	**921.3**
Total	***16,007***	***10,544***	***7,956***	***34,507***	***1,419.0***	***997.9***	***728.0***	***3,144.9***

Impact on Canadian Employment (Jobs)								
	Canada				Atlantic Canada			
	Direct	Indirect	Induced	Total	Direct	Indirect	Induced	Total
Aerospace Mfg	55,724	41,694	32,971	130,389	2,786	2,085	1,649	6,519
Aerospace MRO	31,448	28,895	16,912	77,255	4,403	4,045	2,368	10,816
Aerospace Total	**87,172**	**70,589**	**49,883**	**207,644**	**7,189**	**6,130**	**4,016**	**17,335**
Defense	**26,968**	**17,769**	**13,902**	**58,638**	**3,668**	**2,417**	**1,891**	**7,975**
Total	***114,140***	***88,358***	***63,785***	***266,282***	***10,857***	***8,547***	***5,907***	***25,310***