



Maine Defense Industry Report 2018

*An Industry Assessment Tool
for Maine Businesses*



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Executive Summary

Purpose

This report will assist Maine defense companies and businesses in assessing both the domestic defense market for DoD contracts and the international defense market for exporting defense-related goods and materials.

Domestic Defense Markets

A reinvigoration of the US defense budget is expected to grow DoD contract spending in Maine to \$2.8 billion in 2021, an increase of 53 percent from 2016. In Maine, the DoD is expected to increase spending in the ships, small craft, pontoon, and docks product service category by \$958 million in 2021, an increase of 86 percent from 2016. Growth in the modification of equipment product service category is forecasted to grow by \$190 million or 133 percent in Maine over the next five years to 2021.

Foreign Defense Markets

International demand for Maine defense exports is expansive and increasing. Over a ten year period, from 2008 to 2017, Maine defense exports grew by about \$13 million. Increased defense spending from regional powers such as India, China, and Japan are likely “to drive global defense sector revenue growth in 2018 and beyond.”¹

In 2017, Maine exported \$65 million of defense-related goods and materials to countries around the world. The top foreign markets in 2017 for Maine defense exports were Australia, South Korea, and Oman. Estimates² indicate that global defense spending will grow at a compounded annual growth rate of about 3 percent over the 2017-2022 period.

Opportunities for Maine Businesses

- The reinvigoration of the US defense budget is expected to grow DoD contract spending in Maine to \$2.8 billion in 2021, an increase of 53 percent from 2016.
- DoD spending on the ships, small craft, pontoon, and docks and the modification of equipment product service categories in Maine is forecasted to grow significantly over the next few years to 2021.
- The military weapons category (930190) is 54 times more concentrated in Maine compared to the US and exports in this category grew by \$8 million, or 172 percent, between 2012 and 2017. Therefore, investment in this category could have high returns.

Domestic Defense Industry

On February 12 of 2018, the White House unveiled the Fiscal Year 2019 Budget which describes an increase in DoD spending by 13 percent from the 2017 level to keep the US as the “predominant military

¹ <https://www2.deloitte.com/us/en/pages/manufacturing/articles/a-and-d-outlook.html>

² Ibid.

power in the world,” and to “maintains world order that reflects America’s values.”³ There will be a \$597 billion base budget and an additional \$89 billion for Overseas Contingency Operations.

Specifically, the document stipulates that “the United States faces an increasingly competitive and dangerous international security environment, characterized by the reemergence of great power competition with China and Russia, dangerous new technologies, empowered non-state actors, and the proliferation of weapons of mass destruction.”⁴

This reinvigoration of the US defense budget is expected to grow DoD contract spending in Maine to \$2.8 billion in 2021, an increase of 53 percent from 2016.

- Growth in the modification of equipment product service category is forecasted to grow by \$190 million or 133 percent over the next five years to 2021.
- In 2016, General Dynamics represented 68.5 percent of all DoD contracts and US Family Health Plan at Martin’s point represented 17.9 percent.

Top Maine Defense Contractors (2016)

Rank	Contractor Name	Total Awards (Millions)	DoD-Related Awards (Millions)
1	General Dynamics Corp	\$1,268.0	\$1,264.4
2	US Family Health Plan at Martin's Point	\$329.5	\$329.5
3	City of Bangor	\$25.4	\$25.4
4	MC	\$17.6	\$17.6
5	Ameresco, Inc.	\$13.1	\$13.1
6	Engineered Construction Services, Inc.	\$7.4	\$7.4
7	Orbis	\$7.3	\$7.3
8	CCI Energy and Construction Services	\$7.9	\$7.0
9	CCI Construction Services, LLC	\$6.6	\$6.6
10	Shape Construction Inc	\$6.0	\$6.0

Source: <https://www.rade-commons.org/>

- In 2016, General Dynamics represented 68.5 percent of all DoD contracts and US Family Health Plan at Martin’s point represented 17.9 percent.
- Together, these two companies represent 86.4 percent of all DoD contract spending in Maine in 2016.

³ <https://www.whitehouse.gov/wp-content/uploads/2018/02/budget-fy2019.pdf>

⁴ Ibid.

Defense Spending in Maine Forecast

Product Service Category	DoD FY 2016	DoD FY 2021	5-Year Forecast	
			Millions	Percent
Total	\$1,837.7	\$2,814.1	\$976.5	53.1%
Ships, Small Craft, Pontoon, Docks	\$1,107.5	\$2,065.7	\$958.2	86.5%
General Health Care Services	\$329.3	\$224.7	(\$104.6)	-31.8%
Modification of Equipment	\$142.4	\$332.7	\$190.3	133.7%
Maint., Alter, Repair Nonbuildings	\$77.8	\$35.9	(\$42.0)	-53.9%
Construction of Buildings	\$29.5	\$15.0	(\$14.5)	-49.3%
Fuels, Lubricants, Oils, Waxes	\$25.4	\$18.8	(\$6.7)	-26.2%
Utilities	\$11.3	\$4.6	(\$6.7)	-59.2%
Defense Systems Randd	\$10.8	\$14.7	\$3.9	35.9%
Arch-Eng Svcs – General	\$10.6	\$6.4	(\$4.2)	-39.5%
Weapons	\$9.7	\$18.4	\$8.7	90.0%
Housekeeping Services	\$9.4	\$5.0	(\$4.5)	-47.3%
Maint., Repair, Rebuild of Equipment	\$8.8	\$6.1	(\$2.7)	-30.4%
Maint., Alter, Repair Buildings	\$5.8	\$3.0	(\$2.8)	-47.8%
ADP Eqpt., Software, Supplies and Eqpt.	\$4.0	\$7.4	\$3.4	84.5%
Administrative Support Services	\$4.0	\$1.3	(\$2.7)	-66.4%

Source: <https://www.rade-commons.org/>

- In 2016, DoD contract spending was \$1.8 billion and over the next five years that number is forecasted to grow to \$2.8 billion in 2021.
- Growth in the ships, small craft, pontoon, and docks product service category is forecasted to grow by \$976 million over the next five years to 2021.
- Growth in the modification of equipment product service category is forecasted to grow by \$190 million or 133 percent over the next five years to 2021.

MEP Survey Data

In 2017, the Maine Manufacturing Extension Partnership (MEP) conducted a survey of Maine defense companies and military installations to assess Maine DoD dependency, analyze the defense supply chain, assess risks and needs of companies in the Maine defense industry, and measure the percentage of the workforce connected to DoD work. MEP had 32 survey respondents, below is a summary of the survey data.

Summary Data

Summary and Estimations

Out of State Operations	40%
Use Subcontractors	50%
More than 5 million in revenue	69%
Total Estimated Employment	14,742
Total Estimated DoD dependent employment	12,342

Source: Maine MEP Report, 2017

Risk Assessment⁵

In addition to survey questions, each company was asked to identify some of their biggest risks and challenges regarding their defense dependency. A summary of their responses are as follows:

1. Uncertainty from a federal budgeting perspective
2. Workforce and training challenges
3. Visibility and ability to market their products to the government (specifically DoD)
4. Increasing price competition
5. Finding reliable regional suppliers

The most common risk identified was the uncertainty in the federal budget and how that would affect defense contracting from a continuing services perspective and new awards going out to bid.

Foreign Defense Industry

International demand for defense and military products is increasing in the Middle East and Eastern Europe. This is resulting in higher defense spending globally, especially in United Arab Emirates, Saudi Arabia, India, South Korea, Japan, India, China, and Russia.⁶

In Syria, Russian forces used more than 200 new types of advanced weapon systems.⁷ This could lead to higher defense spending by Western countries and NATO members to counter potential threats and remain competitive.⁸

Increased political pressure from the US administration on NATO member countries to increase military expenditure to 2.0 percent of GDP is likely to drive defense spending growth in Europe.

- In 2017, Maine exported \$65 million of defense-related goods and materials to countries around the world.

⁵ Maine MEP Report, 2017

⁶ <https://www2.deloitte.com/us/en/pages/manufacturing/articles/a-and-d-outlook.html>

⁷ <http://nationalinterest.org/blog/the-buzz/russias-military-used-215-new-weapons-systems-syria-24283>

⁸ <https://www2.deloitte.com/us/en/pages/manufacturing/articles/a-and-d-outlook.html>

- Canada, South Korea, and Norway are potential international markets for Maine defense exporters based on Maine export data analysis.
- In 2017, the category in which exports declined the most was gas turbine parts (841199); from 2016 to 2017 exports in this category declined by 71% or about \$16 million.
- In 2017, Maine defense industry categories with the highest amount of exports were parts and accessories of military weapons (930591), rocket launchers and flamethrowers (930120), and military weapons (930190). Combined, these three categories make up about 72% of Maine's defense exports.

International Market Prospects for Maine Exporters⁹

Asia Pacific Region: Japan, the Republic of Korea and Taiwan remain long-standing top importers of U.S. defense articles. Southeast Asian defense forces have also increased steadily over the past decade to counter China, as it has become the second largest global military spender.

Middle East: Oman imported \$10 million in defense products from Maine in 2017 and \$1.9 billion from the US. However, fluctuations in oil prices will likely impact future defense spending in Oman and in the region.

Western Europe: Following ongoing aggression in Ukraine, the terrorist attacks in Paris in November 2015 and Brussels in March 2016, activity in the Mediterranean and Syria, and lessons learned from Libya, NATO allies are providing additional resources to protect national and European security.

Top Global Military Spenders (2017)

2017 Rank	2016 Rank	Country	2016 Spending (\$ billions)	Change (%) 2008-2017	2016 World Share (%)
1	1	U.S.A	610	-14	35
2	2	China	[228]	110	[13]
3	4	Saudi Arabia	[69.4]	34	[4.0]
4	3	Russia	66.3	36	3.8
5	6	India	63.9	45	3.7
6	5	France	57.8	5.1	3.3
7	7	United Kingdom	47.2	-15	2.7
8	8	Japan	45.4	4.4	2.6
9	9	Germany	44.3	8.8	2.5
10	10	South Korea	39.2	29	2.3
11	13	Brazil	29.3	21	1.7
12	11	Italy	29.2	-17	1.7

⁹ https://www.trade.gov/topmarkets/pdf/Defense_Top_Markets_Report.pdf

13	12	Australia	27.5	33	1.6
14	14	Canada	20.6	13	1.2
15	15	Turkey	18.2	46	1.0
Total top 15			1396	..	80
World Total			1739	9.8	100

Source: <https://www.sipri.org/publications/2018/sipri-fact-sheets/trends-world-military-expenditure-2017>

Note: [] = SIPRI estimate; figures are in U.S. \$, at current prices and exchange rates

- This snapshot includes total military spending by each country on total defense purchases, regardless of the country of origin. According to the 2016 ITA Defense Market Report¹⁰, “Military expenditure” is often used as a key indicator of economic resources dedicated to military objectives because it includes actual dollars spent to support military activities.
- The top 15 countries on the World Military Expenditures chart remained essentially the same in 2017 as compared to 2016’s rankings. Net global defense expenditures increased by \$53 billion from 2016 to 2017.

Top Foreign Markets for Maine Defense Exporters¹¹

According to the International Trade Administration Defense Markets report, “the best opportunities for U.S. exporters exist with America’s closest friends and allies, as well as countries with whom the United States has partnered in regional security operations. These two groups compose most of the leaders in global military spending, giving them both the financial and strategic wherewithal to purchase U.S. products.”¹² It is essential that Maine and the United States foster a close relationship with ally countries to ensure a successful, working defense trade partnership.

Canada

The Canadian defense industry generates US\$7.28 billion (C\$10 billion) in annual sales, with 60 percent attributed to exports. In 2016, exports of U.S. defense products to Canada reached US\$6.8 billion, whereas Canadian defense exports into the United States reached US\$12.7 billion.

The unmanned aerial vehicle (UAV) segment is one of Canada’s most defense-concentrated areas. The new Defense Policy will fully fund 15 Canadian Surface Combatants; 88 advanced fighter jets; land capabilities including ground based air defense, combat support vehicles, and training simulators; and airborne intelligence, surveillance, and reconnaissance platforms.

Opportunities

- Future Aircrew Training
- Joint Unmanned Surveillance Targeting and Acquisition System
- Strategic Tanker Transport Capability

¹⁰ trade.gov/topmarkets/pdf/Defense_Top_Markets_Report.pdf

¹¹ All information sourced from: <https://2016.export.gov/industry/aerospace/bestprospects/index.asp>

¹² Ibid.

- Underwater Warfare Suite Upgrade
- Advanced Sub-Unit Water Purification System

For more opportunities in Canada, see:

<http://apps.export.gov/article?id=Canada-Defense-Products-and-Services>

South Korea

For 2017, a total of 36.67 billion USD has been announced for Korea's defense budget, which includes 11.09 billion USD for its force improvement plan (FIP). The total budget and FIP budget have increased by 4.0 percent and 4.8 percent, respectively, compared to the previous year. For 2017, Korea's defense budget is around 1.9 percent of its GDP and constitutes about 10.1 percent of the total national budget. Korea is estimated to have the 10th largest defense budget in the world.

Korea's defense procurement agency, the Defense Acquisition Program Administration (DAPA), is the sole government agency conducting and executing the procurement of defense equipment. Recently, the ROK government has shown a preference for DCS over Foreign Military Sales (FMS) on some programs, in an effort to reduce purchase price and work with a faster and more simple process.

Opportunities:

- Aircraft Upgrade (fighters, multi-role airlift aircraft)
- Asymmetric warfare/littoral/coastal surveillance and patrol
- Support for Combat Equipment (fighter aircraft, etc.)
- Anti-terrorism products
- High-tech sensors, radars, and missile systems

For more opportunities in South Korea, see:

<http://apps.export.gov/article?id=Korea-Defense-Industry-Equipment>

Norway

Norway is a member of the International Civil Aviation Organization (ICAO), hence the country adopts and adjusts to regulations and technical standards provided by the ICAO. Norway is not an EU member, but the country commits to most EU regulations through the European Economic Area (EEA), which also connects and commits Norway to EASA standards (European Aviation Safety Agency).

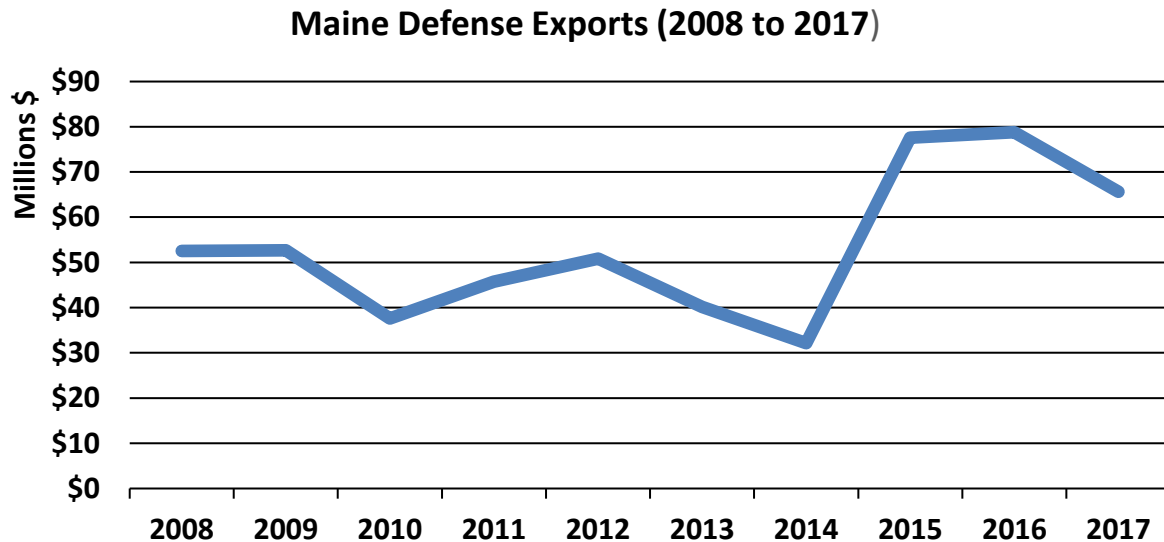
Opportunities:

- There are procurement opportunities expected for almost all military branches. More specifically renewal and expansion of helicopter capacity for the Norwegian Military and law enforcement, including replacement of the ageing fleet of Bell 412SP transport helicopters. In addition to strengthening SAR capabilities, there is a growing need for Arctic and maritime surveillance.
- There is a high demand for commercial offshore helicopter service; the offshore industry transports personnel to the offshore oil rigs and more than 60,000 flights are made each year with around 600,000 passengers. The oil and gas industry accounts for 13% of all domestic flights in Norway.

For more opportunities in Norway, see:

<http://apps.export.gov/article?id=Norway-defense-and-aerospace-technologies>

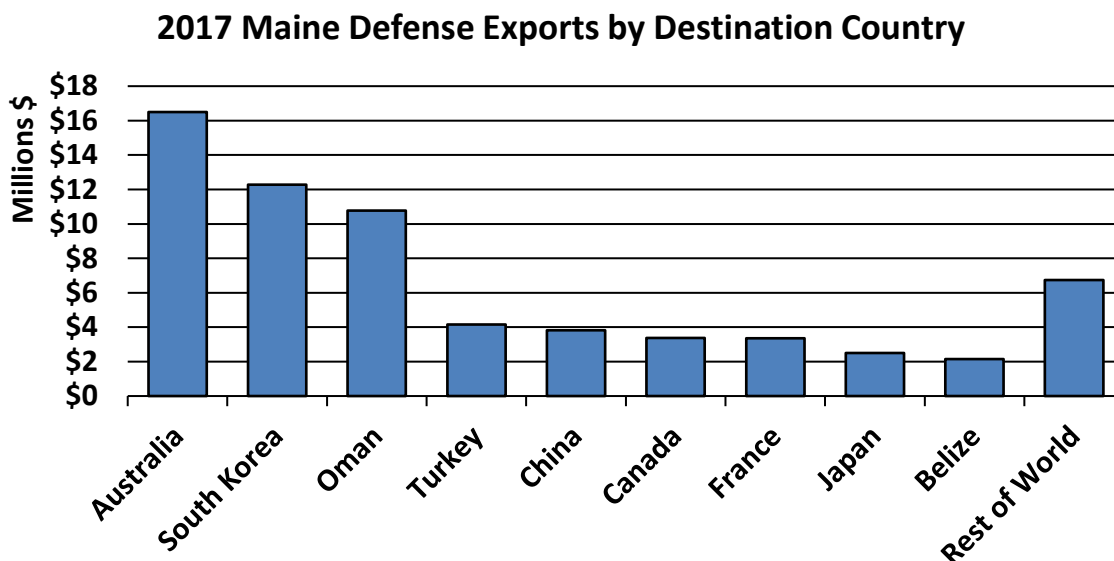
Maine Defense Exports 2008 to 2017



Source: WISERTrade, data from the U.S. Census Bureau Foreign, Trade Division

- Maine's defense exports fluctuated since 2008 but have increased significantly since 2014 despite recent decline. Additionally, Maine's defense export industry was very resilient throughout the majority of the Great Recession from 2007 to about late 2009.
- There was a significant increase from 2014 through 2016 of about \$45 million in defense exports. Most of this increase occurred in two defense industry categories, military weapons (other than revolvers and pistols) (930190) and parts and accessories of military firearms (930591). These two categories had an increase in exports from 2014 to 2015 of \$16 million and \$22 million, respectively.
- In 2017, the category in which exports declined the most was gas turbine parts (841199); from 2016 to 2017 exports in this category declined by 71% or about \$16 million.
- Over the ten-year period, Maine defense exports grew by about \$13 million. This represents a growth rate of 25%. For comparison, from 2008 to 2017 U.S. defense exports grew by \$8.2 billion with a total growth rate of about 17%.

Maine Defense Exports by Destination Country



Source: WISERTrade, data from the U.S. Census Bureau Foreign, Trade Division.

- In 2017, Maine defense goods and materials were primarily exported to Australia, South Korea, and Oman.
- There are many export regulations for U.S. manufactured defense articles sold to countries such as Russia, North Korea, and Sudan and other sanctioned entities. Companies should refer to section 126.1 of the International Trade in Arms Regulations (ITAR) to determine which countries are sanctioned, embargoed or have export restrictions.

Maine Defense Exports by Category

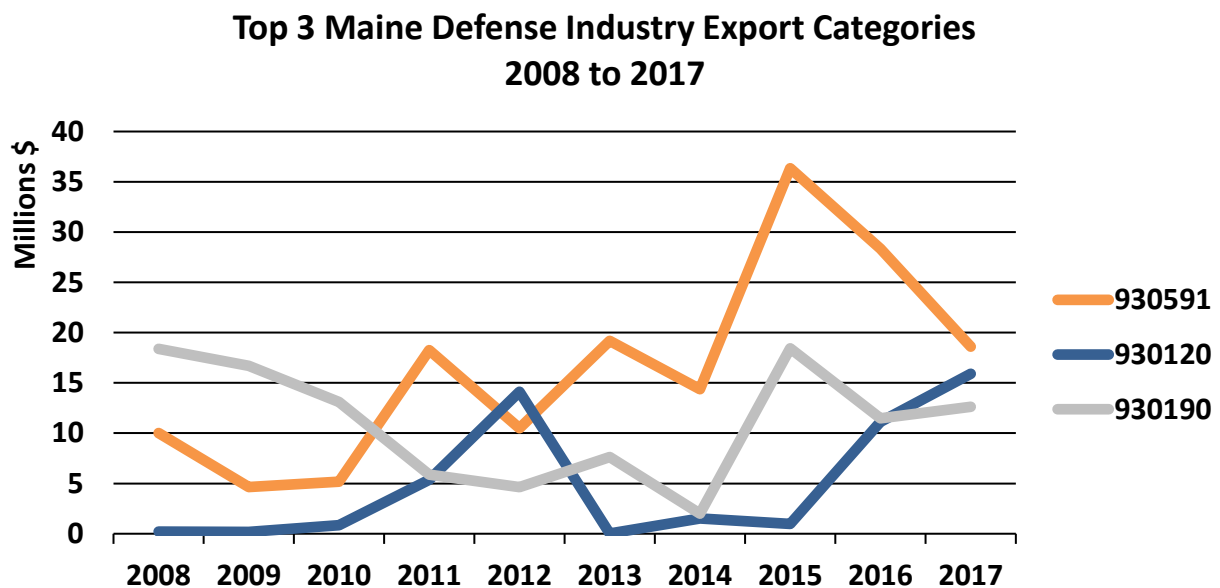
6 Digit HS Code Category	Description	Exports in U.S. \$
930591	Parts & Accessor. Of Military Weapons Of Head 9301	\$ 18,611,346
930120	Rkt Launch.,Flamthrow, & Sim. Projectors(Military)	\$ 15,906,499
930190	Military Weapons,Oth Thn Revol,Pist,&Hd 9307,Nesoi	\$ 12,636,898
841199	Gas Turbine Parts Nesoi	\$ 6,570,392
980320	Exports Of Military Equipment, Not Identified	\$ 4,011,096
841182	Gas Turbines Of A Power Exceeding 5,000 Kw	\$ 3,815,195
841191	Turbojet And Turboproller Parts	\$ 3,378,291
871000	Tank & Ot Armored Fight Veh, Motorized; And Parts	\$ 340,088
841121	Turbopropellers Of A Power Not Exceeding 1,100 Kw	\$ 250,873
901420	Instruments & Appl F Aerntcl/Spc Navig Ex Compass	\$ 30,482

930629	Air Gun Pellets And Parts Of Shotgun Cartridges	\$	29,580
930630	Cartridges And Parts Thereof, Nesoi	\$	23,871
840910	Parts For Aircraft Engines (Sp-Ign, Rot Or Comp)	\$	5,104
880330	Parts Of Airplanes Or Helicopters, Nesoi	\$	3,500
Total			\$65,613,215

Source: WISERTrade, data from the U.S. Census Bureau Foreign, Trade Division

- In 2017, Maine defense industry categories with the highest amount of exports were parts and accessories of military weapons (930591), rocket launchers and flamethrowers (930120), and military weapons (930190). Combined, these three categories make up about 72% of Maine's defense exports.

Top 3 Maine Defense Industry Categories



Source: WISERTrade, data from the U.S. Census Bureau Foreign, Trade Division

- These three defense industry categories account for the majority of Maine defense exports in 2017; growth in these categories is very important. It is also important to recognize that it is natural for industries to go into slumps and booms over time. However, policies, business plans, and diversification can help minimize the slumps and increase the booms.

Location Quotient Analysis¹³

Location quotient analysis is a valuable way of quantifying how concentrated an industry or category is in Maine compared to the nation. It can reveal what makes a specific region “unique” in comparison to the national average. Defense industry categories with location quotients less (greater) than 1.0 are less (more) concentrated in Maine than in the U.S.

¹³ Data for this analysis are sourced from WISERTrade, data from the U.S. Census Bureau Foreign, Trade Division

There are four different types of classifications for the defense industry categories: star, mature, emerging, and transforming. The classifications are explained below. It is important to note that there are more defense industry categories (as seen in Appendix A). However, Maine has no exports for these industries.

HS Code	Description	2017 Location Quotient	Classification
930591	Parts & Accessor. Of Military Weapons Of Head 9301	46.92	Star
930120	Rkt Launch.,Flamthrow, & Sim. Projectors(Military)	62.51	Mature
930190	Military Weapons,Oth Thn Revol,Pist,&Hd 9307,Nesoi	54.91	Star
841199	Gas Turbine Parts Nesoi	0.20	Transforming
980320	Exports Of Military Equipment, Not Identified	4.11	Star
841182	Gas Turbines Of A Power Exceeding 5,000 Kw	0.89	Emerging
841191	Turbojet And Turboproller Parts	1.62	Star
871000	Tank & Ot Armored Fight Veh, Motorized; And Parts	0.14	Emerging
841121	Turbopropellers Of A Power Not Exceeding 1,100 Kw	3.65	Mature
901420	Instruments & Appl F Aerntcl/Spc Navig Ex Compass	0.10	Emerging
930629	Air Gun Pellets And Parts Of Shotgun Cartridges	1.13	Star
930630	Cartridges And Parts Thereof, Nesoi	0.03	Transforming
840910	Parts For Aircraft Engines (Sp-Ign, Rot Or Comp)	0.04	Transforming
880330	Parts Of Airplanes Or Helicopters, Nesoi	0.00	Transforming

Star Categories are highly concentrated, exporting and still experiencing growth in the region. The most highly concentrated of the Star industry categories in Maine is the military weapons category (930190). Its location quotient is 54.91, indicating that the category is 54 times more concentrated in Maine compared to the U.S. The other strong defense industry categories are parts and accessories of military weapons (930591), military equipment (980320), and turbo jet and propeller parts (841191). These industry categories are growing and highly concentrated therefore investment in these categories could have high returns.

Mature Categories are relatively concentrated, but their growth is trending downward. The two mature defense industry categories in Maine are turbopropellers of a power not exceeding 1,100 Kw (841121) and rocket launchers and flamethrowers (930120). It may be worthwhile to invest in these concentrated categories to stimulate positive growth.

Emerging Categories may be poised for future growth because they are relatively less concentrated in Maine than in the rest of the U.S. but have experienced growth since 2012. These three categories are gas turbines of a power exceeding 5,000 kw (841182), tanks and armored fighting vehicles and parts (871000), and instruments for aeronautical and space navigation (901420).

Transforming Categories capture the mix of those defense industry categories that are experiencing relative decline (or those that have completely declined) and limited export capability. There are several of these in Maine; any amount of growth in these categories would require relatively large investments.

Shift Share Analysis¹⁴

Shift share analysis is a standard regional analysis method that attempts to determine how much of regional, defense export growth can be attributed to national trends and how much is due to unique regional factors. Shift share can help answer why exports are growing or declining in a regional defense industry category.

The **national growth effect** explains how much of the regional industry category's growth is explained by the overall growth of the national economy: if the nation's whole economy is growing, you would generally expect to see some positive change in each industry category in Maine.

The **industrial mix effect** represents the share of regional industry growth explained by the growth of the specific industry category at the national level.

The **competitive effect** explains how much of the change in a given industry category is due to some unique competitive advantage that the region possesses, because the growth cannot be explained by national trends in that industry category or the economy as whole.

Finally, the **allocation effect** indicates the extent to which the region is specialized in those industry categories where it enjoys a competitive advantage.

HS Code Category	Description	National Growth Effect	Industry Mix Effect	Competitive Effect	Allocation Effect
930591	Firearms; parts and accessories, of military weapons of heading 9301	-0.1%	-2%	4%	98%
930120	Rkt Launch.,Flamthrow, & Sim. Projectors(Military)	11%	1817%	-10%	-1718%
930190	Military weapons; other than revolvers, pistols, and arms of heading 9307, n.e.c. in heading 9301	-2%	-20%	10%	111%
841199	Turbines; parts of gas turbines (excluding turbo-jets and turbo-propellers)	-42%	27%	330%	-216%
841191	Turbines; parts of turbo-jets and turbo-propellers	41%	-13%	105%	-33%
871000	Tanks and other armoured fighting vehicles; motorised, whether or not fitted with weapons, and parts of such vehicles	-459%	452%	6850%	-6742%
841121	Turbo-propellers; of a power not	43%	129%	-18%	-54%

¹⁴ Data for this analysis are sourced from WISERTrade, data from the U.S. Census Bureau Foreign, Trade Division

exceeding 1100kW					
901420	Navigational instruments and appliances; for aeronautical or space navigation (excluding compasses)	-187%	178%	2450%	-2342%
930630	Ammunition; cartridges and parts thereof n.e.c. in heading no. 9306	6463%	-6084%	-4760%	4481%
840910	Engines; parts of aircraft engines (spark-ignition reciprocating or rotary internal combustion piston engines)	-48%	-13%	126%	36%
880330	Aircraft and spacecraft; parts of aeroplanes or helicopters n.e.c. in heading no. 8803	37%	-31%	591%	-497%

Note: Table only includes those defense industry categories that had exports in both 2012 and 2017; percentages are relative weights

- The table above breaks down the change in exports from 2012 to 2017 for 11 defense industry categories into the four different types of effects. Exports for some of these categories fell from 2012 to 2017 while exports for other categories increased. The percentages show which effects dominate and whether they positively or negatively impacted category exports.
- The two top Maine defense export industries were parts and accessories of military weapons (930591) and rocket launchers and flamethrowers (930120). The national growth and industry mix effects are responsible for a partial decline in Maine's export of parts and accessories of military weapons however it is clear that Maine has a big competitive advantage and is highly specialized in this industry due to the positive competitive and allocation effects. Therefore, Maine exports of this category are up by about \$8 million since 2012.
- National growth and industry category growth for rocket launchers and flamethrowers (930120) are represented by positive national growth and industry mix effects which contributes to the increase in Maine exports of this category. However, Maine is not highly competitive or specialized in this industry because most of growth is explained by industry mix effect. This means that nationally, this industry category has done very well since 2012 which explains Maine's growth in this industry.

Appendix A: Note on Data Used in this Report

In the 2016 Defense Markets Report, the International Trade Administration (ITA) identified all the HS codes that are associated with defense exports; the HS codes they identified are 10-digit HS codes. The trade data used in this report are based on 6-digit HS classifications of the ITA codes because WISERTrade only includes the 6-digit level of trade specificity. Therefore, some of the trade data may be overestimated due to the inclusion of exports that are characterized by the 6-digit HS codes but not the 10-digit codes.

Appendix B: Complete Defense Industry Category List

This table lists all defense industry category codes sourced from the 2016 Defense Top Markets Report. Each 6-Digit HS code contains one or more 10-Digit HS Codes that are included in the 6-Digit classification. For example, the 871000 HS Code Category (tanks and other armored fighting vehicles) contains three 10-Digit HS Codes (tracked vehicles, armored fighting vehicles, and parts of fighting vehicles).

6 Digit HS Code	Description and Corresponding 10 Digit HS Codes	End Use Code
360300	Fuses and detonators; safety or detonating fuses, percussion or detonating caps, igniters, electric detonators 3603000000: SAFETY FUSES; DETONATING FUSE; PERCUSSION CAPS ETC	50070
840710	Engines; for aircraft, spark-ignition reciprocating or rotary internal combustion piston engines 8407100090: SPK-IGN REC OR ROT INT COM PST TYP A/C ENG EXC CIV	50020
840910	Engines; parts of aircraft engines (spark-ignition reciprocating or rotary internal combustion piston engines) 8409100080: PARTS FOR SP-IG OR COMP-IG FOR USE IN A/C EX CIVIL	50020
841111	Turbo-jets; of a thrust not exceeding 25kN 8411114050: TURBOJET A/C TURBINES EXC CIVIL, THRUST LE 25 KN	50020
841112	Turbo-jets; of a thrust exceeding 25kN 8411124050: TURBOJET A/C TURBINES EX CIVIL, THRUST OVER 25	50020
841121	Turbo-propellers; of a power not exceeding 1100kW 8411214050: TURBOPPELLR A/C TBN, EX CIVIL, POWR NT OV 1100 KW	50020
841122	Turbo-propellers; of a power exceeding 1100kW 8411224050: TURBOPROPELLER A/C TBN EXCEPT CIVIL, OV 1100 KW	50020
841181	Turbines; gas-turbines (excluding turbo-jets and turbo-propellers), of a power not exceeding 5000kW 8411814050: GAS TURBINE A/C TBN EXC CIVIL, 5000 KW AND UNDER	50020
841182	Turbines; gas-turbines (excluding turbo-jets and turbo-propellers), of a power exceeding 5000kW	50020

	8411824050: GAS TURBINE A/C TBN EXC CIVIL, OVER 5000 KW	
841191	Turbines; parts of turbo-jets and turbo-propellers	50020
	8411917050: PARTS OF TURBOJET & TURBOPROPELLR A/C ENG,EX CIVIL	
841199	Turbines; parts of gas turbines (excluding turbo-jets and turbo-propellers)	50020
	8411997050: PARTS OF GAS TURBINE A/C ENG, EXC CIVIL A/C	
871000	Tanks and other armored fighting vehicles; motorised, whether or not fitted with weapons, and parts of such vehicles	50030
	8710000030: TRACKED (INCLUDING HALF-TRACKED) VEHICLES	
	8710000060: ARMORED FIGHTING VEH,MOTORIZED,NESOI	
	8710000090: PARTS OF ARMORE FIGHTING VEHICLES,MOTORIZED	
880211	Helicopters; of an unladen weight not exceeding 2000kg	50000
	8802110015: NEW HELICOPTERS, MILITARY, UNLADEN WGT LT= 2000 KG	
	8802110060: USED/REBLT HELICOPTERS,MILITARY,UNLDN WT LT=2000KG	
880212	Helicopters; of an unladen weight exceeding 2000kg	50000
	8802120020: NEW HELICOPTERS, MILITARY, UNLAD WGT > 2,000 KG	
	8802120060: USED/REBUILT HELICOP,MILITARY,WGT > 2,000 KG	
880220	Aeroplanes and other aircraft; of an unladen weight not exceeding 2000kg	50000
	8802200020: NEW AIRPLANES, MILITARY UNLADEN WEIGHT 451-2000 KG	
	8802200030: NEW MILITARY AIRCRAFT UNLADEN WT 451-2000 KG NESOI	
	8802200070: USED/REBUILT MILITARY AIRCRAFT UNLAD WT 451-2000KG	
880230	Aeroplanes and other aircraft; of an unladen weight exceeding 2000kg but not exceeding 15,000kg	50000
	8802300010: NEW MILITARY AIRCRAFT FIGHTERS,WT(2000-15000 KG)	
	8802300020: NEW MILITARY AIRCRFT,NOT FIGHTERS (2000-15000 KG)	
	8802300070: USED/REBUILT MILITARY AIRCRAFT,(2000-15000 KG)	
880240	Aeroplanes and other aircraft; of an unladen weight exceeding 15,000kg	50000
	8802400015: NEW MILITARY FIGHTERS, WEIGHT EXCEEDING 15,000 KG	
	8802400020: NEW MILITARY CARGO TRANSPORTS,WEIGHT GT 15,000 KG	
	8802400030: NEW MILITARY AIRCRAFT,NESOI,WEIGHT GT 15,000 KG	
	8802400080: USED OR REBUILT MILITARY AIRCRAFT,WGT GT 15000KG	
880260	Spacecraft; (including satellites) and suborbital and spacecraft launch vehicles	50000
	8802609020: MLTRY SPACECRFT & LAUNCH VEH (EXC COMM SATELLITES)	
880310	Aircraft and spacecraft; propellers and rotors and parts thereof	50070
	8803100060: PROPLLRS & ROTORS & PRTS THEREOF FOR MLTARY AIRCFT	
880320	Aircraft and spacecraft; under-carriages and parts thereof	50070
	8803200060: UNDERCARRIAGES & PARTS THEREOF FOR MILITRY AIRCFT	

880330	Aircraft and spacecraft; parts of aeroplanes or helicopters n.e.c. in heading no. 8803	50070
	8803300060: OTHER PARTS,NESOI,OF MILITARY AIRPLANES/HELICOPTRS	
880390	Aircraft and spacecraft; parts thereof n.e.c. in chapter 88	50070
	8803909060: OTHER PARTS,NESOI,FOR OTHER MILITARY AIR&SPACECRFT	
880400	Parachutes (including dirigible parachutes and paragliders) and rotochutes; parts thereof and accessories thereto	50010
	8804000000: PARACHUTES(ALSO DIRIGIBLE CHUTES)&ROTOCHUTES&PRTS	
880510	Aircraft launching gear, deck-arrestor or similar gear and parts thereof	50010
	8805100000: AIRCRAFT LAUNCHING GEAR,DECK-ARRESTOR,ETC.& PARTS	
880521	Ground flying trainers and parts thereof; air combat simulators and parts thereof	50010
	8805210000: AIR COMBAT SIMULATORS AND PARTS THEREOF	
890610	Vessels; warships	50040
	8906100000: WARSHIPS (INCL SUBMARINES, TROOPSHIPS ETC.)	
901420	Navigational instruments and appliances; for aeronautical or space navigation (excluding compasses)	50070
	9014208080: INST & APPLN, AERONAUTICAL/SPACE NAVIGATION, NESOI	
930110	Military weapons; artillery weapons (e.g. guns, howitzers, and mortars)	50050
	9301100010: SELF-PROPELLED ARTILLERY WEAPONS (MILITARY)	
	9301100080: GUNS, HOWITZERS, & MORTARS W/A BORE OF LT 30-MM	
930120	Rkt Launch.,Flamthrow, & Sim. Projectors(Military)	50050
	9301200000: ROCKET LAUNCHERS & SIMILAR PROJECTORS (MIL)	
930190	Military weapons; other than revolvers, pistols, and arms of heading 9307, n.e.c. in heading 9301	50050
	9301903000: MILITARY RIFLES	
	9301906000: MILITARY SHOTGUNS	
	9301909030: MACHINE GUNS, MILITARY	
	9301909090: MILITARY WEAPONS, EXC ARMS OF HEADING 9307, NESOI	
930591	Firearms; parts and accessories, of military weapons of heading 9301	50050
	9305911000: PARTS AND ACCESS FOR MILITARY RIFLES	
	9305912000: PARTS AND ACC FOR MILITARY SHOTGUNS	
	9305913010: PTS & ACC MILITARY ARTILLERY WEAPON OF 9301.11/930	
	9305913030: PARTS AND ACC OF MIL WEAPONS HEADING 9301, NESOI	
930621	Ammunition; shotgun cartridges	50050
	9306210000: SHOTGUN CARTRIDGES AND PARTS THEREOF	
930629	Ammunition; parts of shotgun cartridges	50050
	9306290000: PTS FOR SHOTGUN CARTRIDGES AND AIR GUN PELLETS	



930630	Ammunition; cartridges and parts thereof n.e.c. in heading no. 9306	50050
	9306304110: CARTRIDGES FOR RIFLE OR PISTOLS .22 CALIBER	
	9306304120: CARTRIDGES FOR RIFLE OR PISTOLS, NESOI	
	9306304130: CARTRIDGES CONTAINING A PROJECTILE, NESOI	
	9306304140: EMPTY CARTRIDGES SHELLS FOR RIFLES OR PISTOLS	
	9306304150: EMPTY CARTRIDGES SHELLS, NESOI	
	9306304160: CARTRIDGES NOT CONTAINING A PROJECTILE & NT EMPTY	
	9306308000: PARTS OF CARATRIDGES, NESOI	
930690	Ammunition; n.e.c. in chapter 93	50050
	9306900020: GUIDED MISSILES	
	9306900040: BOMBS, GRENADES, TORPEDOS, & SIML MUNITIONS OF WAR	
	9306900060: PARTS FOR GUIDED MISSILES	
	9306900080: PARTS FOR BOMBS, GRENADES, & SIML MUNITIONS OF WAR	
930700	Arms; swords, cutlasses, bayonets, lances and the like, parts thereof and scabbards and sheaths therefor	50050
	9307000000: SWORDS, CUTLASSES, BAYONETS, & SIML ARMS & PARTS	
980310	Exports Of Military Wearing Apparel Of All Types	50060
	9803100000: MILITARY WEARING APPAREL OF ALL TYPES & MATERIALS	
980320	Exports Of Military Equipment, Not Identified	50060
	9803200000: MILITARY EQUIPMENTS NOT IDENTIFIED BY KIND	