



INTERNATIONAL
T R A D E
ADMINISTRATION

The background of the cover is a photograph of an airplane's wing and engine, viewed from a low angle, flying over the ocean at sunset. The sky is a mix of blue and orange, and the water is dark blue. A dark blue rectangular box is overlaid on the right side of the image, containing the title and edition information.

Aerospace Resource Guide

2021 - 2022 Edition

This document is a composite derived from the original guide at www.trade.gov/top-markets. It is intended for use by those who prefer the information as a single downloadable resource.

This 2020-2021 edition of the Aerospace Resource Guide provides in-country market intelligence from ITA aerospace experts around the world. ITA aerospace industry specialists are dedicated to enhancing the global competitiveness of the U.S. aerospace and defense industry, expanding market access, and increasing exports. The Aerospace & Defense Team uses its presence in 200 global cities to help you foster new business relationships and expand the world-wide presence of U.S. firms.

Industry & Analysis' (I&A) staff of industry, trade and economic analysts devise and implement international trade, investment, and export promotion strategies that strengthen the global competitiveness of U.S. industries. These initiatives unlock export, and investment opportunities for U.S. businesses by combining in-depth quantitative and qualitative analysis with ITA's industry relationships. For more information, visit www.trade.gov/industry.

I&A is part of the International Trade Administration, whose mission is to create prosperity by strengthening the competitiveness of U.S. industry, promoting trade and investment, and ensuring fair trade and compliance with trade laws and agreements.

U.S. Department of Commerce
International Trade Administration
Industry & Analysis (I&A)

Executive Summary

Through *Top Markets Rankings* the International Trade Administration helps companies determine their next export market by comparing opportunities across borders. Each ranking rates *future* export opportunities within a particular industry based on a sector-specific methodology. The rankings include a detailed assessment of the competitiveness landscape within a sector.

ITA's [Industry & Analysis](#) (I&A) business unit creates the Top Markets Rankings. I&A industry, trade, and economic experts provide detailed analysis to strengthen the export competitiveness of U.S. industry and support strategies to unlock export and investment opportunities that benefit the U.S. economy.

This report provides an update to the *2015 Aircraft Parts Top Markets Report* issued by the International Trade Administration (ITA), U.S. Department of Commerce in May 2015. This update includes a revised ranking of the top markets based on more recent trade data, an analysis of recent changes that affect the international competitiveness of U.S. suppliers of aircraft parts, updates to five country case studies from the previous report (Canada, China, Germany, Saudi Arabia and Singapore) and the inclusion of two additional country case studies (Australia and Brazil).

The ranking of top markets is based on 13 factors, such as the value of aircraft parts exported to particular foreign markets, identified by ITA's team of aerospace industry specialists. The team assigned varying weights to each factor based on its assessment of the relative importance of one factor to another. In making judgments about which factors to select and their relative values, the team drew from its experience in international trade in aerospace products, including global marketing strategies and the dynamics of particular aerospace markets outside the United States.

U.S. suppliers of aircraft parts may find this report to be of most value when used in conjunction with other materials related to the specific products they seek to export.

The lead author of this report is Andrew Rechenberg, an international economist on the Aerospace Team in the U.S. Department of Commerce's International Trade Administration. Bob McEntire and Luke Yanos, also Aerospace Team staff members, collaborated in preparing and analyzing country case studies. Chris Blaha and Jeffrey Eversman, Office of Trade Negotiations and Analysis, provided trade data and statistical analysis. Kim Wells, Aerospace Team Leader, managed the team effort.

Table of Contents

Executive Summary	2
Australia.....	6
Executive Summary.....	6
Market Entry	6
Current Market Trends and Demand.....	7
Opportunities.....	8
Contact:.....	8
Brazil.....	9
Executive Summary.....	9
Market Entry	11
Opportunities.....	12
Trade Events	13
Contact:.....	13
Canada	14
Executive Summary.....	14
Market Entry	14
Current Market Trends and Demand.....	15
Opportunities.....	15
Trade Events	16
Contact.....	16
Denmark	17
Executive Summary.....	17
Market Entry	17
Current Market Trends and Demand.....	17
Opportunities.....	18
Trade Events	19
Relevant Associations	20
Contact.....	20
Finland	21
Executive Summary.....	21
Market Entry	21
Current Market Trends and Demand.....	22
Opportunities.....	22
Trade Events	23
Contact.....	23
France	24
Executive Summary.....	24
Market Entry	24
Current Market Trends and Demand.....	25
Opportunities.....	25
Trade Events	26
Contact.....	26

Germany	27
Executive Summary.....	27
Market Entry	27
Current Market Trends and Demand.....	28
Opportunities.....	30
Trade Events	32
German Aerospace Industry Associations	33
Contact.....	34
India	35
Executive Summary.....	35
Market Entry	35
Current Market Trends and Demand.....	36
Opportunities.....	36
Trade Events	38
Contact.....	38
Italy	39
Executive Summary.....	39
Market Entry	39
Current Market Trends and Demand.....	40
Opportunities.....	40
Trade Events	40
Contact.....	40
Japan	41
Executive Summary.....	41
Market Entry	41
Current Market Trends and Demand.....	41
Opportunities.....	42
Trade Events	42
Contact.....	43
Netherlands	44
Executive Summary.....	44
Market Entry	44
Current Market Trends and Demand.....	44
Opportunities.....	45
Trade Events	46
Contact.....	46
Poland	46
Executive Summary.....	46
Defense	49
Market Entry	51
Current Market Trends and Demand.....	51
Opportunities.....	51
Trade Events	52
Contact.....	52
Singapore	53
Executive Summary.....	53

Market Entry	53
Current Market Trends and Demand.....	53
Opportunities.....	54
Trade Events	54
Contact.....	55
South Korea	56
Executive Summary.....	56
Market Entry	56
Current Market Trends and Demand.....	56
Opportunities.....	58
Trade Events	59
Contact.....	60
Sweden	61
Executive Summary.....	61
Market Entry	62
Current Market Trends and Demand.....	62
Opportunities.....	64
Trade Events	65
Contact.....	65
Thailand	66
Executive Summary.....	66
Market Entry	66
Current Market Trends and Demand.....	66
Opportunities.....	67
Trade Events	68
Contact.....	68
Turkey.....	69
Executive Summary.....	69
Market Entry	70
Current Market Trends and Demand.....	70
Opportunities.....	70
Trade Events	70
Contact.....	70
United Kingdom	71
Executive Summary.....	71
Market Entry	71
Current Market Trends and Demand.....	72
Opportunities.....	73
Trade Events	73
Contact.....	73

Australia

Executive Summary

Australia is traditionally a major user of civil and military aviation equipment. Its population of just over 25 million is mostly concentrated along the east coast with additional hubs along the southern and southwest coasts. As Australia is physically the same size as the continental United States, this has made aviation an essential feature of the commercial, military and recreational sectors since the earliest days of powered flight. Australia's commercial aviation sector is led by QANTAS, one of the world's oldest and most respected airlines, and its air force is one of the most modern in the world. In fact, it is regarded as the world's first all fifth generation air force flying mostly US-origin aircraft. Boeing has its largest presence outside the US in Australia. Australia has a civil helicopter fleet in excess of 2000, one of the largest worldwide, and has a vibrant UAV sector. Australia also has a small but growing space sector with two small launch centers under development, a national space agency and a dynamic space start-up community. Historically Australia ranks as a top 20 market for commercial aircraft and a top 5 market for military equipment with aircraft the largest component. While civil and commercial aviation has been heavily impacted by travel restrictions instituted during 2020, the defense sector has continued to perform strongly with a new ten-year, USD 190 billion acquisition strategy announced in July 2020. Australian defense companies are also prominent investors in the US, with offices and manufacturing facilities in over thirty US states. Australian aerospace companies also manufacture critical components in Australia for both the Boeing 787 Dreamliner and the Lockheed Martin F35 Joint Strike Fighter.

Market Entry

Australia and the United States have had a Free Trade Agreement in place since January 2005. Australia relies extensively on US-made aircraft of all types and sizes and many of the major companies active in the Australian aviation sector are US subsidiaries or US-owned. The Avalon Airshow is the major showcase of the aviation industry and is traditionally held every February in odd-numbered years, alternating with the Singapore Air Show which is held in February every even-numbered year. Due to international travel restrictions disrupting aviation in particular in 2020, Avalon and indeed most other trade events have been rescheduled to later dates in 2021. Avalon is one of the world's largest airshows with many aircraft on display and flying during the event. It also features an extensive conference program featuring MRO, UAVs, airports and space. Avalon also includes a large US Pavilion and a US Investment Seminar featuring various US states pitching to aviation companies looking to establish a presence in the US. Avalon is a platform not only for the Australian market but also the wider Indo Pacific market and buyers and delegations from across the world attend.

Rotortech and Land Forces offer particular additional promotional opportunities for rotorcraft and UAVs and AFAC 2021 is the event to attend and exhibit at in terms of aerial fire-fighting.

Current Market Trends and Demand

Very limited in the civil aviation sector given the imposition of international and domestic travel restrictions in mid-2020 for air travel within as well as to and from Australia and the consequential impacts on commercial airlines, hotels and the tourism sector broadly. Passenger services mostly ceased nationwide with some refocusing on air cargo to support export markets. Most aircraft are sitting idle and many have been placed in storage at facilities in central Australia and the western US until demand recovers. Second largest airline Virgin Australia collapsed in April 2020; was placed into voluntary administration and subsequently bought by a US-led consortium headed by Bain Capital in June 2020. As short-term government financial assistance across the Australian economy is progressively terminated, it is expected that air services will be reinstated during 2021. There has been some positive expansion domestically in 2020 but on a limited scale.

Defense remains the one major bright prospect with the July 2020 Defense Strategic Update announcement of a ten-year, USD 190 billion defense acquisition program. The Update is accessible online at www.defence.gov.au. Historically the US supplies the majority of Australia's civil and military aviation needs. Approx. one-third of this investment is directed at aviation capabilities including remotely piloted and/or autonomous combat aircraft; expansion of the Jindalee radar network; replacement and expansion of airborne electronic attack capability upon retirement of the EA-18G Growler; ground control systems; expanded replacement fleet for the C-130J Hercules aircraft to improve lift capacity; expanded replacement fleet for KC-30A air-to-air refueling aircraft, including crewed and/or remotely-piloted platforms; decontamination equipment for aircraft and air bases in the event of attack; infrastructure enhancement for Australia's northern bases to improve capability and survivability; new long range helicopters for the army; plus USD 5 billion for space initiatives and USD 10 billion for various cyber initiatives across the Australian Defense Force.

A major inquiry is underway into the national response to the Australian bushfire crisis during the 2019/2020 summer. It is widely anticipated that the inquiry will result in recommendations for better preparation at national and state level, including increased investment in systems to fight and prevent future severe fires. US companies have been active in fighting bushfires in Australia over many years and this may well open up additional substantial opportunities.

Helicopters and UAVs are widely used across the Australian economy particularly in support of the agricultural, mining and energy industries and that should continue but tourism-related services are experiencing a substantial reduction in demand. This will ease as and when domestic and international travel restrictions are relaxed by the Australian Government and the respective state and territory governments. Border security remains a very high priority and this can be expected to increase to enable greater control and awareness of passenger and cargo movements.

Opportunities

1. Defense Products
2. Rotorcraft
3. UAVs
4. Passenger and Cargo Screening
5. Aerial Fire Fighting

Land Forces 2021, 1-3 June 2021, Brisbane, Queensland

<https://www.landforces.com.au/>

Rotortech 2021, June 2021, Brisbane, Queensland

<https://www.rotortech.com.au/>

AFAC 2021, 17 – 20 August 2021, Sydney, New South Wales

<https://www.afaconference.com.au/>

Australian International Airshow 2021 ('Avalon Airshow'), 23 – 28 November 2021, Geelong, Victoria

<https://www.airshow.com.au/airshow2021/index.asp>

Australian Airports Association annual conference and trade expo, TBA but likely late 2021

<https://airportsconference.asn.au/>

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Brazil

Take advantage of our market research to plan your expansion into Brazil's aerospace and defense market. This guide includes information on:

- Current market needs
- The competitive landscape
- Best prospects for U.S. exporters
- Market entry strategies
- The regulatory environment
- Technical barriers to trade and more

Executive Summary

Commercial Aviation

There are three major segments that U.S. suppliers in this industry should focus on, which are the original equipment manufacturers (OEMs), the General Aviation, and the Repair & Maintenance markets. A fourth niche, still small but growing rapidly, is the UAV (unmanned aerial vehicles) market.

OEMs – Embraer is a global company headquartered in Brazil with businesses in commercial and executive aviation, as well as in defense and security markets. Founded in 1969, the company became a leading manufacturer of commercial jets up to 150 seats. In July 2018, Boeing and Embraer signed a Memorandum of Understanding to establish a strategic partnership. However, on April 25, 2020, Boeing announced that it has terminated its Master Transaction Agreement (MTA) with Embraer, under which the two companies sought to establish a new level of strategic partnership.

Currently, Embraer imports approximately 56% of its components from North America, mostly from the United States. Embraer always welcomes the registration of new and qualified companies in its Supplier's Portal www.embraersuppliers.com. Embraer's selection criteria take into consideration: technical solutions; product quality; commercial and aftermarket support; supplier's performance, expertise and financial health; and manufacturing capability. It requires certifications such as, but not limited to, AS9100, EN9100, JISQ9100, and NBR15100. Depending on the type of the product, additional certifications might be required.

The other major OEM is Helibras, the Brazilian subsidiary of Airbus Helicopters. In 2019, approximately 36 helicopters were produced in its Brazilian plant, serving the military and civil markets. Companies interested in supplying parts or technology to Helibras should send an e-mail to procurement@helibras.com.br. Information on requirements to become a supplier is also available on the company's website www.helibras.com.br.

Commercial aviation share has been decreasing since 2015 and has kept a 1% reduction rate until the first six months of 2019 in comparison with the 2018 fleet.

General Aviation

According to the Brazilian Association of General Aviation (ABAG), general aviation plays a strategic key role on the development of Brazilian transportation and logistics industries by establishing connections with 5,568 municipalities, through 2,567 airport spread across the Brazilian territory, which in 2018 were responsible for more than 600,000 landing and takeoff operations. It all happened with approximately 7,800 airplanes and helicopters in activity, being 610 jets, 1,130 turboprops, 1,160 helicopters and about 4,900 piston engine aircrafts, distributed among passenger air taxis, load and aero medics services, private operators, and flight instruction providers.

Cessna, Neiva, Piper, Embraer and Beechcraft together represented 50% of the existing fleet. According to a study conducted by the Brazilian General Aviation Association, 40% of the fleet is concentrated in the Southeast region, but in 2018 the South and the Midwest regions registered the highest growth rate of 5.99% and 4.17%, respectively.

In a subcategory sector within the general aviation industry, the aerial agricultural sector has never had a negative year in fleet growth. According to the National Agricultural Aviation Companies Union, in 2018, 79 aircraft were added (5 helicopters and 74 aircraft).

Repair & Maintenance

According to the Brazilian National Civil Aviation Agency, the Brazilian fleet consists of 22,219 aircraft composed of 640 commercial aircraft, 15,914 general/business aircraft, and 5,665 experimental aircraft. Due to the political and economic disruptions going on in the country, demand for new aircraft has slowed down over the last couple of years, but the demand for replacement parts will likely continue growing over the next few years.

In 2018, the market for aircraft repair and maintenance was estimated at US\$730 million and has annually expanded 5-6%. The relatively strong market for repair and maintenance is driven by more than 40% of the general aviation fleet being composed of one or two-engine piston-powered aircraft with more than 30 years of use. The average age of the general aviation fleet is currently 30 years, while the commercial aviation fleet has an average age of six years. To provide repair and maintenance services in Brazil, a company needs a Maintenance Organization Certificate (COM) issued by the National Civil Aviation Agency – ANAC. There are 522 maintenance bases currently in Brazil with a valid COM. The importation of parts and components for the aeronautical industry amounted to US\$9.2 billion in 2018. Around 36% of the imports have their unit value in the range of US\$10 thousand and US\$100 thousand.

Unmanned Aerial Vehicles (UAVs)

There is no official data on the size of the UAV market in Brazil, but it is estimated to be approximately US\$80 million. Following a worldwide trend, the market should grow rapidly over the next few years, mainly in the agricultural and inspection segments. In May 2017, the Brazilian National Aviation Agency (ANAC) approved the special regulation for the commercial use of UAVs throughout the Brazilian territory. UAV operations in Brazil must follow the ANAC regulations as well as the regulations established by the Brazilian Air Space Control Department (DECEA) and the National Telecommunications Agency (ANATEL). According to ANAC, there are currently around 2,400 companies registered for drone operations in Brazil.

The services provided by drones have increased over the last years, perceived by the increase in the number of drones used for professional reasons. The main activities are agricultural mapping, mainly used in ethanol production. In 2019, most drones (64%) were used for recreational reasons and the owner's registries are mainly individuals.

Airlines

Currently, there are 11 air transport domestic companies with regular certification to operate in the country; they are concentrated in five Brazilian states: São Paulo, Paraná, Amazônia, Goiás, and Rio de Janeiro. There are 72 foreign companies certified to operate regularly in the country. The United States hosts most of these companies, followed by Argentina and Colombia, with seven, five, and four companies, respectively.

In 2018/2019, the highest concentration of operations was made by Azul (29%), followed by GOL (27%) and LATAM (24%). Although Azul has the most operations in 2018/2019, it is not the biggest company in terms of transported passengers. Azul uses mainly narrow-bodied aircrafts and connects, although not exclusively, smaller airports in Brazil. The most used aircrafts in commercial aviation are the Airbus A320 (20%) and the Boeing B737 (22%).

In 2019, 107 million passengers were transported by Brazilian and international airlines, 1.2% more than in the previous year.

Ground Service Providers (GSP)

Ground Service Providers (GSP) plays a key role to bolster the aviation sector in Brazil. Currently, it accounts for 40% of the potential service types in Brazil. According to the International Air Transport Association (IATA) world average is 50%, showing that the country is in the right path to reach this goal. In comparison to May 2016 and December 2018, there has been a 30% rise in the segment. Brazil has 120 GSPs which, together, are responsible for generating more 42 thousand direct jobs.

Market Entry

Limitations on Selling US Products and Services

Aeronautical products must have a certification issued by [ANAC – National Civil Aviation Agency](#), responsible for the regulation, inspection, and safety of civil aviation activities, aeronautical products, and airport infrastructure.

Import Requirements & Documentation

As in most industries, having a local office or a trusted and well-respected local representative with extensive contacts and a solid sales record is a critical business practice to succeed in Brazil and is required. Some of aviation technology might be subject to ITAR regulation. U.S. companies should contact the State Department to learn about regulations and restriction before engaging in any business practices.

Selling to the Government - if applicable

To conduct business with the Brazilian government Agencies, U.S. companies must be prepared for a long and complex engagement. In addition to the ever-present desire for offsets, U.S. firms must be prepared to engage in long-term partnership with the Brazilian local partners.

Distribution & Sales Channels - if applicable

Brazil is a geographically large country. Aircraft part suppliers without local representation may find it difficult to build relationships, get timely information, and gain access to decision-makers.

Principle Business Associations

ABIMDE – Brazilian Defense and Security Industries Association – www.abimde.org.br

AIAB – Aerospace Industries Association of Brazil – www.aiab.org.br

COMDEFESA/ FIESP – Department of Defense and Security / State of Sao Paulo Industry Federation – www.fiesp.com.br

ABAG – Brazilian Association of General Aviation – www.abag.org.br

ABEAR – Brazilian Airlines Association – www.abear.com.br

IBA – Brazilian Aviation Institute – www.institutoaviacao.org

ABESE - Brazilian Association of Electronic Security Equipment - www.abese.org.br

ABSEG – Brazilian Association of Security Professionals www.abseg.org.br

FENAVIST – National Federation of Security Companies - www.fenavist.org.br

Opportunities

1. Defense Products
2. Rotorcraft
3. UAVs
4. Passenger and Cargo Screening
5. Aerial Fire Fighting

Trade Events

Land Forces 2021, 1-3 June 2021, Brisbane, Queensland

<https://www.landforces.com.au/>

Rotortech 2021, June 2021, Brisbane, Queensland

<https://www.rotortech.com.au/>

AFAC 2021, 17 – 20 August 2021, Sydney, New South Wales

<https://www.afaconference.com.au/>

Australian International Airshow 2021 ('Avalon Airshow'), 23 – 28 November 2021, Geelong, Victoria

<https://www.airshow.com.au/airshow2021/index.asp>

Australian Airports Association annual conference and trade expo, TBA but likely late 2021

<https://airportsconference.asn.au/>

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Canada

Executive Summary

Canada is the world's fifth largest aerospace market with \$24 billion in revenues in 2019 supporting approximately 213,000 jobs. Canada ranks #1 for civil flight simulator production, #3 rank in civil engine production, and #4 rank in civil aircraft production. Approximately 80 percent of Canada's aerospace sector is civil oriented while 20 percent is military. Montréal is the world's third largest aerospace hub after Seattle, Washington and Toulouse, France.

Main aerospace subsectors are:

1. Aircraft manufacturing (civil, defense and space) (69%)
2. Aircraft maintenance, repair and overhaul (MRO) (31%)

Over 50 percent of Canada's aircraft manufacturing occurs in Québec, 30 percent in Ontario, while 41 percent occurs in Western Canada. In 2018, the sector spent \$1.08 billion in R&D; the aerospace sector is five times more R&D intensive than the average for Canadian manufacturing industries. Canada's MRO subsector has grown by 26 percent over the last decade, and over 25 percent of Canada's MRO activities are in the defense sector.

Over the years, Canada consistently ranks in the top five export markets for U.S. aerospace goods. In 2018, Canada was the United States' fourth largest aerospace export market, accounting for nearly US\$10 billion in U.S. exports. U.S. companies play a dominant role in the Canadian aerospace sector; close to 60 percent of all of Canada's aerospace imports are from the United States. The U.S.-Canada aerospace supply chains are highly integrated. Over 60 percent of all Canadian exports are supply chain driven; more than half of all Canadian aerospace exports are to the United States.

Market Entry

A number of U.S.-Canada agreements make it easier for U.S. aerospace companies to do business in Canada than in any other foreign market, including the U.S.-Canada Bilateral Aviation Safety Agreement (BASA) that facilitates airworthiness approval by Transport Canada of FAA-approved aerospace products. U.S. companies can also export International Traffic in Arms Regulations (ITAR) items to Canada more easily due to Canada's ITAR Exemption.

U.S. companies are encouraged to participate in Canadian trade shows and industry events. Canadian representatives prefer to do business with companies they can build a long-term relationship with. In addition to selling directly to clients. U.S. companies should also consider establishing distributorships or hiring local sales representatives given Canada's large landmass, hence facilitating greater access.

Current Market Trends and Demand

Prior to the industry disruptions of 2020, production in the Canadian civil aerospace market was forecast to outpace the global market for the 2014-2021 period. This was due to the rise in the need for civil aircraft, particularly the single-aisle, short- to mid-range categories, all markets that Canada dominates in. Due to these disruptions, however, the aerospace sector has been greatly impacted as airlines have had to cancel or delay their orders and delay delivery of new aircraft. While it is difficult to ascertain the full market impacts on the aviation sector, experts say that 2019 production rates will only return in two-three years.

At the time of writing, Canada has sharply increased fiscal spending in healthcare, therefore it is unknown to predict defense spending moving forward. Further, Canada has designated “defense” an essential service and function.

Defense Emerging Technologies: Advanced Materials, Artificial Intelligence, Cyber Resilience, Remotely Piloted Systems and Autonomous Technologies.

Leading Competencies and Critical Industrial Services for Defense Aerospace: Aerospace Systems and Components, Defense Systems Integration, Electro-Optical / Infrared (EO/IR) Systems, In-Service Support, Training and Simulation.

Opportunities

Aircraft Parts

The aircraft parts and systems sub-sector is the largest of the Canadian aerospace industry representing over 60 percent of the sector. Within this sub-sector, the best business opportunities are in engine parts and components; composite materials; avionics; manufacturing 4.0 processes; space parts, particularly satellite parts.

Defense Products

Future Fighter Capability Project (FFCP) - The Future Fighter Capability Project will acquire 88 advanced fighter jets, along with associated equipment, weapons and sustainment capability at an approximate cost between US\$11 – 14.3 billion.

Remotely Piloted Aircraft System (RPAS) - The RPAS program is for the acquisition of a medium altitude and armed Remotely Piloted Aircraft System. The procurement budget is between US\$753 million and US\$3.76 billion, and it includes project management costs, infrastructure, contracts and contingency

Maintenance, Repair and Overhaul (MRO)

The MRO sub-sector continues to grow significantly in Canada. While it represented 7 percent of the aerospace sector in 2010, it is now over 30 percent. Canada’s MRO center is in

Winnipeg, with substantial aircraft maintenance being done near the Toronto Pearson International Airport and the Montreal Trudeau Airport.

Trade Events

- **Unmanned Canada**, Virtual Conference and Trade Show, November 2-6, 2020
- **Canadian Aerospace Summit**, Ottawa, Ontario, November 3-4, 2020
- **Aerospace Innovation Forum**, Montreal, Quebec, December 14-15, 2020
- **Aeromart Montreal**, Montreal, Quebec, March 30-April 1, 2021
- **U.S. Delegation to CANSEC 2021**, Ottawa, Ontario, June 2-3, 2021

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Denmark

Executive Summary

Denmark enjoys an expansive air traffic network consisting of 15 public airports and numerous independent airfields. Copenhagen Airport is the largest Danish and Scandinavian airport and is classified as a European hub airport, receiving around 30 million travelers annually. Management of air traffic is the responsibility of Naviair, an independent state-owned enterprise.

Besides the SAS Group – the Scandinavian flag carrier for Denmark, Sweden, and Norway – the Danish aviation industry is comprised of several smaller companies that depend on a few large contracts. They each cater to the dependencies of major individual companies in relation to transportation of personnel and freight, for instance in connection with the offshore oil industry.

In 2017, the Danish aviation industry directly employed 30,000 people and an additional 20,000 people in tangential companies. Moreover, it is estimated that the sector, including its indirect effects, creates value for more than DKK 30 billion, or around USD 4.5 billion.

Market Entry

The import climate of Denmark is open to U.S. products and governed by fair business conduct. In the interest of minimizing costs, major Danish civil aviation buyers usually prefer to deal directly with the manufacturers of aircrafts, aircraft parts, and other relevant equipment. Because purchasing timelines may differ depending on market, U.S. firms may consider building a network of local business contacts to gain insight into timing of major contract bids or equipment purchases in Denmark. This can be achieved by using local consultants or setting up a locally based sales office. During the sales process, it can be advantageous for the exporter to help with certification procedures and preparation of appropriate documentation (i.e., manuals and pilot instructions).

In Denmark, EU directives dictate the regulative framework that market participants must abide by. In many cases, these directives supersede national legislation. This ensures common standards in areas such as market entry, passenger rights and safety procedures. Like most countries, the civil aviation industry in Denmark is subject to very fierce price competition, which drives margins down.

Current Market Trends and Demand

Over recent years, the overall Danish market demand for aircrafts has steadily declined. From 2015 to 2019, the number of registered aircrafts decreased from 1,064 to 1,008. This decrease reflects an overall downward trend in the number of aircrafts of all sizes, including helicopters.

The market's largest categories are airplanes with 1-2 or 3-5 seats. These aircrafts account for 73.4% of the market. Propeller aircrafts with 1 engine also represent a significant proportion of registered aircrafts.

In 2020, Copenhagen Airport was named the 8th best airport in Europe by Skytrax' World Airport Awards 2019/2020. The Copenhagen Airport alone accounts for approximately 74% of Denmark's total connectivity and employs more than 22,000 people. It is the largest hub airport in Northern Europe and has seen a steady rise in the number of passengers in recent years. In 2019, the terminals of Copenhagen Airport were teeming with passengers and reached a total of 30,256,703 passengers. The airport handles 66 airlines and has room for over 100 airplanes.

In Denmark, there is a close link between the market demand for aircraft and aircraft parts and the amount of airline passenger traffic. The main airline in the Nordic region is SAS. They constitute the largest single buyer of U.S. aircraft and parts. SAS is currently engaged in replacing parts of their old fleet with new, more efficient aircrafts in order to meet sustainability targets. In addition to SAS, the charter flight airline Sunclass Airlines also boosts Danish demand for American aircrafts and parts.

COVID-19: The Danish market for civil aviation is currently faced with the economic and social consequences of the COVID-19 pandemic, producing a volatile market environment. Due to decreased demand for commercial travel, airlines such as SAS has been cancelling departures and laid off a significant proportion of its workforce. In June 2020, SAS laid off 1,600 of their Danish employees, a number representing more than 50 percent of their flight crew staff. Layoffs were not limited to flight crew personnel, however: positions ranging from pilots to technicians were also eliminated. The extreme fluctuation of trends for air traffic is not expected to normalize to pre-pandemic conditions until at least 2022.

Opportunities

Defense Products & the Arctic

The Danish government has [pledged](#) steady increases in the defense budget through at least 2023. Per NATO guidelines, 20 percent of the total increased budget goes towards new equipment. Danish defense budget increases provide an optimistic outlook for American aircraft companies looking to provide Denmark with military technology.

Danish defense needs in the Arctic are increasing along with Greenland's strategic significance amid mounting regional tensions with Russia and China. Therefore, additional resources are expected to be allocated to build the Danish military capacity to monitor and survey the Greenlandic coasts and the waters that surround the island. This development creates opportunities for U.S. contractors providing systems and solutions within this field.

Rotorcraft

There are currently no Danish firms that manufacture helicopters. In 2019, there were [115](#) registered helicopters on the market in Denmark. This is a 11.3% percentage decrease in the market from 2015, where 128 helicopters were registered, signaling a current decrease in

demand for rotorcraft in the Danish market. In addition, Denmark has 28 helidecks, that are designed for a variety of purposes. Geographically Denmark possesses 7,000 kilometers of coast line, which accounts for longstanding maritime traditions, that are transferred to the rotorcraft industry. Of the 28 helidecks, 19 of them are designed for offshore services within the oil and windmill industry, five are hospital decks and four are comprised of private platforms or attachment to airports.

The Danish buyer profile in the rotorcraft industry is a mix between public and private institutions as well as private enterprises and personal usage.

Drones

Within the past few years, the emerging industry for unmanned aerial vehicles (UAVs), also known as drones, has enjoyed remarkable attention in Denmark. UAS Denmark, the Danish drone cluster initiative, was established in 2013 to develop and promote the Danish drone industry. Shortly thereafter, several Danish universities and technology organizations began research and educational activities related to drone technology and industry development. Today, UAS Denmark provides a dedicated test center of 867 square kilometers at the Hans Christian Andersen Airport in Odense, Denmark, which allows UAV operators to securely test and monitor their vehicles. The industrial network consists of 120+ international members.

Denmark highly prioritizes this industry due to drones and their corresponding technology's capacity for commercial growth. In 2016, the Danish government launched a strategy for the use of civil and commercial drones in Denmark. The ambitions for this Drone Strategy is to establish a good and secure framework for technological and commercial development in the area. The strategy presents 23 initiatives to enhance the development and use of drone technology in Denmark. The high level of national ambition and access to advanced UAV facilities give U.S. businesses immense opportunity for development.

Trade Events

Roskilde Airshow

August 13 - 15, 2021

Roskilde, Denmark

www.airshow.dk/en/

Roskilde Airshow takes place every other year at Roskilde Airport and presents a wide range of airplanes. At least one international airshow team participates as well as military planes; helicopters from the Danish Navy, the Army, and the Air force; and passenger planes, business aircraft, and helicopters. Also, military war birds from World War II, acrobatic flights, and a great number of experimental airplanes (homebuilt) and veteran airplanes including the Danish KZ airplanes participate. The show includes planes from Denmark, Sweden, Norway, Germany, and England, as well as gliders, ultra-lights, model planes, and parachute jumping. All aircraft participating in the airshow will be accessible on ground as well as several different exhibitions related to flying, such as flying clubs, flying unions, flying schools, etc.

Nordic Defense Industry Seminar (NDIS)

August 2021

fmi.dk/da/industri/industridag/ (Seminar details will be updated as available)

The Danish Ministry of Defense Acquisition and Logistics Organization (DALO) annually organizes the DALO Industry Day, which is a large “open house” event, where DALO employees as well as selected outside guests have the opportunity to meet with industry exhibitors. The purpose of the Industry Day is to create a framework in which managers and employees from DALO and the other authorities of the Armed Forces can meet with representatives from the Danish defense industry to discuss opportunities, needs, and issues. The event is a natural initiative in connection to the Ministry of Defense’s “Open for Business” strategy, which contributes to the promotion of Danish companies - primarily in relation to defense and aerospace. Last year’s event attracted approximately 130 companies and over 350 participants. DALO is primarily aimed at Danish companies which develop and manufacture defense equipment – primarily members of FAD, CenSec, Naval Team Denmark, and Danske Maritime as well as companies under the Danish Industry.

Relevant Associations

Danish Aviation Association

www.es-daa.dk

DAA seeks to promote the interests of its members as a part of the commercial and technical areas of the aviation industry in Denmark. ES-DAA represents the Danish chapter of the European Council of General Aviation Support - ECOGAS - ECOGAS.

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Finland

Executive Summary

The Finnish aviation market is suffering significant impacts from the market disruptions of 2020 and related decreases in air travel. The full extent of the impacts is unknown at the time of this writing. The following report covers the Finnish aviation market for the time period up to, but not yet including, 2020 and the economic implications as a result of these disruptions.

The Finnish aviation market has been booming for the last few years due to increased domestic and international air traffic. The year 2019 was exceptionally busy, with Finland's airports serving close to 26 million passengers. Total air traffic related activities, including airlines and their supply chains, employ more than 100,000 people and are estimated to account for 3.2 percent of Finland's GDP.

Market Entry

Finavia is a state-owned commercial enterprise that manages the Finnish national airport network and maintains the Finnish air navigation system. Finavia's airport network consists of 21 airports. The volume of air traffic by number of air transport passengers has been increasing steadily for many years now. In 2019, the total number of passengers reported by Finavia was over 26 million. Finland's largest international airport, Helsinki-Vantaa, welcomed 21 million (81 percent) of those passengers, with a record-breaking 74,000 on a single day in June. The number of passengers at Helsinki-Vantaa connecting from an international flight to another international flight increased by 16.7 percent, representing 38.6 percent of all passengers at Helsinki-Vantaa in 2019. Most on routes from Japan, Germany, China and Sweden.

The number of civil aviation operators in the market is fairly small. Finnair is Finland's flagship air-carrier since 1923 and one of the world's longest continuously operating airlines. Other airlines operating in the Finnish market include Nordic Regional Airlines (NORRA), Scandinavian Airlines, Norwegian, Air Baltic and Lufthansa. Additional operators include air taxi and business jet service providers. Finnair Technical Service, the airline's maintenance department and GA Telesis Engine Services (GATES), a full-service engine overhaul and repair station based in Helsinki International Airport, are the largest buyers of aircraft parts when it comes to commercial aircraft and component repair and overhaul. GATES is a fully integrated subsidiary of U.S. based GA Telesis. Finland's import climate is open and receptive to U.S. products. The major buyers in the market usually prefer to operate directly with aircraft, part, and equipment manufacturers—personal contacts are important and highly appreciated. The Finnish climate sets demanding requirements for both civilian and defense technologies. Everything must function and be reliable in an arctic environment, as well as in summer's heat and autumn rainfalls.

Current Market Trends and Demand

Finnish aviation operators have been facing operational challenges in a fiercely competitive business environment. However, Finnish aviation companies continue to be forerunners and innovators in offering environmentally friendly solutions for the aviation industry. For example, jet engine cleaning solutions for cleaner engine components, faster cleaning processes, and reduced failure rates.

Carbon neutrality is a current top priority for the civil aviation industry. The aeronautics industry plays a key role in reducing the environmental impact of civil aviation through innovation, particularly in lessening noise levels and decreasing fuel exhaust emissions. Joint technology initiatives funded by the EU, such as Clean Sky and SESAR, are crucial in this respect and help to ensure that each new generation of aircraft reduces emissions by 15-20 percent. The implementation of the first ever sectorial carbon offsetting scheme (CORSIA) will also be instrumental in decarbonizing aviation, especially in view of its growth forecast.

At Finnish airports, responsibility towards the environment and sustainability is reflected in Finavia's climate program which consists of a range of different actions. Its essential parts include increase in the use of renewable forms of energy, the origin of power and heat, and the improvement of energy efficiency in all activities.

Another trend in aerospace is electric aviation and drones. The development of unmanned, electric aircraft is revolutionizing the aviation and defense sectors. Electric aircraft are expected to play a role in how the air transport sector responds to addressing climate change. For example, an electric aircraft running by wind or solar power could run completely emission-free. Finavia is involved in the development of electric flying in Finland. It is anticipated that the first full e-passenger plane will fly on domestic routes in Finland by 2030 at the earliest.

Opportunities

Aircraft Parts

According to the Trade Policy Information System (TPIS) the \$97 million export value of U.S. aircraft, spacecraft and parts, HS88 to Finland in 2018 represents almost a 40 percent increase from the previous year (\$69 million in 2017), and ranks Finland at #74/209 as an export destination.

Defense Products

The Finnish Defense Forces annual budget represents one percent of Finland's GDP. In 2018, total defense materiel procurement totaled \$611 million, just over 21 percent of the total defense expenditure. The Finnish Defense Forces is preparing large procurements for the upcoming years, which include fighter planes for the Air Force (HX Fighter Program), multi-purpose ships for the Navy, and artillery for the Ground Forces. Cooperative ventures and partnerships with the Finnish defense industry, including Patria Group and Insta Group which

both have a strategic partnership with the Finnish Defense Forces Logistics Command, are highly recommend for market entry.

UAV/Drones

Different industries have shown interest and adopted novel commercial drone solutions for efficient asset, logistics and security management. Land and sea drone markets are rather untapped, but smaller in size compared to the aerial drone market. There are several on-going R&D programs providing opportunities for cooperation and market entry. Harsh weather conditions with strong gusts and cold temperatures demand a lot from the drones granting premium products to have the best prospects to succeed in the market.

Trade Events

International Paris Airshow 2021

Paris-Le Bourget, June 21-27, 2021

<https://www.siae.fr/en/>

The Paris Air Show is the largest aerospace-industry exhibition Air Show in the world.

Farnborough International Air Show 2022 (2020 cancelled)

Farnborough, UK, July 17-24, 2022

<https://www.farnboroughairshow.com>

Farnborough International Air Show is one of the biggest, most internationally attended aerospace events in the world - a globally renowned showcase of aerospace equipment and technology.

Finnish Aeronautical Association's Annual Airshow (in Kauhava for 2020)

<https://www.kauhavaairshow.com/#>

Trade Associations

The Finnish Aeronautical Association (FAA)

Finavia

Association of Finnish Defense and Aerospace Industries, AFDA

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France

Executive Summary

Reported sales revenue for the French aerospace industry in 2019 grew to €74.3 billion, this is a 13% increase over 2018. The aerospace and defense aerospace industry exported approximately 84% of its consolidated turnover, and the civil sector represents 73% of revenues. Orders overall in 2019 were slightly up, to €61.9 billion.

However, since the Spring of 2020 there has been a very sharp downturn, which is reshaping the market in the immediate. Airbus has announced it will hold production down by 40% for at least the next 2 years, and has laid off 15,000 employees. This is impacting all parts of the aerospace supply chain deeply and has forced the cancellation of hundreds if not thousands of external service contracts by Airbus. MRO services and components and aerostructures are particularly affected. Despite the downturn, Airbus currently has a production backlog of 8 and a half years.

Five aircraft manufacturers account for the majority of the French market: Airbus (large commercial and military aircraft, drones, spacecraft), Airbus Helicopters, Dassault Aviation (high-end business jets, fighter aircraft, UAVs), ATR (passenger and cargo turboprop aircraft for regional transport, an Airbus JV with Italian firm Leonardo), and Daher (TBM and Kodiak light aircraft and business turboprops).

In defense, France and the United States are close operational allies, but France buys very little defense equipment from the United States and almost always FMS when it does - preferring to build its own equipment or partnering on a European level in order to maintain its strategic independence. France is very reticent to use components subject to ITAR in its defense supply chains.

The 2020 defense budget is €37.5 billion, an increase over the previous year, and the equipment acquisition share is about a quarter of that. The Ministry of Defense has accelerated a number of purchases for a value of about €832 million – tanker aircraft, surveillance aircraft, helicopters, naval drones – all French made.

Market Entry

Because of the breadth and depth of the aerospace industry in France, U.S. manufacturers often decide to use the services of a distributor or agent to reach out to the many potential customers. It is generally considered difficult to break into the business (with some exceptions based on product type) without local representation that can interface with the various layers of engineers, purchasers and supply chain quality managers. It is normal business practice in France for manufacturers' representatives to work on retainer only or a mixed retainer/commission fee; rarely will an agent accept a commission-only contract to develop new business. U.S. firms must be prepared to invest significantly in their business development process over extended periods before generating any orders. AS9100/ISO 9001 certification

would be considered the minimum requirement for doing business in the aerospace supply chain in France.

In general, the French aerospace market provides many opportunities (not necessarily in the next 2-3 years, but will again) and is considered extremely competitive. Potential new suppliers must target the right tier and understand clearly what their value added is compared to those already in place in the supply chain, and must understand they will be competing with companies from around the world, not just in France. Lead times to sales may be very long. Many major French firms like Safran, Airbus or Dassault are all present in the US and have sourcing offices there, which may be an easier path to receiving OEM approval.

France is also a challenging environment for American defense companies – it is extremely important to look “French”, or at least “European”, and to explore ways to increase local footprint, through local manufacturing or other French content. JVs or partnering arrangements will help, as firms benefit from the experience of the French company (instead of being a competitor) in its own market, and share costs and look French. It is extremely rare for the French MoD to purchase from a U.S. based supplier directly. A local partner or a physical presence is a necessity.

Current Market Trends and Demand

A major technology shift is taking place in aerospace in France – the current market difficulties and the resulting French Government aerospace assistance plan has accelerated it - and that is to move to producing a zero emissions aircraft by 2035, a very ambitious goal. It is usually new aircraft development, driving new design and technology requirements, which create opportunities for potential suppliers.

The best prospects for American firms in this market continues to be those associated with the manufacturing of new aircraft or engine models, or very technical products.

Opportunities

Aircraft Parts

Future aircraft will increasingly include more electric systems on board and will move to hydrogen as a primary fuel, although there are other technologies such as hybrid electric or biofuel options on the table in the interim. The decision on the technology to pursue to achieve a narrow body carbon neutral aircraft should be made in 2025, for a launch in 2027-2028 and entry into service by 2035. Airbus is looking to field a successor to the A320 or perhaps a regional aircraft. Other technologies of interest include Enhanced Vision Systems, other autonomous systems and specialty materials.

Airbus is also currently reviewing the approved Boeing list of suppliers in order to identify new potential suppliers. They are looking for redundancy, expecting industry consolidation to take place in the supply chain over the next 2-4 years.

Defense Products

France is one of the few nations in the world that maintains full spectrum military production capabilities, including fighter jets, nuclear submarines and aircraft carriers and ballistic missile production. Usually ranked as the 3rd or 4th major arms exporter in the world after the U.S., Russia and China, it is a small country with a big defense footprint. France is a strong supporter of its own and the EU's technology and industrial base.

Because France is a major arms exporter, competing around the world with American platforms, the French MoD has instructed its prime contractors to actively seek ways to eliminate any products in their supply chains which require 3rd country authorization, such as products covered by U.S. ITAR regulations; the French government considers it is a commercial disadvantage for its defense sales to be contingent upon the U.S. government for export permission.

France has announced it will build a second aircraft carrier and is supposed to make the technology choices such as the type of propulsion system or catapults, among other things, during the summer of 2020.

Rotorcraft

Airbus Helicopters, the dominant manufacturer in France, is the rotorcraft used almost exclusively by the French military, Police, EMS and Gendarmerie.

As with commercial aircraft, the French Government is actively encouraging Airbus Helicopters and the aviation supply chain in France to design and field rotorcraft fueled by hydrogen.

Trade Events

Euronaval – Naval Defense, biennial in October

<http://www.euronaval.fr>

Aeromart Toulouse – Aero BtoB, biennial in December

<http://www.euronaval.fr>

JEC Composites Europe Show - Composite Manufacturing, annual in March/April

<https://www.jec-world.events/>

Paris Air Show – biennial in June

<http://www.siae.fr/EN.htm>

Eurosatory – Land and Land/Air Defense, biennial in June

<http://www.eurosatory.com>

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Germany

Executive Summary

In 2019, the German aerospace industry reported revenues of EUR 41 billion, representing a growth of 2.5% over 2018 (EUR 40 billion). At the beginning of the decade, the annual revenues were just over EUR 25 billion. From there they climbed to EUR 40 billion in 2017, remained steady in 2018, and plateaued at 41 billion last year, before the COVID-19 pandemic and the impact on the global aerospace sector. Consequentially, the German Aerospace Industries Association (BDLI) announced in July 2020 that the pandemic represents the biggest threat to the industry in decades. At the end of 2019, the number of direct employees in the German aerospace industry stood at 114,000, up 2.2% to from 111,500 in the previous year. The share of university graduates was 50%. Another 900,000 jobs were supported throughout the supply chain of the aerospace industry. Some 250,000 people worked in the air transport sector. Research spending is significantly higher than in any other industry. It amounted to EUR 3.3 billion or 8% of the overall revenues in 2019. Seven years earlier, this figure stood at EUR 4.4 or 15.7% of the overall revenues of EUR 28.4 billion. This was due to higher investments in new materials and processes related to the production ramp-up of commercial aircraft and the introduction of new aircraft models by Boeing and Airbus. Due to its technological know-how and its strong innovative capacity, the German aerospace industry also has a significant effect on other industrial sectors. In 2020, the aerospace industry will decline by 30% or more.

Market Entry

Market entry in the aerospace industry can be achieved through getting access to the suppliers of Airbus and Boeing. Around 80% of Airbus' production activity is outsourced. The company works with more than 24,000 suppliers worldwide that provide products and services for flying and non-flying parts. In 2018, the overall external sourcing volume was valued at around EUR 52 billion and shared between divisions and commodities as follows: propulsion systems (40%), structure & airframe (14%), systems & equipment (10%), production material & parts (5%), product-related services (4%), cabin and cockpit (3%), indirect goods & services (16%), not assigned (8%). Some 27% of the sourcing occurred in the United States. Airbus' external procurement is equivalent to over two-thirds of the company's revenues. Global sourcing is one of the group's leading long-term objectives. An integrated Airbus Global Sourcing Network (GSN) has been tasked with increasing the global sourcing footprint. The GSN central team is based in Toulouse, France and operates Country Sourcing Offices in three strategic countries (China, India, and the United States). Country Focal Points are Brazil, Japan, Korea, Malaysia, and Mexico. For U.S. aerospace manufacturers, the first point of contact is the joint U.S. Sourcing Office that was set up by Airbus North America in November 2010 to enhance the group's procurement in the United States. The main sourcing tools are eProc Strategic Procurement, Click n'Buy, and AirSupply (www.airbus.com/be-an-airbus-supplier/airbus-supply-registration.html). The major German Tier I suppliers and systems integrators, such as Diehl Aviation, Liebherr-Aerospace Lindenberg, MTU Aero Engines, and Premium AEROTEC, as well as

some of the foreign Tier 1 suppliers with locations in Germany, such as Rolls-Royce Deutschland, can be approached directly. Which strategy is preferable in each case depends on the overall situation and the products of the respective supplier.

Like companies in any other industry, the German aerospace manufacturers are trying to mitigate the impact of the coronavirus crisis. On June 30, 2020, Airbus announced a reduction of its global workforce by 15,000 positions (France: 5,000, Germany: 5,100, Spain: 900, UK: 1,700, other worldwide sites: 1,300) and resized its commercial aircraft activity, which could translate into a 30 percent lower production rate. In July 2020, the company reported 49 deliveries compared to 69 deliveries in July 2019 and 77 in July 2018 (including wide-body aircraft). MTU Aero Engines feels the effects as well. The company still reported relatively good figures the first half of 2020. Revenues were EUR 2,049 million, compared to EUR 2,243 million in the first half of 2019. Operating profit was EUR 224.2 million, compared to EUR 365.2 million in the prior-year period. In March, MTU Aero Engines suspended operations at several facilities across Europe. By the end of 2021, the company aims to reduce capacity at its German and international locations by a total of around 10 to 15 percent. These are just two prominent examples. All other German aerospace companies are affected as well and have to adjust accordingly.

Current Market Trends and Demand

According to the BDLI, the German aerospace industry generated revenues of EUR 41 billion or USD 45.90 billion in 2019 (based on the European Central Bank's EUR-USD average exchange rate of 1.195). The revenues break down as follows: aviation = USD 35.82 billion or 78%; defense & security = USD 7.50 billion or 18.3%; space = USD 3.02 billion or 6.6%. The exports reported by the 200+ BDLI member companies amounted to 77% or USD 35.34 billion of the overall revenues, a slight increase from 76% in 2018. Imports from the United States to Germany reached EUR 2.69 billion or USD 3 billion, marking a 47% growth over 2018 due to higher aircraft deliveries. The overall extra-EU28 imports to Germany were EUR 4.47 billion or USD 5 billion, boosting the U.S. share from 45% in 2018 to 60% in 2019. The intra-EU28 imports to Germany amounted to EUR 12.39 billion or USD 13.88 billion. The trade data were pulled from the statistics page of the European Union Trade Helpdesk (EUTH) based on the product code for aircraft, spacecraft and parts thereof (HS 88).

With the structure of the European aerospace industry in mind, mainly the flow and aircraft parts between the Airbus sites in Germany, France, Spain, and the UK, it is easy understand that the intra-EU28 imports to Germany were almost three times higher than the extra-EU28 imports and averaged at 30% of the local production. Without France (EUR 6.42 billion or USD 7.19 billion), Spain (EUR 1.39 billion or USD 1.56 billion) and the UK (EUR 2.66 billion or USD 2.98 billion), the intra-EU28 imports to Germany were only EUR 1.92 billion or USD 2.15 billion in 2019.

The structure of the German aerospace market becomes clear by looking at the size and revenue distribution of businesses. There are under 10 large companies with over 2,000 employees but they employ 60% of the workforce and generate over 60% of the revenues. The following 15 companies with 501 to 2,000 employees employ 20% of the workforce and generate 15% of the revenues. Thus, some 20% of the companies make up 80% of the

market. Among these companies are the above-mentioned original equipment manufacturers (OEMs), Tier I suppliers and systems integrators. They are also the companies with sufficient purchasing power to buy from U.S. aerospace manufacturers. Obviously, smaller manufacturers also buy U.S.-made aerospace technology, yet in smaller quantities. The German aerospace market is mostly driven by civilian aircraft orders. That means the orders first go to Airbus and then feed the entire inter-connected supply chain. The U.S. content in Airbus' aircraft is already high. For some models, it is arguably higher than 50%. The A380 with the Engine Alliance GP7200 turbofans by General Electric and Pratt & Whitney was such an example. The A350 XWB also boasts a high U.S. content. For example, the center fuselage sections and wing spars are made by Spirit AeroSystems in North Carolina. The forward and the rear fuselage sections are added at the Airbus facility in Hamburg. Through Airbus and its suppliers, the German aerospace industry is buying a vast array of aircraft parts from U.S. aerospace manufacturers, including structural parts, raw material, avionics, and equipment. Among the more than two dozen U.S. Tier I suppliers are such major firms as Alcoa Mill Products, Coast Composites, Fairchild Controls, Honeywell, Teledyne, and Vought Aircraft Industries. Several hundred other suppliers are spread across 40+ States. The trend towards U.S. procurement has increased steadily over the last decade and it was not limited to the OEM-level. German Tier I suppliers also had a vested interest to improve their costs by purchasing from the dollar zone. However, the COVID-19 pandemic has a severe impact, especially on the aerospace industry. The ripple effect will be felt all along the German aerospace supply chain only later this year once the OEMs and the systems integrators have made the necessary adjustments. Most of the early consequences after the spread of the virus in March were compensated by the German short-time working compensation until now. Even when the economic rebound sets in, getting access to the German aerospace supply chain will be challenging and depend on a variety of factors.

Looking at this year's development so far, it is safe to assume that the German aerospace industry will decrease between 25% and 35% in 2020, resulting in annual revenues of EUR 26.65 billion or USD 30.38 billion based on a EUR-USD exchange rate of 1.14. With the imports accounting for some 35% of the market, we would arrive at a figure EUR 10.97 billion or USD 12.5 billion. With the exports accounting for some 75% of the market, we would arrive at a figure of EUR 19.99 billion or USD 22.79 billion. The difference between exports and imports would be EUR 9.02 billion or USD 10.09 billion and translate into a market size of EUR 17.63 billion or USD 20.1 billion (total production plus total imports less total exports).

As described under "Market Entry", the current demand for U.S. aerospace technology in Germany is largely dictated by the order intake from Airbus and to a much smaller degree from Boeing with its 70 to 80 suppliers in Germany. This trickles down to the German Tier 1 suppliers, such as Diehl Aviation, Liebherr-Aerospace Lindenberg, MTU Aero Engines, and Premium AEROTEC, depending on their work shares in the respective aircraft programs. In 2019, Airbus delivered 863 aircraft to 99 customers, took in 768 net orders and recorded a year-end backlog of 7,482 aircraft. The 2019 deliveries break down as follows:

- A220: 48 vs. 20 in 2018
- A320: 642 vs. 626 in 2018 (of these, 551 were NEO family aircraft vs. 386 in 2018)
- A330: 53 vs. 49 in 2018 (of these, 41 were NEO family aircraft vs. 3 in 2018)
- A350: 112 vs. 93 in 2018 (of these, 25 were A350-1000 vs. 14 in 2018)

- A380: 8 vs. 12 in 2018

The A380 production was ended due to lack of market demand. The decision was made in April 2019. Until 2019, the ramp-up of production capacities had a direct influence on the current and future demand for aircraft parts to be used by Airbus and its suppliers in Germany as well as in other European countries. In 2018, Airbus aimed to achieve a monthly production rate of 60 A320 family aircraft by mid-2019. On April 2nd, 2020, the company announced that it would reduce production from 60 to 36 per month for one or two quarters to address the industrial and delivery-related challenges raised by the coronavirus pandemic. In July 2020, Airbus delivered 49 aircraft which is still pretty good considering that airlines are one of the hardest-hit industries at this time.

In December 2019, the 22 German international and 16 German regional commercial airports recorded some 16.9 million passengers. This represented a decrease of 1.9% from December 2018. In total, some 248.5 million passengers were counted at German airports from January to December. Domestic traffic was down by 1.9%, while European traffic grew by 2.3%. Intercontinental traffic saw an increase of 2.7%. The number of commercial aircraft movements fell by 4% to 154,828 departures and landings in December but remained stable overall with 2.2 million, mainly due to growth at some of the smaller international airports.

Air freight slumped for the second consecutive month to 397,377 tons, 4% less than in December 2018. Overall, air freight saw less demand, with 2.5 million tons (-4.3%) of outbound cargo and 2.3 million tons (-2.1%) of inbound cargo in 2019. The picture in 2020 is an even more drastic one. In June 2020, domestic traffic was down by 91%, the European traffic was down by 93.9% and intercontinental traffic was down by 96%. As of August 2020, with the case numbers increasing all over Europe, it seems unlikely that the situation will improve before early 2021. Air traffic figures are published by the Association of German Commercial Airports (ADV – www.adv.aero). The annual figures for 2019 are included in the monthly report for December 2019 (www.adv.aero/wp-content/uploads/2016/02/12.2019-ADV-Monatsstatistik.pdf). The report is only available in German but a breakdown of the passenger numbers by airport is included on pages 10 to 13. The current figures are available here: www.adv.aero/aktuelle-verkehrszahlen/

Opportunities

Under normal conditions—without a crisis of global proportion—opportunities in the German aerospace industry are relatively evenly distributed across all levels of the industry. However, while it is possible for U.S. firms to supply aerostructures on an OEM level, getting access to the supply chain on the first, second or third tier should be faster. OEMs and systems integrators constantly screen the market for capable suppliers. The overall best prospects include everything from commercial, business and GA aircraft, aircraft and engine parts, airborne equipment and systems, aircraft interiors, pilot controls and avionics, as well as composite materials, structural components, and forgings and fasteners. Potential suppliers should be AS9100-certified and/or NADCAP-accredited. Entering the market requires a long-term approach.

a. Example: Aircraft Parts

A good example of fully or partly U.S.-made aircraft parts that go on European models that are assembled or outfitted at German Airbus sites are the engines for the A320neo product line. Neo stands for new engine option. The baseline A320neo has a choice of two new-generation engines, the PurePower PW1100G-JM from East Hartford, Connecticut-based Pratt and Whitney and the LEAP-1A from CFM International, a joint venture between Evendale, Ohio-based GE Aviation, a division of General Electric, and Safran Aircraft Engines, a division of Safran from France. Thousands of U.S.-parts go into these products but U.S. manufacturers of engine parts can also supply Munich-based MTU Aero Engines (www.mtu-portal.com/wps/mos). The same is true for other aircraft parts. The road to becoming a supplier can be a long one though.

b. Example: Defense Products

Other than the commercial aerospace industry, the defense sector will suffer as much this year. The German defense budget for 2020 stands at EUR 45.2 billion or USD 51.53 billion based on a EUR-USD exchange rate of 1.14. Some 23.4% or EUR 10.56 billion are set aside for procurement, an increase of 7.9% over the previous year (EUR 9.79 billion). Most of the large defense procurement projects are on track. The largest chunk will go to German or European defense firms, but U.S. companies may be awarded with contracts if local technology is not available or existing U.S.-made systems need to be replaced or upgraded.

German defense companies also stand to benefit from a EUR 10 billion cash infusion under a massive stimulus package meant to soften the economic blow of the coronavirus pandemic. Leaders of the CDU-SPD coalition government unveiled the measure in June, which provides a total of EUR 130 billion, in the hopes of mustering enough economic “oomph” to get through the crisis swiftly, as German Finance Minister Olaf Scholz put it.

Defense News commented on the fact that a defense “earmark” is included in the package as an explicit instrument for helping industry as setting a “new tone in a country where defense sector dealings are traditionally treated as a necessary evil in the business of geopolitics.” Consequentially, German Minister of Defense Annegret Kramp-Karrenbauer said in an interview as part of the Brussels Forum, an online think tank event: “Behind every equipment decision there is an industrial-policy calculus, especially nationally, that includes jobs.” This indicates that most of the money is intended to go to German defense firms. Some of it may trickle down to U.S. companies who supply to these firms.

c. Example: Rotorcraft

According to the German Federal Aviation Office (LBA), there were 729 registered helicopters in 2019. In terms of production, Airbus Helicopters is the dominant player in the market. The company is headquartered Marignane, France, and has sites in Donauwörth and Kassel, Germany. Donauwörth, the German head office, is home to the final assembly process for the civilian H135 and H145 models, the Tiger attack helicopter, and the NH90 transport and naval helicopter; testing, research, and prototyping; as well as the Military Support Center for helicopter fleet of the German Federal Armed Forces, including the Sikorsky CH-53, Sea Lynx Mk88A, and Sea King Mk41. In 2019, Airbus Helicopters saw slower commercial momentum but took in 369 gross orders (310 net orders), down from 413 gross orders (381 net orders) in

the previous year. Some 130 orders were for the best-seller H125. The company delivered 332 helicopters, including the 1,000th Super Puma, thus maintaining its lead in the civil and para-public sector with a 54% market share in terms of units. The revenue split was 55% civil and 45% defense. At the end of 2019, Airbus Helicopters employed just over 20,000 people worldwide, of which 5,500 were based in Donauwörth and over 100 were based in Kassel. U.S. exports into Germany in the HS customs categories for helicopters under 2,000 kg (8802.11) and over 2,000 kg amounted to USD 6.2 million in 2019, while German imports to the United States reached USD 7.1 million. Earlier in the decade, German imports to the United States were over 100 million per year. The U.S. market is now mostly served from the Airbus Helicopters' U.S. sites which explains the sharp decline. Apart from that, the demand for new helicopters in Germany was somewhat limited in 2019, both on the civil and the defense side. This explains the moderate U.S. exports. The defense side is made up by the helicopter fleet of the Bundeswehr which currently operates the following models:

- 99 x NH-90 Multi-Role Transport Helicopters, Army
- 4 of 18 x NH-90 Naval Transport Helicopter (NTH) Sea Lion, Navy
- An unspecified number of Sea King Mk41 Search and Rescue (SAR) helicopters operated by the Navy. They will be phased out and replaced with the NH-90 NTH starting in 2020.
- 22 x Sea Lynx Mk88A Helicopter, Navy
- 15 x H145M Light Utility Helicopter (LUH) – Special Operation Forces (SOF), Air Force & Army
- 71 x CH-53G(S) Transport Helicopter (a total of 112 CH-53 G/GS/GE/GA models were acquired since the 1960ies), Air Force
- 53 x Tiger Combat Helicopter, Army
- 19 x EC135/H135 Training Helicopter, Army

For the civil side, the German Helicopter Association (DHV) provided the following breakdown before 2015: Federal and State police (120), air rescue (110), offshore and wind farms (10-15), personal transport / two-engine VIP (70), aerial work (130). A more recent breakdown was not available at the time of this writing. The figures should still be fairly current because there has been little movement in the police and air rescue segments. The U.S. content of Airbus Helicopter models is substantial but not as high as the content on commercial aircraft. Honeywell Aerospace, for example, is listed as an engine supplier. The H135 uses collision avoidance systems from Avidyne, full authority digital controls from Goodrich Engine Control Systems, engine air filters from Pall, and rotor drives from UTC Aerospace Systems. Lastly, a quick glance at the UH-72A, Airbus Helicopter's H145-based, American-built solution for the U.S. Army utilizes systems, components and hardware from numerous U.S. suppliers, including CAE, Goodrich, Keith Products, NORDAM and Sikorsky.

Trade Events

Aircraft Interiors Expo 2021

Hamburg, April 13-15

www.aircraftinteriorsexpo.com

World's largest exhibition for airline interior design and airline cabin systems

engineering. Launch pad for a wide range of product types from cabin management systems, fasteners, finishing, flooring, galleys, in-flight entertainment, interior paints, lighting, seating, repairs, safety, wiring, and more. Attracted close to 600 exhibitors, 1,200+ airline buyers, and 14,000 industry decision makers in 2019. Over 100 of the exhibitors were from the United States. The 2020 edition of the show was cancelled due to the COVID-19 pandemic.

AERO 2021

Friedrichshafen, April 21-24

www.aero-expo.com

International trade fair for general aviation and ideal stepping-stone to enter the European market. The range of exhibits comprises business jets, single and twin-engine aircraft, light aircraft (UL, VLA, LSA), motor gliders, kit planes, helicopters, propulsion systems, components, avionics, and more. Attracted 600 exhibitors from 35 countries and 33,000 visitors from 40 countries in 2019. Some 50 of the exhibitors were from the United States. The 2020 edition of the show was cancelled due to the COVID-19 pandemic.

inter airport Europe 2021

Munich, November 9-12

www.interairport.com/europe/english

World's leading exhibition for the airport industry with a comprehensive range of equipment, technology and services for ground handling, terminal operations, airport IT and airport design. Held every two years in Munich, Germany. Caters to a global audience of industry professionals from airports, airlines, air cargo carriers, and aviation-support. Attracted 659 exhibitors from 40 countries and 14,962 visitors from 108 countries in 2019. Some 74% of the exhibitors and 80% of the visitors came from outside of Germany. The United States contributed the fourth-largest exhibitor contingent with 55 companies.

ILA Berlin 2022

Berlin, May 11-15

www.ila-berlin.de

One of the most important aerospace, defense and space industry trade shows in Europe. Held every two years at Berlin ExpoCenter Airport. The main segments are Aviation, Space, Defense and Security, Suppliers, Unmanned Systems. Special segments are Helicopters, Cyber Security, Digitalization, Future Lab, ILA CareerCenter (branded spelling). The 2018 edition attracted 1,100 exhibitors from 41 countries, 65,000 trade visitors from close to 100 countries, and 2,500 media representatives. Some 20 exhibitors were from the United States. The 2020 edition of the show was cancelled due to the COVID-19 pandemic.

German Aerospace Industry Associations

German Aerospace Industries Association (BDLI)

www.bdli.de

German Airport Technology & Equipment

www.gate-alliance.de

HANSE AEROSPACE e.V.
www.hanse-aerospace.net

ALROUND (Association of Aerospace-oriented SMEs in Germany)
alround.de/

German Helicopter Association (DHU)
www.dhv-org.de

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India

Executive Summary

The world is facing an unprecedented situation due to the COVID-19 pandemic. The aviation sector has been particularly hard hit globally, including India. Given the evolving situation and uncertain economic impact of the pandemic, companies are advised to reach out to us for the latest updates. Prior to the COVID-19 outbreak, India's civil aviation market, the third largest in the world after China and the United States, was expected to continue to grow rapidly. By 2035, India was expected to be a market of 442 million passengers, with the aviation industry supporting 19.1 million jobs and contributing to \$172 billion in GDP, according to the International Air Transport Association (IATA). India was expected to need an additional 2,500 passenger aircraft according to the Boeing market forecast.

India has the third largest armed forces in the world and plans to spend billions of dollars on defense acquisitions over the next several years. India is the third largest defense spender after the United States and China, according to Jane's HIS Markit. Due to an underdeveloped defense manufacturing sector, India is one of the largest importers of defense equipment. India imports approximately 60% of its defense requirements, according to the Government of India. This makes India one of the most attractive markets globally for foreign defense manufacturers. Following the U.S. designation of India as a Major Defense Partner in 2016, the U.S.-India defense relationship continued on a positive trajectory. The defense relationship emerged as a pillar of the U.S.-India strategic relationship and an important driver to the overall bilateral relationship. In 2018, the U.S. Department of Commerce announced Tier 1 Strategic Trade Authorization status (STA-1) for India, enabling a license exception for many U.S. exports to India subject to the Export Administration Regulations (EAR).

The sentiment in India in relation to U.S. products has always been very favorable. Connections between people of the two great democracies and rich relationship between the two governments have built an unflinching trust in U.S. products. India's middle class, constituting nearly 30 percent of India's total population, is seen as a major force driving the country's economy, and to a great extent influencing major policy decisions directly or indirectly.

Market Entry

India, aptly described as having "many countries within a country" due to multiplicity of authority among other reasons, is a complex, large, and diverse market. The exporter needs to have a fair idea of India's laws and restrictions both at macro and micro levels. The Indian market has failed those who aim to make quick money and leave. It pays you well if you build a strong foundation by getting right local partner, pursuing your goals with utmost patience, showing persistence, and with an eye on competitive pricing.

New-to-market companies must address issues of sales channels, distribution and marketing practices, pricing and labeling, and protection of intellectual property. These issues can often be effectively addressed through an Indian partner or agent. Relationships and personal

meetings with potential agents are extremely important. Due diligence is strongly recommended to ensure that partners are credible and reliable.

There are many foreign companies eyeing opportunities in India. For entry into the Indian market, it is essential to identify the target market and find good partners who know the local market well and are completely acquainted with procedural issues. Foreign investors should also explore various market options in India that could include forming subsidiary relationships or joint ventures with an India-based company.

Current Market Trends and Demand

Defense is one of the most promising sectors for U.S. exports to India, thanks to U.S. products' technological edge and India's determined efforts to be well-equipped in dealing with all possible challenges from some of its neighbors. Given the Indian government's strong preference for products designed and manufactured in India (India's defense ministry released draft DPP in March 2020 with an aim to encourage indigenous capability), many U.S. companies are now implementing strategies to develop partnerships, cooperation, and supply chains within India to meet future defense requirements. Defense procurement timeframes are long. There can be poor transparency in the procurement process and offset regulations can be challenging to navigate and manage on extended timelines. Poor infrastructure and skills gaps pose manufacturing challenges. There can also be substantial payment delays.

The 2020 pandemic situation is bound to have a deep impact on the civil aviation sector which was previously a fast-growing sector. The industry may undergo complete restructuring to meet the challenges ahead. Business models, traffic growth, fleet expansion, pricing, and costs may have to be made contextually relevant. As India builds greenfield and brownfield airports over next 10 years there will be growing opportunities in airport planning and development, sustainable airports, safety and security, body scanners, and digital systems, etc. Policy reforms, such as including aviation turbine fuel in the Goods and Services Tax (GST), would create opportunities for U.S. investment to address India's shortage of Maintenance Repair Operations (MRO) facilities.

Opportunities

General and Business Aviation Aircraft

India operates fewer than 300 civilian helicopters, compared to over 14,000 in the United States. Similarly, India has few small fixed-wing aircraft. With increased interest in developing regional connectivity, tourism, and emergency medical evacuation, opportunities are expected in these sectors.

Maintenance Repair and Overhaul (MRO)

India's growing fleet of airplanes will demand more maintenance services. 90% of India's MRO business currently occurs outside India, especially in Sri Lanka, Singapore, and Malaysia. India continues to try to develop the MRO sector. In support of this goal, India's GST council has

“decided to re-work the GST structure for MRO for aircraft and slashing the tax from 18% to 5% along with providing the benefit of full tax credit on inputs”.

Navigation and Air Traffic Management Systems

According to NCAP, the Airports Authority of India (AAI) is ranked as a top global air navigation service (ANS) provider. AAI continues to upgrade and modernize air navigation services. With the launch of the GPS Aided GEO Augmented Navigation (GAGAN) system, India became the fourth country in the world to implement satellite-based navigation systems. India began utilizing satellite-based ADS/B services in 2019. Radar systems and other air traffic management systems are in demand.

Safety and Security

Airport and aviation safety and security systems are a top Indian priority for each airport and throughout the industry. In 2018, DGCA successfully passed an FAA International Aviation Safety Assessment (IASA) based on accomplishing International Civil Aviation Organization (ICAO) standards for civil aviation regulatory safety oversight. There are many opportunities for safety and security equipment and solutions in all aspects of the aviation industry, especially x-ray scanner equipment for passengers and baggage. The government has also mandated about 84 airports to be equipped with body scanners.

Remotely Piloted Aircraft (RPA), Drones

India sees great potential and aims to develop opportunities for drones and remote aircraft. Recently, the DGCA allowed ten consortia to carry out “beyond visual line of sight” (BVLOS) drone projects in designated airspaces across the country. In 2018, the DGCA released the first drone regulations, and these enabled visual line-of-sight (VLOS) daytime-only operations under 400 feet. The Digital Sky Platform is an online system rolled out to register pilots, devices, service providers and implement a “no permission, no takeoff” (NPNT) rule and listed latest policy on beyond-VLOS operations and the delivery of payloads.

Land Systems

The Future Infantry Combat Vehicle (FICV) program aims to meet the requirement for over 2,100 combat vehicles. There are additional opportunities in field artillery modernization (self-propelled howitzers and fire control systems), small arms and crew-served weapons, and precision guided munitions and surface to air missiles.

Maritime Systems

More demand for fast patrol craft is expected. The Indian Navy is also planning to build more submarines and begin construction of a second indigenous aircraft carrier. The Navy has expanding requirements for fixed and rotary wing aircraft.

Air Systems and Air Defense

There is demand under “Make in India” for coproduction of aircraft. There is also demand for unmanned aerial systems (UAS) of all sizes and capabilities, along with missiles of various ranges. The Ministry of Defense is pursuing air defense systems and close-in weapon systems to provide point defense against ballistic projectiles, missiles, and other air threats. The Ministry of Defense also hopes to expand and further develop their rotary wing and UAS fleets.

Trade Events

Aero India 2021

February 3-7, 2021

Bengaluru (South India)

<https://aeroindia.gov.in/>

The Aero India show is organized by the Indian Ministry of Defense and it is the country’s largest biennial premier air show and aviation exhibition.

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Italy

Executive Summary

With a turnover of 12 billion USD in 2019 and a direct workforce of over 50,000, the Italian aerospace and defense industry ranks among the top 10 worldwide and 4th in Europe and represents the largest manufacturing sector in Italy in the field of high-tech integrated systems. Five regional players and over 300 small- and medium-sized enterprises (SMEs) stand out at the national and international level, both in civil and military fields. The major players include Leonardo, Fincantieri, Ge Avio Aero, Thales Alenia Space Italia, Avio S.p.A. and Elettronica.

According to the Italian Aerospace Industry Federation (AIAD), 85 percent of its members are SMEs spread out across the country in clusters located in the regions of Piedmont, Lombardy, Lazio, Puglia, Campania and Umbria. About two-thirds of the sector is made up of companies that supply aircraft, spacecraft and related devices (47%) and companies specialized in repair (19.6%). The remainder manufacture equipment such as radars, flight recorders and instruments for engine control. The industry is characterized by a highly skilled workforce. Leonardo counts some 4,000 Italian SME suppliers that support 52 Italian sites. Avio Aero has over 1,000 suppliers accounting for a total purchase volume of around 470 million USD.

The 2 most important international programs for Italian industry include the Boeing Dreamliner 787, on the civil side, and on the defense side the Joint Strike Fighter (JSF). Leonardo partners with Boeing to produce composite fuselage and horizontal stabilizers for the B787. Fuselage parts are integrated in the industrial complex in Grottaglie in southern Italy prior to shipment to the Boeing assembly facility in Everett, WA. As for the JSF program, the FACO in Northern Italy assembles aircraft for Italy and the Netherlands, and produces wing assemblies for the F-35 program worldwide. The FACO should assume a central regional role as more orders are expected across Europe.

Market Entry

The best market entry strategy is becoming suppliers to Tier 1 companies that will seek certified components and require a vendor screening process. Market access is rooted in strong relationships and distribution practices and industrial competence play a fundamental and very delicate role in this industry. U.S. companies that do not wish to operate with a direct presence should have an agent or distributor that is well introduced, knowledgeable and can easily interface with technical departments and decision makers.

Financing and trade practices adhere to normal Italian business standards. The majority of financial transactions are handled through private agreements and banking institutions. Italian firms sometimes find U.S. supplier payment terms too rigid, leading to a loss of business to other suppliers. Financing is considered as much a competitive factor as the product itself, the delivery date, or after-sales service. While some U.S. manufacturers request payment upon

receipt of the goods, more successful sellers offer terms allowing settlement of the account from 60 to 120 days following the invoice date, which is the most common practice in Italy.

Current Market Trends and Demand

Prior to the market disruptions of 2020, the trend of Italian industry policy was focused on strengthening its stake in the civil market to lessen dependency on the defense market given strained budgets. The effects of an extreme market impact of these industry disruptions are causing a reverse trend, with orders and revenues holding up mainly thanks to the defense sector. On the commercial side, production cuts announced by Boeing and Airbus will greatly impact its suppliers including Leonardo and Avio Aero. Leonardo recently signed MOUs with banks and credit institutions to facilitate access to credit for its suppliers, including some 3,000 SMEs. At this writing, it is not yet clear how the main Italian players will reorganize supply chains, whether the trend will be to continue outsourcing as in recent years, versus insourcing to mitigate the impact of the crisis. The latter case would signify thousands of jobs at risk.

Opportunities

Space Products

Opportunities may exist for U.S. suppliers to the space industry. Italy holds the 6th market position worldwide and 3rd in Europe. The industrial complex counts some 600 companies and 7,000 workers that generated about 2.4 billion USD in 2018 of which about 70 percent accounting for exports. Italy's know-how includes launcher production, satellite production, ground stations, flight control and data transmission.

Rotorcraft

Opportunities may also be found within the national champion Leonardo's helicopter division. Interested U.S. suppliers should register in the supplier portal: <https://www.leonardocompany.com/en/suppliers/supplier-portal>.

Trade Events

Aerospace & Defense Meetings Torino

November 29 – December 1, 2021 | Turin, Italy

<https://torino.bciaerospace.com/>

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Japan

Executive Summary

Japan offers a lucrative market for imported aircraft, aircraft parts, and engines. U.S. firms have an overwhelming presence in the market due to long-standing relationships, some spanning over 60 years, with domestic manufacturers and trading firms. U.S. firms are presented with opportunities in the market as the domestic industry undertakes international projects, develops transport and patrol aircraft for defense, as well as small jets and small jet engines for civil aviation. U.S. firms that are new to the market should consider partnering with trading firms that are knowledgeable in aircraft industry networks.

Market Entry

Specialized trading firms market imports to domestic end-users including manufacturers, airlines, private users, law enforcement, defense, and other government agencies. Many U.S. manufacturers also have partnerships with their Japanese counterparts. New-to-market firms should consider partnering with trading firms knowledgeable in aircraft industry networks.

Current Market Trends and Demand

According to the Ministry of Finance, in 2019, imports of aircraft products amounted to \$15.9 billion, with U.S. aerospace products accounting for 59.5% of the total. U.S.-made aircraft, aircraft engines, parts and supplies enjoy an overwhelming presence in the market.

In the civil aircraft market, Japanese manufacturers such as Mitsubishi Heavy Industries (MHI), Kawasaki Heavy Industries (KHI), and Subaru (former Fuji Heavy Industries), supply about 35 percent of the content for the Boeing 787 and 21 percent of Boeing 777. Thus, the aerospace business on the commercial side is influenced by the success of Boeing programs.

MHI's subsidiary, Mitsubishi Aircraft Corporation (MITAC), has been developing a twin-engine commuter aircraft since 2008 that was originally promised for 2013 but has been postponed to 2021 or later due to a series of design changes. The firm announced in May 2019 the name of the aircraft changed from Mitsubishi Regional Jet to Space Jet in order to reflect a more global vision for the previously Japan-centric business. According to the press reports in June 2020, the firm will reduce development costs in the aircraft business by more than half to 60 billion yen (USD 550 million) in the fiscal year ending in March 2021. The workforce of 1,800 personnel will also be reduced because of the plunging air travel demand due global market disruptions. The firm is conducting flight tests for the aircraft in the State of Washington, and focusing on improving the design of the aircraft and validating testing flight data as it seeks to obtain a safety certification from the Japan Civil Aviation Bureau for the 88-seat Space Jet.

Export, Import and Production Data

Unit: USD millions

	2016	2017	2018	2019
Total Local Production	17,937	15,281	16,105	16,602
Total Exports	15,111	10,241	11,005	10,934
Total Imports	10,731	12,284	15,571	15,924
Imports from the US	13,556	8,216	10,217	9,475
Total Market Size	9,691	17,324	20,670	21,592
Exchange Rates: 1 USD	108.66	112.10	110.40	109.02

Data Sources: Total Local Production: Ministry of Economy, Trade and Industry
Total Exports, Total Imports and Imports from U.S.: Ministry of Finance

Opportunities

Japan's civil helicopter market has seen a continuous decline in the past decade due to decreasing demand for transport helicopters and dust cropping operations. The industry expects potential growth in such areas as: emergency medical services, or the so-called the Doctor Heli program, and disaster relief operations as Japan is regrettably subject to earthquakes and other natural disasters. Japan's Ministry of Defense, as the largest helicopter operator in Japan, operates helicopters for search and rescue operations at the onset of natural disasters such as major earthquakes.

The three indigenous manufacturers, MHI, KHI, and FHI, supply approximately 90% of their helicopter production to the Japan Ministry of Defense, independently and in partnership with American manufacturers such as Sikorsky, Bell and Boeing. In the civil helicopter market, all major manufacturers have established a presence in Japan. Airbus Helicopters, Bell, Sikorsky, MD and some other makers have successfully formed partnerships with local agents to market their products in Japan.

Trade Events

Engine Forum Kobe

Dates: October 20 & 21, 2020

Venue: Kobe Convention Center, Hyogo

Website: <https://www.kobe.bciaerospace.com/en/>

Description: Supply chain event dedicated to aero-engines, gas turbines and other propulsion and power generation equipment.

MAST Asia (Maritime/Air Systems and Technologies)

Dates: November 9-11, 2020

Venue: Tokyo

Website: <https://mastconfex.com/>

Description: Particularly focused on Undersea, Surface, Air, Space, and Cyber Platforms,

Systems, and Technologies, MAST provides networking opportunities between Government, Research and Technology, and Defense Industry.

DSEI Japan (Defense and Security Equipment International – Japan)

Dates: May 19-21, 2021

Venue: Makuhari Messe, Chiba

Website: <https://www.dsei-japan.com/>

Description: DSEI-Japan brings the global defense and security sector together with both the Japanese and wider Asian defense community to innovate, partner and share knowledge

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Netherlands

Executive Summary

The Dutch market for aircraft, parts, associated equipment, and services can be broken down into commercial and military sectors. Both sectors are transparent, making it relatively easy to identify the key players. Nevertheless, U.S. companies should consider working with a local representative in order to take advantage of upcoming opportunities in a timely manner. Although competition is strong, U.S. suppliers with advanced technology and a good price/quality ratio can expect to do well in the Netherlands.

Market Entry

The Dutch are receptive to U.S. made aviation products, which are well known for their innovation and quality. Price, quality and after-sales service are the dominant purchasing factors in addition to compliance to EU regulations.

Furthermore, it is important to work with a local partner or to consider opening a local sales office. A reputable agent with good contacts can provide important and timely information, which is often not readily available through public sources. In addition, in light of complicated tender and import procedures, it can be challenging to beat the competition and sell effectively without a competent agent. Companies choosing local representatives can expect to benefit from their knowledge of the market, local technical expertise, existing customer base, local marketing and sales experience, and services such as installation, maintenance, training, and after-sales service.

U.S. exporters should be aware of a growing reluctance in the Netherlands to work with ITAR-regulated products and technologies. The lead-time to obtain an export license approval for products is long. A lead time of six-to-eight weeks is deemed acceptable, but in practice, customers at the Ministry of Defense and the National Police are waiting 12-16 weeks, or longer.

Current Market Trends and Demand

Aviation remains a growth sector due to its increasing economic interest and importance to the Netherlands. Schiphol is Europe's second-best connected airport and the second-best hub for international travel worldwide. It is among the top five busiest airports in Europe and the airport authority expects further passenger and freight growth going forward.

In terms of military opportunities, the Dutch Government has committed to incrementally increase defense spending by €1.5 billion between 2019-2023, with a one-time increase of €1.2 billion in 2019 and an annual increase of €162 million in the following years. Opportunities are outlined in a national plan laid out by the Ministry of Defense, which lists the top five Dutch defense priorities: the procurement of additional F-35s, reinforcement of land capabilities through investment in direct and indirect firing power, strengthening of maritime capabilities

through investment in ballistic missile defense capabilities, additional enablers for their Special Operations Forces (on ground and in air, including an additional rotary wing), and the expansion of capabilities in the cyber and information domain.

Opportunities

Defense Products

Future military opportunities are normally outlined in the Defense Program Overview (DPO). An English version of the DPO is available on request from the U.S. Commercial Service at the Embassy in The Netherlands. The 2018 Defense White Paper offers a more long-term overview of all the opportunities between 2018 and 2033. In light of the large number of programs on the horizon, companies are advised to review the list posted here.

Woensdrecht Air Base is mainly used by the Royal Netherlands Air Force as a training and logistical base. It is also well known as the Dutch Air Force's logistics center and became the spare parts warehouse for all F-35 in Europe as of November 2019. Woensdrecht Air Base also has one civilian user, Fokker Services, which provides maintenance, primarily but not exclusively for Fokker aircraft. As a result of the presence of Fokker Services, many Fokker aircraft are usually present at the airfield. The Royal Netherlands Air Force mainly operates the Pilatus PC-7 for initial training from this Air Base.

Unmanned Aerial Vehicles

The use of Unmanned Aerial Vehicles (UAVs), also known as drones or remotely piloted aircraft (RPA), is increasing in the Netherlands. The Dutch government is developing regulations to classify and track UAVs. Law enforcement and the military are seeking technologies that will counter hostile UAV-threats.

The Dutch established an aerospace innovation hub called Aviolanda to support and stimulate the national aircraft maintenance, repair, and overhaul (MRO) sector. This initiative aims to develop the Netherlands as a premier location for state-of-the-art industrial maintenance, logistical processes, and repair in both civil and military aviation. An ongoing project at Aviolanda is the Dutch Drone Center which is a public-private partnership primarily aimed at safe testing and demonstrating of drones within a controlled airspace. This unique location provides professional drone developers and companies the opportunity to further develop their unmanned aerial systems and associated applications. Demonstrations with drones for potential customers are also possible, both for certificated and non-certificated systems or companies. The center also drives innovation and development in the fields of MRO; electronics; development production, and assembly of parts; training and education; certification; and logistics.

Trade Events

Amsterdam Drone Week (international conference and exhibition)

Amsterdam, the Netherlands

December 1-3, 2020

<https://www.amsterdamdroneweek.com>

NIDV Exhibition Defense & Security (national conference and exhibition)

Rotterdam, the Netherlands

November 19, 2020

<https://www.nidvexhibition.eu/en/home-2>

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Poland

Executive Summary

Aerospace

Poland has an over hundred years of aviation history and a tradition of more than eighty years in the aerospace industry, aircraft production and aviation personnel training. Strong scientific, academic and engineering environments played a key role in the development of this sector. The end of the Cold War brought about a rapid decline in the industry as orders from former Eastern bloc countries dried up. The situation began to improve in the late 1990's as a result of economy transformation. The expansion of international cooperation and direct foreign investments made the further development of the sector possible. Currently, the Polish aerospace industry has a rich export offer of advanced aviation products. Almost every passenger aircraft in the world features at least one component that has been produced in Poland. Since November 2012, Poland became a member of the European Space Agency and participates in many international scientific and technological projects.

According to Polish aerospace industry sources, there are over 150 aerospace manufacturers in Poland, employing over 25,000 workers, with total annual industry revenues of about \$1.93 billion in 2018. Based on the U.S. Department of Commerce statistics, 90% of Poland's aerospace production is exported. Prominent Polish aerospace manufacturers are owned entirely or substantially by parent companies in the United States and Europe.

Poland is known for the production and servicing of:

- Light sport, passenger, agricultural and training aircraft;
- Helicopters;
- Gliders;
- Parts and accessories.

Much of the country's aerospace production is concentrated in the southeastern part of Poland in an area known as "Aviation Valley" (<http://www.dolinalotnicza.pl/en/>). When established in 2003, this industry cluster consisted of 18 companies with total revenues on the order of \$270 million. Currently, the Association consists of 158 entities from the region.

U.S. manufacturers are well represented in Poland and include such firms as Sikorsky, Pratt & Whitney, Goodrich, Raytheon, Lockheed Martin and others.

Civil Aviation

During the past several years, the civil aviation sector in Poland has undergone many changes concurrent with the country's accession to the European Union in 2004. The liberalization of Poland's air transportation industry and implementation of the "open skies" agreement as of May 1, 2004, created a new operating environment and increased competition, and was resembled, among others, in the dynamic growth of the market. Between 2004 and 2008, Poland boasted one of the fastest annual growth rates of passengers served worldwide. It was in this period that two significant structural changes of the Polish aviation sector occurred. First, low-cost airlines gained footholds and then expanded their operations, thus adding to the global growth of passengers. Second, passenger traffic at Poland's regional airports increased at a much higher rate than at the Chopin Airport in the capital city of Warsaw, even if the latter remained the country's largest facility of this kind.

Poland's current airport network consists of one central airport (Warsaw Frederic Chopin), one regional central airport (Krakow Balice), 13 regional airports, and in addition several small airports, sporting and training airports owned by the Polish Aeroclub, a number of post-Russian military airports, and a few facilities owned by manufacturing enterprises. The number of passengers passing through Polish airports has been growing significantly last years. In 2019, nearly 50 million passengers traveled through the Polish airports.

With more than six percent of growth in 2019, the Warsaw Chopin airport is a country leader in passenger flow. This position was achieved mainly by contribution of LOT Polish Airlines, owned by the State Treasury, which served 18.9 million passengers in 2019. Regional airports are also fast growing with a large increase in passenger number and extended development plans.

Due to a substantial increase in air passenger traffic in Poland, and capacity of Poland's largest airport (Chopin Airport), the government announced the plan to construct the Solidarity Transport Hub (STH), a brand-new international airport, located approximately 25 miles from Warsaw. The project is scheduled to be completed in 2027. In according to government plans, new airport should handle 45 million passengers with the prospects of servicing up to 100 million travelers annually.

Size of Polish airports- passenger traffic and aircraft movements in domestic market in scheduled and charter service in 2017 – 2019.

Origin Airport	2019	2018	2017	2019/2018	2019/2017
1. Warsaw Chopin Airport					
passengers	1 758 286	1 752 184	2 093 527	0,3%	-16,0%
movements	26 983	26 359	28 114	2,4%	-4,0%
2. Kraków – Balice					
passengers	525 602	495 505	453 981	6,1%	15,8%
movements	6 466	6 505	6 352	-0,6%	1,8%
3. Katowice – Pyrzowice					
passengers	150 982	145 836	102 143	3,5%	47,8%
movements	3 130	3 246	2 433	-3,6%	28,6%
4. Wrocław – Strachowice					
passengers	346 815	313 837	537 109	10,5%	-35,4%
movements	4 711	4 617	6 241	2,0%	-24,5%
5. Poznań – Ławica					
passengers	201 299	184 256	166 647	9,2%	20,8%
movements	3 317	3 191	2 936	3,9%	13,0%
6. Łódź					
passengers	13	0	5	-	160,0%
movements	15	14	7	7,1%	114,3%
7. Gdansk Lech Walesa Airport					
passengers	428 957	413 295	637 439	3,8%	-32,7%
movements	5 541	5 495	7 534	0,8%	-26,5%
8. Szczecin – Goleniów					
passengers	216 823	236 975	203 001	-8,5%	6,8%
movements	2 517	2 781	2 476	-9,5%	1,7%
9. Bydgoszcz					
passengers	6 653	0	0	-	-
movements	176	0	0	-	-
10. Rzeszów – Jasionka					
passengers	217 010	220 731	198 858	-1,7%	9,1%
movements	3 295	3 245	2 955	1,5%	11,5%
11. Zielona Góra – Babimost					
passengers	27 848	20 852	17 016	33,6%	63,7%
movements	820	586	525	39,9%	56,2%
12. Warsaw / Modlin					
passengers	185	340	0	-45,6%	-
movements	93	58	9	60,3%	933,3%
13. Lublin					
passengers	36 989	7 165	0	416,2%	-
movements	748	171	0	337,4%	-

14. Radom – Sadkow					
passengers	0	0	4 412	-	-
movements	0	0	221	-	-
15. Olsztyn-Mazury					
passengers	6 630	0	4	-	165650,0%
movements	138	0	2	-	6800,0%
Total					
Total passengers	3 924 092	3 790 976	4 414 142	3,5%	-11,1%
Total movements	57 950	56 268	59 805	3,0%	-3,1%

Note: transit passengers as well as general aviation passengers and operations are excluded

Source: Civil Aviation Authority of Republic of Poland, data obtained from Polish airports, April 2020.

The Civil Aviation Office (www.ulc.gov.pl) is the primary Polish civil aviation authority, and falls under the authority of the Ministry of Infrastructure and Development

Defense

Due to the sensitive nature of the defense industry sector, there are no official statistics available on local production, imports, and exports. The only data available through public sources is the annual amount of defense expenditures, indicated in the table below.

Spending on Defense in Poland

Year	2015	2016	2017	2018	2019	2020
Approximate Defense Spending (\$ billion)	10.30	9.8	9.5*	10.1	12.5	12.5

Source: Ministry of Defense (MON) – Annual Budget

*Please note that the value of the USD increased in 2016

The Polish Government annually negotiates its defense budget and the budget parameters are set during these negotiations. In the 2020 budget, the Polish government allocated 2.1% of 2019 GDP (the government has announced its intent to increase spending up to 2.5% of GDP by the year 2030), an amount equal to about \$12.5 billion** (PLN 49.997 billion) for total defense expenditures, of which about \$12.25 billion** (PLN 49.015 billion) is dedicated to national defense. This is a y-o-y increase of 11.3% and includes \$3.35 billion (PLN 13.413 billion) allocated for arms and technical modernization.

**based on the current exchange rate: 1 USD = 4.0 PLN

Poland's military is undergoing changes designed to transform it into a more capable, mobile, and NATO-compatible force. Change is occurring in every area of operation, to include force structure, staff organizations, training programs, doctrine, and security procedures.

Modernization plans include improvement of troop capacity/mobility and air defense systems and further development of a professional army. Poland leads the former East-Bloc countries in transforming from Soviet-era equipment to modern NATO platforms. The total for 2020-2035 modernization plan is estimated at \$133 billion.

2020 Modernization Plan spending includes:

- Air Defense Systems - including further supply of Piorun missiles and Poprad missiles; beginning supply of Pilica rocket-artillery systems; and continuation of financing Wisła medium-range anti-aircraft and missile system (IBCS/Patriot system)
- C4ISR System Integrated support and command systems and C4ISR battlefield imaging
- Combating threats at sea
- Modernization of Armored and Mechanized Forces including continued modernization of the Leopard 2 tanks to the 2PL standard
- Imaging and satellite recognition
- Individual soldier equipment and armament TYTAN
- Modernization of Rocket and Artillery military units - including Regina artillery modules with Krab self-propelled howitzers, Rak self-propelled mortars, and continued funding of acquisition of Homar multi-rocket launchers.
- Simulators and trainers
- AJT training aircraft
- Rosomak program
- Spike precision weapons antitank missile

These programs will cost nearly USD 1.43B. The additional USD 1.76B will be spent on F-35, C-130H Hercules transport aircraft, guided air-to-ground missiles and short- and medium-range guided air-to-air missiles for F-16C/D, high mobility vehicles for aero-mobile troops, engineering support works for the EOD/IED mission, individual armament, night vision and optical equipment, IT equipment and software, modernization of Orkan rocket ships, BPz-2 armored tractors and NUR-12 radar stations, and modification of BWR-1S/D vehicles.

The modernization plan is based on three principles: 1) assessment of Polish military needs, 2) timeframe for delivery of equipment, and 3) Polish industry participation. The implementation of the program has placed an emphasis on using Polish defense industry capabilities, especially the Polish Armament Group (PGZ) companies. U.S. companies are encouraged to work with Polish defense companies seeking cooperation agreements or joint venture opportunities that, combined with the relatively lower cost of production in Poland, will be attractive to potential customers.

Poland leads the former East-bloc countries in parting from Soviet-era equipment and has long term plans to replace any remaining Soviet era equipment with modern NATO platforms. However, the Polish Government's plans to strengthen and reorganize the armed forces and the Polish defense industry must compete with other reforms that are financed through the state budget.

Market Entry

U.S. companies interested in the Polish market should contact our office located in Warsaw, Poland. The companies should also consider cooperation with Dolina Lotnicza (Aviation Valley) <http://www.dolinalotnicza.pl/>), a cluster' of suppliers in the South-Eastern part of Poland. This organization has proven to be very effective in reaching out to the industry in Poland and abroad.

Networking opportunities within the supply chain arise from initiatives of the Dolina Lotnicza, as well as individual events organized by large aerospace investors in Poland, such as Pratt & Whitney and Sikorsky.

Since Poland is a member of the European Union, the same duties apply in Poland and the EU. Most aerospace products enjoy zero custom duties. In order to find specific duty, please look at: https://ec.europa.eu/taxation_customs/customs_en. In addition to the custom duty, the 23% VAT applies in Poland, calculated on CIF value of product.

Current Market Trends and Demand

The most important trends observed in the civil aviation sector include the growing number of passengers of low-cost airlines, and a growing number of passengers at regional airports (versus Chopin Airport in Warsaw).

Opportunities

The next years should bring a technological leap among Polish companies and an increase in the presence of foreign companies in Poland. Currently, technologies of printing components in 3D using metals, implementation of new solutions in engines and aircraft transmissions or created software for engine control are already being developed in Poland, financed through European Union funds.

Best prospects for U.S. companies include:

1. Aircraft parts and components;
2. Airplanes;
3. Avionics;
4. Fuel efficiency;
5. Noise and emission reduction technologies;
6. Safety and security equipment.

Trade Events

Aerospace & Defense Meetings – May 18 – 20, 2021, Rzeszow, Poland <http://poland.bciaerospace.com/>;

MSPO International Defense Industry Exhibition – September 8 – 11, 2020, Kielce, Poland, <https://www.targikielce.pl/mspo>.

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Singapore

Executive Summary

In pre COVID-19 pandemic, Singapore's aerospace industry has maintained a leading position in the Asia-Pacific market. Growing by a compounded annual growth rate of 8.6% over the past two decades and a total annual output of more than \$8.0 billion, the Singapore aerospace industry is a key economic driver for Singapore. As a convenient one-stop center for all aircraft maintenance needs, with a full range of MRO services and a large precision engineering suppliers base, Singapore's MRO cluster has captured over 10% of the global MRO market.

Market Entry

Many American exporters use agents or distributors to serve the Singapore market and other markets in Southeast Asia. Finding prospective partners usually presents no problem as Singapore firms are aggressive when it comes to representing new products and typically respond enthusiastically to new opportunities. Because of the relatively small size of the Singapore market, potential partners often ask to cover regional territories. With a strong history of trade, Singaporean companies are particularly successful in taking products to the region. New-to-market firms should consider partnering with Singapore firms knowledgeable in aircraft industry networks.

Current Market Trends and Demand

Singapore enjoys excellent connectivity and an efficient supply chain. It is further strengthening its infrastructure to ride future growth trends. The Seletar Aerospace Park is a centerpiece of this effort. Spanning 300ha, the dedicated aerospace park will host an integrated cluster of activities including aerospace MRO; design and manufacture of aircraft systems, components, and light aircraft; business and general aviation activities; and a regional aerospace campus for aerospace education, research and training.

Singapore's MRO business segment is robust. Backed by a large pool of over 130 aerospace companies, Singapore has become the leading aviation hub in Asia-Pacific today, contributing over a quarter of the region's MRO output. Leading players such as ST Engineering Aerospace and SIA Engineering Company carry out comprehensive nose-to-tail MRO services from airframe maintenance to engine overhaul to aircraft modifications and conversion. Singapore is also a center for regional parts distribution and warehousing.

In addition to supplying to all aspects of the MRO business, Singapore also expects to see new growth opportunities in the areas of business aviation, regional training and asset management.

Export, Import and Production Data

	2017	2018	2019	2020 (Estimate)
Total Local Production	7,004	7,606	8,140	6,675
Total Exports	10,112	13,553	16,249	12,531
Total Imports	14,864	22,172	25,153	19,131
Imports from the US	8,357	13,193	14,775	10,692
Total Market Size	11,756	16,225	17,044	13,275
Exchange Rates	1.34	1.36	1.34	1.39

\$US millions (total market size = (total local production + imports) - exports)

Data Sources: Singapore Government Trade Statistics

Opportunities

Prior to the COVID-19 pandemic, Singapore Changi Airport's passenger traffic has grown steadily in the past decade, with an average per annum growth of 5.4%. Barring any unforeseen circumstances caused by the COVID-19 situation, and based on the earlier projection of strong aviation growth over the next 20 years, particularly in the Asia-Pacific region, demand for air travel is expected to increase and traffic at Changi Airport is anticipated to grow in tandem. Singapore is particularly well-equipped to capture the demand from aviation-related services from this market given its MRO hub status, which will translate into greater opportunities for American suppliers to sell to this lucrative market.

Besides MRO services, sales prospects for products related to aircraft repair and overhaul, such as repair equipment for landing gears and nacelle, brake linings, tires, engines and fuel systems, avionics systems and equipment, fan blades, test equipment, etc., will likely remain strong over the next few years. Going forward, besides strengthening the MRO cluster, the aerospace manufacturing and R&D segments will also be further developed. Products designed and manufactured in Singapore include engine casings, engine gears, valves, seat actuators, and electrical power systems, among others.

Trade Events

International Conference on Unmanned Aerial Vehicles and Geomatics (ICUAVG)

Dates: January 11-12, 2021

Venue: Singapore

Website: <https://waset.org/unmanned-aerial-vehicles-and-geomatics-conference-in-january-2021-in-singapore>

Description: ICUAVG aims to bring together leading academic scientists, researchers and

research scholars to exchange and share their experiences and research results on all aspects of Unmanned Aerial Vehicles and Geomatics.

Singapore Airshow 2022

Dates: February 15-20, 2022

Venue: Changi Exhibition Center, Singapore

Website: <https://www.singaporeairshow.com>

Description: As Asia's largest Airshow, this event attracts leading aerospace companies and major players in the aviation and defense industry to showcase their wares to the international aerospace and defense potential end-users.

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South Korea

Executive Summary

South Korea (Korea) is the 15th largest market for U.S. aerospace exports in 2019 (based on Korea International Trade Association data). In 2019, total U.S. aerospace exports to Korea exceeded 2.5 billion USD (including aerospace products in the defense sector). In total value, U.S. aerospace sales constituted about 69 percent of Korea's total aerospace imports in 2019. Over 98 percent of the total aerospace imports into Korea are for commercial and defense aircraft and their parts and components. Of this, 69 percent of Korea's aircraft, parts and component imports were from the United States in 2019.

The United States remains Korea's most significant military ally, owing largely to the presence of 28,500 U.S. troops in Korea as a deterrent to any aggression from North Korea and with its 67 years of close alliance history, U.S. standards are generally accepted in Korea and most Korean aerospace and defense systems are based on American standards. This has affected defense procurement decisions. The United States constitutes about 84 percent of Korea's total defense imports (including military aerospace). (This figure is the sum of U.S. share in the foreign defense procurement from 2014 to 2018. There was a sharp increase in FMS in 2014 due to major contracts including F35, Global Hawk, and air-refueling tankers, etc.)

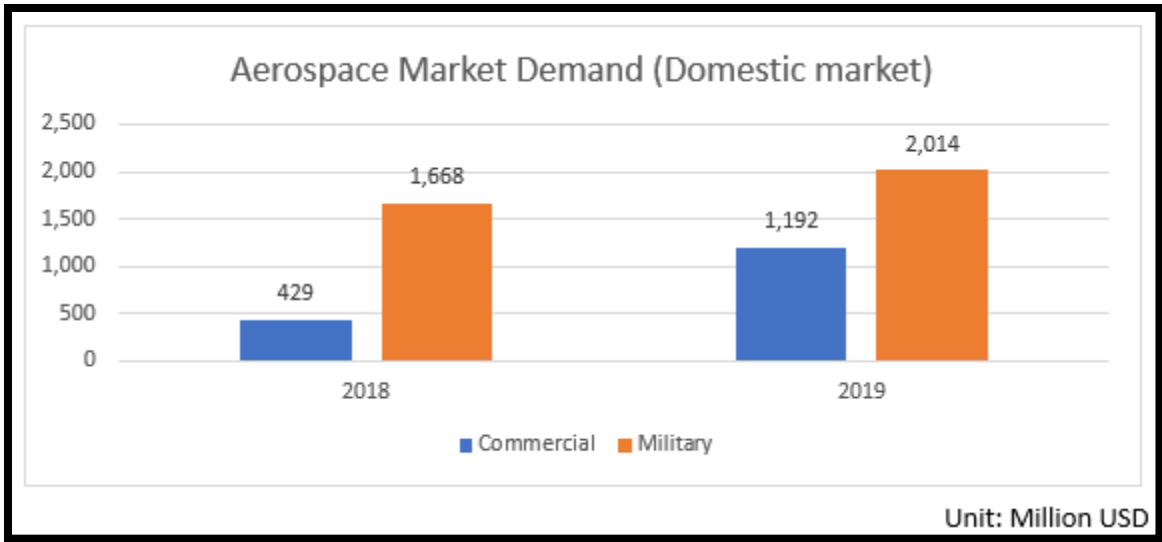
Although the United States continues to be a primary supplier in Korea, the strict U.S. export control policy and aggressive marketing of other suppliers from Europe and Israel come as a challenge for U.S. firms.

Market Entry

Many U.S. firms have sales representatives or agents in Korea and partnerships with local agents is advised for the new-to-the-market firms and especially for those firms targeting Korea's law enforcement, defense, and government entities. It is important to visit the Korean market to understand the business culture before appointing the appropriate agent who has depth of knowledge and wide networks in the market.

Current Market Trends and Demand

The market size and demand are greater in military aerospace compared to the commercial aerospace sector in Korea.



Over the past ten years, Korea has procured several critical military assets and most of these assets were aerospace platforms. According to the mid-term defense plan from 2020 to 2024 announced by the Ministry of National Defense, a total of 84.6 billion USD had been allocated for the Force Improvement Plan over the next five years. In the plan, procurement of the following key platforms are included: military satellite and mid/high altitude surveillance UAVs, maritime patrol aircrafts and operation helicopters, and additional F-35s to replace F-4s and F-5s.

With the COVID-19 pandemic, the Korean government had announced defense budget cuts three times which will have some impact on both on-going programs and programs that have not started. However, this does not indicate the ‘cancellation’ of the programs but rather a ‘delay’ in either payment or initiation of the planned programs.

On the other hand, the COVID-19 pandemic seems to have a much greater impact on the commercial aerospace sector. Korean Air is the largest passenger and cargo carrier company in Korea and is one of the largest consumers of aircraft, equipment, components, and various aerospace services — as well as being one of the major exporters of aerospace parts and components. Asiana Airlines is the second largest airline in Korea, however, it is going through financial difficulties and as of April 2020, HDC Hyundai Development has postponed its acquisition of Asiana Airlines indefinitely. The decision was highly impacted by the pandemic. LCCs in Korea have continuously increased its operating fleets in the past ten years and demonstrated a dramatic annual sales revenue growth to 40 percent in the past five years. However, the pandemic has a greater impact on the LCC industry. Bankruptcy of financially weak LCCs are reported and mergers and acquisitions are expected leaving a smaller number of LCC operators in near future.

Opportunities

Aircrafts (Rotorcraft and military fixed-wings) and upgrades

Korea has constant demands on both commercial and military rotorcrafts and fixed-wings. While the commercial aircraft market is and will continue to go through difficult times due to the COVID-19 pandemic, military platforms will be procured based on Korea's mid-term military plan. According to the recent mid-term plan, budget had been allocated for maritime patrol aircraft (decision made to procure Boeing's P-8) and maritime operation helicopters (Lockheed Martin vs. Leonardo). Additional purchase of F-35s to replace old F-4s and F-5s are also planned as well as upgrade of CH-47s and UH-60s are expected. Although not in great numbers, there are also opportunities for commercial helicopters in non-defense public sectors such as firefighting and emergency/rescue sectors.

Defense Products

For 2020, a total of 40.69 billion USD has been announced for Korea's defense budget which includes 13.62 billion USD for the force improvement plan (FIP). The total budget and FIP budget have increased by 7.4 percent and 8.5 percent compared to the previous year, respectively. For 2020, Korea's defense budget is around 2.69 percent of its GDP and constitutes about 14.1 percent of total national budget. Korea is estimated to have the 10th largest defense budget in the world.

According to the mid-term defense plan from 2020 to 2024 announced by the Ministry of National Defense, a total of 84.6 billion USD had been allocated for the Force Improvement Plan over the next five years. Following are the detailed plans for Force Improvement:

1. Allocated 27 billion USD to cope with nuclear/weapons of mass destruction threat
 - Improve surveillance capability: Establish Korea's independent surveillance capability with military satellite, and mid/high altitude surveillance UAVs, etc. (indigenous development)
 - Improve ballistic missile capability with Hyunmoo (indigenous ballistic missile), SSM-700K Haeseong (indigenous anti-ship missile), and TAURUS missile, etc.E
 - Expand coverage and missile capability for Korea Air and Missile Defense (KAMD): Acquire additional early-warning radar (indigenous) and Aegis combat system radar, upgrade Patriot and Cheolmae II missiles (indigenous), and upgrade Korea Theater Missile Operation Cell

2. Allocated 46 billion USD to cope with defense force restructuring
 - Conventional weapons will be replaced with the high-tech weapon systems to cope with defense force reduction: Artillery detection radar-II, 230mm rocket artillery system, Korean tactical surface-to-surface missile system, indigenously developed tanks, small tactical vehicles, and armed helicopters, warrior platform based on 4th industrial revolution, 'drone-bot system', and indigenously developed unmanned attack,

surveillance, and operation vehicles (most programs falls under indigenous development)

- Improve warship and submarine capabilities and acquire maritime patrol capability: Acquire additional Great-class destroyer with Aegis combat system, 3,000-ton submarine, multi-purpose large carrier, latest maritime patrol aircraft and maritime operation helicopters
- Replace old fighter platforms to latest fighter jets and develop space operation capabilities: Phase out F-4 and F-5s and replace them with F-35A and continue invest in KFX project, acquire additional large military transport aircrafts, develop capabilities for satellite surveillance and monitoring

3. Allocated 2 billion USD to utilize advanced 4th industrial revolution technologies for military operation

- Smart Defense Innovation: Apply big data, AI, IOT into defense field
- Foster Advanced Concept Technology Demonstration (ACTD)

4. Improve maritime surveillance and monitoring capabilities (mostly indigenous development programs)

- Deploy maritime surveillance radar and newest TOD-III
- Develop and deploy fixed long-range radar

C4ISR, sensors and radars

Advanced technologies have opportunities in Korea's defense market especially with the C4ISR products and high-tech sensors. Korean industry has made a big progress with radar technologies but radars that meets specific high-standard specifications still have opportunities in Korean market.

Trade Events

Defense & Security Expo Korea (DX Korea)

November 18 – 20, 2020

Goyang, South Korea

<https://www.dzkorea.org/en/index.asp>

Seoul International Aerospace & Defense Exhibition 2021 (Seoul Air Show 2021)

October 15 - 20, 2021

Seoul, South Korea

<https://www.seouladex.com/eng/main.asp>

MADEX 2021 (International Maritime Defense Industry Exhibition)

June 9 - 12, 2021

Busan, South Korea

<https://www.madex.co.kr/eng/index.asp>

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Sweden

Executive Summary

The aerospace sector is important for Sweden's economy and competitiveness. Leading companies within this sector include Saab, SAS, and the Swedish Space Corporation (SSC). In 2019, Sweden imported \$690 million of aircraft, spacecrafts and parts. U.S. imports are frequently used within the Swedish aerospace market and U.S. suppliers clearly dominate this market. U.S. suppliers market share of the Swedish aerospace industry has grown from 29% in 2017 to 79.5% in 2019 and is an area of opportunity for U.S. exporters.¹

Sweden is active in the space industry, which is an aerospace subsector. Sweden invests \$159 million a year in space activities, industry, and international cooperation in space.² Esrange, a city located in north Sweden, accommodates one of Europe's largest civilian satellite ground stations and acts as a hub in the satellite station network. Esrange is presently used by the international scientific community for launching sounding rockets for microgravity and atmospheric research as well as high altitude balloons for astronomy, atmospheric research and drop tests of space and aerial vehicles.

During 2020, Luleå University of Technology (LTU) developed a new program called RIT2021 (A program whose purpose is to establish Sweden as a leader in the space industry) which aims to stimulate business between the established space industry and regional small and medium enterprises interested in entering the space market.³

The second subsector of Swedish aerospace is the aviation industry. The aviation industry created 90,000 jobs in Sweden and an additional 100,000 jobs in tourism, trade, investments, etc.⁴ Swedish aviation industry is more research-intensive than most other industries. The research environment is based on collaboration between companies, public actors, and academia. Technical breakthroughs and innovations that take place in aviation research are largely spread to other areas and other industries. One reason is that the willingness and ability to absorb and try new technology and the level of competence is high. Small and medium sized U.S. companies can benefit from the technologically focused environment since technological breakthroughs within the industry are shared.⁵

¹ Global Trade Atlas, HS 8802
www.gtis.com/gta/secure/htscty_wta.cfm

² Sveriges Radio
sverigesradio.se/artikel/6204067

³ RIT2021
www.ritspace.se/newsletter-rit2021/

⁴ Regeringen (2020, p.6) www.regeringen.se/490ab0/contentassets/661596dee93f47f397f45dfb59bb9171/2017_flygstrategi_webb_ny.pdf

⁵ Aerospace
aerospace.se/images/dokument/Nyttan-med-flyg-fr-Sverige-flygfakta-i-fickformat.pdf

Market Entry

Sweden's major buyers often prefer to operate directly with the seller without going through a middleman, primarily to save on costs. It is common in Sweden for foreign exporters to use consultants to advise on market trends. In the sales process, it is common that the exporter offers to assist in the required certification procedures and prepares the appropriate documentation including manuals and pilot instructions.

In order to be registered in Sweden, new aircraft need to be approved and certified by the European Aviation Safety Agency (EASA). The requirements are similar to those in the United States.

Current Market Trends and Demand

Trends

Space industry

According to Swedish Space Corporation, sustainability is important within the space industry, with focus on UN's sustainability goals defined in the Agenda 2030 for Sustainable Development. The rapid increase in the number of satellites makes it possible to collect and measure more data on environmental changes across the globe. This data needs the correct infrastructure to be collected, processed and translated into information that can lead to concrete actions for the benefit of humanity.⁶

A trend in the space industry is the increase of more and smaller satellites. Of all launched satellites, small satellites have increased in launches from 15% in 2010 to 38% in 2017. Another trend over the past decade is that the number of launches is increasing, with current annual launches slightly above 80.⁷

Another trend over the last decade is that each launch on average lifts up several satellites. Early on, satellites were typically launched one by one, while in recent times each launch contains several satellites. The average number of satellites per launch increased from two in 2015 to 4.5 in 2017.⁸

Aviation industry

Given the Nordic location, Sweden is dependent on its aviation industry and air travel connections both domestically and internationally. With faster and safer aircraft, new airline alliances, more airports, increased competition, and attractive prices, air traffic has become a common mean of transportation.

Sustainability is of great importance for the Swedish aviation industry and the goal is to be fossil fuel free by 2045.⁹ According to the Swedish government, the aviation industry in Sweden contributes to meeting society and the market's need for reduced environmental impact and

higher energy efficiency. The government focuses on green approaches, more efficient aircraft, new engine types and alternative fuels.¹⁰ The initiative of going green can create opportunities for U.S. suppliers.

In 2019 due to the movement “Skolstrejk för klimatet” (School strike for the climate) lead by Greta Thunberg, people are less willing to fly, which resulted in a 4% passenger decrease.¹¹

Demand

Space industry

Since 2013, commercial infrastructure (products related to development, operation, and launches of satellites) has increased in demand. The industry accounted for \$85 billion in 2013 and has increased to \$125 billion in 2016, an increase of 47%.¹²

Aviation industry

In the aviation industry, the market demand for aircraft and aircraft parts is closely linked to the volume of airline passenger traffic. In 2019, there were 40.2 million airline passengers with the majority flying from Stockholm-Arlanda and Gothenburg-Landvetter.¹³ The number of passengers traveling by international flights has increased annually except for in 2019 when the current environmental trend resulted in a 4% decrease of passengers. Between 2017 and 2018, the volume of passengers traveling by international flights increased by 2%. Travelers traveling outside of Europe increased by 9%, implying trends and increased demand for long-distance flights. Meanwhile, demand for domestic flights has decreased over the last years¹⁴.

The largest single buyer of U.S. aircraft and parts is the SAS Group¹⁵. In addition to SAS, there are several airlines operating in Sweden: TUI Fly Nordic, Malmo Aviation, Novair, West Air Sweden, Wizz Air, Ryanair and BRA.¹⁶

2019 market share, international flights (latest figures¹⁷) includes:

- SAS—24.4%
- Norwegian—19%
- Ryanair—8%
- Other—49.6%

2019 market share, domestic flights (latest figures¹⁸) includes:

- SAS—49.2%
- Norwegian—18.7%
- BRA—29.7%
- Other—2.4%

Helicopters

There are 24 helicopter airports in Sweden and 21 civilian helicopter airlines operating.¹⁹

U.S. suppliers of helicopters exceeding 2,000 kg have a market share of 66% in 2019, an increase from 49% in 2017.²⁰ Swedish defense uses U.S. imported helicopters.

⁶ Swedish Space Corporation

www.sccspace.com/wp-content/uploads/2020/06/SSC-Summary-2019.pdf

⁷ Omvärldsanalys Rymd 2017

⁸ Omvärldsanalys Rymd 2017

⁹ Svenskt flyg

www.svensktflyg.se/wp-content/uploads/2018/04/F%C3%A4rdplan-f%C3%B6r-fossilfri-konkurrenskraft-flygbranschen.pdf

¹⁰ Regeringen www.regeringen.se/490ab0/contentassets/661596dee93f47f397f45dfb59bb9171/2017_flygstrategi_webb_ny.pdf

¹¹ Swedavia

www.swedavia.se/globalassets/statistik/swedavia_201912.pdf

¹² Omvärldsanalys Rymd 2017

¹³ Swedavia

www.swedavia.se/globalassets/statistik/pax_201912.pdf

¹⁴ Swedavia

www.swedavia.se/globalassets/statistik/swedavia_201912.pdf

www.swedavia.se/globalassets/statistik/swedavia_201812.pdf

¹⁵ SAS Group

www.sasgroup.net/newsroom/press-releases/2019/sas-flygplan-far-nytt-utseende/#:~:text=Som%20ett%20led%20i%20modernisering,Airbus%20A350%2C%20och%203%20st

¹⁶ Skyscanner

www.skyscanner.com/flights-to/se/airlines-that-fly-to-sweden.html

¹⁷ My new desk

www.mynewsdesk.com/se/transportstyrelsen/documents/rapport-flygtrafikstatistik-utvecklingen-2019-93046

¹⁸ My new desk

www.mynewsdesk.com/se/transportstyrelsen/documents/rapport-flygtrafikstatistik-utvecklingen-2019-93046

¹⁹ Helis

www.helis.com/database/country/SE/

²⁰ Global Trade Atlas, HS 880211

www.gtis.com/gta/secure/htscty_wta.cfm

Opportunities

Space industry

LTU is launching a Business Development program called RIT2021, a collaborative EU funded project with the objective to create sustainable growth in the Swedish space industry. The goal is to help small and medium enterprises tap the aerospace market, increase awareness of opportunities and needs within the industry as well as connecting companies to potential

buyers. This program can present opportunities for small and medium-sized U.S. companies. The Swedish aerospace industry is experiencing growth and has an ongoing need for subcontractors in manufacturing, construction, transport, IT, project management, staffing, etc.²¹

Aviation industry

There are several areas and trends within the Swedish aviation industry that present opportunities for U.S. companies. Categories that have increased in value (U.S. imports to Sweden) between 2017-2019 are aircrafts not exceeding 2,000 kg (+45%) and aircrafts exceeding 15,000 kg (+820%).

Total Swedish import of aircrafts not exceeding 2,000 kg has had a high annual growth of 5-10% over the last three years. The market share of U.S. suppliers has additionally increased from 63% in 2017 to 77% in 2019, implying that U.S. suppliers grows in degree of reputation on the Swedish market.²²

Total imports of aircrafts exceeding 15,000 kg has had significant growth between 2017 and 2018, but has decreased by 19% in 2019.²³ Even if the total import market is relatively unstable, U.S. supplier's market share has increased from 26% in 2017 to 84% in 2019. U.S. suppliers of aircrafts exceeding 15,000 kg can benefit from these indicators, since they are supported by higher demand and trends within long-distance and international flights.

²¹ Ritspace - www.ritspace.se/new-sme-business-development-program/

²² Global Trade Atlas, HS 880220 - www.gtis.com/gta/secure/htscty_wta.cfm

²³ Global Trade Atlas HS 880240 - www.gtis.com/gta/secure/htscty_wta.cfm

Trade Events

Aerospace Technology Congress

September 4 -9, 2022

Stockholm Waterfront Conference Centre, Stockholm, Sweden

Aerospace Technology Congress with the theme of sustainable aerospace innovation in a globalized world.

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Thailand

Executive Summary

Thailand relies on imported aviation equipment and is a net-importer of products including aircraft, parts, maintenance services, and airport/ground support equipment. U.S. aviation equipment and technology are well received by Thai buyers. Thailand's location is at the center of Southeast Asia. This geographical advantage supported further growth in the aviation sector due to a rise in tourism prior to global travel downturns that occurred in 2020.

The commercial aviation industry is currently valued at US\$2.2 billion and is expected to rise further as the number of inbound passengers and tourists visit to Thailand rebounds. Prior to the pandemic, passenger volume in Thailand was forecast to grow at an average of 5.4% per year.

Market Entry

Partnering with a local agent or distributor is the most effective way to enter the Thai market and reach potential Thai buyers. The agent or distributor can facilitate and expedite market entry with their extensive market knowledge and established distribution networks and relationships with key business and government officials. The Commercial Section at the U.S. Embassy in Bangkok provides a series of customized business development services to assist U.S. firms planning to enter or expand their presence in the market.

Current Market Trends and Demand

In 2019, more than 38 million tourists visited Thailand. With the increase in number of passengers; major Thai airlines expanded their networks. Moreover, passenger volume in Thailand grew at an average of 2% per year.

The influx in air passenger growth, prior to economic disruptions in 2020, meant that the Thai market became an attractive destination for commercial aircraft maintenance and aircraft manufacturing industries. Infrastructure facilities began to fall into place for Maintenance Repair and Overhaul (MRO) services, mostly operated by local and regional airlines.

While the impact of 2020's market disruptions on the Thai tourism industry is undeniable, the attractiveness of Thailand continues as a major tourist destination. Thailand is centrally located in the heart of ASEAN which benefits both from a returning number of tourists and foreign investors. According to the leading operator at Airports of Thailand (AOT); Thailand's tourism industry contributed to the growth in air passenger traffic. Airports managed by AOT handled 143.00 million passengers in 2019 up from 139.58 million in 2018. There were 893,533 aircraft movements (takeoffs and landings) in 2019, versus 874,999 in 2018. While air cargo movements showed a decrease to 1.444 million tons in 2019 from 1.690 million tons in 2018.

Thailand was a net-importer of aviation equipment in 2019, including aircraft, parts, maintenance services, and airport and ground support equipment. Its total aviation equipment imports were worth US\$2.1 billion, with the total aviation equipment imports from the U.S. at US\$705 million. Thai buyers prefer foreign aviation equipment and products, especially from the U.S. or Europe, as these are perceived to be of higher quality. Foreign aircraft manufacturers are preferred suppliers due to lack of local producers. Airlines increase or replace their fleets by purchasing or leasing additional aircraft.

Furthermore, demand exists in Thailand to establish its Maintenance, Repair and Overhaul (MRO) hub in ASEAN, partly through government incentives for aircraft parts manufacturers and aircraft maintenance and repair businesses. Key MRO subsectors include components which represent the highest share of 41% of all the spending; engine maintenance, making up 28% of the share; line maintenance, accounting for 16%; airframe heavy at 8%; and modifications at 7%.

Opportunities

Under the Thai government policy to develop domestic aerospace industry, Maintenance, Repair and Overhaul (MRO) services will take center stage. Thailand is a major player in regional aircraft maintenance and manufacturing industries. Infrastructure facilities are in place for aircraft repair and engine overhaul services. The major, leading airlines in the country, Thai Airways, Bangkok Airways, and Thai Lion Air have established Maintenance MRO facilities, aiming to serve their own aircraft and those of other airlines that visit Thailand. MRO activities is creating demand for aircraft parts and technical services.

Apart from MROs, aviation related business such as logistics, catering and land transport service will be developed. As a result, Thailand is expected to assume a new role as a regional hub. Thai airlines and aviation industry are open to opportunities for U.S. aircraft parts and aerospace equipment suppliers.

The Eastern Economic Corridor approved two aviation infrastructure development projects, the U-Tapao Airport and Aviation City, as well as an MRO center at the U-Tapao Airport. These projects create further demand for ground support equipment, aircraft & parts, training services for pilots and technicians, aviation safety advisory services, security equipment, and ground support vehicles.

The product demand includes airport construction equipment, ground support equipment, aircraft and parts, Maintenance Repair and Overhaul (MRO) services, research and development, human resources (particularly pilots and mechanics), aviation safety advisory, security equipment, passenger service equipment, baggage screening, and ground support vehicles.

Trade Events

Defense & Security 2021, Nov 2021, Bangkok, Thailand
<https://www.asiandefense.com/>

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Turkey

Executive Summary

The FY 2020 Ministry of Defense (MOD) budget is \$7.38 billion (\$/TL at 7.3). Half of this budget is allocated to procurement of goods and services, including modernization. It does not include spending by the Ministry of Interior's Gendarmerie, the Coast Guard, defense procurements funded by the Turkish Treasury or the Defense Industry Support Fund. Along with MOD spending, the 2020 proposed budget for the Gendarmerie is \$3.15 billion, \$150 million for the Coast Guard and \$5.3 billion for the National Police is. In 2020, over \$15 billion was allocated from the centralized budget on defense and security spending, which is the sum of funds allocated to the MOD, Gendarmerie, Turkish National Police, Coast Guard, National Intelligence and Under Secretariat of Public Order and Security.

Turkey's goal is to improve its manufacturing capabilities and develop a self-sufficient national defense industry. To attain this, Turkey is trying to maximize local manufacturing capabilities through R&D and technology transfer. Large-scale system integrators along with SMEs, which develop subsystems for system integrators, play a key role in building up indigenous solutions for the defense industry. According to official figures, the share of off-the-shelf direct imports has fallen to 12% from 98% since the 1990s and the share of local production in Turkish Armed Forces (TuAF) procurements has gone up to 68% from 25% since 2003.

According to data released by the Defense Industry Exporters' Association (SASAD), the sector-wide turnover reached \$10.8 billion. The lion's share of the total revenue goes to land platforms with \$3 billion and military air platforms with \$2.4 billion.

Turkey's defense industry has gone through a rapid change in less than a decade as Turkey has become more involved in co-production and co-development projects, which have also brought along export opportunities. With rapid growth over the last 10 years, the industry has reached the point of transition from prototypes to serial production. According to the Defense and Aviation Industry Exporters' Association, Turkey's defense exports reached \$3 billion in 2019. According to the Stockholm International Peace Research Institute (SIPRI), Turkey's 2019 military expenditures were \$20.4 billion, placing it among the top 16 spender countries globally. Some sources put Turkey's arms imports in the range of \$3 to \$3.5 billion per year. While Turkish annual defense exports to the United States are close to \$600 million, imports from the United States are in the range of \$1.5 billion. The United States is the largest defense export market for Turkey, followed by Germany, Malaysia, Azerbaijan, the UK, the UAE, Qatar and Saudi Arabia. The top export items are aircraft and helicopter parts, engines, parts of tanks and other armored land vehicles, ammunition for other weapons, turbojets for civilian aircraft, hunting rifles, and receiver/transmitter equipment for military use.

Market Entry

Despite the emphasis on localization and increasing national content in major defense procurements, Turkey is still heavily reliant on imported products, especially at the component level. TuAF requirements are met through direct purchases from domestic and foreign markets or through participation in joint production programs. Joint production programs constitute potential export opportunities, as the tendency is to give more emphasis to joint production and joint activities through R&D. Turkey has started taking steps to develop indigenous systems to meet TuAF needs.

It is recommended that US companies, especially those new to the market, work with a local agent for easy access. Local representation, either through an agent or in partnership with a Turkish firm, is viewed favorably by procurement authorities and the Turkish industry or considered as a sign of commitment to the market.

Current Market Trends and Demand

The emphasis on increased localization is expected to continue as the defense industry is a priority sector for the Turkish Government. Particularly at the platform level, other than urgent requirements, tier 1 Turkish OEMs will continue to act as prime contractors. Joint production, technology partnership and co-development will be key project models for future programs.

In parallel with heightened security requirements, the demand for defense products is increasing across the board.

Opportunities

- Aircraft (rotary and fixed wing) parts and components
- Electronics / avionic parts and components
- Engines, engine parts and components
- Electro-optics

Trade Events

IDEF 2021, 15th International Defense Fair

May 21-25, 2021, Istanbul

<http://www.idef.com.tr/en>

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United Kingdom

Executive Summary

U.S. aerospace & defense manufacturers produce the highest trade surplus, year after year, of all manufacturing sectors. According to TradeStats Express, a U.S. Department of Commerce-furnished database showing the latest global patterns of U.S. merchandise trade, the 2018 U.S. aerospace and defense exports to the UK amounted to approximately \$10.18 billion. The UK aerospace and defense industry is one of the largest in the world, behind that of the U.S. In 2019, total UK aerospace and defense turnover totaled close to \$73 billion, and the sector had a 18% global market share.

The UK does not produce any large civil aircraft and 90% of domestic production is exported. The UK has a particular reputation as a global center of excellence for the design and production of engines, helicopters, wings, structures and aircraft systems (including landing gear). Rolls-Royce-manufactured engines power more than 35 types of commercial aircraft, and the company has over 13,000 engines in service around the world. The UK also designs and manufactures wings for all Airbus aircraft platforms. In addition to manufacturing, the UK has a thriving maintenance, repair and overhaul sector, including servicing the huge numbers of military and civil aircraft that fly through and from the UK every year, which makes up a 17% share of the \$45 billion global MRO industry. The aerospace industry is a major market for U.S. exports in the United Kingdom.

Market Entry

Entry or expansion by U.S. companies into the UK aerospace market is challenging for SMEs and OEMs alike. Due to a mature and sophisticated supply chain, a U.S. company can expect to have to commit both time and resources to enter into or expand within the UK aerospace market. The UK aerospace and defense supply chain directly employs some 246,000 people, ranging from very large companies such as OEMs to small businesses making very specialized components.

The UK government has demonstrated significant interest in developing and increasing the domestic supply chain, unveiling a \$20.2 billion initiative to help give a competitive advantage to UK companies in the aerospace market. UK industry and government established the Aerospace Growth Partnership (AGP), which develops initiatives to encourage UK companies to cooperate closely and to address gaps and problems that affect the sector, tackle barriers to growth, and boost both UK exports and high value jobs. UK industry and government committed \$3.5 billion to an Aerospace Technology Institute and to invest in R&D, to help ensure that the UK remains Europe's number one aerospace manufacturer.

The UK continues to enjoy a record backlog of orders for equipment across narrow-and wide-body aircraft, but to deliver on these orders is an increasing challenge within the UK supply chain. This backlog of orders is becoming more acute for tier 2 suppliers and below, and may lead UK companies to consider forming new alliances to create extra capacity to meet

obligations. U.S. suppliers should consider collaborating with a larger customer with an established presence in the UK which is looking to increase capacity. U.S. companies should also expect to enter the UK market at a lower tier of the supply chain than they might otherwise usually enter in the U.S. or globally. Suppliers may also need to consider using a local distributor or agent with established ties within the market.

Entering the UK aerospace market requires patience, investment, innovative products, and competitive pricing. The aerospace supply chain is well-integrated with the primes all looking to reduce the number of their suppliers. A U.S. company can expect to have to commit both time and resources to enter or expand within the UK aerospace market, especially companies providing what are known as “me too” products and services. Selling to OEMs as well as tier 1 and 2 manufacturers entails a vendor/product qualification

and assessment process. All U.S. companies desiring to become a supplier will need to register with their prospective customer. In addition, AS9100 and NADCAP would be considered minimum requirements for doing business in the aerospace supply chain in the UK. All companies desiring to do business with the Ministry of Defense are required to complete Cyber Essentials accreditation.

Current Market Trends and Demand

The commercial aerospace sector has been significantly impacted by COVID-19. There have been deep job cuts at OEMs and SMEs alike and aircraft production and work orders have been cut by approximately 40%. Airbus have reduced their staffing levels by 1,700 jobs at its factory at Broughton and Rolls Royce have reduced their staffing levels in the UK by 3,000 jobs. Airbus announced that the aerospace industry is facing the gravest crisis the industry has ever experienced that its business in the civil airliner business was reduced by 40%, and that it expects to remain at this reduced level for the next two years. Airbus expects there will be an uptake in single-aisle business in 2022 and that widebody deliveries will take longer to recover, perhaps until 2025.

The pre-COVID surge of demand for fixed wing aircraft and helicopters was being led by high-growth economies from Asia, the Middle East and South America. UK aerospace companies are actively seeking opportunities in these high-growth markets as their importance in the global supply chain increases. These markets were expected to account for 58 percent of new fixed wing aircraft and 45 percent of rotor craft orders to 2031. With previous market projections forecasting a requirement for 29,000 new large civil airliners, 24,000 business jets, 5,800 regional aircraft and 40,000 helicopters by 2032, the right prioritization and strategy will be critical in maximizing the opportunities for the UK aerospace industry. Major international OEMs and MRO providers shifted some activities to these countries or were planning to do so.

Opportunities

Aircraft Parts

The best prospects for U.S. aerospace firms in the UK continue to be associated with the manufacturing of new aircraft or new versions of older aircraft. The key areas include:

- Aerodynamics (e.g., wing design)
- Propulsion (e.g., rotor blades, engine assembly)
- Aero structures (e.g., fuselage & wing assembly)
- Advanced systems (e.g., avionics, undercarriage)

Defense Products

The best prospects for a U.S. defense supplier come in autonomous solutions for air, land, sea and subsea domains; counter-autonomous solutions, artificial intelligence solutions for all 5 domains, cyber solutions, soldier systems such as night vision devices, optical systems for crew served weapons or small arms and tactical radios.

Rotorcraft & UAVs

Officials from the UK's Maritime & Coastguard Agency (MCA) have begun industry engagement sessions as they work towards the procurement of the second-generation of Search and Rescue (SAR) service. While the tender for the present SAR contract included a technical specification document for the helicopters and base structure that ran to 76 pages, the MCA stresses that it is "agnostic" as to how the future service will be delivered. Although helicopters will remain the primary platforms for rescue missions, the MCA is encouraging bidders to offer solutions that use current and emerging technologies such as UAVs or even high-altitude pseudo-satellites for surveillance.

Trade Events

- **Farnborough International Airshow** – Held biannually in July during even calendar years.
- **DSEI** - Held biannually in September during odd calendar years.
- **DPRTE** – Held annually.

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