

AEROSPACE INDUSTRY



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INVEST
IN ITALY

ITCA
ITALIAN TRADE AGENCY

INVITALIA

FOREWORD ON METHODOLOGY

The data contained in and employed for the present report was collected by Cerved Group through the exclusive processing of information from both public and private sources. The term 'public sources' is intended here as those available to the public, from institutions including but not limited to the OECD, the Italian National Statistics Institute (Istat), the Italian National Aerospace Technology Cluster (CTNA) and the European Space Agency (ESA). The term 'private sources' is intended here as Cerved Group's proprietary databases on the major companies that operate in the aerospace industry. All data collected has been cross-checked to verify consistency, by:

- comparing different sources (e.g. OECD and Istat);
- supplementing and verifying data and information via direct requests to industry operators.

These checks serve to avoid overlapping and duplications.

The data has then been collated and aggregated to build a complete set that covers the aerospace industry overall (and also differentiates between the aircraft and the spacecraft segment). The tables and graphs contained herein have been developed by Cerved Group based on proprietary data and/or data from the public sources indicated above. With regard to aggregation criteria, the following economic activity (Ateco) categories have been included in the analysis:

- 30.30.01 - *Manufacture of seats for aircraft*
- 30.30.09 - *Manufacture of aircraft, spacecraft and related equipment*
- 33.16 - *Repair and maintenance of aircraft and spacecraft*

This enables our analysis to begin with a brief introduction to the aerospace industry as a whole and then proceed to examine each specific segment.

AEROSPACE AT A GLANCE

THE ITALIAN AEROSPACE INDUSTRY IS 7TH IN THE WORLD AND 4TH IN EUROPE BY REVENUE GENERATED

IN 2018, THE MAJOR COMPANIES INVESTED OVER €1.7 BILLION IN R&D

AGGREGATE SECTOR REVENUE IN ITALY (€ bn)



SEGMENTS (€ bn)



514

COMPANIES

47,274

EMPLOYEES

AEROSPACE AT A GLANCE

THERE ARE AEROSPACE INDUSTRY DISTRICTS IN 11 DIFFERENT REGIONS OF ITALY



30 UNIVERSITIES AND 53 RESEARCH CENTRES ARE LINKED TO THESE DISTRICTS

ITALY BOASTS 28 START-UPS AND INNOVATIVE SMEs IN THE AEROSPACE SECTOR^{a)}

FDI INFLOWS REACHED €1.095 BILLION IN 2018 (+2.9% FROM 2017)

Total ESA Funding (€ bn)	4.87
France (€ mn)	1,311.7
Germany (€ mn)	981.7
ITALY (€ mn)	665.8
UK (€ mn)	464.3

a) companies registered under Ateco category 30.30.09

HIGHLIGHTS

The aerospace industry is taking on an increasingly important role for regional economic development in Italy. The technological skills and know-how of Italian aeronautics and space companies, combined with the increasingly advanced technological knowledge required in production processes and Italian companies' growing participation in major international research programmes, have become critical growth drivers for Italy in the sector.

The Italian aerospace sector is composed of both leading manufacturers and small to medium-sized sub-suppliers of high-tech products, structured to ensure that the industry's highly demanding technology and quality standards are met.

According to the European Space Agency (ESA), Italy is the 6th leading global space power, with total space industry revenue amounting to €2.23 billion in 2018.

The Italian **National Aerospace Technology Cluster (CTNA)** comprises industry districts in 11 regions of the country (Piedmont, Lazio, Lombardy, Campania, Puglia, Abruzzo, Basilicata, Emilia Romagna, Tuscany, Umbria and Sardinia), along with three national research institutes, two industries and the national aerospace industry association.

Each regional technological district has its own specific strengths with highly specialised businesses (active in areas such as avionics, component manufacturing and services). These businesses often collaborate with major universities and research centres. In addition, other industry clusters, research institutes and technology hubs work together with the CTNA to develop innovative applied technologies in the aerospace sector and in other sectors, including for instance the important Mechatronics Hub established in the province of Trento.

In the coming years, the **key developments** in the aerospace sector will be centred around:

- digitisation and sustainability
- corporate restructuring
- the 'Space Economy'

New technology from aerospace research and programmes is spreading into other sectors. The spacecraft sector is in fact influencing other markets such as radars and geoinformation. Meanwhile, technological developments in aeronautics, particularly in the production of

HIGHLIGHTS

helicopters and airplanes are, thanks to an integrated production chain, positively influencing not only key industry players but even microbusinesses and SMEs along the chain.

Advanced know-how required in the sector entails a need for constant investments in innovation. According to the European Patent Organisation, in the air transport sector alone, **9,635 European patent applications** were submitted in 2019, a 6.6% increase from 2018; of these, 378 came from Italy, putting it in third place behind Germany (2,138 applications) and France (999).

Spending on aerospace technology (including the portion in military budgets) by governments and/or national agencies and international agencies greatly influences aerospace sector trends, both globally and in Italy. As such, it is vital for companies in the sector to invest heavily in R&D, as technological innovation is one of the leading competitive factors across the entire industry. Italy's aerospace districts are thus involved in numerous R&D projects co-funded by national and international programmes.

The Italian aerospace sector is developing an ever more international strategic approach.

The main **opportunities** in the sector are:

- innovation in the solutions offered
- participation in international programmes to develop highly innovative technology
- a recovery in global commercial air transport demand



HIGHLIGHTS



The critical success factors in the sector are:

- R&D investments
- Organisational capabilities
- Skills & know-how
- International partnerships

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INDUSTRY OVERVIEW

KEY CHARACTERISTICS

The Italian aerospace sector contains 514 active businesses whose **aggregate revenue** in 2018 came to €16.4 billion (+5.1% from 2017). These businesses employ nearly 47,300 people combined.

The **aircraft** segment accounted for an estimated 86% of total sector revenue in 2018, while the **spacecraft** segment accounted for 14%.

The aircraft and spacecraft production chain plays a very important role in Italy's economic development, especially considering the advanced technological knowledge and skills required for the production processes.

Italian companies' know-how in the spacecraft sector and their participation in major international programmes are important growth drivers.

According to the National Aerospace Technological Cluster (CTNA), an association that brings together all the major actors in the Italian aerospace sector, **Italy's aerospace industry ranks seventh in the world and fourth in Europe** in terms of revenue. Furthermore, within the broader integrated systems and high-tech manufacturing sector in Italy, aerospace is the largest sub-sector.

There are **aerospace industrial districts** in 11 different regions of the country (Abruzzo, Basilicata, Campania, Emilia-Romagna, Lazio, Lombardy, Piedmont, Puglia, Sardinia, Tuscany and Umbria), characterised by an integrated chain of highly specialised SMEs along with major multinationals .

KEY CHARACTERISTICS

KEY FIGURES



KEY BUSINESS AREAS



KEY CHARACTERISTICS

SUPPLY SIDE

Businesses of all sizes are present in the sector and they generally focus specifically on the aerospace industry, in which they have amassed advanced technological skills in both product research and development and in the production of components and finished products. In addition to the large manufacturers, there are numerous small to medium-sized sub-suppliers that are capable of guaranteeing the high technical quality standards required in the industry.

The **largest businesses** can handle the entire product cycle – from design to construction to maintenance – of airplanes, space vessels and/or engines, even if many of them do outsource a significant portion of these activities. **Smaller businesses** tend to be more highly specialised in niche areas, such as the manufacture of certain components.

The presence of **foreign operators** is limited and maintenance/assembly services are generally outsourced to Italian businesses. Multinational leaders do have commercial links in Italy, through subsidiaries or sales offices, which take care of relations with institutional clients and large private sector clients.

DEMAND SIDE

The industry's **end market is naturally international** and is composed of two types of target clients:

- **public** sector clients: armed forces, law enforcement agencies and national security agencies including civil protection departments, as well as emergency rescue services;
- **private** sector clients: include first and foremost commercial airlines, which have sizeable fleets, as well as other economic actors that use aircraft to provide their services (such as telecommunications companies and oil & gas companies) and other smaller players like flying clubs.

Demand fluctuates and is specific to each client. Greater attention is focused on the purchase of whole systems rather than single components.

Many companies in the sector have partnerships with universities and research centres to collaborate on international-scale projects.

KEY CHARACTERISTICS

TYPES OF OPERATORS

Most companies active in the sector specialise in the aerospace industry and any other business activity mainly involves technological synergies with related sectors, such as naval and ground transport. Operators in the sector can be categorised as follows:

- integrated global competitors
- specialised aircraft manufacturers
- specialised manufacturers of spacecraft and related systems
- engine producers
- component manufacturers/assemblers
- design, assistance and maintenance service providers

It should be noted that the component manufacturers/assemblers category contains a numerically substantial and very diverse set of companies in terms of both size and the types of businesses they run. There are also some start-ups operating in the sector: according to the

Chamber of Commerce database, there are 28 start-ups and innovative SMEs registered in Italy under the Ateco business activity code for the aerospace sector; six of those businesses are located in the region of Campania. If we were to include businesses registered under other Ateco codes in which products and services are applicable to the aerospace industry, there are 65 innovative SMEs, 53 of which are considered start-ups. Geographically, the highest concentration of these companies is in Lazio, with 24.5% of the total.

Several large aerospace companies have forged **partnerships** or even joint ventures with major foreign multinationals and/or universities and international research institutes, in order to develop new aircraft, spacecraft and/or components.

KEY CHARACTERISTICS

R&D AND PATENTS

Companies in the aerospace sector **invest heavily in R&D**, as technology is a crucial competitive factor. In 2018, just taking the companies with over €100 million in annual revenue, total R&D investments exceeded €1.7 billion.

According to data from the European Patent Organisation (EPO), European **patent applications** in the transport sector rose by 6.6% year-on-year in 2019 to a total of 9,635. Of these applications submitted, 378 came from Italy, putting it third behind Germany (2,138) and France (999).

Transport remained the leading sector for patent applications in Italy in 2019.

IMPORTS & EXPORTS

In 2019:

- **Italian exports** of aerospace products reached a value of €6.193 billion, up 7.6% from 2018;
- **Italian imports** came in at €3.324 billion, up 13.7% from 2018, showing a faster growth rate than the previous year.

The **United States** remained the leading trade partner for Italian aerospace companies in 2019, accounting for 40.3% of imports and 33.5% of exports .

KEY CHARACTERISTICS



Source: Illustration of CTNA data

PRODUCTION CLUSTERS AND THE CTNA

The Italian National Aerospace Technology Cluster (CTNA) is an association of public and private sector members that brings together all the major actors in the Italian aerospace industry: large, medium and small companies, research centres and universities, government agencies and national platforms, industry federations and regional aerospace industrial and technological districts. The association's Strategic Plan is aligned with and runs parallel to European Union policy in aerospace matters, including for 2020.

The CTNA's role is to:

- establish, through an agreement with and between the national aerospace industry players, technological priorities and initiatives, as a function of international developments and policies;
- aim to ensure that the Italian aerospace industry has a robust, proactive global role in both aeronautics and space research.

KEY CHARACTERISTICS

Indeed, the CTNA's strategic goals are: to realise the potential value of Italian **technological excellence**; to expand and enhance **research and innovation networks**; to foster the **development** of all players in the industry; to strengthen the industry's **competitiveness** nationally and internationally; and to increase the quantity and quality of **jobs** in the sector.

The **industry district members** of the CTNA are located in 11 different regions of the country: Piedmont, Lazio, Lombardy, Campania, Puglia, Abruzzo, Basilicata, Emilia Romagna, Tuscany, Umbria and Sardinia. Each regional district has its own specific strengths and is comprised of highly specialised companies – whether in avionics, components, services or other niches – that work closely with universities and research centres. **Each district is committed to developing an industry of its own**, building a structured production chain in order to offer competitive, cutting-edge solutions.

CTNA figures, which include not just core activities but the entire value chain in the industry, aerospace districts contain predominantly **SMEs**, and most of them are highly specialised businesses that collaborate with larger global companies.

The regional districts also include **universities** and **research centres**, which have partnerships with companies that aim to develop innovative products.

KEY CHARACTERISTICS

COMPOSITION OF ITALIAN AEROSPACE DISTRICTS

Regione	District / Cluster	SMEs	Large Companies	Universities	Research Centres	TOTAL
ABRUZZO	Dominio ICT Aerospazio Abruzzo	15	2	1	3	21
BASILICATA	CLAS Cluster Lucano Aerospazio	21	2	1	4	28
CAMPANIA	DAC Distretto Tecnologico Aerospaziale della Campania S.c.a.r.l.	119	22	5	13	159
EMILIA-ROMAGNA	IR4I Cluster Tecnologico Aerospaziale dell'Emilia Romagna S.c.a.r.l.	27	1	2	1	31
LAZIO	Distretto Tecnologico dell'Aerospazio del Lazio	250	24	5	10	289
LOMBARDY	Lombardia Aerospace Cluster	209	11	4	3	227
PIEDMONT	DAP Distretto Aerospazio Piemonte	280	9	3	6	298
PUGLIA	DTA Distretto Tecnologico Aerospaziale della Puglia S.c.a.r.l.	80	9	3	6	98
SARDINIA	DASS Distretto Aerospaziale della Sardegna S.c.a.r.l.	17	5	2	3	27
TUSCANY	Distretto Advanced Manufacturing 4.0	30	6	3	4	43
UMBRIA	Umbria Aerospace cluster	25	3	1	-	29

Source: CTNA presentation, 6 February 2020

KEY CHARACTERISTICS

The leading aerospace districts in terms of revenue generated, are those located in Lombardy, Lazio and Piedmont.

REVENUE OF ITALIAN AEROSPACE DISTRICTS

Region	District/Cluster	Revenue (€ bn)
ABRUZZO	Dominio ICT Aerospazio Abruzzo	n.d.
BASILICATA	CLAS Cluster Lucano Aerospazio	n.d.
CAMPANIA	DAC Distretto Tecnologico Aerospaziale della Campania S.c.a.r.l.	2.8
EMILIA-ROMAGNA	IR4I Cluster Tecnologico Aerospaziale dell'Emilia Romagna S.c.a.r.l.	0.5
LAZIO	Distretto Tecnologico dell'Aerospazio del Lazio	5.0
LOMBARDY	Lombardia Aerospace Cluster	6.0
PIEDMONT	DAP Distretto Aerospazio Piemonte	3.9
PUGLIA	DTA Distretto Tecnologico Aerospaziale della Puglia S.c.a.r.l.	1.5
SARDINIA	DASS Distretto Aerospaziale della Sardegna S.c.a.r.l.	n.d.
TUSCANY	Distretto Advanced Manufacturing 4.0	0.35
UMBRIA	Umbria Aerospace cluster	0.4

Source: CTNA presentation, 6 February 2020

KEY CHARACTERISTICS

Italy and its 11 aerospace districts are involved in many R&D projects that receive regional, national and European subsidies. The number of district projects by segment (aeronautics and/or astronautics) is an indication of the region's particular pursuits. CTNA figures show that Campania and Puglia are the districts engaged in the most aeronautics projects, while for astronautics it is Lazio engaged in the most research projects.

Another key institution for the sector is the Italian Aerospace Research Centre (CIRA). A company that is majority-owned by the Italian government, CIRA was founded in 1984 to conduct aeronautical research. CIRA, a member of CTNA, possesses infrastructure such as **test facilities that are unique in the world** and the most **advanced laboratories** used by both Italian and foreign institutions and industry players. The activities carried out at CIRA cover some of the most advanced topics in aerospace research. CIRA also participated in major European and other international research programmes, working with

universities and both Italian and foreign aerospace companies.



KEY CHARACTERISTICS

NUMBER OF RESEARCH PROJECTS IN ITALIAN AEROSPACE DISTRICTS

Region	Aeronautics	Astronautics
ABRUZZO	2	4
BASILICATA	4	19
CAMPANIA	82	9
EMILIA-ROMAGNA	-	1
LAZIO	20	30
LOMBARDY	26	15
PIEDMONT	54	10
PUGLIA	76	11
SARDINIA	6	1
TUSCANY	-	15
UMBRIA	9	2

Source: CTNA presentation, 6 February 2020

KEY CHARACTERISTICS

OTHER CLUSTERS AND ENTITIES

In addition to the CTNA member districts, there are other business clusters and institutions in Italy that, while not specialists in aerospace, are technological innovators that can have an impact through applications in the aerospace sector.

Most notably, a **Mechatronics Hub** was recently established in the north-eastern region of Trentino Alto Adige. This hub is a common space for manufacturing and testing products, conducting research, developing innovative products and new or more efficient production processes using a combination of advanced computer, electronic and mechanical technology. This cluster, whose total annual revenue is over €49 million, includes companies active in the automotive sector, robotics and smart electronics systems, sensor technology and industrial automation. A few of Trentino's Mechatronics Hub companies also develop solutions for the aerospace

sector.

In the same region, the **Hub for Innovation in Trentino (HIT)** was established for the purpose of promoting economic growth in Trentino through advanced technology transfer and new innovations from scientific research. HIT has become a partner in numerous initiatives, including National Technology Cluster initiatives in 'Smart Factory' and 'Smart Communities' projects. It is also participating and/or running various EU-level innovation projects. HIT works to facilitate the transformation of positive scientific research results into value for businesses and investors (by means of licenses, patents and contracts) and supports the development of technologically innovative start-up companies.

KEY CHARACTERISTICS

One of HIT's founding members, which also plays an active role in the Mechatronics Hub, is Trentino **Sviluppo**, an agency of the provincial government that supports sustainable, innovative development across the area, promoting cooperation between businesses and the formation of stronger industry networks and strategic clusters in the province. Trentino Sviluppo runs six Business Innovation Centres within the province. These business incubators oversee over 100 businesses (start-ups, other young businesses and research centre-affiliates of larger industrial groups), employ over 700 people and generate over €380 million in annual revenue.

HIT and Trentino Sviluppo have also sponsored an awareness-raising campaign among local businesses about the potential opportunities in the aerospace industry, particularly regarding applied research and technological advances.



KEY SECTOR DATA

In 2018, the aerospace businesses operating in **Italy** attained aggregate revenue of €16.4 billion, a 5.1% increase from 2017, recovering from a decrease the previous year.

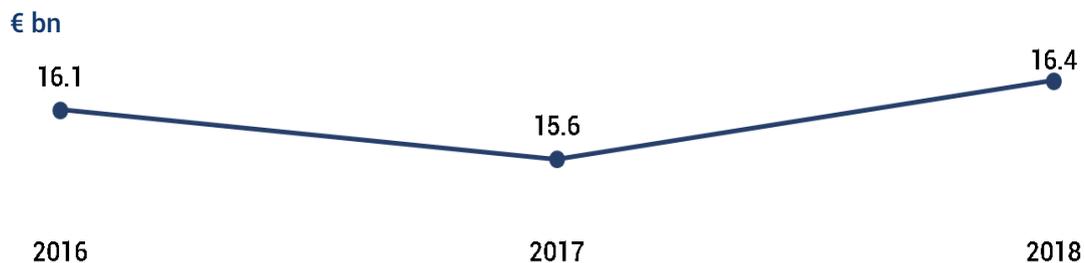
According to the Aerospace and Defence Industries Association of Europe (ASD), aerospace and defence sector revenue in **Europe** reached €246 billion in 2018 (+7.7% from 2017). The aeronautics and space component (75% of the total aerospace and defence sector value in Europe) grew by 4.9% year-on-year.

Italian companies' 2018 revenue trend was in line with the European sector trend.

At the **global** level, based on the latest available data, in 2017 total aerospace industry revenue reached €838 billion, 49% of which was in the United States .

KEY SECTOR DATA

AGGREGATE REVENUE OF COMPANIES ACTIVE IN ITALY, 2016-2018



EUROPEAN AEROSPACE AND DEFENCE INDUSTRY REVENUE, 2016-2018



a) the Aeronautics and Space sector here includes both civil and military aircraft and spacecraft

Source: Illustration of ASD of Europe data

KEY SECTOR DATA

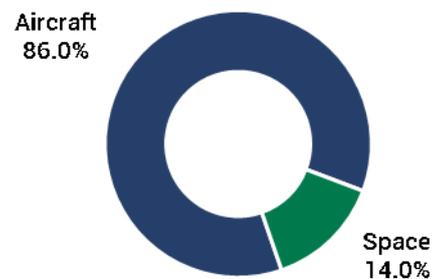
The **aircraft segment** constitutes the larger area of business, accounting for an estimated 86% of total industry revenue in 2018. This segment has been positively influenced by growing demand for air travel. This expansion has had a positive impact on related maintenance and repair service businesses. In Italy, the aircraft production chain plays a very important part in the country's economic development, particularly due to the advanced technological knowledge required for the manufacturing processes. This chain is composed of large manufacturers flanked by small to medium sized sub-supplier companies that are capable of guaranteeing that the industry's high technical quality standards will be met.

The **spacecraft segment** is not the main segment in terms of revenue, accounting for about 14% of total industry revenue in 2018, although space programmes in which industry players are participating have made progress. Spacecraft does appear, however, to be the more dynamic of the two segments. **Several countries have come to view the space sector as strategic** for economic development, with technological advances that spread into other high-tech industries, such as telecommunications. The

know-how of Italian space sector companies and their participation in international programmes thus constitutes a major growth driver. According to the European Space Agency (ESA), **Italy is the 6th leading global space power, with total space industry revenue amounting to €2.23 billion in 2018.** The Italian spacecraft segment is composed of about 600 businesses that employ around 7,000 people. Spacecraft revenue, about 70% of which comes through exports, has over the last five years amounted to 1.5% of GDP.

AGGREGATE REVENUE BREAKDOWN BY SEGMENT, 2018

100% = €16.4 bn



MAIN TRENDS

DIGITISATION AND SUSTAINABILITY

In recent years, many companies in the sector have invested in:

- **digitisation and digital technology** in order to construct a production chain with cutting-edge technology that is also cost-effective. As part of the Industry 4.0 programme, enabling inventions are being developed and applied, including collaborative robotics, additive manufacturing, augmented virtual reality, calculator-assisted simulations, the industrial internet of things, cloud manufacturing techniques, cyber-security, as well as big data and advanced analytics;
- **sustainability**, by seeking to develop and implement manufacturing processes that consume less and less energy, while at the same time using more environmentally friendly and energy-efficient materials and managing maintenance activities more efficiently.

CORPORATE RESTRUCTURING

The supply side of the aerospace sector has undergone a phase of reorganisation in recent years, both in Italy and internationally, through both actions by companies to focus on their core business and a series of mergers and acquisitions aiming to expand geographical market coverage and/or optimise costs by means of economies of scale.

MAIN TRENDS

THE SPACE ECONOMY

According to the Italian Space Agency (ASI):

*Space has for some time become a pervasive super-infrastructure, by definition without boundaries, from which we seize new, intertwined opportunities every day. Space must therefore be approached as a 'system of systems' based on the integration of many factors, technologies and services, both from 'Earthly' sources and from space programmes themselves. This is the **new Renaissance that will come from space, the Space Economy**. It is a phenomenon with the potential to increase the €270 billion in global space economy revenue through a transition from manufacturing value chain to a service-based value chain, which thanks to the internet can be propagated at a trivial cost. Satellite services will thus become a low-cost utility that can generate indirect revenue for companies capable of anticipating our society's needs. Space technologies will have an increasing, positive influence on our lives.*

(Retrieved from: [https://www.asi.it/space-economy/La nuova frontiera dell'economia oltre l'atmosfera terrestre](https://www.asi.it/space-economy/La-nuova-frontiera-dell'economia-oltre-l-atmosfera-terrestre), 2020)



MAIN TRENDS

The aerospace sector is developing more and more innovative solutions within the context of international research programmes, including putting smaller satellites (nanosatellites) and increasingly functional satellites into orbit. These new satellites are performing useful functions for both civil and military purposes, including **geolocation, observations and transmitting** more types of information. For example, the Vega launch system (Vega is an acronym for *Vettore Europeo di Generazione Avanzata*, meaning 'Advanced Generation European Carrier Rocket') currently in use by Arianespace, was developed jointly by ASI and ESA to launch small satellites into orbit.



MAIN TRENDS

Meteorological monitoring, global communications and transportation, imaging, satellite navigation and remote sensing/surveying, as well as many other fields, all rely on the aerospace industry, so constant technological advances in aerospace are influencing other sectors of the economy to an increasing extent. For example:

- **the radar market**, and especially synthetic aperture radar (SAR): not only has the widespread use of radar hardware and software in the defence sector stimulated growth in this market, but radar-based systems have also been developed for measuring ocean currents and seabeds, to measure pollution and small targets, to monitor maritime traffic, for search and rescue missions at sea, to locate accumulations of floating waste such as plastic islands, as well as other applications;
- **the geoinformation market**: geographical information, in today's world, is an important part of the global economy, providing added value in daily life.

The market volume in this area has risen sharply thanks to the development of geographical information systems (GIS) applied to the fields of environmental protection, natural disaster mapping for emergency preparedness measures, marine surveillance systems, logistics and even leisure and tourism.

Regarding the **aircraft** sector, it should be stressed that as a result of its solidly integrated production chain, products and solutions have evolved in such a way as to positively affect upgrades, not only for the biggest players but even for Italian microbusinesses and SMEs, which have introduced a huge variety of new mechanical parts and other components onto the market, supported by skilled maintenance, repair and overhaul (MRO) services.

MAIN TRENDS

- **The helicopter market** with cutting-edge avionics (including advanced automatic pilot systems, anti-collision systems to improve visibility at night or in smoke, smog or fog) is becoming increasingly widespread for rescue operations, passenger transport, law enforcement, offshore transport, coast guard operations and environmental monitoring activities.
- **The airplane market** is one of the main beneficiaries of the latest aerospace technologies, from precision speed reducers to bionic aircraft design.
- **The Unmanned Aerial Vehicle (UAV) market** is one of the most promising business areas in the aerospace industry, as its range of application is expanding. Drone use is in fact being extended not only by armed forces (to surveillance of borders and seas, and to monitoring migratory flows), but also in the field of civil protection (support for emergency response and critical infrastructure

protection operations), by industries (such as drone inspections of offshore oil platforms and thermographic inspections of photovoltaic plants), by the healthcare sector (to disinfect public spaces and monitor compliance with hospital and public health measures), in the agricultural sector (to monitor crops) and in the commercial sector (civil use of remote-pilot aircraft).



INTERNATIONAL PERSPECTIVE



INVESTMENTS IN ITALY

Italy occupies a prestigious position in the global Aerospace, Defence and Security (AD&S) industry by virtue of the industrial and technological capabilities of a national supply chain that takes on significant strategic value. Italy's AD&S sector is among the **top ten in the world**, and the country has led the way in several major advances in the field. For instance, Italy was the first country in the world to build a certified convertiplane for civilian use, was among the first to have conducted joint flight operations with both manned and unmanned aircraft, was the third country in the world to launch a satellite into orbit, and more than half of the pressurised volume of the international module at the International Space Station was made in Italy. (The above facts were gathered in a report published in September 2018 by The European House – Ambrosetti, in partnership with the Leonardo corporation).

R&D EXPENDITURES

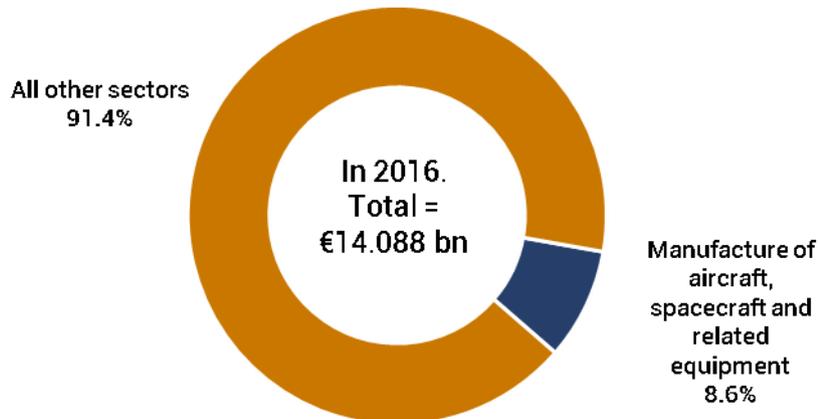
In **Italy**, according to the latest OECD data available (for 2016), research and development spending in the

'manufacture of aircraft, spacecraft and related equipment' sector amounted to €1.21 billion, which is 82.3% of the R&D spending in the broader 'manufacture of other means of transport' sector and 8.6% of the total R&D spending in Italy. In 2018, the major companies active in the industry (those with at least €100 million in annual revenue) reported over **€1.7 billion** in R&D spending combined.

The combined R&D spending of the 2,500 largest companies in the **world** active in the broader aerospace and defence industry in 2017/2018 amounted to €19 billion (-4.3% from the previous year), making it one of the top ten economic sectors in terms of corporate R&D expenditures. Within the **European Union**, the aerospace and defence sector accounts for 4.4% of total R&D spending at about €200 billion, up 0.9% year-on-year (according to the European Commission's '2018 EU Industrial R&D Investment Scoreboard'). According to ASD Europe, R&D investments in the **aeronautics segment** reached €15 billion, €9 billion of which was in the civil aeronautics field, which is attracting a growing number of private sector investors.

INVESTMENTS IN ITALY

R&D EXPENDITURE IN ITALY



Source: illustration of Istat data on Ateco 2007 (business registry code) 30.30: "Manufacture of aircraft, spacecraft and related equipment"

INVESTMENTS IN ITALY

New developments in the **space segment** are primarily connected with national and international space agency programmes. However, over the past few years, private-sector investments in spacecraft have been growing.

Italy's agency in the field is *Agenzia Spaziale Italiana* (the Italian Space Agency, or ASI), while for European programmes the key institution is the European Space Agency (ESA).

ASI

The Italian Space Agency (ASI) is a national public body under the Ministry for University and Research. It works in partnership with other major institutions such as the ESA and NASA. ASI's activities consist primarily in allocating public funds earmarked for national space programmes and in participating, on behalf of the Italian government, in ESA programmes. Operations are therefore planned based on the funding that is effectively made available to the agency.

At the European level, ASI actively participates in all ESA programmes, and its tasks include promoting, supporting and coordinating Italy's participation in EU space and aerospace projects and initiatives.

The ASI and Italy have for some time played an important role in the European and global space research community, having established relationships and cooperation activities with numerous other national space agencies.

Apart from the ESA, the United States is the international partner with which ASI has established the most preferred relations, as it has expanded its cooperation with US space agency NASA into numerous areas over the years through bilateral agreements.

INVESTMENTS IN ITALY

Over time, ASI has established solid relationships and signed notable agreements with the national space agencies of numerous other countries and with their governments, including:

- Roscosmos - Russia
- JAXA - Japan
- CONAE - Argentina
- ISA - Israel
- Luigi Broglio Space Centre – Malindi, Kenya
- SRO - India
- CNSA, CAS and CMSA - China
- CSA - Canada
- BSA - Brazil
- AMS - Mexico
- KARI – South Korea
- GISDTA - Thailand

INVESTMENTS IN ITALY

ESA

- The European Space Agency (ESA) outlines and implements the European Union's space programmes. ESA also actively cooperates with space organisations outside of Europe.
- ESA's statutory activities (scientific space programmes and general budget activities) are funded through contributions by the agency's member states, which are calculated based on national GDPs. In addition, ESA conducts several optional programmes. Each member state decides which optional programmes it wishes to participate in and to what extent it wishes to contribute financially.
- For **2020**, ESA's budget is **€6.68 billion**, 16.8% higher than in 2019. Funding for its programmes from individual EU member states came to **€4.87 billion**, while the remaining **€1.81 billion** will be funded through other income. Looking at the contributions from each member state, Italy covers a major role: it is the third-leading contributor with a 13.7% share

of the budget, behind France (26.9%) and Germany (20.1%), and ahead of the United Kingdom (9.5%).

Italy has participated in many ESA projects, including the Artemis and Egnos satellite programmes, the Mars Express and Cheops programmes for solar system exploration, the ERS-1 and ERS-2 Earth observation projects, as well as the Vega and Ariane space rocket launcher ventures.



INVESTMENTS IN ITALY

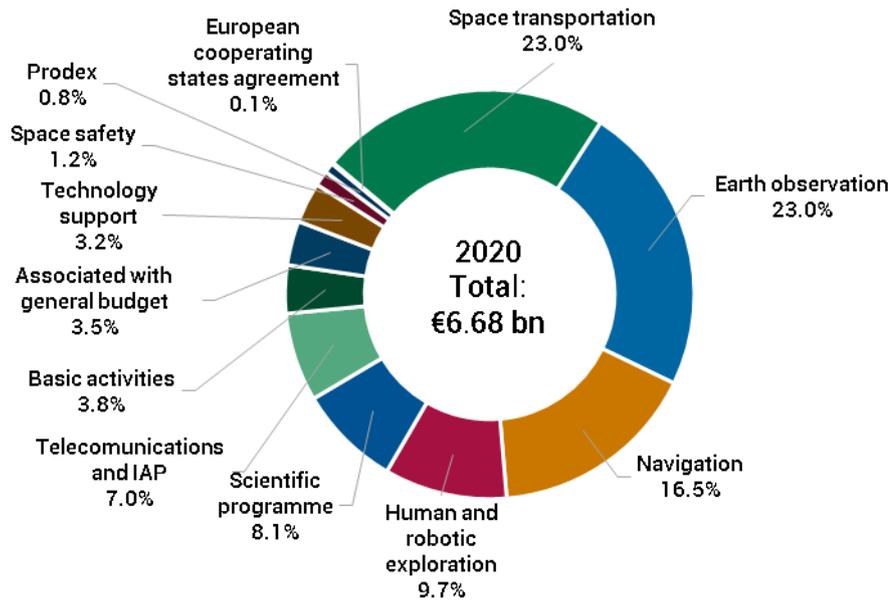
ESA

Breaking down ESA's budget for 2020, the main areas being funded are Earth observation (€1,536.8 billion, 23% of the total) and space transport (€1,536.1 billion, 23%).

In November 2019, the ESA's ministry-level Council held its Space19+ meeting in Seville, approving the various budgets for individual space programmes scheduled for the next three years (until 2022). The total budget for the 3-year period is €14.4 billion, the highest ever for ESA. **Italy has solidified its position as one of the leading participant nations** in ESA by committing to contributions of €2.3 billion, around 16% of the total to be funded by member states, behind Germany (23%) and France (19%).

INVESTMENTS IN ITALY

THE ESA BUDGET BY SECTOR^(a)



a) includes activities implemented on behalf of institutional partners

Source: illustration of ESA data

INVESTMENTS IN ITALY

DEFENCE SPENDING

Defence spending by governments all over the world greatly affect the aerospace industry, especially as regards investments in modernisation, fleet renewals and research.

GLOBAL MILITARY SPENDING

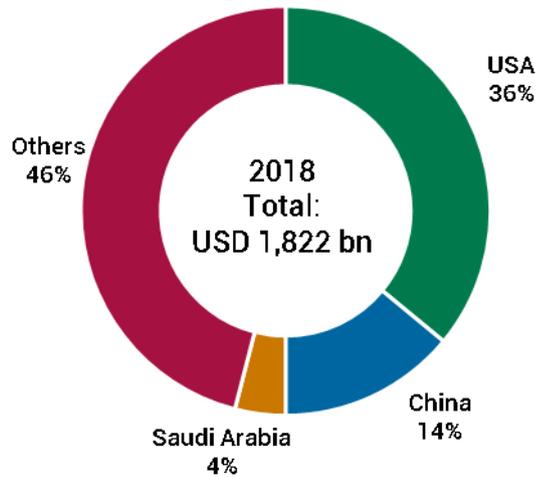
According to the Stockholm International Peace Research Institute (SIPRI), in 2018 global military spending rose by 2.6% year-on-year in inflation-adjusted dollars to \$1.822 trillion, continuing an upward trend seen in recent years.

Most countries' military spending increased in 2018; exceptions included countries in Africa, Oceania and eastern Europe. The United States remained the top military spender in 2018 after a year-on-year inflation-adjusted increase of 4.6%; the USA accounts for around 36% of global defence spending. It is followed by China (14%) and Saudi Arabia (4%).

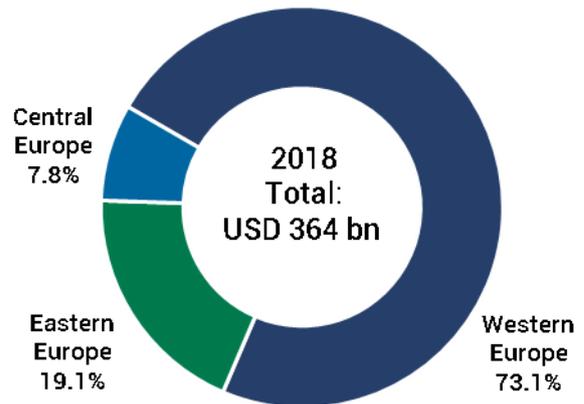
Within Europe, western European countries accounted for the lion's share (73.1%) of military spending in 2018.

INVESTMENTS IN ITALY

MILITARY SPENDING OF MAJOR COUNTRIES



MILITARY SPENDING IN EUROPE



Source: illustration of SIPRI data

INVESTMENTS IN ITALY

FOREIGN DIRECT INVESTMENT (FDI)

According to rankings published by the Research on Investment firm, in 2018 and 2019 Italy has been among the 30 "best countries for business". For 2018, OECD data on foreign direct investments (FDI) show that inward direct investment stocks in the 'manufacture of aircraft and spacecraft and related equipment' sector in Italy amounted to 0.3% of all inward FDI. This amount was also 1.1% of all inward FDI in manufacturing (which in turn accounts for about one-third of the total). The year-on-year trend for all inward FDI stocks in Italy was +5.2% in 2018, reaching an amount of €372.4 billion.

ITALY'S INWARD FDI STOCK, 2017 AND 2018

(figures in € mn unless specified)

Activity	Inward FDI			
	2017	2018	% Change 18/17	as % of 2018 stock
Manufacturing	98,768	97,059	-1.7	26.1
of which:				
<i>Manufacture of aircraft, spacecraft and related equipment</i>	1,064	1,095	2.9	0.3
Other sectors	255,383	275,368	7.8	73.9
All sectors	354,151	372,427	5.2	100.0

Source: OECD

INVESTMENTS IN ITALY

FOREIGN DIRECT INVESTMENT (FDI)

In the aircraft and spacecraft industry, the income (returns) on inward foreign direct investments rebounded from a €40 million net loss in 2017 to a €2 million net gain in 2018.

INCOME FROM ITALY'S INWARD FDI STOCKS, 2017 AND 2018 (figures in € mn unless specified)

Activity	Income from inward FDI		
	2017	2018	% Change
Manufacturing	6,219	5,998	
of which :			
<i>Manufacture of aircraft, spacecraft and related equipment</i>	-40	2	<i>n.s.</i>
Other sectors	11,186	11,215	0.3
All sectors	17,405	17,213	-1.1

Source: OECD

INVESTMENTS IN ITALY

FOREIGN-OWNED COMPANIES IN ITALIA

There are 42 companies active in the aerospace industry in Italy that are **owned or part-owned by foreign investors**, 28 (or 66.7%) of which are **majority foreign-owned**. More than half (61.9%) of these companies are located in northern Italy. They employ a combined 5,120 people (49.7% of total sector employment) and their combined annual revenue was over €1.7 billion (54.2% of the total).



INVESTMENTS IN ITALY

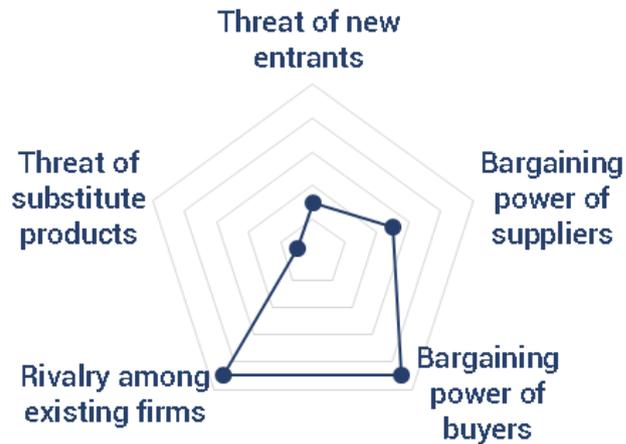
ACTIVE FOREIGN-OWNED OR PARTLY FOREIGN-OWNED COMPANIES, AS OF FEBRUARY 2020

	Area		
	North	Centre/South	Total
Number of active companies at least partly foreign-owned			
- Total:	26	16	42
. Majority foreign-owned	18	10	28
- % majority foreign-owned	69.2	62.5	66.7
Number of employees of foreign-owned / part-foreign-owned companies			
- Total:	5,120	5,176	10,296
. Majority foreign-owned	4,939	3,442	8,381
- % attributable to majority foreign-owned companies	96.5	66.5	81.4
Revenue (2018 aggregate) of foreign-owned / part-foreign-owned companies			
- Total:	1,725.3	1,456.8	3,182.1
. Majority foreign-owned	1,636.2	979.1	2,615.3
- % attributable	94.8	67.2	82.2

INDUSTRY ATTRACTIVENESS



INDUSTRY ATTRACTIVENESS RADAR, 2020(a)



a) The smaller the area between the five points, which represent attractiveness factors, the more attractive the sector is for business.

INDUSTRY ATTRACTIVENESS RADAR, 2020(a)

THREAT OF NEW ENTRANTS

The likelihood of new entrants is medium to low. Some new competitors are emerging, located especially in emerging economies, mainly active in local or regional markets.

BARGAINING POWER OF SUPPLIERS

The bargaining power of suppliers is medium; the power they have is associated with the fact that the supply market is on a global scale, while basic input materials required for production (especially metals) must meet specific technical specifications.

BARGAINING POWER OF BUYERS

The bargaining power of clients is high, with respect to both armed forces and private sector clients (especially airlines that have sizeable fleets).

RIVALRY AMONG EXISTING FIRMS

Competition is intense in the various segments of the industry, especially over technological innovations.

THREAT OF SUBSTITUTE PRODUCTS

There is little threat of alternative products, as any potential substitutions would come from within the sector – for example, unmanned aircraft could be used more frequently in both civil and military contexts.

OPPORTUNITIES

INNOVATION

Throughout the world, the aerospace industry is considered to be a driving force for the entire economy, both directly (for sectors such as telecommunications and Earth observation) and indirectly (for example, satellite production has a positive impact on the development of nanotechnology and new material businesses). Designing and building innovative solutions is therefore a strategic competitive factor. Over the next few years, trends in aerospace and defence are likely to be shaped by the following three main areas of innovative developments:

- **Electric propulsion aircraft:** Given the aerospace industry's rising carbon dioxide emissions as a result of growing demand for air travel, some well-established companies in the sector, along with a number of start-ups around the world, have begun developing electric propulsion systems for aircraft.
- **Urban air mobility (UAM):** This refers to the development of urban transport systems in the air. More specifically, breakthroughs are expected in drone passenger aircraft in the coming years. However, there are a series of challenges that must be overcome: urban air transport would require new regulations,

new infrastructure, new traffic control systems and poses major energy requirements. These are some of the questions that will need to be solved in the near future.

- **Automated flight decks:** The transition to automated flight deck guidance systems will reduce the cabin crew numbers required for each flight, consequently lowering operating costs for airlines.

Major projects in the aerospace sector involve both longstanding companies with solid experience in research and very small companies that have extremely specialised knowledge and skills. For both types of companies, it is crucial to keep pace with technological developments in a rapidly changing production environment.



OPPORTUNITIES

INTERNATIONAL PROGRAMMES

International programmes constitute an important business opportunity for the short to medium term for aerospace companies. ESA's programmes, in which Italy's aerospace industry is participating, include the fields of Earth observation, rocket launchers, scientific research, and human space flight applications. In the years to come, ESA will concentrate its efforts on four main areas: scientific research, improving the quality of life, cooperation with the EU and national agencies, and promoting European industry.

CHEOPS (CHaracterizing ExOPlanets Satellite) is an ESA project to study planets outside of our solar system. Italy is a key member of this project through the Italian National Astrophysics Institute (INAF), the University of Padua and ASI. The Cheops project is in fact using a high-tech telescope designed and produced in Italy that can detect even tiny changes in the brightness of stars, caused when planets move even slightly in front of them – that is, by mini-eclipses.

DEMAND FOR AIR TRANSPORT

Recovery in global commercial air transport demand, especially from emerging countries, will have a strong impact on the entire aerospace industry chain, including the components and spare parts segments. The future of air travel is likely to be set in motion by cross-sector partnerships between aerospace companies and players in ICT, electronics and other fields, in order to maximise competitiveness. There is a growing demand to reduce greenhouse gas emissions, so in the future, air transport will need to become more energy-efficient. The 'decarbonisation' of the aerospace industry will indeed be a crucial aspect of global efforts to contain climate change. Finally, the introduction of automated aircraft will compel regulatory bodies to provide sufficient guidelines to meet minimum security requirements for such vehicles.

CRITICAL SUCCESS FACTORS

R&D INVESTMENTS

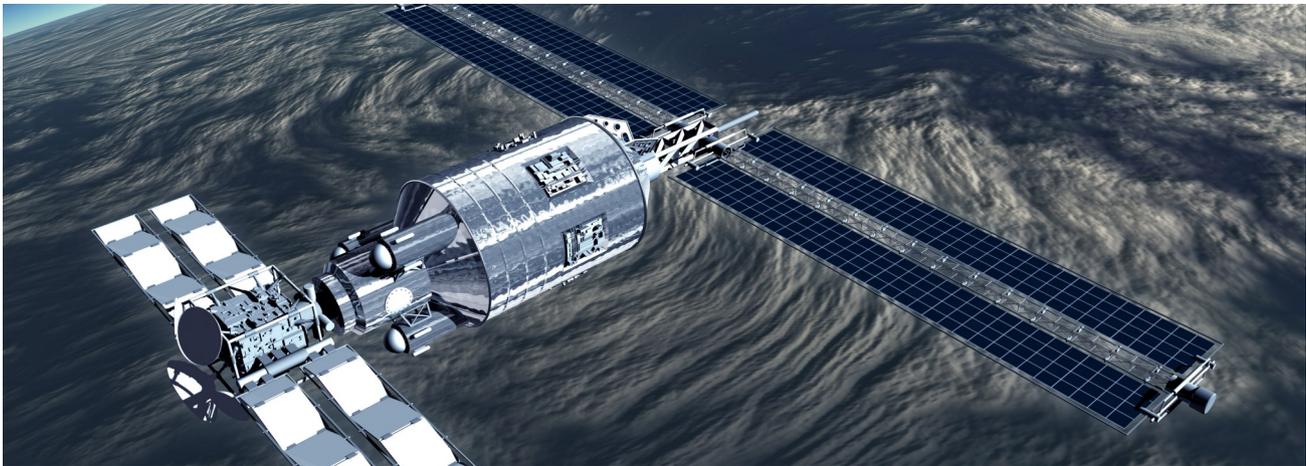
The market is rewarding companies that invest in research and development in order to:

- achieve technological innovations that improve performance;
- develop and build product upgrades.

In 2018, the major aerospace sector companies (those with over €100 million in annual revenue) spent anywhere between 5% and 40% of their revenue on R&D, and the aggregate amount spent was over €1.7 billion.

KNOW-HOW

Businesses must continually improve and maintain the capabilities that Italian companies are widely recognised as having, in terms of design, production techniques, aircraft integration engineering and systems integration. In general, such continual improvements are important in order to compete with emerging players. Companies also benefit from implementing technological advances to gain and maintain a competitive edge. It remains crucial to develop new skills given the highly complex and rapidly changing technology involved.



CRITICAL SUCCESS FACTORS

ORGANISATIONAL CAPABILITIES

It is important for aerospace businesses to maintain and optimise efficiency in the manufacturing process through targeted investments. Companies need to have organisational flexibility so that they can efficiently manage different processes and contain costs. Furthermore, in a market that is paying closer attention to sustainability issues, it is very important to aim to develop production processes that save energy, as well as to prioritise sustainability in product and service development activities, including the use of innovative and/or reusable materials.

Both nationally and globally, the sector is characterised by constant shifts and reshuffles on the supply side. Such restructuring often takes place when companies decide to focus on their core business, but there are also frequent mergers and acquisitions, where companies aim to extend their coverage of markets and to optimise costs by achieving economies of scale.

INTERNATIONAL PARTNERSHIPS

In order to grow and achieve greater visibility, it is important for companies to participate in international programmes in the sector (for example, by forming a partnership with ESA to develop rocket launchers) as well as to work with the leading multinational players like Airbus and Boeing.



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