

IN FIGURES

Sources : GIFAS - <https://www.gifas.asso.fr>

- France's leading export sector
- 348 aeronautics companies
- 184,000 employees, 20% of whom are recent graduates (2014)
- €50,800 million in sales (2014) • €73,100 million in orders (2014)

INTERNATIONAL

France's aeronautics and space industry is number one in Europe for the production of civil and military airplanes and helicopters: Airbus, Falcon, Mirage, Rafale, Vulcain, and more. The nation's rocket engines are also renowned, as are its launching systems, satellites, and the navigation systems used on Ariane rockets. The European Space Agency (ESA) has its headquarters in Paris and liaison offices in Brussels, Moscow, Washington, and Houston, as well as an office in the European space port in French Guiana.

Initiated by France as early as 1950, international cooperative ventures have enabled Europe to develop innovative and high-performance aeronautical equipment, such as aircraft (A380, A350 XWB, A320neo, A400M, Ariane 5, Rafale, Falcon 7X, ATR 72), the Tigre and NH90 helicopters, the CFM and Leap engines, the Meteor missile, the Helios military observation satellite, the Sentinel family of environmental monitoring satellites, and the Neuron, Sperwer, and Watchkeeper drones.

Aircraft builder Airbus is a consortium of European manufacturers that employs 55,000 people around the world. Headquartered in Blagnac, outside the southern French city of Toulouse, Airbus makes more than half of the aircraft used by the world's airlines and is Boeing's chief competitor. The A380 is the world's largest passenger plane, carrying from 515 to 853 people. www.airbus.com

Founded in 1928, the Dassault aviation group is the last in the world still held by its founder's family and bearing the founder's name. Dassault employs more than 12,000 people around the world, including 9,500 in France. Some 2,200 Dassault Falcons are in operation; 1,000 Dassault planes are in military use. www.dassault-aviation.com

Safran designs and manufactures airplane and helicopter engines, rockets, and other aeronautical and defense equipment. It employs more than 70,000 people in 50 countries. www.safran-group.com

The products and services of the Thales group ensure connectivity and communications between air-traffic controllers, aircraft in flight, and the airlines' operations centers. The company produces cockpit electronics, onboard entertainment systems, air-traffic control systems, and cybersecurity systems. Thales also provides maintenance services. www.thalesgroup.com

Aéroports de Paris, Europe's second-largest airport system, welcomed 92.7 million passengers to Paris in 2015. The company manages 34 airports throughout the world. www.aerportsdeparis.fr

RELATED FIELDS

• Aviation • Defense • Manufacturing • Telecommunications • Tourism • Transportation

SUBFIELDS

• Aircraft manufacturing • Airports • Civil and military aviation • Embedded systems • Helicopters • Information systems • Radar • Rocketry • Satellites • Space • Travel

USEFUL LINKS

- ◆ Aeronautics industry recruitment: www.aeroemploifformation.com
- ◆ Aeronautics and Space Institute: <https://www.inst-aero-spatial.org>
- ◆ Aerospace Valley: www.aerospace-valley.com
- ◆ AIREMPL0I, careers in aviation: www.airemploi.org
- ◆ Boost Aerospace: www.boostaerospace.com
- ◆ CNES, National Space Studies Center: <https://cnes.fr>
- ◆ CORAC, Civil Aeronautics Research Council: <http://aerorecherchecorac.com>
- ◆ ENAC, National School of Civil Aviation: www.enac.fr
- ◆ ESTACA, Higher School of Aeronautics and Automobile Construction: www.estaca.fr
- ◆ ESA, European Space Agency: www.esa.int/ESA
- ◆ European COPERNICUS Program: <https://copernicus.cnes.fr>
- ◆ GIFAS, European Aeronautics and Space Industries Group: <https://www.gifas.asso.fr>
- ◆ Hanvol, aviation career training and placement for the disabled: www.hanvol-insertion.aero
- ◆ International Aeronautics and Space Show, Paris Le Bourget: <https://www.siae.fr>
- ◆ ISAE-SUPAERO, Higher Institute of Aeronautics and Space: <https://www.isae.fr>
- ◆ IPSA, School of Air and Space Engineering: www.ipsa.fr
- ◆ NAFAN, North American French Aerospace Network: www.nafan-aerospace.com
- ◆ ONERA, French Center for Aerospace Research: www.onera.fr
- ◆ SIAE-ENSMA, National School of Mechanics and Aerotechnics: <https://www.ensma.fr>

October 2018

AERONAUTICS
AEROSPACE

France is the world's second-largest exporter of aeronautics (after the United States and ahead of Germany); in Europe, it plays a pivotal role in aeronautical assembly. Flagship programs have earned the nation's aeronautics industry world-class status. These include the Ariane rocket (the generic designation for a family of European satellite launch vehicles), the Airbus A380 consortium, and the Rafale fighter aircraft.

A sector of excellence, the French aerospace industry comprises several subsectors: passenger aircraft, combat and special-purpose aircraft, helicopters, launchers, satellites, and missiles. The complementary supply chains for these subsectors embrace all of the know-how needed to mount and sustain a civil or military manufacturing program.

Based in Toulouse, France's Aerospace Valley is Europe's largest center of employment in the field of aeronautics and aerospace. The nation's aeronautics and space industry is one of the few manufacturing sectors in which employment has grown and where high-quality jobs predominate—nearly 40% of the workforce consists of engineers and managers. Demand for skilled employees (technicians, welders, metalworkers) is so great that the sector has trouble meeting it.

The French postsecondary system provides training for aeronautics and aerospace occupations at all levels, from vocational certificates offered in secondary schools to post-Master programs. Programs are taught either in French or in English.

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AERONAUTICS – AEROSPACE

LICENCE (BACHELOR)

LEVEL

MENTION COMPLÉMENTAIRE (MC)

(BACCALAURÉAT + 1 YEAR OF POSTSECONDARY STUDY) – L1

The MC in **aeronautics** is offered at education and training centers in a dozen French cities. Three options are available: avionics, turbine-engine airplanes, and turbine-engine helicopters.

BREVET DE TECHNICIEN SUPÉRIEUR (BTS)

(BACCALAURÉAT + 2 YEARS OF POSTSECONDARY STUDY) – L2

The BTS in **aeronautics** is offered in public and private high schools and training centers in a dozen French cities.

INSTITUTION-SPECIFIC DIPLOMA

(BACCALAURÉAT + 2 YEARS OF POSTSECONDARY STUDY) – L2

A diploma recognizing the recipient as a **civil aviation technician** is offered by ENAC, the National School of Civil Aviation. Recipients are future runway crew leaders, refueling managers, and air-traffic controllers, among other functions. www.enac.fr

LICENCE PROFESSIONNELLE

(L2 + 1 YEAR OF POSTSECONDARY STUDY) – L3

A licence professionnelle is awarded in **science and technology** with majors and specializations in **aeronautics** (maintenance of multi-technical aeronautical systems).

Students majoring in networks and telecommunications may elect a specialization in **integration of embedded aeronautical systems**, while electricity and electronics majors have the option to specialize in **aeronautical and space electronics**. The major in manufacturing offers a specialization in **aeronautics** (aeronautical design and production).

BACHELOR

(BACCALAURÉAT + 3 YEARS OF POSTSECONDARY STUDY) – L3

This bachelor's degree from the Toulouse Business School is part of the aviation management track offered in partnership with ENAC:

www.tbs-education.fr/fr/formations/bachelor/programme/filiere-aviation-management

MASTER

LEVEL

DIPLÔME INTERUNIVERSITAIRE (DIU)

(BACCALAURÉAT + 5 YEARS OF POSTSECONDARY STUDY) – M1

In partnership with the University of Cincinnati, the University of Bordeaux proposes a DIU in Aero-System Operations. The program, taught in English, allows students to earn a Master of Engineering from the University of Cincinnati: <http://ceas.uc.edu/aesop/about.html>

MASTER

(BACCALAURÉAT + 5 YEARS OF POSTSECONDARY STUDY) – M2

Several relevant concentrations and specializations are possible in master's programs in science, technology, and health:

- Concentration in aeronautical maintenance;
- Concentration in materials (specialization in aeronautics and space structures);
- Concentration in mechanics, physics, and engineering (specialization in aeronautics and space);
- Concentration in physics and astrophysics (specialization in aeronautics and space).

The engineering school at the University of Bordeaux offers a master's in engineering and maintenance of aeronautics and transportation systems. In schools of engineering, several pertinent specializations are possible in programs leading to a master, the national engineering diploma, or the equivalent:

- Engineering and maintenance of aeronautics and transportation systems;
- Engineering of electronic air safety systems;
- Air-traffic management and control;
- Aeronautics and space mechanics;
- Air and ground transportation.

Programs taught in English include:

- Master of Science in Aeronautics and Space:
www.ec-lyon.fr/en/academics/master-programs/international-master-programs/masters-aeronautics-space
- Master of Science in Aeronautical and Space Systems:
<https://www.isae-supaero.fr/en/academics/masters/isae-supaero-master-s-program/>
- Master of Science in Aeronautical Mechanics and Energetics:
<https://www.isae-supaero.fr/fr/formations/masters/l-offre-de-masters/>

DIPLÔME/TITRE D'INGÉNIEUR – EQUIVALENT TO MASTER

(BACCALAURÉAT + 5 YEARS OF POSTSECONDARY STUDY) – M2

France's schools of engineering deliver diplomas accredited by CTI, the commission on engineering degrees:

CNAM, the National Conservatory of Arts and Crafts, specialization in aeronautics and space, in partnership with ISAE-ENSMA and AEROTEAM: www.cnam-poitou-charentes.fr/site/formation/ingenieur_aeronautique
ENAC, the National School of Civil Aviation:

www.enac.fr/fr/ingenieur-enac

ISAE-ENSMA, the National School of Mechanics and Aeronautics, focuses on air and ground transportation: www.isae-ensma.fr

ESTACA, the Higher School of Aeronautics and Automobile Construction, enables students to acquire multidisciplinary competence in engineering, with a focus on transportation: www.estaca.fr

ISAE-SUPAERO, the Higher Institute of Aeronautics and Space: <https://www.isae.fr>

POST-MASTER LEVEL

MASTÈRE SPÉCIALISÉ

(MASTER + 1 YEAR OF POSTSECONDARY STUDY)

About 20 *Mastères Spécialisés*—specialized post-master programs accredited by the *Conférence des Grandes Écoles* and offered in schools of engineering such as ENSAM, ENSEIRB-MATMECA, and ISAE—allow students to acquire new or complementary expertise in aeronautical and aerospace engineering.

A dozen such programs are taught in English:

- Aircraft and helicopter engineering; Air operations and maintenance; Aerospace project management; Embedded systems; Experimental flight; Maintenance and support; Processes for aeronautical structures; Safety aircraft; Space communication systems.

Other *Mastères Spécialisés* programs include:

- Management of aeronautical industry projects; Aeronautics and space structures; Embedded lighting systems; Aerospace propulsion systems; Aeronautics and space communications and networks.

Information on the *Mastère Spécialisé* diploma:

www.campusfrance.org >Resources center>Educational and Research programs>Degree description>*Mastères spécialisés*