FIELD OF STUDY

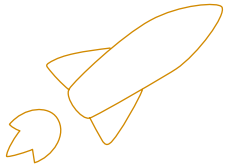
ENGINEERING SCIENCES

RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

CAMPUS FRANCE

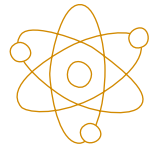
Aeronautics

Aerospace



- **1st** in the French export sector
- **7%** of employees in the French industry (2020)
- **691,000** jobs (2020)
- **263,000** employees in aerospace (2020)
- **106,000** billion euros in turnover (2020)

Sources: INSEE - https://www.insee.fr



Charles and Gabriel Voisin opened the very first aircraft factory in 1905, Henri Farman flew a one-kilometer closed circuit for the first time in early 1908, Louis Blériot was the first to fly across the English Channel in 1909, and Jean Mermoz opened the Andes line in 1929. Needless to say, France is a pioneer in aviation.

With 1,000,000 km², the French aviation services account for one of the largest airspaces in Europe. One third of the 460 regional airports in the European Union are located in France. One of the most important airports in the world's air traffic, Paris-Charles de Gaulle is the second European airport for passenger travel (first for freight traffic) and the tenth worldwide. It is the hub of Air France, a member of the Air France-KLM group and founder of the Skyteam alliance, whose network links every continent, either directly or through partnerships.

The French aerospace industry is very prestigious, and covers a wide range of sectors: passenger and freight aircraft, combat or mission aircraft, helicopters, launchers, satellites, combat missiles, etc.

The supply chain is complementary and covers all the necessary expertise for equipping a civil or military program. Flagship projects have brought the French aeronautics industry to the global forefront: the Ariane rocket, the generic name for a group of European civil satellites launchers, the Airbus A380 as part of the consortium and the Rafale fighter aircraft.

Based in Toulouse, the Aerospace Valley is the leading employment area in Europe in the field of aeronautics and aerospace. The French aeronautics and space industry is one of the few sectors where employment is growing and where qualified jobs prevail (about 40% of engineers and executives).

The demand for training in aeronautics for professions such as technicians, welders and boilermakers is extremely high, so much so that the sector is having difficulty finding a qualified workforce.

The French training offer encompasses all the professions in aeronautics and aerospace, with certifications at all levels: Brevet de Technicien Supérieur (advanced technician's certificate), Licence (undergraduate), Master and post-Master, in French and in English.

International

Decarbonizing air transport is the primary objective of the aeronautics component of the France 2030 Investment Plan, with a budget of 1.2 billion euros. The environmental impact of air traffic, responsible for over 2% of global energy-related CO_2 emissions, is a major challenge when it comes to ecological transition. In France, the aviation sector's carbon emissions accounted for 5.6% of national greenhouse gas emissions in 2019. In February 2021, the European aeronautics industry made a commitment to attain carbon neutrality in air transportation by 2050, through the adoption of sustainable alternative fuels and the large-scale development of new technologies. A dedicated acceleration strategy named «bio-based products and sustainable fuels» specifically targets the establishment of a French industrial sector dedicated to producing sustainable alternative fuels.

France is a leading country in the sector of aeronautics and space construction in Europe. It includes the electronic sector of defense, civil and military aviation: planes, helicopters, engines, missiles, satellites, security, defense and navigation systems, and space launchers. The main French manufacturers are: Eurocopter, Dassault, Airbus and ATR for aircraft, the Safran and Latécoère (aerostructures) groups for engines, equipment suppliers Thales for air connectivity and cybersecurity, and Zodiac for emergency slides and seats. The Pegasus network, including about thirty European aeronautical schools and universities, enables students to spend one semester or one year in any of the twelve following European countries: Germany, Spain, the Netherlands, Poland, the United Kingdom, Sweden, etc.

RELATED FIELDS

• Aviation • Defense • Industry • Telecommunications • Tourism • Transport

SUBFIELDS

• Aircraft • Airports • Civil and military planes • Aircraft manufacturers • Space • Rockets • Helicopters • Radar • Satellites • Embedded systems • Passengers

Useful links

- Aerospace Valley: **www.aerospace-valley.com/en/node/1**
- Boost Aerospace: **www.boostaerospace.com/**
- National Center for Space Studies (CNES): **www.cnes.fr/en**
- National School of Civil Aviation (ENAC): **www.enac.fr/en**
- École Nationale Supérieure de Mécanique et d'Aérotechnique (ISAE-ENSMA): **www.ensma.fr/en/**
- École Supérieure des Techniques Aéronautiques et de Construction Automobile (ESTACA): **www.estaca.fr/en/**
- European Space Agency (ESA): **www.esa.int/**
- ISAE group: **www.groupe-isae.fr/en**
- Institut Supérieur de l'Aéronautique et de l'Espace (ISAE-SUPAERO): **www.isae-supaero.fr/en/**
- Institute of Polytechnic Science and Aeronautics (IPSA): **www.ipsa.fr/en/**
- North American French Aerospace Network (NAFAN): **www.nafan-aerospace.com/**
- The French Aerospace Lab (ONERA): **www.onera.fr/en**
- PEGASUS: **www.pegasus-europe.org/**
- COPERNICUS: **www.copernicus.cnes.fr/en/copernicus-0**
- Paris Air Show: **www.siae.fr/en/**

LEVEL Licence

BREVET DE TECHNICIEN SUPÉRIEUR (BTS)

NATIONAL DIPLOMA – 2 YEARS OF HIGHER EDUCATION – L2
120 ECTS credits

The **BTS Aéronautique** (Advanced Technician's Certificate in Aeronautics) is offered in a dozen French cities in public or private high schools, schools and training centers.

DIPLÔME D'ÉTABLISSEMENT

BACCALAURÉAT – 2 YEARS OF HIGHER EDUCATION – L2
120 ECTS credits

The **Technicien de l'aviation civile** (civil aviation technician) diploma is provided by the National School of Civil Aviation (ENAC) for professions such as runway supervisor, station manager, airport controller, etc. **www.enac.fr/en**

LICENCE PROFESSIONNELLE

NATIONAL DIPLOMA – 3 YEARS OF HIGHER EDUCATION – L3
180 ECTS credits

Several courses include majors in aeronautics:

- Mechanics, major in **Mechanical Engineering in Aeronautics**
- Engineering Sciences, major in **Engineering and Maintenance for Aeronautics and Transport,** Master's Degree in Aeronautics Engineering and Transport
- Maintenance and Technology: Electronics, Instrumentation, major in **Aeronautics, Space and Transport**
- Electronic professions: Communication, Embedded Systems, major in **Integration of Embedded Systems for Aeronautics and Transport**
- Industrial professions: Design and Improvement of Industrial Processes and Procedures, major in **Aircraft Navigability**
- Industrial professions: **Aeronautics Industry,** major in Design and Industrialization, Aeronautical and Space Equipment, Expertise and Maintenance of Composite Materials in Aeronautics, Improvement Project Management, Aeronautical Maintenance, Aeronautical, Avionics and Structure Maintenance, Maintenance of Avionic Systems, Aeronautical Engine Development, Air Navigation Control, Aeronautical and Space Propulsion, Aeronautical and Space Structures, Aeronautical and Space Systems, Aircraft Technology, Industrial Techniques in Aeronautics and Space

BACHELOR IN SCIENCES AND ENGINEERING

LICENCE LEVEL – 3 YEARS OF HIGHER EDUCATION – L3
180 ECTS credits

Le Bachelor **Sciences et ingénierie industrie des transports** est proposé par École d'ingénieurs des sciences aérospatiales (ELISA Aerospace Bordeaux) :
www.elisa-aerospace.fr/cursus-bachelor-2/

LEVEL Master

Aeronautics
Aerospace

MASTER

NATIONAL DIPLOMA – 5 YEARS OF HIGHER EDUCATION – M2
120 ECTS credits

In universities, several programs, courses and majors are provided:

- Business Law, major in Transport and Aeronautics Law
- International and European Law, major in Aviation and Aeronautical Law; Space and Telecommunications Law
- Electronics, Electrical Energy, Automation, major in Aeronautical and Space Systems Engineering
- Energy, major in Aeronautics and Space
- Industrial Engineering: Master's Degree in Engineering, Engineering for Aeronautics; Mechanics and Composite Structures: Aeronautics and Ecodesign
- Mechanical Engineering, major in Aeronautical Computing; Aeronautical Design; Aeronautical and Space Engineering; Aeronautical Production
- Complex Systems Engineering, major in Automation and Mechatronics, Automobile, Aeronautics and Space; Industry of the Future and Intelligent Systems; Aeronautical Industries, Airworthiness
- Aeronautical Maintenance, major in Aeronautical Avionics Engineering and Maintenance; Aeronautical Structure Engineering and Maintenance; Customer Support for Aeronautics
- Mechanics, major in Aeronautics and Transport
- Networks and Telecommunications, major in Aeronautical, Space and Terrestrial Telecommunications
- Materials Science and Engineering, major in Materials and Structures for Aeronautics and Space

In Engineering schools, a wide range of specializations are offered to obtain a Master's degree, a national diploma or status:

- Aeronautics and Space Aerostructures; Aeronautical and Space Propulsion; Aeronautical and Ground Transportation; Turbulence
- Energy, major in Aeronautics and Space
- Networks and Telecommunications, major in Aeronautical, Space and Terrestrial Telecommunications
- Earth and Space Sciences and Space Technologies
- Materials Science and Engineering, major in Materials and Structures for Aeronautics and Space

Programs Taught in English:

Aeronautical Maintenance and Structures; Aeronautical Mechanics and Energetics; Aeronautical and Spaces Structures; Aerospace Engineering; Aerospace Materials Design, Manufacturing and Innovation Management; Aerospace Materials Design, Manufacturing and Autonomous Systems; Aerospace Project Management; Aerospace Systems - Navigation And Telecommunications; Electrical Engineering: Mechanical and Aerospace Engineering; Smart Aerospace and Autonomous Systems; Electronic Systems for Embedded Communications and Applications; Smart Aerospace and Autonomous Systems; Space and Telecommunications Law; Transfers-Fluids Materials in Aeronautical and Space Applications

Programs Taught in English: https://taughtie.campusfrance.org

TITLE OF ENGINEER

MASTER'S LEVEL – 5 YEARS OF HIGHER EDUCATION – M2
120 ECTS credits

Engineering schools deliver diplomas accredited by the CTI (Engineering Accreditation Institution):

- Conservatoire des Arts et Métiers, specialization in Aeronautics and Space: **www.cnam.eu/site-en/**
- École de l'air et de l'espace : **www.ecole-air-espace.fr/**
- National School of Civil Aviation (ENAC): **www.enac.fr/en**
- École d'ingénieurs des sciences aérospatiales (ELISA Aerospace): **www.elisa-aerospace.fr/cursus-ingenieur/**
- École Nationale Supérieure de Mécanique et d'Aérotechnique (ISAE-ENSMA) : **www.ensma.fr/en/engineering-program/**
- École Supérieure des Techniques Aéronautiques et de Construction Automobile (ESTACA) : **www.estaca.fr/en/**
- École polytechnique universitaire Aix-Marseille Université, specialization in Microelectronics and Telecommunications, major in Electronic Systems in Aeronautics, Aerospace and Automobile : **www.ensma.fr/en/engineering-program/**
- Institute of Polytechnic Science and Aeronautics (IPSA): **www.ipsa.fr/en/**
- National Higher French Institute of Aeronautics and Space (ISAE-SUPAERO): **www.isae-supaero.fr/en/**

Engineering Accreditation Institution : www.cti-commission.fr/accreditation

LEVEL Post-M

MASTÈRE SPÉCIALISÉ® (MS)

DIPLÔME D'ÉTABLISSEMENT – 1 YEAR OF HIGHER EDUCATION

These programs, accredited by the Conférence des Grandes Écoles, offer instruction in both English and French and result in a diploma awarded by an engineering school (ENSAM, ENSEIRB-MATMECA, ISAE-SUPAERO) that vouches for a specialization in Aeronautical and Aerospace Engineering or a dual competence:

- *Advanced manufacturing processes for aeronautical & spaces structures; Aeronautical engineering, maintenance & support; Aeronautical and Space Project Manager; Aeronautical and Space Structures; Air Operations and Maintenance; Airline & Airport management; Aviation and aircraft safety management; Embedded Systems; Experimental Flight Test Engineering; Aerospace vehicle engineering and architecture; Space Applications and Services, etc.*
- *Aeronautical and Space Engineering, Management of Aeronautical and Space Applications; Experimental Flight Test Engineering; Location and Multi-sensor Systems Engineering - Security, Internet of Things, Aeronautics, Intelligence; Management of Aeronautical Industrial Projects - Aeronautical Maintenance; Aerospace Propulsion Systems.*

Mastères Spécialisés® programs description:
www.campusfrance.org/en/resource/the-mastere-specialise-programs

List of MS courses:
www.cge.asso.fr/formations-labellisees/liste-formation-ms/

ECTS: European Credit Transfer and Accumulation System