MASTER OF SCIENCE
IN AEROSPACE ENGINEERING

2023

isae
Institut Supérieur de l'Aéronautique et de l'Espace
SUPAERO

Excellence with passion

ISAE-SUPAERO

A world leader in aerospace engineering higher education

A SPIRIT OF CONQUEST FROM THE VERY BEGINNING

Created by ambitious, passionate scientists, ISAE-SUPAERO was the very first aeronautical engineering school in the world, founded more than 100 years ago. Today, our passion and vision remain intact. They are what drive us and take us forward in our quest for academic and scientific excellence. Over time, our graduates have contributed greatly to the development of the aerospace sector and ISAE-SUPAERO has earned a solid international reputation thanks to its engineers and the quality of its academic programs and researchers. The wide range of programs and the many partnerships forged with the academic and industrial worlds have made ISAE-SUPAERO a point of reference and a model to follow.

A wide range of degree programs in aerospace engineering:

33 programs

40% international students

More than **1,900** students

63 nationalities are present on campus

Access to an extensive active international alumni network:

- Inventors: from the designer of the first jet aircraft to the inventor of the black box
- CEOs and high level executives at Airbus, Dassault, Safran, Thales, ATOS, AXA, IBM, and countless other industry leaders in France, Europe and all over the world
- Directors of major programs such as Caravelle, Concorde, Airbus A320, Airbus A380 and Airbus 350
- Astronauts : Thomas Pesquet, Luca Parmitano and Jean-François Clervoy
- Many alumni work on space missions

An exceptional environment in the heart of Toulouse

Europe's leading hub of aerospace industries, laboratories and universities

A public higher education and research institution

CONTENTS

ISAE-SUPAERO, COMMITTED TO THE ENERGY TRANSITION FOR AVIATION

At ISAE-SUPAERO, we are convinced that Aeronautics and Space are part of tomorrow's world.

In 2021, we saw concrete implementation of the Institute's 'Horizon' sustainable development strategy built around 3 key themes:

- *Contribute to the ecological transition in the aerospace sector through training and research,*
- *Train students to participate in these debates*
- *Continue campus decarbonization*

The Mermoz project is part of these actions as well as the initiative "Framework Aviation & climate" which was published at the start of the academic year to inform the debate on the Future of Aviation.

More generally, it commits the Institute to strengthening its position as an international leader in advanced training in aerospace engineering by asserting itself as a major player in civil and military aerospace sector transitions.

The mobilization of the Institute in the integration of environmental issues was recognized by a third place in the ChangeNOW ranking of the French engineering schools most committed to the ecological transition.

Focus on the Mermoz Project

Check out all our innovative projects related to the ecological transition here

Faced with the climate emergency, aeronautics must be reinvented today. This will involve technological breakthroughs, of which hydrogen is one. This is why we are working on the design of a liquid hydrogen drone, theMERMOZ drone, capable of long distance flight with no CO2 emissions. During 2021, a wind tunnel model of the drone was made and tested in the ISAE-SUPAERO Drones wind tunnel. Two hydrogen propulsion chain validation campaigns were prepared with our partner H3Dynamics, in collaboration with the LAPLACE laboratory and the company H2-PULSE in order to carry out initial flight tests during the first semester of 2022.

Through this innovative project, we are anticipating the changes that will affect the next generation of more environmentally-friendly aircraft. This project is already arousing a great deal of enthusiasm on the part of our students, who see this as a throw-back to the heyday of aviation pioneers and as a way to give purpose and meaning to their future professional careers.

THE MASTER OF SCIENCE IN AEROSPACE ENGINEERING

The Master of Science is a two-year program undertaken after undergraduate studies, including Bachelor's degrees or an equivalent. It provides higher qualification for employment or further doctoral studies.
The ISAE-SUPAERO Master of Science degree program is internationally renowned and highly regarded as an innovative program in science and technologies.

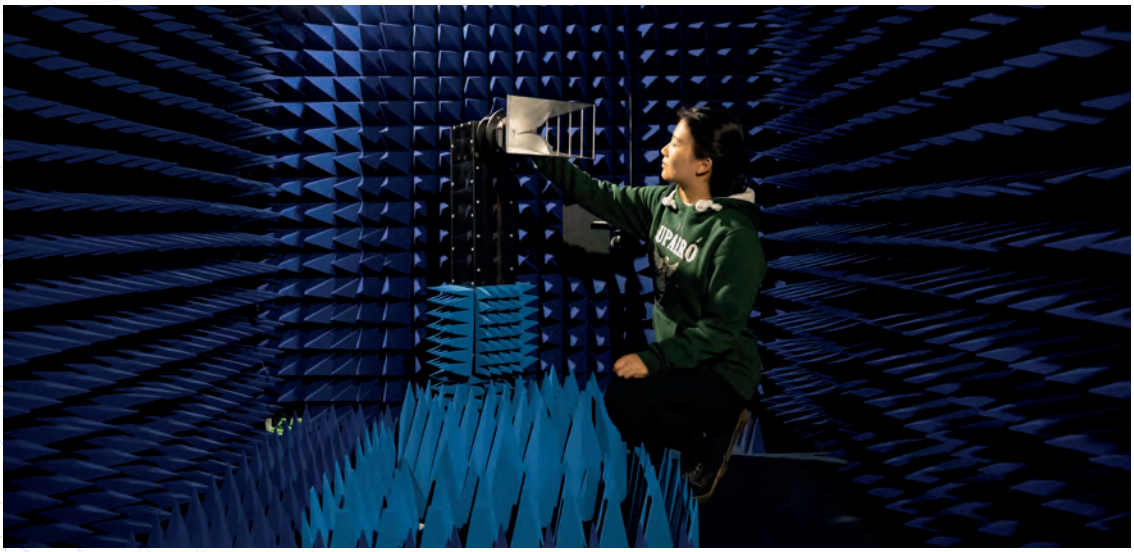
Fully taught in English, this program is designed to prepare engineering students to find and develop solutions to today's and tomorrow's challenges facing the world and the aerospace industry.
The Master is accredited by the French Ministry of Higher Education and Research in line with the European higher education system.

OBJECTIVES

The Master of Science in Aerospace Engineering is intended to educate graduate students in subjects relevant to the demanding challenges and needs of the industry.
Endowing students with skills in engineering science, technology and design as they relate to aeronautics and space, the MSc AE program is designed to be multi-disciplinary preparing future engineers to easily and efficiently work on aeronautical systems, space systems and their applications, with a focus on the complete life cycle of the system. The MSc AE program takes in a wide spectrum of knowledge, enabling students to tackle various
aspects from design to operating products and systems either in research organization or in an aerospace company in a multinational environment.

LEARNING APPROACH

The ISAE-SUPAERO Master program is designed around a combination of lectures, tutorials, study cases and projects to be performed in an industrial environment or in ISAE-SUPAERO's laboratories. It is taught in English.
The MSc AE program includes a three-semester academic session on ISAE-SUPAERO's premises, taught by permanent professors and experts from the aerospace industry to bring current knowledge and experience.
The last semester consists in a master thesis to be prepared in a company or laboratory in the aerospace sector. After the thesis,
students who obtain 120 credits in the examinations will be awarded the Master of Science in Aerospace Engineering degree from ISAE-SUPAERO.



A MULTIDISCIPLINARY CURRICULUM

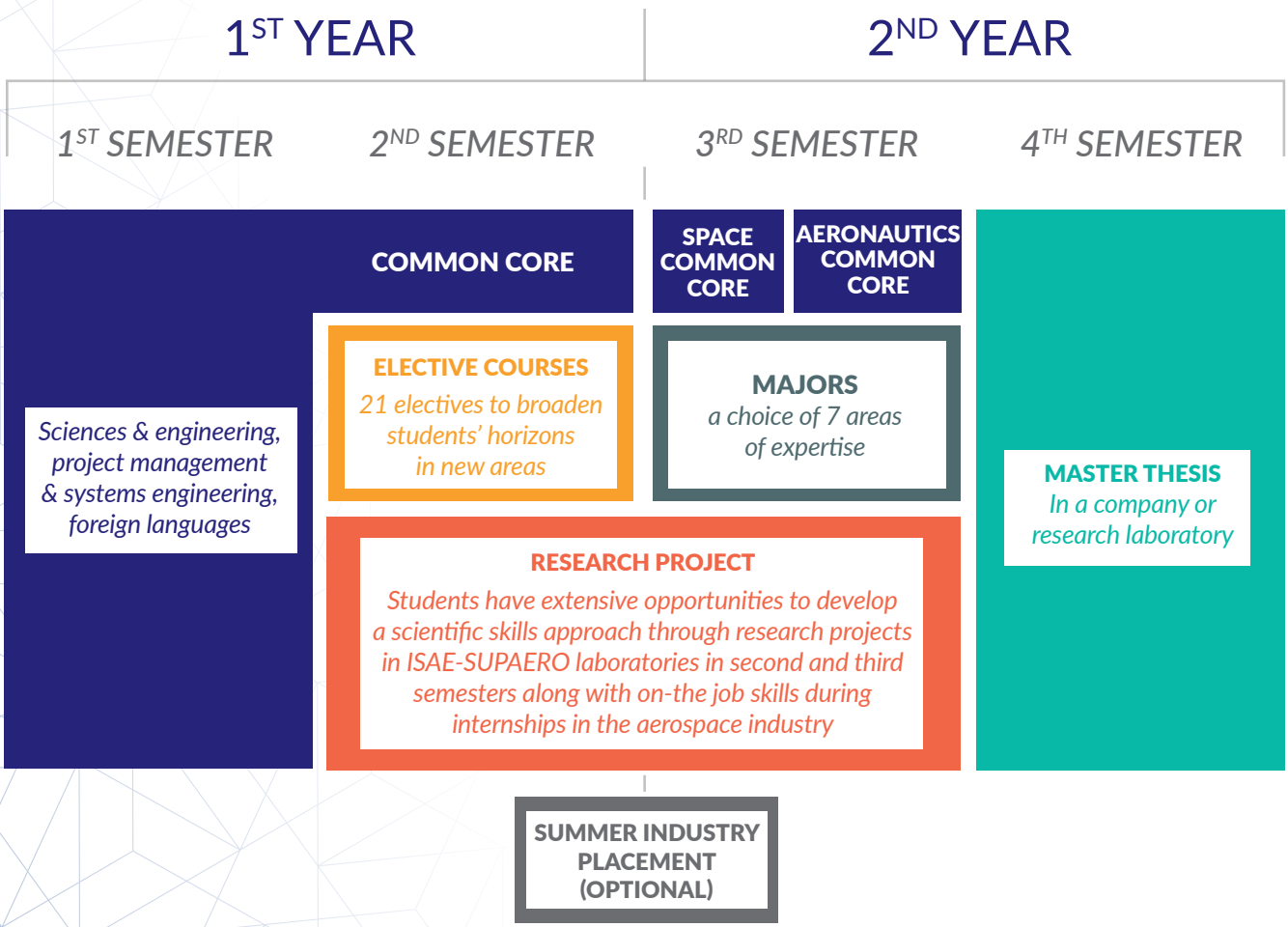
Fully taught in English

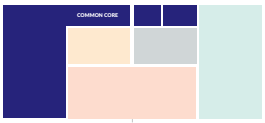
FULLY TAUGHT IN ENGLISH
4 SEMESTERS WITH 30 ECTS EACH

The first semester of the Master of Science in Aerospace Engineering program focuses on the common core curriculum, while the second semester offers a wide choice of electives.

In the third semester, students choose one of the seven majors in the main areas of aeronautical and space systems design.

Students complete a master's thesis in the fourth semester.





COMMON CORE

The core curriculum is multidisciplinary with a strong grounding in science and engineering, along with courses in project management and foreign languages. During the third semester, it is split into two parts focusing on space environment and mission or sustainable aviation.

Sciences & Engineering

Objective 1: to master solid technical and scientific skills in the major disciplines related to aerospace engineering

- *Aircraft systems*
- *Space systems*
- *Human factors*
- *Aviation safety airworthiness*
- *Control*
- *Aerodynamics & propulsion*
- *Flight dynamics*
- *Aeronautical structures*
- *Applied mathematics*
- *Algorithm and computing*
- *Signal processing*
- *Embedded systems*

Objective 2: to be aware of disciplines playing a major role in new aerospace projects

- *Air and space law*
- *Sustainable aviation*
- *Climate sciences*
- *Space medicine*

Project Management & Systems Engineering

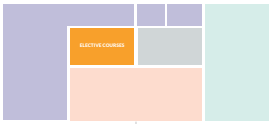
Objective: to develop a comprehensive, interdisciplinary approach to the design and development of a product or system

- *Project management*
- *Systems engineering*

Foreign Languages and Soft Skills

Objective: to prepare students to work and communicate in evolving multicultural, team-oriented, innovative environments. French classes are mandatory for beginners during the two-year program.

- *Soft skills for innovation (innovation management & projects, creativity development, pitch conception, collective decision-making in situation of uncertainty, conferences with industrial actors in innovation)*
- *Languages: French as a Foreign Language, German, Arabic, Chinese, Spanish, Italian, Japanese, Portuguese and Russian*



ELECTIVES COURSES

Students select four electives among a choice of twenty-one

- *Acoustics – Mechanics of materials & structures – Space instrumentation – Object-oriented software development – Aircraft design methods*
- *Aeroengines Architecture & Performance – Aircraft structures – Control dynamic systems & implementation – Simulation for systems engineering – Instrumentation & flight data analysis - Model engineering - Language engineering*
- *Experimental Approach in fluid dynamics – Computational solid mechanics – Signal processing and digital electronic basics – Systems architecture and programming – Adaptive control*
- *Software for CFD – Structures design project – Real time control of an aerospace system – Cloud and network computing - MDO*

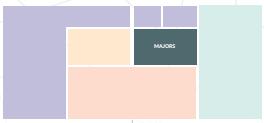
RESEARCH PROJECT

Projects are a key component of the program and are designed to broaden students' scientific, intellectual and social horizons.

- *This research project features a graduate-level research experience over 2 semesters with a focus on acquiring in-depth knowledge, expanding autonomy, and fostering innovation and critical thinking.*

Beyond scientific excellence, ISAE-SUPAERO seeks to ensure quality teaching in French as Foreign Language for its international students. The French as Foreign Language (FLE) Quality Label was obtained in December 2020, with the maximum score of 3 stars.

MAJORS



Students focus on one of seven areas of expertise including:

Advanced Aerodynamics & Propulsion

- *Advanced Aerodynamics*
- *Aeroelasticity & Flexible Aircraft - Aeroelasticity part*
- *Aeroelasticity & Flexible Aircraft - Flexible Aircraft part*
- *Advanced Aerodynamics of Turbomachinery*
- *Numerical Fluid Mechanics*
- *Aeroacoustics*
- *Physics and Modelling Turbulence*
- Multiphase Flow and Combustion

Aerospace Systems and Control

- *Multiple-Input, Multiple-Output systems*
- *Control of flexible structures*
- *Robust and optimal control*
- *Systems identification and estimation*
- *Non-linear control*
- *Hybrid control*
- *AI methods and tools for Automatic Control*
- *Aerospace Power Systems & Architecture*
- *Aircraft & Space Actuation Systems - Preliminary Design*
- *Model & Sizing of Aircraft Air-conditioning Systems*

Aerospace Structures

- *Aeroelasticity & Flexible Aircraft - Aeroelasticity part*
- *Aeroelasticity & Flexible Aircraft - Flexible Aircraft part*
- *Aerospace Structures - Advanced Structural Dynamics Part*
- *Aerospace Structures - Composite Structures in Services Part*
- *Computational Solid Mechanics*
- *Manufacturing*
- *Mechanics of materials*
- *Space Structures: spacecrafts & launchers*

Embedded Systems

- *Architecture and Programming of Software Systems*
- *Real-Time Systems*
- *Model-Based System Engineering*
- *Real-Time Networks*
- *AI and Autonomous Systems*
- *Architecture, Design and Synthesis of Hardware Systems*
- *System Dependability*
- *Certification*

Space Systems

- *Space environment and effects*
- *Mission analysis and orbital mechanics*
- *Space communications systems*
- *Space project: tools for simulation*
- *Space systems architecture: ground segments, satellites & sub-orbital planes*
- *Launchers architecture*
- *Satellite propulsion: chemical & electrical*
- *Satellite AOCS*
- *Launchers guidance and control*
- *Satellite electrical systems*
- *On board data handling sub-systems: functions and architectures*
- *Satellite thermal control systems*
- *Estimation and filtering*

Space Imaging, Navigation and Communication

Fundamentals of electrical engineering

- *Random signal processing and estimation*
- *Microwave and antenna engineering*

Satellite communications and navigation

- *Digital communications*
- *Land-mobile satellite transmission*
- *Satellite-based navigation*
- *Telecommunications and networks*

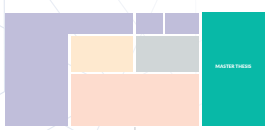
Earth observation

- *Remote sensing and sensors*
- *Image processing and data analysis*

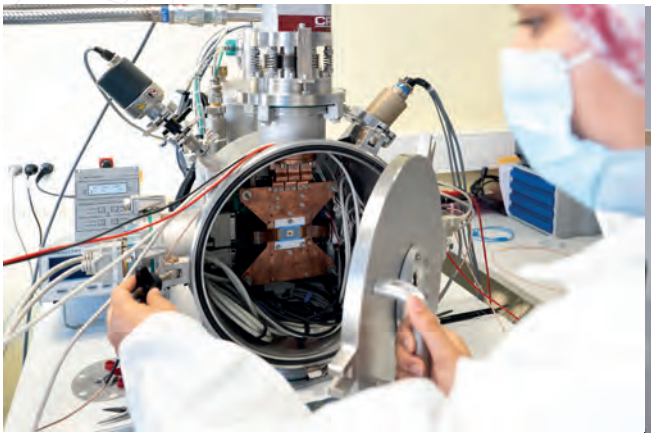
Systems Engineering

- *Requirements Engineering*
- *Systems Engineering Data Technical Management*
- *Systems Modelling and Analysis*
- *Systems Dependability*
- *Systems Design and Architecture*
- *Introduction to Verification & Validation*
- *AIRBUS study case: Systems Engineering & Certification of the A350*

MASTER THESIS



The Master thesis is prepared either in industry or in a laboratory. It enables the student to develop deeper knowledge, understanding, capabilities and attitudes. The overall goal of the thesis is for students to demonstrate their ability to successfully take up scientific or industrial challenges



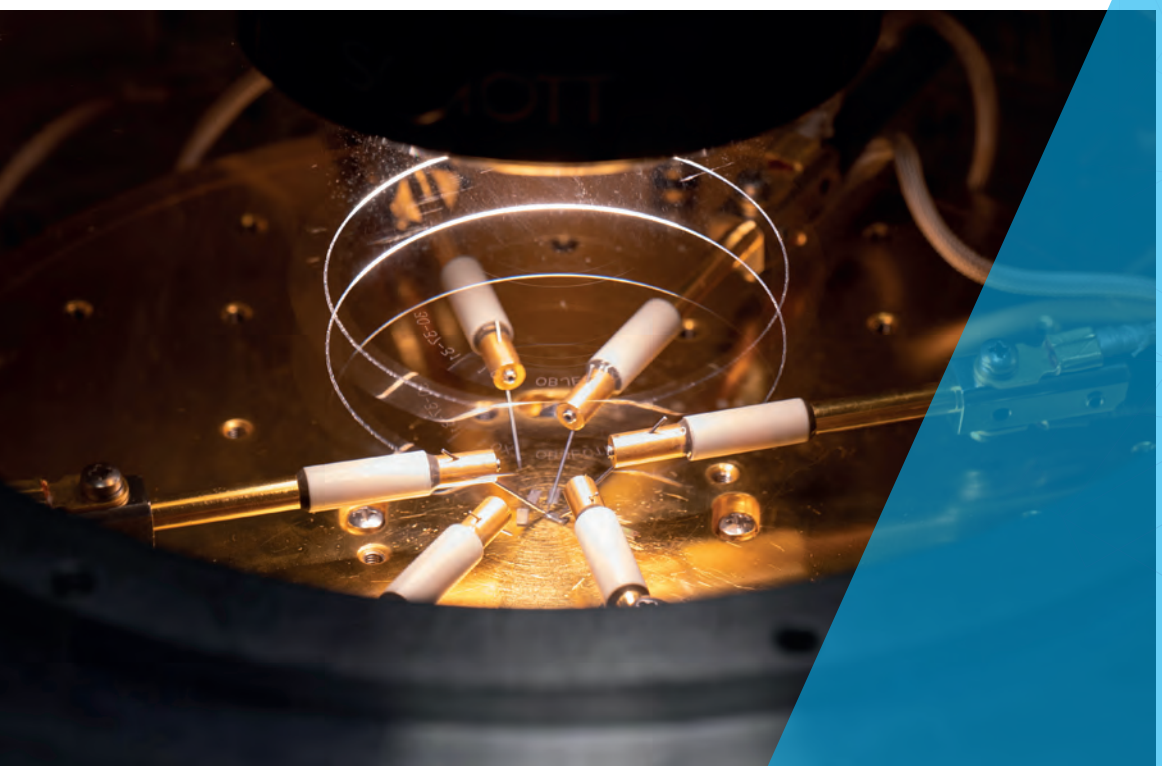
New partnership with the National School of Meteorology

M2 students from the ISAE-SUPAERO Master of science can chose to conduct their 3rd semester's Major in the Semester 9 of the"Weather & climate sciences" curriculum at the National School of Meteorology in Toulouse.
Six teaching units compose this program:

- Create weather and climate observation data
- Set up and use simulation tools in NWP – Numerical Weather Prediction – to forecast weather and climate.
- Climate Change Issues: a formal debate
- Answering a need from a client at a Weather and Climate Service
- The Economic Value of Met and Climate Information
- Personal Project

Pathway Aircraft Design and Operation:

Students in Aerospace Structures, Aerospace Systems & Control and Systems Engineering majors can follow the Aircraft Design and Operation pathway.
In this case they attend two dedicated modules : Aircraft Design Methods and Multidisciplinary Optimization in semester 2, and they prepare their research project in this field.
Examples of multidisciplinary projects undertaken in the pathway :
Overall Aircraft Design of Blended Wing Body architecture, Thermal Management of a fuel-cell propulsion pod installed under the wings, Multifidelity aerodynamic optimization for aircraft design.



ACQUIRING RESEARCH EXPERIENCE

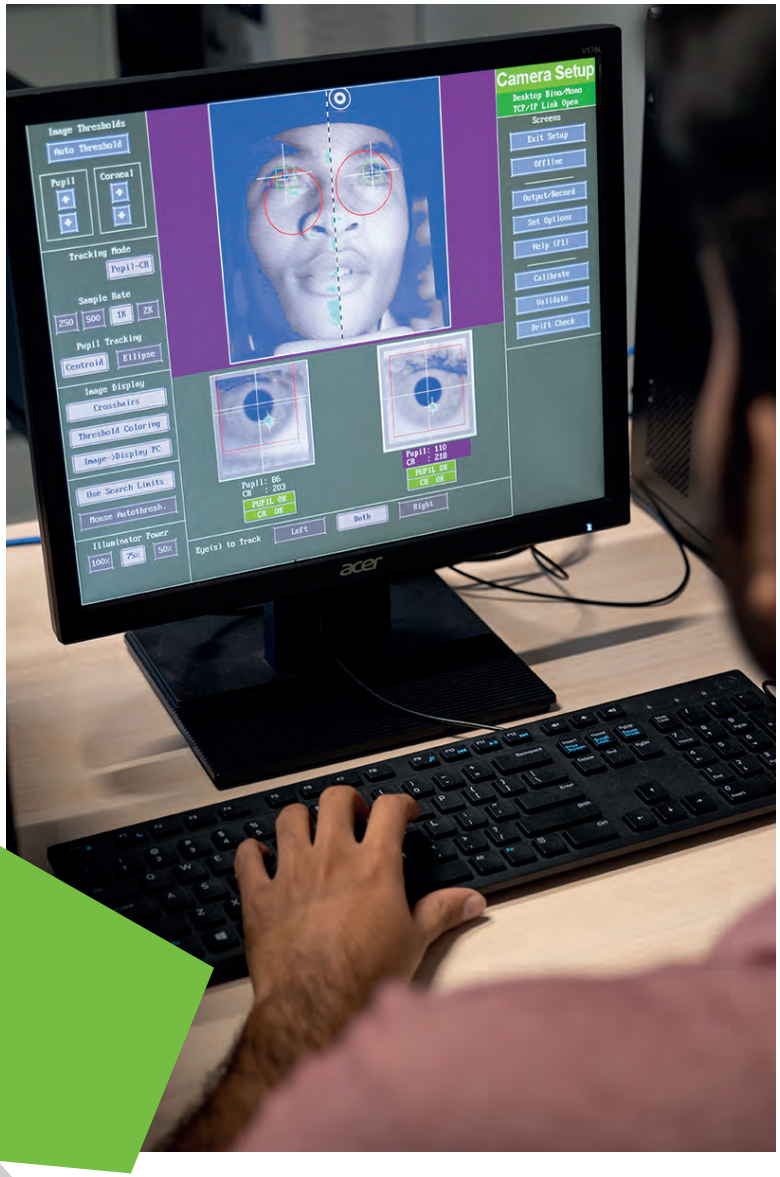
Research laboratories host students to complete their research projects

We are deeply committed to offering our students full access to our research capabilities as well as academic and industrial partnerships, covering the entire field of aerospace engineering. From a research policy point of view, the dual objective is to foster the development of new knowledge as well as to address the needs of the aerospace industry. Our main research partners are ONERA (the French Aerospace Lab.), LAAS-CNRS and OMP (Midi-Pyrénées Astronomical Observatory), the largest French laboratories in the engineering science and space fields. We have numerous long-term research and development agreements with the main European aerospace companies: Airbus, SAFRAN, Thales Alenia Space, Rockwell-Collins, MBDA and Liebherr- Aerospace. Reflecting our longstanding commitment to higher education and research in the aerospace field, we are a member of the management board of the Aerospace Valley cluster (550 aerospace companies and higher education and research institutions from the Nouvelle-Aquitaine and Occitanie Regions).

More than **400** researchers on campus

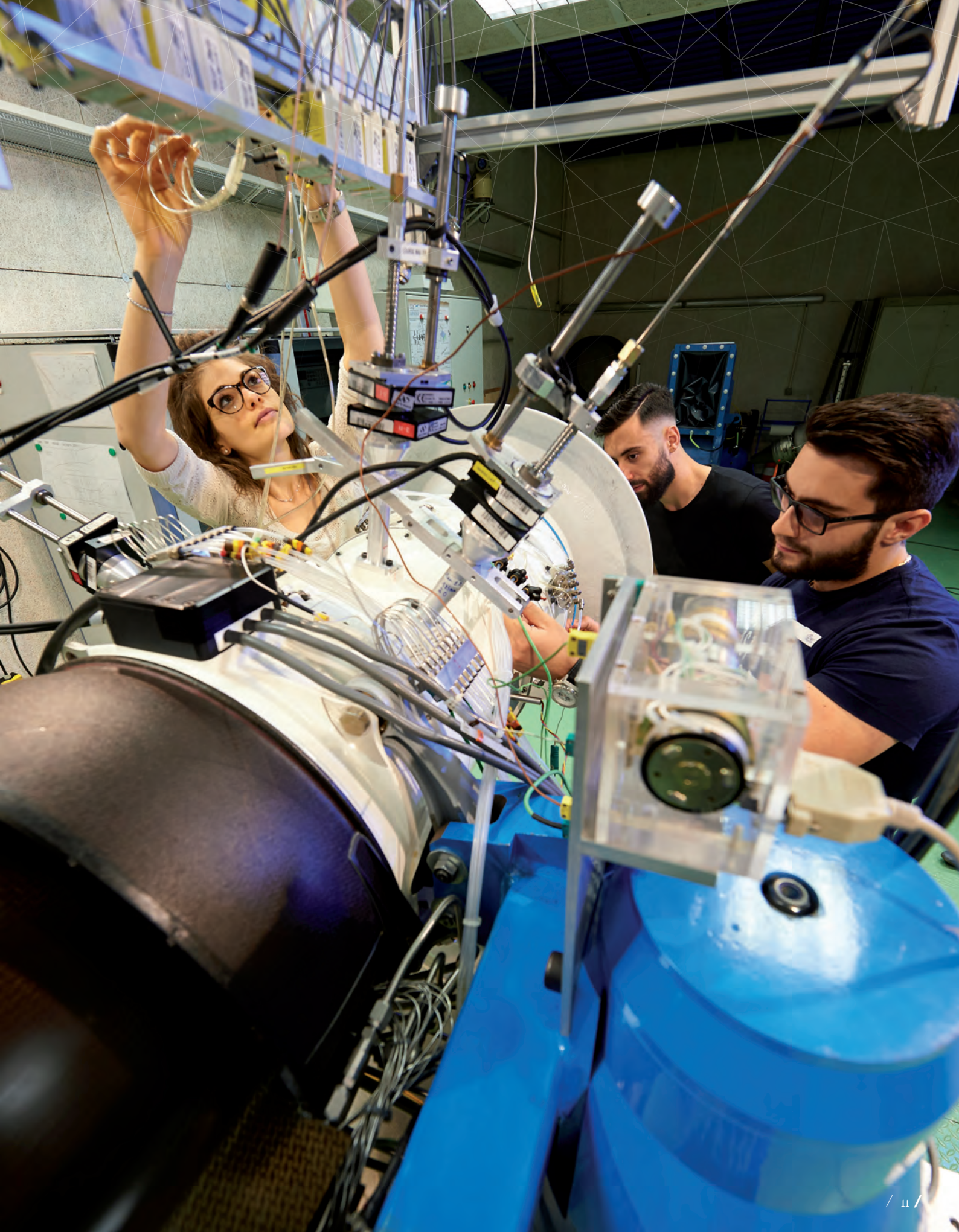
6 doctoral schools

An international center to host and train doctoral students



PhD Track:

Every year, several Master Graduates pursue PHD studies in our laboratories. MSc and PhD programs can be connected in the frame of a PhD Track, supported by Toulouse School of Aerospace Engineering (TSAE).



RESEARCH AT ISAE-SUPAERO

World-class research facilities

- Autonomous system platform for micro-drones and robots
- Critical embedded systems platform
- Flight simulators and neuroergonomics platform
- Wind tunnels, aeroacoustics wind tunnel
- Turbofan Test Bench
- 6m high Drop tower, gas guns
- Fleet of 9 aircrafts: TB 20, Robin DR 400, Vulcanair P68 Observer
- Software-defined radio room
- Clean rooms for satellite integration
- Ground station for satellite tracking and operation
- Satellite command and control center
- Additive manufacturing machine
- 320kV X-Ray Irradiator

A multidisciplinary scientific policy:

5 teaching and research departments

The Department of Aerospace Vehicles Design and Control (DCAS)

is a multi-disciplinary team structured in four research groups:

- *Aircraft design*
- *Space systems design*
- *Decision and Control*
- *Neuroergonomics and human factors*

DCAS covers a wide variety of problems including guidance and navigation, collaborative unmanned vehicle control, astronauts psychophysiology during orbital teleoperations, spacecraft trajectography and future aircraft architectures. Its unique resources include motion flight simulators, a drone fly arena, and a fleet of single-engine (TB-20 and DR400) and twin-engine (P68) aircraft used for flight experiments

The four research groups collaborate in the following areas:

- *Safer navigation and control of aerospace systems,*
- *Integrated multi-disciplinary aircraft design*
- *Advanced space concepts*

The Aerodynamics, Energetics and Propulsion Department (DAEP)

is organized on the basis of three core research groups:

- *Fundamental fluid dynamics*
- *External aerodynamics*
- *Turbomachines and Propulsion*

The department works closely with the scientific community on the Toulouse site and on joint research projects with French and international academic partners, whether on a formal basis or based on researcher-to-researcher connections. The department also has research agreements and contracts with major aeronautics firms, equipment suppliers and sub-contractors.

The Department of Electronics, Optronics and Signal Processing (DEOS)

develops and produces the payloads for the advanced aeronautics and space applications of tomorrow. Its team's skills cover a wide range of technologies, from silicon sensor design to interplanetary science payloads, and from theoretical signal studies to advanced communication and navigation systems.

The departement is organized into five core research groups:

- *Micro Electronic Image Sensors*
- *Photonics, Antenna, Microwave and Plasma*
- *Navigation, Communication, Radar*
- *Communications and Information Theory*
- *Space Systems for Planetary Applications*

The Complex Systems Engineering Department (DISC)

develops knowledge in mathematics and computer science for the aerospace industry.
In education as in research, DISC deals with models, methods and tools to master the behaviors and performances of complex systems. This complexity may come from the multiphysics or multiscale nature of the systems, their dynamic behavior or their connected and distributed structure.
The department focuses on research driven in:

- *Applied mathematics*
- *Communication networks*
- *Decision making systems*
- *Engineering for critical systems*

The Department of Mechanics for Structures and Materials (DMSM)

organizes and supervises all the teaching activities associated with the mechanics of deformable solids and structures for ISAE SUPAERO programs, in synergy with fundamental and applied research on aeronautics materials and structures. Its team is made up of professors, engineers, technicians and administrative staff. The classes enable our students to gain skills that are closely aligned with the needs of the industry regarding material & structures disciplines but also to address new issues related to multi-disciplinary or environmental considerations. The Integrated Team Project (ITP) addresses practical questions and solutions to be managed in keeping with a research and development methodology, in collaboration with specialists in the industry and/or research or test centers that are ISAE-SUPAERO partners, taking advantage of the synergies with the ICA (Institut Clément Ader).

Three research topics are at the center of DMSM's activities:

- *Durability & damage tolerance of composite and metallic materials*
- *Modelling & qualification of aerospace structures under static or dynamics loads*
- *Multiphysics Requirements-Driven Simulation Design*

All 5 departments support a micro-aerial vehicle development program on the international level based on student projects, research and innovation projects, and international competitions.

STUDENT PROJECTS

FOOD SELF-SUFFICIENCY IN A SPACE ENVIRONMENT, CAN YOU BELIEVE IT ?

Barbara Santos, student in the Master Aerospace Engineering, Embedded Systems Major, is working on an autonomous hydroponics system capable of growing vegetables for long-term space missions. This project consists of producing a fully autonomous hydroponic-system in order to cultivate plants in space!

The project started in 2019 with two former students of the Master (Gabriela Catalàn and Adrien Mencik) who created the first prototype and some of the code development. Barbara got to know the project during the Nanostar challenge, a European student competition, and with the support of the Innovspace, she started working on it in March 2021.

In fact, for long-duration space missions, the food supply from Earth would be very expensive and requires a large volume of freight and space that are not always available. That is why the creation of an inboard space to grow plants has been proposed by the scientific community.

Barbara's role was to finish the construction of the prototype comprising 2 rows of plants and a robotic arm in the middle to control it.

The prototype is also composed of

- *2 tanks of water with nutrients,*
- *1 water pump, 1 tubbing system,*
- *3 sensors*
- *1 light system.*

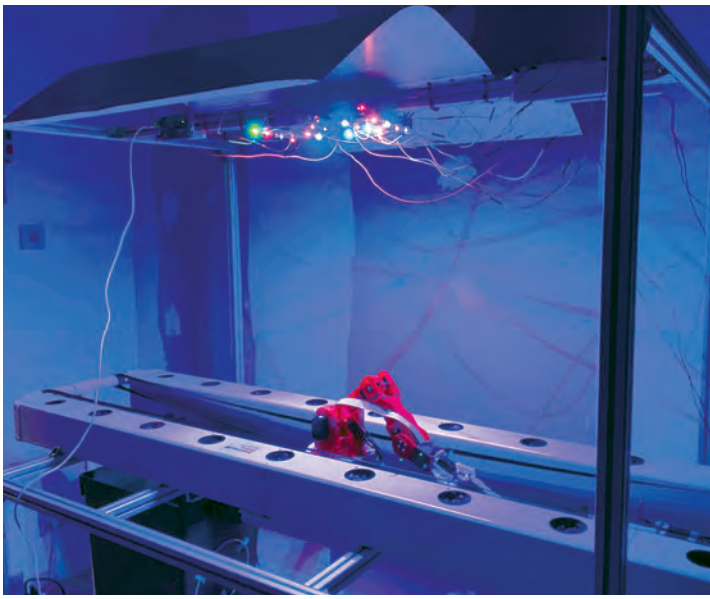
In addition, she developed a data collection strategy, that takes pictures of the plants, creating the data test. After that, the algorithms will assess the state in which the plants are, estimate the amount of greenness, maturation...

Barbara has already started her internship as part of the 4th semester of the Master at ISAE-SUPAERO but there is still much to do with this project; one of the main tasks still to be done is to test the fully autonomous prototype in a Space environment presupposed, which means: gravity.

The outcome of the project would be to grow fruits and vegetables outside the planet Earth and reduce the need to transport food in space.

> ***«The ability to cultivate plants in space has been a source of concern for space agencies for many years.»***

It may inspire our future students when they select their S2-S3 research projects. As for Barbara, she is looking forward to continuing her work in this field and has applied to work on a similar mission for the German Aerospace Center.



SPECTRAL PROJECT : STRUCTURAL DESIGN OF A LIQUID HYDROGEN TANK FOR A MEDIUM-RANGE AIRLINER

Anh-Quân BÙI and Julius BIERMANN (A & J), both MAE 2nd year students from Vietnam & Germany respectively have been working on a project undertaken by ISAE- SUPAERO called SPECTRAL

Supervised by 2 research departments, the DMSM* and the DCAS**, their input to the project was to design a liquid hydrogen fuel tank for the Spectral aircraft, more precisely - a liquid hydrogen-fueled medium range airliner based on the Airbus A320 family. A & J chose to specialize in the major Aerospace Structure that they completed with the ADO pathway (Aircraft Design Optimization).

«They were both attracted by the transversality of this project and its positive environmental impact for the aviation sector.»

They fulfilled their mission in 2 main phases:

- Provide feedback to the SPECTRAL project aircraft design team concerning the mass of the fuel containment system.
- Investigate ideas that are mentioned in the existing literature but are lacking detailed studies, such as the use of a cylindrical truss to support the aircraft's fuel tank

Indeed, cylindrical trusses (see picture) have been used to link stages of space rockets, but their application in commercial aircraft is new. Working on this project has been very inspiring for 3 reasons :

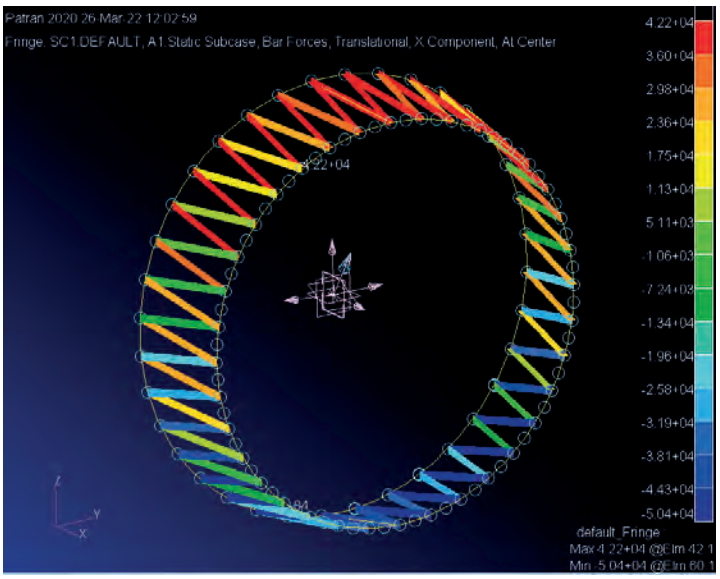
The ecological challenge involved, the multidisciplinarity nature of the project that was related to structures for the main part, but also overall aircraft design and thermodynamics, and finally the transversality with the Space domain.

For Julius, this project inspired him to look for his internship in the same field and he is now doing his internship at the German Aerospace lab.

Both of them look forward to working on this transversal topic again after graduation!

Anh-Quân found his internship in another field with Airbus, and for him, having a background in Space technologies, it was a very rewarding experience that showed

the potential for the cross-dissemination of ideas and knowledge between the aviation and space industries.



DMSM* = Department of mechanics structures and materials
DCAS.** = Department of aerospace vehicles design and control

ISAE-SUPAERO MSc'S GRADUATES

We have already trained more than 24,500 engineers who are contributing to the development of the aeronautics and space sector in France and around the world. Our engineers' vocation is to become future leaders in the aerospace industry and the world of tomorrow. This is why we have developed an integrated approach with training, research and innovation through partnerships with academic players, many industrial stakeholders and a network of the best international universities.

PILAR TAGLIERO
ITALY/ARGENTINA
Aerospace Systems and Control Major

I chose ISAE-SUPAERO because it is one of the most prestigious schools in aerospace engineering. In addition, it is located in Toulouse, the European aerospace pole and an amazing city to live in. The strongest asset of the Master of Science is that many professors are engineers working in industry. We gain theoretical knowledge but also the know-how of the companies we work with. In addition, having one common core year and one specialization year is a great balance. It enables us to cover all aerospace engineering fields but also to get a deeper understanding in the subjects that really interest us.
I did my end-of-studies internship at ONERA working to improve a tool to accelerate controller validation. The loop between design and validation of controllers, as well as the current validation processes, are time-consuming, thus expensive. I'm currently working as an Aircraft Control Engineer at SII, a sub-contractor for Airbus. I am working on the design of generic control laws, i.e., a set of laws that can be applied to all Airbus aircraft, included the designs of the future.

HARI PRASATH
INDIA
Space Systems major

When I started applying for a Master, I was looking for a college that had a good course structure and also well-established connections with industry. ISAE-SUPAERO is one such reputed university. I had the chance to connect with people from the industry, which in time helped me to get my first job in the Space sector, despite the Covid restrictions. Specifically, I loved my space systems course as it covered almost all the topics of space engineering and gave me a broader perspective of the field.
I did my internship at a US startup company, working remotely from home. It dealt with the effects of radiation exposure on DNA on the surface of the moon.
Currently I am working as a scientific engineer in Stellar space studies. I would like to continue and to progress in the space sector, with my career goal being to become a prominent player in the space sector in the future.

PAUL-PETER NAANOUH
LEBANON
Advanced Aerodynamics & Propulsion

I first heard about ISAE-SUPAERO from one of my professors in Lebanon that is himself an alumnus of the school and thought that it would be a great place to continue my studies due to its history, focus on aeronautics, and location in one of the world's greatest aerospace centers. I was lucky enough to be accepted and graduated in 2021 with a major in aerodynamics. Academically the main advantages of Supaero are its close ties with the industry that enabled me to be taught directly by active engineers and the resources that are made available to the students to perform their own research (databases, commercial software, a compute cluster ...).
From a social standpoint, I was surprised by the large number of clubs that were created and run by the student body and the active social life on campus. For my final semester internship at L'Institut Jean le Rond d'Alembert, I performed multiphase flow simulations to better understand the behavior of gas droplets suspended in a liquid.
Currently, I am working as a research engineer at IFP Energies Nouvelles on the subject of multiphase CO2 compression for carbon capture.

MARION BURNICHON
FRANCE
Space Imaging, Navigation and Space Systems

I had originally done a Bachelor of Science in Physics. It was difficult for me to find schools that would admit students for a Master's degree in engineering. I was able to major in what I wanted and found a research project that reconciled my love of physics and its application in engineering by working on trajectory optimization for space missions.
I think the biggest asset of the MAE is the research project. It allows you to pick a topic of your choice to study for a year with the help of a professor. Since it is tailored to the student, it allows each one to learn and progress at their own pace in the area they want. Personally, this research project set me up both for my last semester internship and my current job.
I did my last semester internship at Airbus Defence & Space in the Flight Dynamics team. I worked on designing and optimizing the trajectory for the cis-lunar transfer vehicle in its final maneuvers to reach the Lunar Gateway, a project led by the European Space Agency.
I am currently a Flight Dynamics engineer at OneWeb, a constellation of satellites in LEO, and contribute to placing, maintaining and protecting over 400 satellites. I work both in operations, directly planning maneuvers for the satellites, and help develop the flight dynamics software.

CLOSE COLLABORATION

WITH COMPANIES & INDUSTRY

1,365
engineers, and/or researchers from leading companies are visiting lecturers

250
companies support our development

An alumni network of over
24,500
graduates

Every year companies receive more than
800
ISAE-SUPAERO students for internships and Master theses. Conferences, industrial visits, internships in companies, forums, recruitment workshops

More than **30**
partnerships signed with small and medium-sized companies and major industrial players

11
company chairs for teaching and research in innovative programs

INDUSTRY PARTNERS

DASSAULT
ATR
IAC
AKKA technologie
GAPGEMINI
AIRBUS
CNES
STELIA AEROSPACE
THALES
SIEMENS
AVENCORE
SAFRAN
ACCENTURE
AIR LIQUIDE
LIEBHERR
NAVAL GROUP
RENAULT
MBDA
CYLAD
ALTEN
WAVESTONE
EY
AIRFRANCE
ARIANE GROUP
SOPRA STERIA
DAHER
COLLINS AEROSPACE
CONTINENTAL
MECANO ID
ATOS
PWC

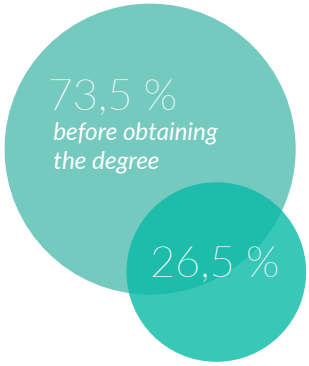
A WIDE RANGE OF EXCITING FUTURE CAREER PROSPECTS AWAIT YOU

WIDE-RANGING JOB OPPORTUNITIES

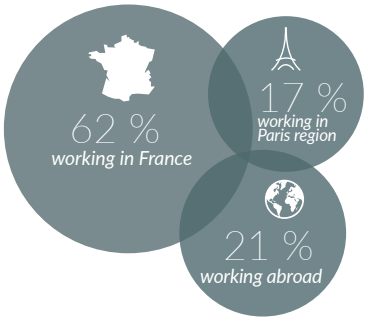
Our graduates will work as technical experts, researchers and managers in the fast-expanding aerospace sector and key sectors of the economy, in Europe and all around the world.

JOBS AFTER GRADUATION

6 months after obtaining the degree

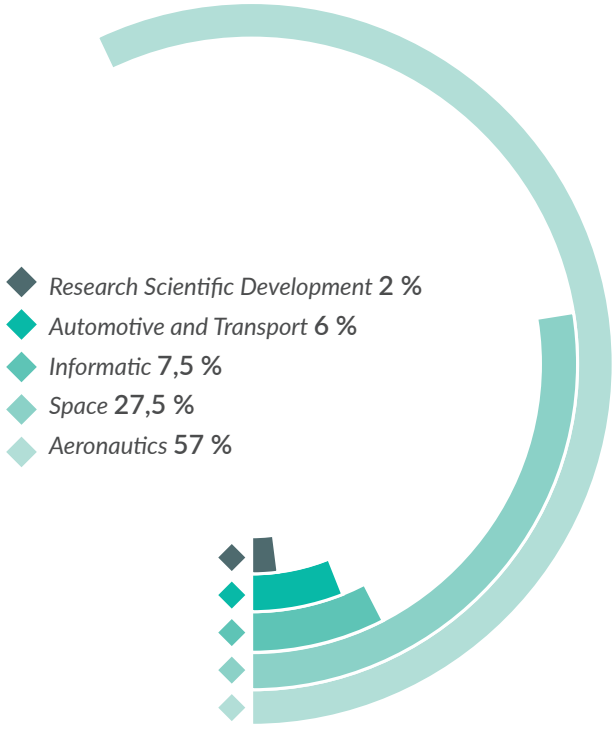


between 2 and 6 months after obtaining the degree



CLOSE-UP ON THE CLASS OF 2021*

Business areas



MAIN RECRUITERS

AIRBUS · Capgemini engineering · SAFRAN · DASSAULT SYSTEMES · THALES · AIRBUS DEFENCE & SPACE · cnes CENTRE NATIONAL D'ÉTUDES SPATIALES · esa

**Survey on 1st jobs, graduating class 2021, 90% of respondents out of 100 young graduates approached*

CAMPUS LIFE
IN THE HEART OF TOULOUSE

Located at the heart of the scientific and university complex, our campus covers 22 hectares along the lovely, UNESCO classified Canal du Midi. Teaching, living and sports facilities – we have it all!

A complete range of athletic facilities

You will enjoy the pool, gym, climbing walls, fitness center, football and rugby fields, tennis and squash courts.

More than 80 clubs for a dynamic social life: culture, sports, technical clubs (micro-drones, space club, aeromodelling, robotics, etc.), social and humanitarian actions, event organization, etc.

Aeronautical sports

Ten minutes from campus, we have a fleet of **9 planes** (TB 20, Robin DR 400, P68 Observer, etc.). Students have the opportunity to earn a wide range of flight licenses under very preferential conditions: powered aircraft gliding, parachuting, and paragliding.
Every year 35 students obtain their pilot's license.

Student residences and the Student Center

The **6** entirely new residences offer **1000 housing units**, from **14**m² to **46**m².
Residences include common areas such as study rooms, kitchens, and laundry rooms.
The Student Center includes a large main room with a snack bar area, a living room,
TV rooms, and rooms for student clubs and activities.

Toul'Box,

The assistance you need to settle down smoothly in Toulouse.
A Welcome Kit offered to MAE Students to make their life easier from day one :

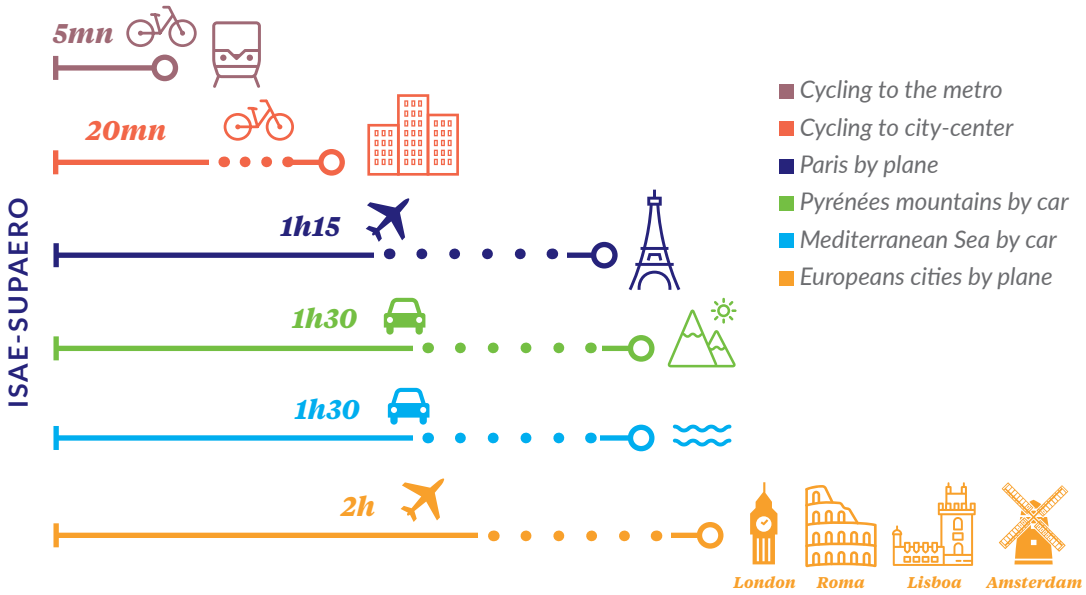
- *Housing on Campus*
- *Bank account*
- *Transport card*
- *City tour*
- *Other administrative formalities*

TOULOUSE,
EUROPEAN CAPITAL OF AERONAUTICS AND SPACE

Nearly **90,000** direct jobs in aeronautics and space.
The leading French region for research and aerospace education.

4th largest city in France
Most attractive city to study

Known as "la Ville Rose", in reference to the color of the city's many historical brick buildings. Repeatedly voted by the French as being the most desirable place to live in France: exceptional quality of life, a great place to live as a student!



- *Cycling to the metro*
- *Cycling to city-center*
- *Paris by plane*
- *Pyrénées mountains by car*
- *Mediterranean Sea by car*
- *Europeans cities by plane*

Toulouse airport has low-cost flights to the main European cities!

"Bienvenue en France" accreditation

The "Bienvenue en France" label accredited by Campus France, distinguishes French higher education institutions, that have developed facilities to host international students at French higher education institutions, and represents a promotional and outreach tool for the institution.
ISAE-SUPAERO is one of the few institutions receiving the '3 stars' certification. The certification demonstrates the quality of the reception from our school.

FOUNDING

Our Master of Science students can benefit from financial support from the ISAE-SUPAERO Foundation and partners during the two years of the Master of Science program.

Fondation ISAE-SUPAERO
Reconnue d'utilité publique

ISAE-SUPAERO Foundation Scholarship
The Foundation Scholarship covers tuition fees and part of living expenses.

AIRBUS

CEDAR Excellence Scholarship
The scholarship from Airbus's Chair for Eco-Design of Aircraft (CEDAR) covers tuition fees and part of living expenses. (Aircraft-related major).

MBDA MISSILE SYSTEMS

MBDA Program of Excellence for Indonesia at ISAE-SUPAERO
This scholarship covers tuition fees and part of living expenses.

MBDA MISSILE SYSTEMS

MBDA Program of Excellence for India at ISAE-SUPAERO - Sponsored by the French Embassy in India.
This scholarship covers tuition fees and part of living expenses.

TSAE

Toulouse School of Aerospace Engineering
Toulouse School of Aerospace Engineering (TSAE), a joint program between ISAE-SUPAERO, ONERA and ENAC aims at promoting graduate and PhD programs in the aerospace engineering field. For this, it offers scholarships to undergraduate students who wish to enter the MSc in Aerospace Engineering at ISAE-SUPAERO and pursue a PhD program.

ISAE Institut Supérieur de l'Aéronautique et de l'Espace SUPAERO

ISAE-SUPAERO Excellence
This scholarship covers tuition fees and part of living expenses.

Follow the QR code for more information about Tuition Fees and Foundings

Scholarships applications: From October to December

CAMPUS FRANCE

For more information on financial aid for foreign students in France, visit the Campus France website: http://www.campusfrance.org.

Numerous state scholarships are available as well CONACYT (Mexico), BECAS CHILE (Chile), COLFUTURO (Colombia), CIENCIA SEM FRONTIRAS (Brazil), BEC-AR (Argentina), etc.

JOIN THE MSc
IN AEROSPACE ENGINEERING PROGRAM

Fully taught in English

Eligibility

This program is particularly suitable for students with:

- **A bachelor's degree in aerospace or aeronautical engineering, mechanical engineering and mechatronics**
  All majors are open to these students: Advanced aerodynamics and propulsion, Aerospace structures, Space systems, Aerospace systems and control, Embedded system, Systems engineering, Space Imaging Navigation and Communication.

- **A bachelor's degree in electrical engineering, electronics, telecommunications**
  Five majors are open to these students: Space systems, Aerospace systems and control, Embedded systems, Systems engineering, Space Imaging Navigation and Communication.

- **Others profiles in Engineering and Science**
  Industrial engineering, civil engineering or physics, mathematics, computer sciences (ISAE-SUPAERO admissions officers can provide you with information on the major open to you).

On-line application documents

Applications starting in October

- *Resume*
- *Cover letter*
- *Copy of highest diploma or certificate of enrollment*
- *Transcripts for the 3 last years*
- *2 letters of recommendation*
- *TOEFL (IBT): 88 points (Inst. code: 9820) or TOEIC: 785 points, or IELTS: 6.5 points or CAE/ FCE: 170 points or Linguaskill: 170 points*
- *GRE test results if available (not mandatory)*

For more information on the admissions procedure, please visit:
https://www.isae-supaero.fr/en/academics/MSc/admission/admissions/

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Website
www.isae-supaero.fr/en

ISAE SUPAERO
Institut Supérieur de l'Aéronautique et de l'Espace

Qualiopi processus certifié
RÉPUBLIQUE FRANÇAISE

GROUPE ISAE

Université Fédérale
Toulouse Midi-Pyrénées

YouTube

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