



# Aeronautical Engineering

## Majors Aircraft Design / Flight Test Engineering



### ■ Objectives

The Advanced Master TAS AERO program is dedicated to Aeronautical Engineering and Human Factors. The program includes a common core and one of the following majors : either one focusing on Aircraft Design process and Engineering (TAS AERO-ADE) or the other focusing on Flight Test Engineering (TAS AERO - FTE). The TAS AERO Advanced Master enables students to develop a high level of expertise in engineering science, human factors, current aeronautical technologies and design.

The TAS Aero curriculum includes a broad spectrum of subjects with the following objectives:

- to develop an integrated approach of the product design, while acquiring necessary skills in the disciplines and techniques predominant in the aeronautical sector,
- to make future engineers aware of human factors issues,
- to facilitate work on multidisciplinary projects in aeronautics with a very practical approach,
- to develop skills in project-management, team building and team process at a multinational level,

The major in Aircraft Design Engineering – ADE -focuses on process and tools required during all Design phases from Conceptual to Detailed Design.

The major in Flight Test Engineering - FTE - focuses on the tests to be conducted during aircraft and equipment development and certification.

### ■ Learning approach

#### First semester:

Academic session of around 430h, provided by ISAE's permanent professors and experts from aerospace industry bringing current knowledge and experience, including:

- lectures, exercises,
- engineering and design study seminars,
- laboratory sessions,
- written report and oral presentation,
- practical sessions,
- team work and team business games,
- in-flight practical experiment and industrial visits (Airbus, DGA Flight Test, Liebherr...).

#### Second semester:

Students have to conduct a professional thesis in aerospace industry or in laboratory, in France or abroad, supervised by a tutor from the host organization and from ISAE-SUPAERO. The thesis is concluded by the preparation of a report and an oral dissertation in front of jury.

### ■ Organization

#### Head of program

- Prof. Éric POQUILLON  
eric.poquillon@isae-supaero.fr

#### Course duration

One year full time : 6 months of courses and 6 months of professional thesis or internship.

#### Course start date

September

#### Location

ISAE-SUPAERO

#### Teaching language

English

### ■ Career opportunities

More than 1100 students from 55 countries have been trained over the last 30 years and now work as research engineers, designers, project managers, program managers, and consultants, in companies such as Airbus, DGA Essais en Vol, AKKA, ALTRAN, MBDA, Dassault, ArianeGroup...





© AIRBUS

## ■ Syllabus

<i>Detailed Program</i>	<i>Hours</i>	<i>TAS AERO Aircraft Design</i>	<i>TAS AERO Flight Test</i>
<b>STRUCTURES AND MATERIALS</b>			
Aircraft Structures	50	✓	✓
Materials for Aerospace structures	15	✓	✓
<b>FLIGHT PHYSICS</b>			
Aerodynamics	40	✓	✓
Propulsion	20	✓	✓
Flight Dynamics	35	✓	✓
<b>AVIONIC AND SYSTEMS</b>			
Aircraft Systems	35	✓	✓
Flight Control laws	20	✓	✓
Human Factors I	50	✓	✓
<b>FLIGHT TEST ENGINEERING MAJOR</b>			
Flight test technics and methods	30		✓
Human factors II	46		✓
Flight test experimentation	55		✓
Experimental Flight Dynamics	15		✓
Measure and Sensors	12		✓
Flight Test Final project	17		✓
<b>AIRCRAFT DESIGN ENGINEERING MAJOR</b>			
Propulsion Systems	20	✓	
Modeling for aeronautical structures	25	✓	
Computer Aided Design (CATIA)	18	✓	
Aircraft Performances	25	✓	
Aircraft Design	28	✓	
System Engineering	10	✓	
Multicultural project management	12	✓	
Aircraft Design - Final project	29	✓	



© AIRBUS



## Testimonies

### Why did you choose ISAE-SUPAERO and apply for this MS ? What were your objectives ?

**CLAIRE BRACA**  
Graduated in 2018  
Engineer - DGA flight tests

I chose ISAE SUPAERO because it has a very good reputation in the aeronautical industry. With this generalist TAS AERO program, my goal was to specialize, reinforce and acquire skills in aeronautics in order to broaden my possibilities to work for large companies in this industry.

Moreover, I have always been passionate by flight tests, as they can combine both theory and practice in aeronautics.

**FRANÇOIS PERRINEAU**  
Cohort 2018/2019  
Flight Test Analysis Engineer - Airbus

I am graduated from a general engineering school (EPF) where I specialized in aeronautical mechanics. During my last year of study, I did my final-year project in the Flight Test & Integration Center department at Airbus Toulouse where I was responsible on aircraft simulators. From this experience and strongly encouraged by my Airbus managers, I integrated the Advanced Master TAS AERO FTE at ISAE SUPAERO. I came to develop my knowledge especially in flight testing but also in human factor, aerodynamics and structure. The program follows a common core with the MS TAS AERO Aircraft Design and flight tests with experiments on the various light aircraft of SUPAERO.

### According to your experience, what are the strong assets of the Advanced Master ?

Thanks to the TAS AERO FTE advanced master, I have:  
acquired general expertise in aeronautics and specific expertise in flight tests, applied the theoretical courses in real life thanks to the case studies,

**acquired as many expertise in fixed wings as in rotary wings, from a general aeronautic point of view as well as in the flight tests.**

We were teams of 3 FTE (Flight Test Engineer), we flew a dozen times on 3 different planes with the help of 2 Experimental Test Pilot, Etienne and Stéphane. During these flights, we focused on airspeed calibration, aircraft climb and cruise performance, stability, handling qualities, engine failure, stall, acceptance flight. Concerning the flight test course and the common core, the program is rich and presented by speakers from the aeronautics industry (Airbus, Dassault, DGA, EPNER) accompanied by company visits and laboratory experience (engine bench tests and aerodynamic wind tunnel at SUPAERO).

**We also had the opportunity to go for 2 days to the flight test center at Istres base where we visited fighter aircraft such as Rafales, Mirage 2000D and Alfajet. It was a very rewarding experience that will be engraved for life.**

Thanks to Prof Eric Poquillion (Head of FTE) for his rich expertise in flight testing and certification, himself a graduate of EPNER (French Test Crew School) and Anne Forget for her work, she keeps us informed of any unexpected changes and answers emails even on weekends!

I will conclude that the FTE Advanced Master is very valuable both on a personal level and in terms of learning and developing the skills of the flight test engineer profession.

### What are your career plans ?

I now work within the operations activities for DGA EV (Direction Générale de l'Armement - Essais en Vol) in Istres. I have acquired many specific and cutting edge knowledge on flight tests. In the mid-term, my goal would be to supervise a flight test. This requires numerous technical knowledge that we usually acquire during a second professional experience.

At the end of the advanced master, I found a permanent contract at Airbus Flight & Integration Tests in Toulouse. I am responsible for the analysis of flight tests in aerodynamics, load and stress activities. My work is very recent, but I'm taking care of the preparation of Airbus flight test campaign, monitoring the measurements in real time in telemetry and providing the necessary support to the flight crew.

These activities are similar to those performed during the FTE Advanced Master and also which helped me to get this job.

Further, my career plan is to implement new technologies, manage projects, prepare and support future changes in development & testing of aircraft.



## Admission procedures

### ■ ADVANCED MASTERS

#### Academic requirements

A master's degree, or an equivalent degree in science or engineering (or in management for advanced masters in management), or bachelor degree completed by 3 years of professional experience

Tuition fees : see our website

### LANGUAGE REQUIREMENTS FOR ALL MASTERS

<b>TOEFL (IBT)</b>	or	<b>TOEIC</b>	or	<b>IELTS</b>	or	<b>CAE/FCE</b>
						
<b>85 points</b> <small>(Inst. code: 9820)</small>		<b>785 points</b>		<b>6.5 points</b>		<b>170 points</b>

NOTA BENE : Volume of teaching hours and contents of the programs are provided for information only and are subject to change.

### LANGUAGE REQUIREMENTS FOR MASTERS IN FRENCH

#### Language qualification requested

Score B2-Common - European Framework of Reference for Languages

### ■ SELECTION AND ADMISSION

#### Selection and admission are made by an admission committee:

Possible interviews can be organized if necessary

#### Deadlines for application:

Applications open in october 2020 for intake in september 2021.

Several admission committees scheduled from January to July, see schedule on our website

#### Application website :

<http://admissionsmasters.isae-supaero.fr>



#### Funding

Information on tuitions fees and funding can be found on our website

<https://www.isae-supaero.fr/en/academics/advanced-masters/financing/>

### Your contacts

#### Caroline ARMANGE

Senior Admission Advisor / Advanced Masters

Phone : + 33 (5) 61 33 80 25

#### Catherine DUVAL

Senior Admission Advisor/Aerospace sector

Phone: +33 (5) 61 33 80 37

[info-master@isae-supaero.fr](mailto:info-master@isae-supaero.fr)

[www.isae-supaero.fr](http://www.isae-supaero.fr)