



Mastère Spécialisé® / Advanced Master

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-supero.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...





■ Syllabus

	<i>Detailed Program</i>	<i>Hours</i>	<i>Detailed Program</i>	<i>Hours</i>	
COMMON CORE	STRUCTURES AND MATERIALS				
	Aircraft Structures	50			
	Materials for Aerospace Structures	15			
	FLIGHT PHYSICS				
	Aerodynamics	40			
	Propulsion	20			
	Flight Dynamics	35			
	AVIONIC AND SYSTEMS				
	Aircraft Systems	35			
	Flight Control Laws	20			
Human Factors I	50				
MAJOR	FLIGHT TEST ENGINEERING MAJOR		OR	AIRCRAFT DESIGN ENGINEERING MAJOR	
	Flight Test Technics and Methods	30	Propulsion Systems	20	
	Human Factors II	46	Propulsion Systems	25	
	Flight Test Experimentation	55	Computer Aided Design (CATIA)	18	
	Experimental Flight Dynamics	15	Aircraft Performances	25	
	Measure and Sensors	12	Aircraft Design	28	
	Flight Test Final Project	17	System Engineering	10	
			Multicultural Project Management	12	
			Aircraft Design - Final Project	29	



Testimonies

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

LUCIE BEAUDUN

Graduated in 2020

Research Engineer | ISAE-SUPAERO

👂 I decided to apply for the TAS AERO Advanced Master because I would like to be specialized in Aeronautics. Therefore, this Master was the perfect compromise: development of my aeronautical knowledge with the theoretical part and improvement of my professional experiences through the practical part.

FRANÇOIS PERRINEAU

Graduated in 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 ISAE-SUPAERO.

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

This Master is international and includes a lot of team projects, pair working and presentations. Therefore this is a great opportunity to improve our English and to reinforce relationships and social links with our classmates. Furthermore, **each course is taught by experts from industries such as Airbus, ONERA and ISAE-SUPAERO, which is valuable.**

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 ISAE-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?

If I have the opportunity, I plan to join a big company in aircraft industry as a System Designer Responsible such as Airbus or Dassault Aviation for instance.

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

LANGUAGE REQUIREMENTS FOR ALL MASTERS



(including for Masters taught in French)

TOEFL (IBT)  88 points <small>(Inst. code: 9820)</small>	or	TOEIC  785 points	or	IELTS  6.5 points
or				
CAE/FCE  170 points		Linguaskill  170 points		

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 2021

for a start of classes in September 2022.

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

Application website :

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

Funding

Information on tuitions fees and funding on our website



Your contacts

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