

Mastère Spécialisé® / Advanced Master

Space Applications and Services

WITH AIRBUS DEFENCE & SPACE



■ Objectives

The first objective of this program is to give students a broad understanding of space systems and their environment, constraints and capacities in the fields of earth observation, communications and navigation.

The second objective of the program is to help students, using real-life examples and experimental work, to grasp the value of space systems for the creation of space applications and services. Students will propose and design tools and solutions in areas such as the environment, agriculture, transport or urban planning. They will be able to specify a complete telecommunications system according to user needs: Internet access, Internet of Things, fixed or mobile terminals ...

Students will be able to both better understand the performance of space systems and identify user needs, as well as develop new services and applications. The know-how in the digital domain have a central place in the training with topics like big data, cloud computing, digital communications, software radio.

■ Organization

Head of program

- Prof. Raphaël Garcia
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Course duration

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

Course start date

End of September

Location

ISAE-SUPAERO Toulouse

Teaching language

English

■ Syllabus

Part 1: Space systems - 43 h

Space systems introduction

Part 2: Digital techniques - 59 h

Big data and cloud - Digital communication and networking basics

Part 3: Earth observation - 100 h

Remote sensing and sensors - Image processing and data analysis - Earth observation applications and services

Part 4: Navigation and positioning - 22 h

Navigation and positioning

Part 5: Space Communications - 111 h

Telecommunications and networks - Broadband satellite communication systems - Satellite broadcasting - Telecommunication satellites for mobiles - Satellite communication business

Part 6: Space economics, regulations & services - 46 h

Space economics and regulations - Services and integrated applications

Part 7: Tutored project - 80h

■ Learning approach

First semester: 6 months of courses delivered in Toulouse, mainly at ISAE-SUPAERO

Second semester: mission to be completed in a laboratory, an SME, in large companies.

Company internship, professional thesis:

Students have to conduct a professional thesis or make an internship in an industry or in a 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 a jury.

Overseen by an academic advisor and in-company tutor, the project entails the acquisition and development of knowledge and skills within a professional framework.

The subject, which must be approved by the academic advisor and the Director of the Advanced Masters programs, must:

- Give the student the opportunity to prepare for professional activities targeted by the program,
- Be a genuine issue of concern to experts working in the field.
- Must be related to the needs of companies in activity sectors covered by the program.

Students who have already acquired professional experience prior to the program, may complete their project in a research center or laboratory.

■ Career opportunities

This Advanced Master degree offers career opportunities in a wide range of fields:

Jobs related to cross disciplinary use of space data (observation of the earth and its atmosphere, telecommunications, data positioning, data from scientific missions and exploration) in complex information systems,

Consulting jobs to identify and define requirements, and implement application solutions using space data,

New jobs related to new space challenges.

The Advanced Master «Space Applications and Services» guarantees a high level of expertise required for today's and tomorrow's international space-related jobs.

Program graduates go on to work as Project Leaders, Business Engineers, Business Development Managers, Consulting Managers, Research Engineers, Expert in Space Applications.

Companies recruiting our students

Thales Alenia Space, Airbus, CNES, SES ASTRA, AKKA Technologies





Testimonies

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

VILLE MESKUS
Graduated in 2020
Supporting the development of innovative Earth Observation products in Europe | ESA

BASILE GOUSSARD
Graduated in 2020
Earth Observation Engineer | Promethee

I've always been passionate about human activities in space, but I didn't work in the field before starting this program at ISAE-SUPAERO. After doing my previous Master's Degree in industrial engineering and management in Finland, I worked in several countries for different industries as a consultant and in product management. Then I decided to go after my passion and applied for several different aerospace schools. Ultimately I chose ISAE-SUPAERO for its position as one of the top aerospace schools in the world and its location in the centre of the European aerospace industry.

I chose this Advanced Master's program as I believe we need to enlarge the human footprint in space in order to accelerate our technological progress and safeguard both our species and Earth. In order to do that, we need to push our boundaries further and find more ways to benefit from the space frontier. This is a program to do exactly that. The fact that we would have close cooperation with industry players such as Airbus was a key point in ensuring that how we approach this domain is up to date with industry demands and the latest knowledge.

My objective upon joining the program was to get a thorough deep dive into how we can design and build satellites and use them to extract value from space. The program gave me exactly that: I was given all the keys I need to make an international career in space industry.

I got a diploma from IMT Atlantique (previously Mines de Nantes) which gave me a very good understanding of the industrial world, as well as the mathematical background needed to work on various issues such as quality control for the aerospace sector. But still, I had the feeling to miss something... I wanted to have a deeper knowledge of space systems but not only. I also wanted to understand **how space could help humankind thanks to day-to-day real-world applications such as GPS, broadcasting, and more specifically earth science linked to earth observation!** ISAE-SUPAERO is clearly the best school on such topics thanks its ability to mix expertise such as space systems, image processing, big data, and earth science.

So, the objective of the Space Application & Services advanced master was clear. Understanding the potential of the space sector to help humankind and be part of it after!

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

The two strongest highlights for me were the extensive cooperation with Airbus, CNES (the French government space agency) and other key partners, as well as getting **a complete view on the whole value chain of the satellite business**. Our learning reached from the basic technical details of designing and building satellites and their payloads all the way to how to use those payloads to create and operate a business. In practical exercises, we used the same tools that the industry is using professionally.

The Advanced Master in Space Application and Services is giving the right level of understanding of game-changers like earth observation, navigation, and telecommunication. Indeed, the SPAPS Advanced Master is offering a very good theoretical level but more importantly, this master gave me the chance to meet experts in the space industry.

During the advanced master, you will have the chance to meet people from Airbus Intelligence, from the CNES, from THALES, ... by listening to them you will, at an incredible pace, upgrade your skill as well as your vision!

Which are your career plans?

For the rest of my career and life, I want to play a major part in the expansion of humanity into space. As long as I'm helping us do that, I know I'm doing exactly what I've always wanted to do. I believe attending this program has been a key stepping stone for me towards this path.

I got immediately attracted by the earth observation. Indeed, this domain is such existing for 2 reasons:

- Earth observation brings an understanding of our planet. This understanding is mandatory in the context of global warming.

- Earth observation is evolving a lot thanks to three groundbreaking innovations:

1- the huge number of data (and free data thanks to the European Commission and the Copernicus program),

2- the cloud computing capabilities which gave people the possibility to work on large scale data

3- Algorithm like machine learning and deep learning are now easy to build.

My career plan is to provide citizens, governments, and companies tools and solutions to fight against climate change and I'm convinced that earth observation has a key role to play in this.



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

Funding

Information on tuitions fees and funding on our website



Your contacts

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