

# Mastère Spécialisé SPACE COMMUNICATION SYSTEMS

[ISAE – ENSEEIHT – TELECOM Bretagne – TELECOM SudParis]

Accredited by the Conférence des Grandes Écoles  
The master program benefit from the strong connections  
with the aerospace and defence industries, as well as automobile and energy.  
developed over the past 100 years by SUPAERO and ENSEEIHT.



For more than so years, satellite systems have demonstrated capabilities to collect and spread, better than any other technologies, messages and data in a vast coverage area for the benefit of thousand users, the space communications market represents one of the most commercially profitable business permanent evolutions.

Consequently companies of the sector, for space system development or for services and applications, recruit permanently junior executives with a specific expertise adapted to the specifics of the environment and quickly operational.

The master SCS is designed to offer students with necessary and up-to-date knowledge for mastering different aspects of digital communications, signal processing, and networks techniques used in space-based communication or navigation systems.

Thus, the master SCS emphasizes on the following objectives:

- give a global system approach by emphasizing the environment, the limitations and the constraints, the interfaces and the expected performances.
- improve the disciplines interacting in the conception of these systems : signal processing, communications, data processing and networks.
  - acquire and master design and simulation tools of the sector.
- train to the development of applications of these systems for space - aeronautics and embedded-systems domains.

## CARRER OPPORTUNITIES

The master Space Communications Systems offers students various junior executive positions in systems design leading to the management of projects in navigation and communications space systems sectors.

### Compagnies recruiting our students :

*Electronics and telecommunications companies*

**EADS, Thales, Safran,  
St Microelectronics, Alcatel**

*Communications operators*

**Eutelsat, Hispasat, SES ASTRA,  
Telespazio**

*Space agencies and research centers*

**CNES, DSN, DLR, ESA**

*Consulting groups*

**Altran,**

**France Développement Conseil,  
M3 Systems,**

## Who ?

Master degree or equivalent degree in science or engineering  
Bachelor degree with 3 years of professional experience at least

## Duration of studies

One year full time  
September to september

## Location of studies

ISAE - SUPAERO Campus  
and  
ENSEEIH Campus

## HEADS OF PROGRAM

Prof. Marie-Laure BOUCHERET  
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## Mastère Spécialisé SPACE COMMUNICATION SYSTEMS

### PEDAGOGICAL APPROACH

#### First semester

Academic session of around 400 h, provided by ENSEEIHT, TELECOM BRETAGNE and ISAE's permanent professors and experts from the aerospace industry bringing current knowledge and experience, including :

- Lectures, tutorials, experimental and practical sessions, online exercises.
- Practical works in team, simulation with MATLAB, OPNET, or specific software.
- 3 projects carried out in pairs for about 100 hours globally.
- Conferences, demonstrations in laboratory, experimentations on links, navigation receivers (GPS, etc).

#### Second semester

The student conducts a professional report in aeronautics industry or organisation, in France or abroad.

He's supervised by a tutor from the host organisation and from ISAE, ENSEEIHT or TELECOM BRETAGNE. The formation is concluded by the preparation of a report and a public defence.

### SILLABUS

#### Part 1 - Project management - 20 h

#### Part 2 - Basics - 159 h

Signal processing and source coding, Digital communications, Spread spectrum techniques, Coding and modulation for satellite channel, Network simulation tools, Networks and protocols for communications, Antennas and microwaves components

#### Part 3 - Systems and specific techniques - 182 h

Orbits and satellites platforms, Radiofrequency links and propagation, Space communications systems, Navigation and localization systems by satellite, Communication and navigation satellite payload, Digital filters and processing, Communications and navigation digital receivers, Ground stations and terminals

#### Part 4 - Applications - 140 h

Satellite based computer networks, Embedded-networks, Mobile communications and multimedia, Legal and economic aspects, Overview of space systems applications, Integrated Team Project

### APPLYING

#### Conditions:

##### Applicants having either:

- a master degree or an equivalent degree in science or engineering
- a bachelor degree with 3 years of professional experience at least

##### English proficiency:

Adequate command of spoken and written English is required for admission.

Language qualification is requested: TOEFL (paper-based): 550, TOEFL (IBT): 79, TOEIC: 750, IELTS: 6.0.

Except if applicant's first language is English or total instruction of Bachelor or master degree has been provided in English.

#### Procedure:

**Through application file, to be downloaded at <http://admissionsmasters.isae.fr>**

Selection is made upon the study of the application file. Interviews can be organized if necessary.

**Deadlines for application : from March to July.**

##### Applications have to be sent:

Institut Supérieur de l'Aéronautique et de l'Espace (ISAE)  
Direction des masters et mastères spécialisés  
10, avenue Edouard Belin  
BP 54032  
31055 Toulouse Cedex 4 – France

**Application fees: 67 euros (non-refundable).**

#### Tuition:

**Tuition fees: 12 500 euros.**

**French and European Students: 6 500 euros**

(students graduated in the year of application or the year before, and with no professional experience)

### CONTACTS

Philippe GALAUP, Head of recruitment and Contractual Relations  
Marie GUIBBAL, Senior Admission Advisor - Phone: +33 (0)5 61 33 80 28  
Laurence BALLARIN, Senior Admission Advisor - Phone: +33 (0)5 61 33 80 22

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