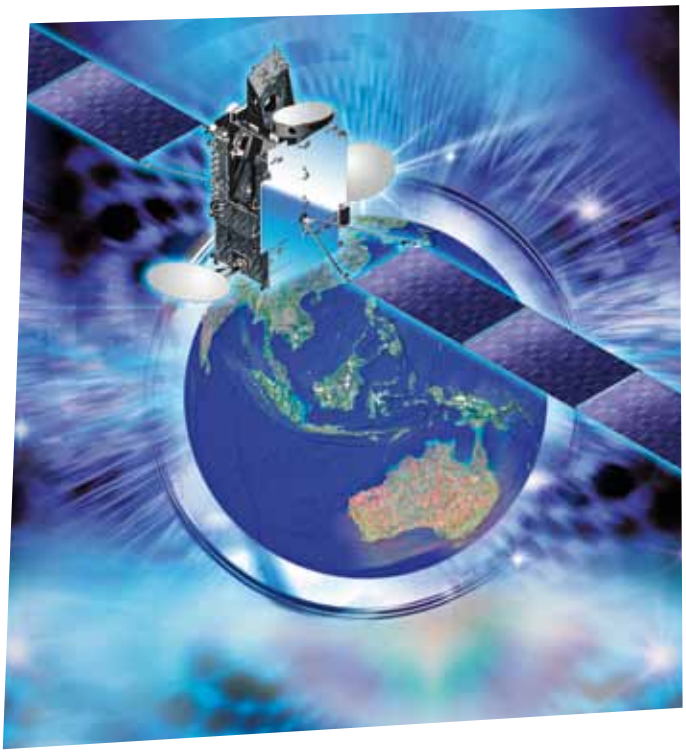
Space Systems Engineering

MS TAS Astro



Organization

Head of Program: Prof. Stéphanie LIZY-DESTREZ

E-mail: stephanie.lizy-destrez@isae.fr

Duration of studies: One year full time

Beginning of classes: September

Location: ISAE, Campus SUPAERO

Teaching language: English

Pedagogical approach

First semester: academic session of around 410h, provided by ISAE's permanent professors and various experts bringing current knowledge and experience from research center (ONERA), Space agencies (CNES, ESA), or European aerospace industry (Thales Alenia Space, Astrium/Space Transportation, Astrium/Satellites, Safran/ SNECMA, etc.).

This first semester includes:

> lectures, exercises, labs,
> engineering and design study seminars,
> laboratory sessions,
> written report and oral presentation,
> practical sessions, team work and industrial visits.

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 organisation and from ISAE. The thesis is concluded by the preparation of a report and an oral dissertation in front of jury.

Aims

The TAS Astro - Space Systems Engineering Advanced Master program is a one-year professional course of study. The TAS Astro Advanced Master allows students to develop a high level of competence in space science, space systems engineering and space project management . The TAS - Astro program is highly multidisciplinary and is aimed at developing engineering skills to easily enter the work world with great opportunities and significant chances of advancement on aerospace projects, either in a agency or in a company in a multinational environment.

The program is designed for students starting immediately after the completion of their graduate degree and for industrial employees who have enrolled through their companies' continuing education programs.

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

> to develop specific skills applied to space sector, in design development, space systems engineering and management of space projects,
> to acquire high competences related to technical aspects, international economical and legal concerns of space projects.

Syllabus

Part 1 - Missions and Systems - 169 h

Space environment and effects
Mission analysis and orbital mechanics
System Dependability (SD)
Satellite design
Satellite based navigation and localization systems
Satellite engineering and design
Design of Launchers
Space communications systems
Space manned missions

Part 2 - Space projects environment - 122 h

Space project and systems
Space project financial aspects
Financial and legislation aspects
Space projects legal aspects (complements)
Aerospace Engineering Environment
Astrium study Case : systems Engineering of Space Systems (SESS)

Part 3 - Sub-systems - 183 h

Real time operational systems
Real time control of a space system
Space propulsion
Advanced control and applications
Satellite AOCS
Launchers guidance and control
Satellite electrical systems
On board systems and data handling
Satellite thermal control systems

Part 4 - Standardisation and Conferences - 45 h

ISAE Digital Services Introduction - Introduction to Space systems - Quality seminar - Seminar «vehicle design» - «Electrical propulsion» conference - «Space mechanisms» conference - «History of Space Exploration» conference - «Space tourism» conference - Spacecraft operations
Visits of companies: ASTRIUM/ST, EADS, CNES...

Career opportunities

TAS Astro Advanced Master program leads students to technical employment either in international industries or in research centers in aerospace world. Current positions are: Project Managers of space systems, Experts in industry or public research laboratories, or in Consulting and services companies, etc.

Companies recruiting our students

Altran, EADS Astrium, EADS Apsys, Aéroconseil, Astek, Atos Origin, Bertin, Eutelsat, Eurilogic, GIST, Saipem, Seditec, Safran, Sopra Group, Transiciel, Thales Alenia Space, CNES, ESA, CTA (Brazil), Inpe (Brazil), DLR (Germany), Instituto Mexicano de Comunicaciones (Mexico). GTD Sistemas de Información (Spain), Hispasat (Spain), Aerospace Computing Inc/AMES (USA),…

TESTIMONIES

Mireia JOYA - Spain, Thermal engineer (Thermal Analysis of Telecom Satellites) at Astrium, Graduated in 2010

The great quality of the ISAE's master has helped me to shape my future the way I imagined. It has been a unique learning experience not only because of the numerous lecturers from different areas of the Space Industry we had but also because it brought me the opportunity to participate in a very interesting project at EADS Astrium. I will always remember with great pleasure the friendship I made with students from all over the world. After the master graduation I joined ALTRAN Toulouse as space thermal engineer».

Chloé DEFREVILLE - France, Graduated in 2011

Why did you choose ISAE and apply for our master ? What were your objectives ?
ISAE is the best engineering school in space domain and localized in Toulouse near the big space centers (CNES, Astrium, ONERA, Thales). The diplom is well recognized.

According to your experience, which are the strong assets of the Master you did ?
The multiplicity and exhaustivity of the studied fields, the high qualifications of our teachers and speakers coming from the best firms allover France, the subject of our class project and the involvement of nearly every student

Which are your career plans ?
Working on big space project like for the CNES.

Hélène MA - France, student 2012-2013

Why did you choose ISAE and apply for the advanced master TAS Astro ?
I was graduated as a general engineer with an option of mechanical engineering. With the engineering training I followed, I only had experience in aircraft industries. Since i wanted to get a better opportunity to work on space field (which was my main objective), so I decided to apply for this master, particularly due to its complete program on space projects and the quality education ISAE is used to giving..

What were your objectives ?
My target was to extend my knowledge in space field in order to strengthen my profile and to become a space engineer as perfomed as possible.

According to your experience, which are the strong assets of the Master you did ?
This advanced master is a complete and mature program because it scans through various issues related to space. Its quality is maintained by ISAE teachers and professional people from different space industries and agencies. Therefore, students are informed of the newest space events and studies. Thus, it allows us to appreciate the international and multi-cultural aspect of team working during different projects such as the Integrated Team Project.

Which are your carreer plans ?
I hope I could contribute to the Space Situational Awareness issues for international industries and agencies.

Common ISAE's admission procedures

Advanced Masters

Academic requirements

Applicants must have a Master degree, or an equivalent degree in science or engineering, or a bachelor degree with 3 years of professional experience at least.

Tuition fees 2014:

	EU		Out of EU	
	reduced tuition fees[1]	tuition fees	reduced tuition fees[2]	tuition fees[3]
TAS Astro	7 000 €	12 500 €	12 500 €	18 000 €

[1] for students graduated in the year of enrollment or the year before and with no professional experience
[2] for individual applicants
[3] fees for public agencies and private companies available upon request from Philippe Galaup at: philippe.galaup@isae.fr, Head of recruitment and Contractual Relations

Selection and admission

Admission to ISAE's master at:

http://admissionsmasters.isae.fr

Selection and admission are made by an admission committee:

> possible interviews can be organized if necessary

Deadlines for application:

> several admission committees scheduled from February to July 2014, see schedule on our website: www.isae.fr

Application fees:

> 67 € (non-refundable)

Language requirements for Masters in English

Language qualification requested:

> TOEFL (Paper-based): 550,
> TOEFL (IBT): 79,
> TOEIC: 750,
> IELTS: 6.0,
> CAE Cambridge, …

Your contacts at ISAE

> **Philippe GALAUP,** Head of recruitment and Contractual Relations - Phone : +33 (5) 61 33 80 27
> **Laurence BALLARIN**, Senior Admission Advisor - Phone :+33 (5) 61 33 80 22
> **Marie GUIBBAL**, Senior Admission Advisor - Phone : +33 (5) 61 33 80 28

info-masters@isae.fr

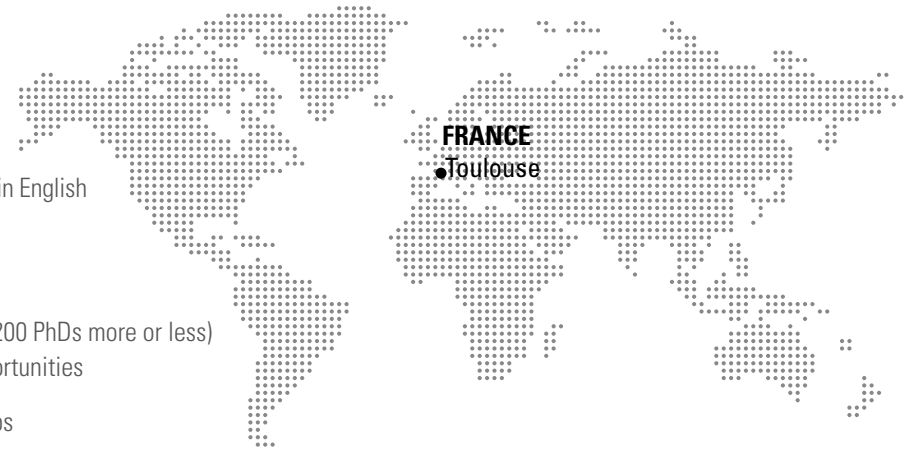
ISAE in few words

The "Institut Supérieur de l'Aéronautique et de l'Espace" (ISAE) was created in 2007 from the merger of the two prestigious French postgraduate schools of engineering, SUPAERO and ENSICA. Today, ISAE, is a world-class higher institute for aerospace engineering education and research. Nowadays with a student corpus of over 1500, ISAE is one of Europe's largest Aerospace Institute offering graduates and postgraduates programs. Yearly, ISAE awards around 20% of master's degrees in Europe in aeronautics and space field. ISAE develops its worldwide reputation on the prestige of its master's programs, the fame of its teaching staff, or the excellence of its research but also on the high-value of its graduates, their skills in engineering or management, as well, their capacity to evolve within a very high-technology environment, their enterprising mind and international opening.

Key figures

- 2 Graduate Engineering Programs: SUPAERO and ENSICA
- 15 Advanced Masters including 10 in English
- 3 Masters of Science
- 5 Research Masters
- 6 PhD Programs
- 1500 students (1300 masters and 200 PhDs more or less)
- 160 international cooperation opportunities

50 academic and research partnerships



Identity card

Name: Institut Supérieur de l'Aéronautique et de l'Espace (ISAE)
Founded in 2007 - as the result of the merging of SUPAERO (1909) and ENSICA (1945)
Legal Status: Public Institution of higher education and research
Trustees: Direction Générale de l'Armement (DGA) [French Defence Procurement] - Ministry of Defense
Endorsements and awards: CTI agreement of the two Graduate Programs, Conference des "Grandes Écoles" for postgraduate Advanced Masters and "Ministry of Higher Education and Research" for Masters of Science
Staff: 420 permanent staff

Two campuses close to all conveniences

The two campuses are located in the very heart of Toulouse. This means that students can very easily balance studies, social life, sports and leisure activities from day to day.

The SUPAERO campus

- Nearly 1,000 students on a 22-hectare campus that runs alongside the Canal du Midi,
- extensive sports facilities: swimming pool, tennis courts, squash courts, gymnasium, sports pitches, climbing wall; the banks of the Canal du Midi are just a short stroll away,
- student residences: 500 places on the campus; on-site catering.

The ENSICA campus

- Located close to the centre of Toulouse and accessible in less than five minutes by metro,
- nearly 500 students on an eight-hectare campus,
- extensive sports facilities: tennis courts, gymnasium, sports pitches; the banks of the Canal du Midi are just a short stroll away,
- student residences: more than 350 places on the campus; on-site catering.