PhD program at ISAE-SUPAERO

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Doctoral program

PhD at ISAE-SUPAERO

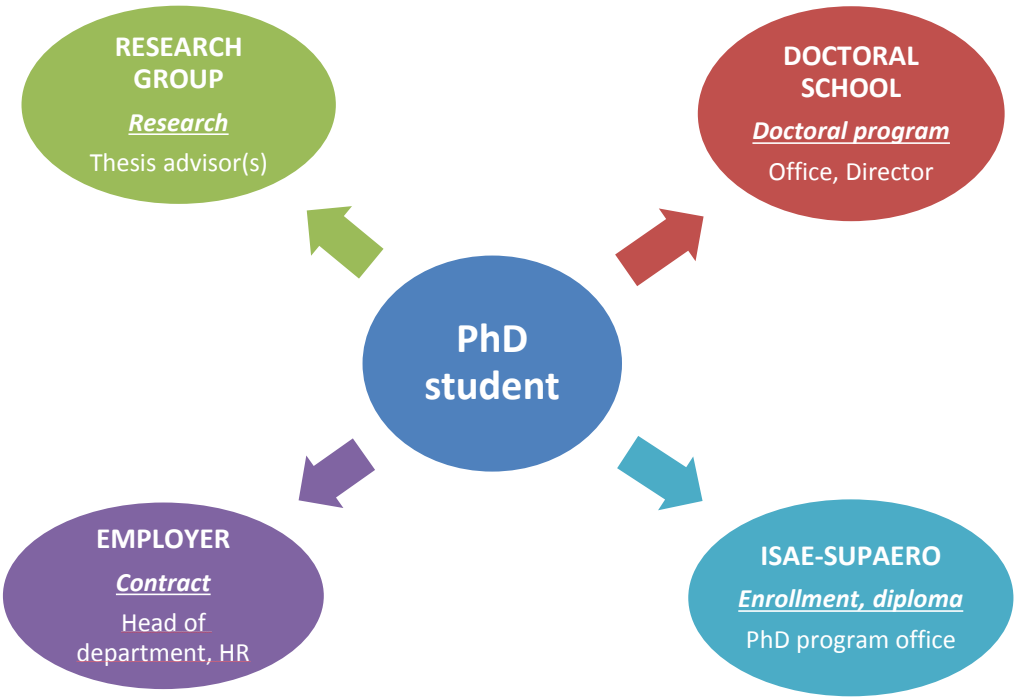
A **world leader in aerospace engineering higher education**, with its engineers and master of sciences programs, ISAE-SUPAERO offers a rich and diverse PhD program, leading to the **PhD degree**, the highest diploma delivered by the institute, recognized internationally.

A member of Toulouse Midi-Pyrénées Federal University, ISAE-SUPAERO is accredited by 5 doctoral schools and is the leading institution of the Aeronautics-Astronautics (AA) doctoral school. Research activities are conducted in six common research groups with ONERA (the French aerospace lab) and the Clément Ader Institute, covering a **wide spectrum of scientific disciplines** related to **aeronautics and space**: aerodynamics and propulsion, materials and structures, embedded systems, communication networks, automatic control, human factors, electronics, signal processing.

Strongly in touch with the **aerospace industry**, supported by various funding, doctoral training at ISAE-SUPAERO constitutes a **training of excellence in and through research** and an exciting professional experience in an environment of strong scientific innovation.

Doctoral program organization

The figure below is a sketch of the PhD student environment.



The doctoral program entails **3 years training in and through research** and constitutes a first **professional experience** in research. A doctoral program

- **is organized within the framework of doctoral schools**
- **includes personal research work conducted within a research group**, under the supervision of a thesis advisor
- **leads to the PhD degree delivered by ISAE-SUPAERO**.

The doctoral schools

Together with accredited institutions, doctoral schools are in charge of doctoral courses and of preparing the PhD students to their future professional career. Doctoral schools provide a stimulating scientific environment and gather research groups from various institutions.

The missions of doctoral schools

The doctoral schools **handle doctoral courses and prepare the PhD students to their future professional career** after the PhD program. They

- Define an admission policy

- Organize exchanges between the PhD student and the scientific community; propose courses with a view to develop a strong interdisciplinary scientific culture, including an advanced knowledge of international research organization
- Ensure that every PhD student receives training in ethics and scientific integrity
- Develop quality monitoring of PhD courses
- Help students prepare their future career
- Contribute to European and international exchanges

The 15 doctoral schools of the Federal University of Toulouse Midi-Pyrénées are organized in a doctoral college, l'école des docteurs de Toulouse, whose goal is to promote the PhD degree in the socio-economic world, to organize doctoral courses and to favor international exchanges, with actions along three lines:

1. **Training**: supporting the doctoral students' professional project
2. **International**: inform, guide and support doctoral students in their international project
3. **Employment of Doctors**: preparing the career path of doctors

The respective roles of doctoral schools and ISAE-SUPAERO

Every PhD student **is affiliated with a doctoral school and enrolled at ISAE-SUPAERO**. Below are a few examples of the respective roles of doctoral schools and ISAE-SUPAERO:

	Doctoral school	ISAE-SUPAERO
Admission	Proposes admission	Proceeds to enrollment
Doctoral training	Handles teaching of additional courses, seminars	Handles administrative aspects
PhD defense	Proposes reviewers and committee	Designates reviewers and committee
Diploma		Delivers diploma

ISAE-SUPAERO accredited by 5 doctoral schools and leading institution of the Aeronautics-Astronautics doctoral school

ISAE-SUPAERO is accredited to deliver the PhD degree to students affiliated with **6 doctoral schools**, including the Aeronautics-Astronautics (AA) doctoral school, for which it serves as the leading institution.

The 6 doctoral schools for which ISAE-SUPAERO is accredited

- Aeronautics and Astronautics (AA)
- Electrical engineering, Electronics, Telecommunications: from system to nano-system (GEET)
- Mechanics, Energetics, Civil Engineering and Processes (MEGeP)
- Mathematics, Computer Science and Telecommunications (MITT)
- Geoscience, Astrophysics and Space Science (SDU2E)
- Systems (SYS)

The Aeronautics-Astronautics doctoral school (AA)

A cross-disciplinary doctoral school of which ISAE-SUPAERO is the supporting institution, ED AA is dedicated to hosting the **interdisciplinary theses of the aeronautics and space sector**. The research activities conducted within AA involve several scientific fields and deal with large scale aerospace systems architecture and related applications.

This doctoral school includes many scientific disciplines involving engineering sciences, physics and mathematics as well as information and communication sciences, earth and space sciences, and humanities and the sciences of the Man and Society including art, law, cognitive sciences, and medicine. This diversity is reflected in the variety of enrollment establishments and the host groups of doctoral theses completed under the aegis of the EDAA:

- Cross-disciplinary doctoral school which brings together aeronautics and astronautics related interdisciplinary doctoral theses.
- Accredited institutions: ISAE-SUPAERO, University Toulouse Capitole, University Jean Jaurès, University Paul Sabatier, National Polytechnic Institute of Toulouse, Applied Sciences National Institute of Toulouse and Mines Albi.
- ED-AA can host theses prepared in all research teams of the University of Toulouse.

Doctoral research teams

The PhD student's research is carried out under the direction of a thesis supervisor and possibly a co-supervisor, within a doctoral research group accredited by the doctoral school. The research group brings together researchers around research themes.

In order to enforce coherence and to develop research structures of sufficient size, ISAE-SUPAERO collaborates with its strategic partners to form joint doctoral research teams. Towards this end, ISAE-SUPAERO and ONERA (the French Aerospace Lab) have created joint doctoral research teams. Similarly, ISAE-SUPAERO is associated with University Paul Sabatier, INSA Toulouse and the Mines of Albi within the framework of the Clément Ader Institute (ICA). Each doctoral team participates in a single doctoral school.

ISAE-SUPAERO welcomes PhD students to **7 research groups**:

- **Joint ISAE-ONERA teams**
  - Fluid dynamics (**EDyF**/MEGeP)
  - Space physics and Instrumentation (**PSI**/ SDU2E)
  - Optronics, Laser Imagery Physics and Space Environment (**OLIMPES**/ GEET)
  - Control of systems and flight dynamics (**CSDV**/ SYS)
  - MOdelization and Systems Engineering (**MOIS**/ MITT)
  - Signal, Communications, Antennas, Navigation, Radar (**SCANR**/ MITT)
- **Institut Clément Ader** (ICA, CNRS UMR 5312)

Admissions

Admission to the doctoral program of ISAE-SUPAERO is awarded by the institute on proposal and after favorable opinion of the doctoral school. The candidate must hold a national Master's degree or another diploma conferring the Master's degree, following a training course or professional experience demonstrating his / her ability to research.

Application

Usually, PhD candidates should first contact professors of their discipline to discuss with them PhD opportunities, i.e., research topics proposed, funding, and PhD positions available.

The application form, which is common to all institutions of the Federal University of Toulouse Midi-Pyrénées and to all doctoral schools in Toulouse, is available on the websites of the doctoral schools. **Candidates should first be registered in** ADUM, **the web site that handles PhD students**. Briefly stated, candidates will have to fulfill the following prerequisites

- Hold a national Master's degree or any other degree conferring the Master's degree. By way of derogation, persons who have carried out studies of an equivalent level or benefiting from the validation of prior experience may be enrolled in a doctorate.
- Demonstrate a research aptitude acquired during the training course or during a professional experience.
- Provide a three-year funding guarantee for the doctoral project, through doctoral contracts, scholarships or industrial funding (e.g. Cifre)

The **application file is examined by the doctoral school** in which the thesis is envisaged **and by ISAE-SUPAERO doctoral committee**. The latter shall issue the registration authorization, after proposal of the director of the doctoral school.

The academic year begins on October 1 and the doctoral committee of ISAE-SUPAERO meets 2 or 3 times a year: mid July, 2nd half of September and beginning of November if necessary. The application must be submitted to ISAE-SUPAERO no later than 10 days before the meeting of the commission.

Each candidate has to fill his/her ADUM file, have it signed by thesis advisor(s) and head of research group, before submitting it to the doctoral school. The latter will examine the candidature and will accept/reject it. The candidature file should also be supplied to ISAE-SUPAERO for examination by its doctoral committee. Final enrollment will be pronounced by ISAE-SUPAERO Managing Director upon proposal of the doctoral school and agreement from the doctoral committee. Note that a single pdf file should be uploaded to ADUM for ISAE-SUPAERO use.

Registration and renewal of registrations

Candidates admitted to the 1st year of thesis at ISAE-SUPAERO complete the registration formalities at the beginning of October.

Enrollment is renewed at the beginning of each academic year by the director of the institute, following a proposal by the director of the doctoral school, after obtaining the opinion of the thesis supervisor and, from the third enrollment, the doctoral student's individual follow-up committee. To do this, the doctoral students fill in the registration renewal form available on the websites of the doctoral schools. This form must be submitted, signed by the thesis supervisor (and possibly the co-supervisor of the thesis) and by the director of the research unit in which the thesis is prepared, to the doctoral school, by June 30th for candidates who must enroll at the beginning of the second or third year, by 5th September for doctoral students who must enroll in the 4th year or more by way of derogation. A new registration is required for all PhD students whose thesis defense is not scheduled before September 30th.

PhD defence procedure

Detailed description of the PhD defence procedure (in French) can be found here.

The PhD defense procedure spans over ten-twelve weeks from the moment that the thesis is deemed ready by the PhD supervisor and reviewers have agreed to evaluate the work, and the public defense. PhD students shall have satisfied all requirements from their doctoral school in terms of courses and publications.

Briefly stated, there are two main steps in the procedure:

1. A first examination from the doctoral school of the 2 reviewers proposed by the PhD advisor. Upon approval of them by the doctoral school, ISAE-SUPAERO asks them to prepare a report

on the PhD work. At this stage, compliance of the examination board may be studied by the doctoral school.

2. A second examination where, given the reviewers report and assuming that the examination board complies with the rules stated in May 25, 2016 decree, PhD defense is allowed. ISAE-SUPAERO calls in the jury for the public defense.

The procedure is illustrated below.