



## TUITION FEES

- Application fees : €65
- Program cost for non-European citizens : €14, 000
- Program cost for European citizens : €8,000

## TOULOUSE

*Toulouse: the second largest university city in France,  
European capital city for aeronautics and space industries*

Many leading companies in Air Traffic have their headquarters or large facilities in Toulouse, such as Airbus, EADS, the French Space Agency, Thales, along with many SMEs associated with the world of Air Traffic.

## ENTRY REQUIREMENTS

- Completed Bachelor Degree in Electrical Engineering, Aerospace Engineering, Mathematics, Physics, Computer science or equivalent.
- Proof of a sufficient english level: TOEFL M 550 (PBT), TOEFL M 213 (CBT), TOEIC M 750, BULATS M 70, D-C-L degree 4 or equivalent.



## ENAC, EUROPE'S LEADING AERONAUTICAL UNIVERSITY

- 4 Bachelor's degree programs
- 7 Master's degree programs
- 10 «Mastères Spécialisés» including 3 in China
- Continuous training: 500 short courses
- 4 Research laboratories,
- International activities: over 15,000 students and foreign trainees from 100 countries.

The ENAC is located on a vast 20-hectare campus, with teaching premises, student residence halls, restaurant, sports and cultural facilities.



## APPLICATION PROCEDURE

- Application: is online on [www.enac.fr/en](http://www.enac.fr/en)
- Application calendar: One monthly selection jury (see website for details). «First-come first-serve process» to select applicants.
- Selection process: Application files assessment (followed by an interview if necessary).
- €4,000 scholarships: Please inform the course director by email. The decision will be given mid-July at the latest.

• For more information, please contact:

- Michel Chauvin

Deputy Director

Higher Education Programs

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ENAC-03-2012-500 ex



## Master of Science in Air Traffic Management



La référence aéronautique

[www.enac.fr](http://www.enac.fr)







*The Master of Science (MSc) in Air Traffic Management (ATM) is a two year program offering advanced education in the scientific and operational problems and technics dealing with the design, control and use of Airspace Management, Air Traffic Control and Airport Management. It aims at training students for the growing ATM industry, with high demands related to the NextGen (US) and SESAR (Europe) programs.*

*Organized by ENAC, this master relies on international cooperation with different international partners.*

*ENAC was ideally suited for this combination of scientific and operational training through a 60 years experience in high level education trainings, along with an international experience in operational trainings, and top level simulators and training facilities.*



## OBJECTIVES

The focus is on Air Traffic Management since Europe, through the SESAR program, and the United States, through the NextGen program have decided to completely update their Air Traffic and Ground Traffic Systems, and to make them inter-operable.

Moreover, Air Traffic Management is also becoming an issue in emergent countries where the increase in air traffic creates new needs regarding the design, installation and maintenance of Air Traffic Management Systems.

The first objective of the MSc is to give students the scientific basis needed to understand the underlying problems regarding the scientific and technical design of Air Traffic Management Systems.

The second objective of the MSc is to give students an operational training which is mandatory to understand the practical complexity of Air Traffic design and Air Traffic or Airport Control.

The third objective is to provide an international overview of Air Traffic Management in Europe and the United States, along with an highlight on the development of emergent countries in Asia.



The course program is a combination of lectures, tutorials, applied projects and assignments.

### 1<sup>st</sup> SEMESTER (30 ECTS):

The first semester concentrates on providing students with the background needed to understand the scientific problematic of Air Traffic management. The pedagogy will revolve around the creation of a fast-time air traffic simulator in Java.

Main lessons taught:

- Mathematics (optimization, statistics and stochastic processes, Monte-Carlo strategies)
- Operational research
- Computer science (complexity, algorithms, programming in JAVA)
- Economy

### 2<sup>nd</sup> SEMESTER (30 ECTS):

The second semester is devoted to operational lessons and trainings to give students an operational experience in Air Traffic design and Air Traffic Control. Using the ENAC simulators facilities, students will concentrate on:

- Aircraft (identification, performance, technics)
- Aviation Law
- En Route Air Traffic Control
- Tower Control
- Meteorology
- Navigation
- Human factors

### 3<sup>rd</sup> SEMESTER (30 ECTS):

The third semester makes a synthesis of the lessons of the first and second semester by explaining how to apply the scientific background of the first semester to the operational problems presented in the second semester. Main lessons:

- Aircraft Management and FMS
- Transportation theory
- Pricing
- Trajectory complexity metric
- Airspace design and ATFM
- Ground holding program and airport capacity model
- Conflict detection and resolution
- Collision risk model
- Safety aspects modelling
- Terminal airspace optimization

### 4<sup>th</sup> SEMESTER (30 ECTS):

5- to 6-month Internship in a company or a research laboratory. At the end of this internship, a report or oral presentation before a jury is to be carried out.

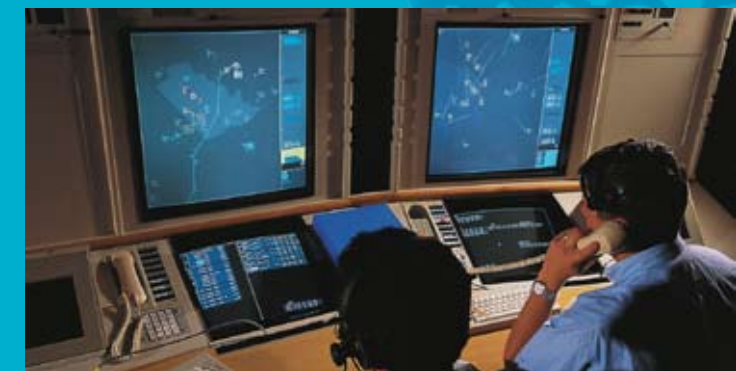
## AN INTERNATIONAL COOPERATION

The MSc in ATM was designed from the start to present a broad picture of ATM through the world. It was thus developed in collaboration with international institutions and universities.

Many foreign lecturers will give lessons during the first and third semester of the MSc, from prestigious universities such as the Massachusetts Institute of Technology, Georgia Tech University, Beihang University (China).

## ORGANISATION

- Duration of studies: two years full time
- Course start date: September
- Location: Toulouse, France
- 2 periods: 3 semesters of courses at ENAC and 1 semester of in-company internship (assessed by a written report and an oral presentation)
- Teaching language: the entire programme is taught in English.



## CAREER OPPORTUNITIES

A 2005 memo of the European commission DG TREN states that the SESAR program would create at least 200 000 jobs in the field of Air Traffic Management related activities.

Large European companies are now developing new ATM systems, with a focus on innovation and Research and Development. This creates lot of opportunities with these companies, but also with sub-contractors or research laboratories.

European institutions are also looking for qualified professionals to manage all the european programs related to ATM.



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