

2013



Masters of Science

Accredited by the French Ministry
of higher education



La référence aéronautique

www.enac.fr →



ATM

Master of Science in Air Traffic Management

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.

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.

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 Massachussets 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.





COURSE CONTENTS

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

1st 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

2nd 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

3rd 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

4th 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.





GNSS

Master of Science in Global Navigation Satellite System

GNSS, Global Navigation Satellite System, defines a satellite-based system that allows autonomous positioning and navigation of a suitably equipped user everywhere and at all times.

The Master of Science (MSc) in GNSS is a 2-year program offering advanced education in Satellite-based Positioning and Space Telecommunications.

It aims at training students for the steadily growing GNSS industry. It is co-organized by ENAC and ISAE (Institut Supérieur de l'Aéronautique et de l'Espace) in Toulouse, France.

Credit ESA



OBJECTIVES

Global Navigation Satellite Systems (GNSSs) have gained a lot of worldwide attention due to a significant increase in applications using GPS for positioning and navigation (aeronautics, vehicular and pedestrian navigation, location-based services, etc.). This international enthusiasm is confirmed by the worldwide development of other global and regional satellite-based navigation systems in Europe, the USA, China, Russia, India and Japan, creating a strong need for experts in this field. The objective of this MSc in GNSS is to provide students with advanced skills and knowledge in the field of GNSS and its related applications, in order to prepare them to enter the highly dynamic GNSS and GNSS-dependent industry. In addition, the students have a training in telecommunications, as both fields are strongly complementary.

Crédit ESA



CAREER OPPORTUNITIES

Recent studies have shown that there will be a lack of graduate students to fill the open positions in the GNSS industry in the near future. This MSc in GNSS provides students with a head start in the evolving and growing market of satellite-based navigation and telecommunications.

Hence, graduate students can enter:

- large companies,
- SMEs,
- national institutions,
- research laboratories.

AN INTERNATIONAL COOPERATION

This MSc in GNSS was developed with the support of the European Commission and the European GNSS Agency, GSA (7th Framework Programme under grant agreement nbr. 248016).

It has been achieved in partnership with the Institute of Space Technology and Space Applications of the Universität der Bundeswehr München (Germany) and Politecnico di Torino (Torino, Italy), both recognized for their leading international roles in education and research in the GNSS field. These two universities also contribute to the MSc teaching and provide their international links with the GNSS industry.

The MSc also received the industrial support of Thales Alenia Space (France), Airbus (France), GMV (Spain), ISMB (Italy) ; as well as the institutional support of the UN





ORGANISATION

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- Teaching language: the entire programme is taught in English.

COURSE CONTENTS

1st, 2nd AND 3rd SEMESTERS :

The course programme of the Master's first 3 semesters is a combination of lectures, tutorials, applied projects and assignments.

Lessons are organized in 9 teaching domains closely linked to the Satellite-based Positioning and Space Telecommunications topics, allowing students to get 91 ECTS credits.

The content of each teaching domain as well as each semester organization are detailed on our website.

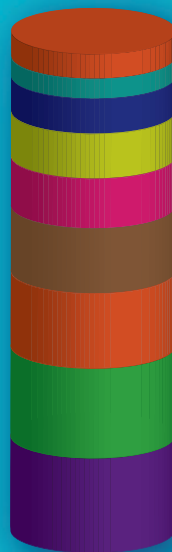
4th SEMESTER (30 ECTS)

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

SCHOLARSHIPS

€4,000 scholarships are available.

Contact Michel CHAUVIN for granting conditions and information.



Electromagnetics & Propagation 5%
 Programming 4%
 Receiver Design 7%
 Mathematics 9%
 Language & Human Sciences 10%
 Telecommunications 13%
 Signal Processing 15%
 GNSS 18%
 Applied Project 19%





IATOM

Master's degree in International Air Transport Operations Management

IATOM is a two year-degree accredited by the French Ministry of Education for those students who hold a Bachelor degree in a relevant subject. Located in Toulouse, a major centre for science and technology and the European aviation capital, ENAC is a gateway to air transport worldwide, recognized by ICAO and major civil aviation organisations as one of the world's leading air transport educational institutions.

Credit: ESA



AIMS

The international aspect of today's aeronautical world is an ever-changing context.

In this context, managers must be capable of :

- Integrating the technical parameters of a high technology sector
- Taking into account the legal constraints of a tightly re-gulated environment and the economics of an extremely competitive field.

The IATOM master meets all the requirements of this very demanding environment.

ORGANISATION

- Duration of studies : two years full time
- Beginning of classes : September
- Location : Toulouse - France

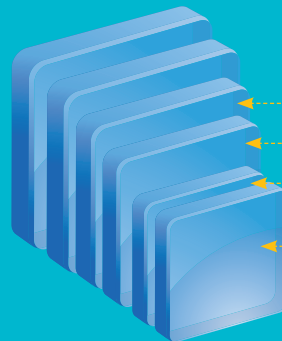
2 periods : 3 semesters of academic tuition at ENAC and 1 semester of in-company internship assessed by a written report and an oral presentation

- Teaching language : The programme is wholly taught in English

PROGRAMME STRUCTURE

- Total :
- 32 courses
 - 100 credits, including 8 elective credits

Six teaching domains: 32 courses 100 ECTS



20% Aircraft Environment

19% Air Transport Economics

17% Flight Operations

16% Aerotechnics

13% Languages, project management and marketing

13% Airworthiness



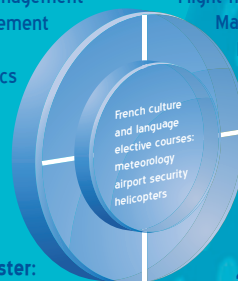


MAIN COURSES

1st semester:
 Aerodynamics and fluid mechanics
 Flight mechanics
 Airport design and management
 Project management

Economics

3rd semester:
 Airlines technical and economical management
 Flight operations
 Flight management systems
 Maintenance engineering
 Marketing
 Human resources Management



2nd semester:
 Air transport law
 Propulsion Airworthiness
 Flight handling qualities
 Noise and pollution Marketing

4th semester:
 5/6 months practical internship

CAREER OPPORTUNITIES

Four main recruitment domains

Aircraft manufacturers

Civil Aviation Authorities

Airlines

Airports



ENAC'S ADMISSION PROCEDURES

Tuition Fees

- Application fees : €67 (non refundable)
- Program cost for non-European Union citizens : €14, 000
- Program cost for European Union citizens : €8,000

Entry Requirements

- Completed Bachelor Degree in Electrical Engineering, Aerospace Engineering, Mathematics, Physics 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.

Selection and admission

Admission to ENAC's master at: <https://masters.enac.fr>

Selection and admission made by admission committees organized from February to June 2013

Deadlines for application

several admission committees scheduled from February to July 2013, see schedule on our website: www.enac.fr

Your contact

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International Development Department

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1 SCHOOL... 10 CAMPUSES IN FRANCE

The main of ENAC

Thanks to its location in seven French regions, ENAC benefits from a synergy with the local development actors and the regional companies on an economic level.

Toulouse : the second largest university town in France

European capital of the aeronautics and space industries Toulouse accomodates all the leading names in aviation and space : Airbus, Alcatel Space, EADS, ATR, CNES, Latécoère, Liebherr Aerospace, Thales... This environment perfectly corresponds to the ENAC's different activities.

Campuses ENAC: a very special environment

All campuses have their own educational installations, club premises, sports centers : everything is to hand, so as to combine studies, social life, cultural life, sport and leisure on an everyday basis.

ENAC, Europe's Leading Aeronautical University

- 3 Bachelor's degree programs
- 6 Master's degree programs
- 14 «Mastères Spécialisés» including 7 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.

