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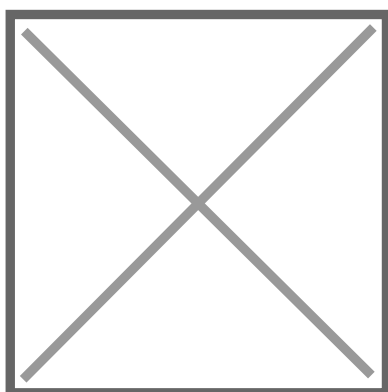
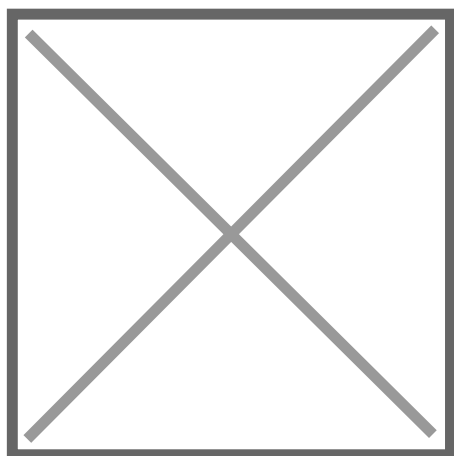
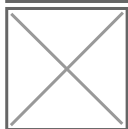
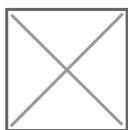
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Add to Compare

M2 Smart Aerospace and Autonomous Systems



Master's degree

Specialisation Electrical Engineering

Enrolment type

Full-time academic programmes Life-long learning

Language(s) of instruction

English

The *Master in Smart Aerospace and Autonomous Systems* trains experts in designing, modeling, and controlling intelligent vehicles and autonomous systems. This unique program combines scientific rigor, artificial intelligence, and embedded technologies to address the industrial and societal challenges of tomorrow.

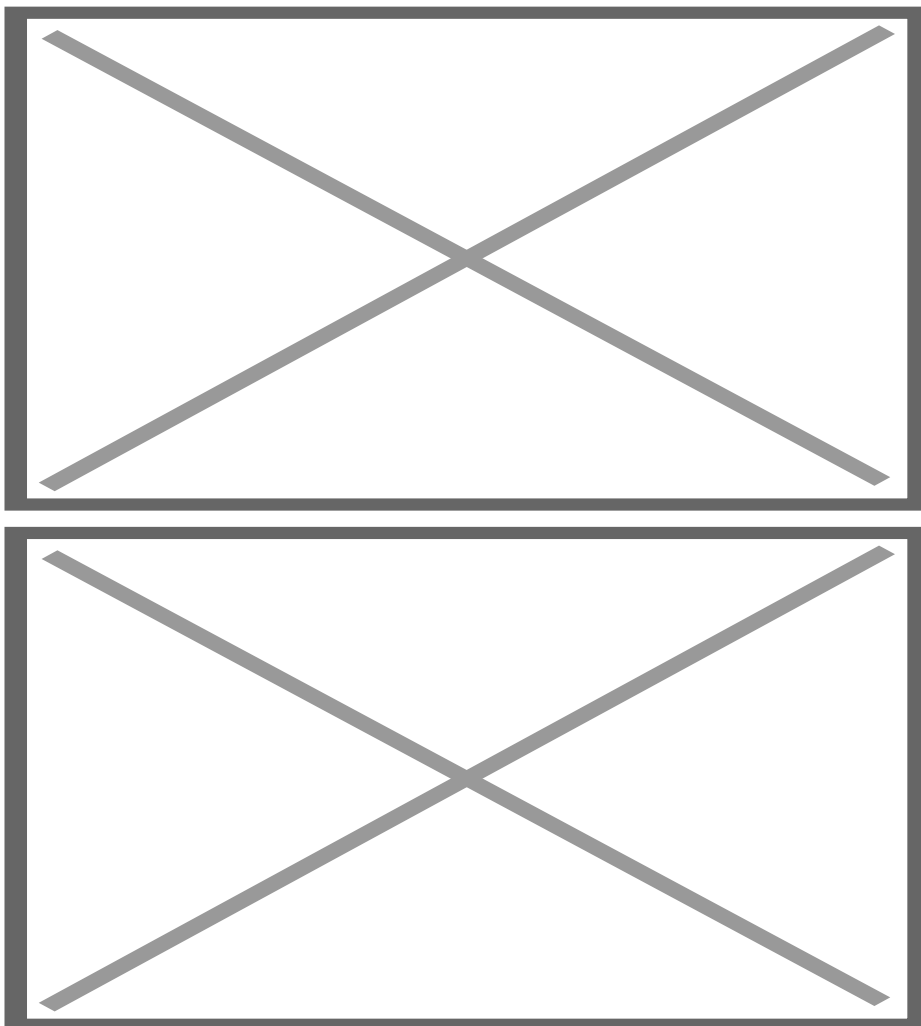
To train professionals and researchers capable of working on drones, autonomous vehicles, or cooperative robotic fleets, mastering both theoretical and practical aspects.

General Organization:

The program includes lectures, tutorials, practical labs, and supervised projects, offering a balance between fundamental knowledge and operational technical skills. The second semester of the Master is dedicated to a 6 months internship.

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Information

- [Overview](#)
- [Application requirements](#)
- [Schedule](#)

Présentation

Skills

- Model, simulate, and control autonomous systems while ensuring stability, robustness, and maneuverability.
- Plan and coordinate missions, and integrate artificial intelligence for perception, decision-making, and the autonomy of intelligent vehicles.

Objectives

The rise of autonomous systems and intelligent vehicles has accelerated dramatically over the past decade, in both research and industry. Today, these technologies are transforming a wide range of fields: from surveillance and precision agriculture with drones, to aerial photography, autonomous cars, service robotics, and even maritime and space exploration. This rapid expansion makes specialized training indispensable, equipping students, future engineers or researchers with the expertise needed to design, analyze, and control such complex systems.

The Master's program in Smart Aerospace and Autonomous Systems directly addresses this demand by offering a unique curriculum that combines theoretical foundations with practical applications. It integrates the latest advances in control, artificial intelligence, and embedded technologies, all applied to intelligent vehicles and autonomous platforms.

Within this program, students build solid expertise in control and guidance, ensuring the stability and maneuverability of intelligent vehicles. They also gain advanced skills in modeling and simulation, which are crucial for the design and validation of robust systems. Special emphasis is placed on trajectory planning and artificial intelligence, enabling true decision-making autonomy. Training in sensor integration and data fusion further equips students to perceive and interpret their environment with accuracy and reliability. Finally, the study of multi-system coordination prepares graduates to manage collaborative fleets of drones, autonomous vehicles, and other intelligent systems.

Although aerospace and aeronautics are central application areas, the competencies acquired extend far beyond this sector, with direct relevance to smart mobility, logistics, security, and service robotics.

By combining an interdisciplinary vision with scientific rigor and hands-on experience, this Master's program offers students and engineers a unique opportunity to become key drivers of innovation in the field of autonomous systems and intelligent vehicles.

Débouchés

Career prospects

After a Master's + PhD: researcher or lecturer

After a Master's or Master's + PhD: researcher or lecturer

After a Master's or Master's + PhD: engineer (Research & Development, control, production, etc.)

Research or Design Engineer

Further Study Opportunities

R&D researcher or data modelling and analysis expert in leading-edge companies or laboratories.

PhD

Engineering, research and development

Admission

Admission Route

Science and Technology
Engineering Sciences

Capacity

Available Places

28

Target Audience and Entry Requirements

Target audience

- Students holding a Master 1, Bachelor's degree (or equivalent) who wish to specialize in autonomous and intelligent systems.
- Practicing engineers or recent graduates seeking to develop advanced skills in control, modeling, artificial intelligence, and embedded technologies.

Prerequisites

- Qualification in aeronautics, electrical engineering, computer science engineering, embedded systems and dynamic systems, or mechanical engineering.
- Solid foundations in applied mathematics, control theory, and programming.
- Good command of technical and scientific English (courses are taught in English).

Période(s) de candidature

Inception Platform

From 02/02/2026 to 05/07/2026

From 15/08/2026 to 29/08/2026

Supporting documents

Compulsory supporting documents

Rank of previous year and size of the promotion.

Copy diplomas.

Copy of identity document.

Motivation letter.

All transcripts of the years / semesters validated since the high school diploma at the date of application.

Curriculum Vitae.

Certificate of English level (compulsory for non-English speakers) or GMAT / GRE test results.

Additional supporting documents

Detailed description and hourly volume of courses taken since the beginning of the university program.

VAP file (obligatory for all persons requesting a valuation of the assets to enter the diploma).

Document indicating the list of local M2 choices available here : <https://urlz.fr/i3Lo>.

Supporting documents :

- Residence permit stating the country of residence of the first country
- Or receipt of request stating the country of first asylum
- Or document from the UNHCR granting refugee status
- Or receipt of refugee status request delivered in France
- Or residence permit stating the refugee status delivered in France
- Or document stating subsidiary protection in France or abroad
- Or document stating temporary protection in France or abroad.

Programme

Professional Development and Research

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	practical class	directed study/practical class	distance learning courses
Master's thesis	24	Semestre 2							

Master's thesis

ECTS : 24

Semester: Semestre 2

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

M2SAAS Courses

Learning objectives

- Apply the scientific and technical knowledge acquired during the program by carrying out a 5 to 6 months project in a company or research lab.
- Develop professional skills in project management, autonomy, scientific communication, and teamwork within an academic or industrial environment.
- Conduct a research or engineering project by defining a problem statement, proposing a methodology, and implementing the theoretical and experimental tools required to achieve the expected objectives.
- Analyze, interpret, and showcase the results obtained, while following a rigorous and scientific approach.
- Write a structured and comprehensive internship report, detailing the context, objectives, methodology, results, and perspectives of the work carried out.
- Present and defend the work during an oral examination at the end of the semester, clearly explaining the contributions, the approach taken, and the significance of the results.
- Demonstrate the level of competence expected from a Master's graduate, assessed through the oral defense, the written report, and the supervisor's evaluation of the work performed.

Type of assessment

Evaluation Continue non Intégrale

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distance learning courses
Project	4	Semestre 2							
■									

Project

ECTS : 4

Semester: Semestre 2

Detail

Project : 30

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

M2SAAS courses

Learning objectives

The master's project represents an opportunity to integrate knowledge and skills that have been acquired over the course of the program. It regroups a student team (2 or 3), working together in order to study and develop a topic related to the Master theme and proposed by professors. At first, the students summarize the state of art then study the problematic, find the solution which is implemented and validated.

Bibliography

Based on the proposed project. The reference is provided for each topic by professors.

Type of assessment

Evaluation Continue non Intégrale

UE libre	2	Semestre	10	10
S2		2		



UE libre S2

ECTS : 2

Semester: Semestre 2

Detail

Lecture: 10

Directed study: 10

Language(s) of instruction

Anglais

Remote teaching

non

Learning objectives

- Permettre aux étudiants de découvrir d'autres domaines de savoir et de pratique.
- Approfondir des centres d'intérêt personnels ou professionnels.
- Développer des compétences transversales utiles dans tous les milieux (communication, travail en équipe, créativité, esprit critique...).
- Encourager l'ouverture internationale, la recherche ou l'engagement citoyen.
- Répondre à des sollicitations ministérielles sur la diversification et la transformation pédagogique.

Overall organisation

Les UE libres sont choisies dans le périmètre des formations accréditées par Paris-Saclay ou par l'établissement référent.

Type of assessment

Evaluation Terminale

Academic background

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	distance learning courses
Language (FLE/English)	1.5	Semestre 1		14					

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
■									

Language (FLE/English)

ECTS : 1.5

Semester: Semestre 1

Detail

Directed study: 14

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

En Anglais:

Niveau B1/B2 du CECRL : être capable de s'exprimer à l'oral et à l'écrit dans tous types de situations, comprendre tous types de documents sur une thématique donnée.

Programme/contents

En FLE

Contenu (français langue étrangère) :

- Se présenter
- Se repérer dans le temps
- Se déplacer et se repérer dans l'espace
- Parler de soi
- Parler de ses goûts
- Raconter un évènement

En Anglais :

Objectifs pédagogiques

Poursuivre et enrichir ses connaissances et compétences linguistiques en anglais dans les domaines étudiés autour des 4 activités langagières que sont la compréhension orale, la production orale, la compréhension écrite et l'expression écrite.

Une préparation au TEST TOEIC s'articulera autour d'un renforcement grammatical et d'un entraînement spécifique à la compréhension de l'anglais à l'oral et à l'écrit.

Contenu et plan :

2 thématiques dans le semestre :

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
Flight modelling and simulation	3	Semestre 1	12	10	8				

Flight modelling and simulation

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 8

Directed study: 10

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

Linear algebra, differential calculus

Programme/contents

Course Content Outline

1. Mathematical Tools

- Basic notions of Euclidean space, orthonormal bases, affine maps
- Rotations and Euclidean displacements
- Lie groups and Lie algebras ($SO(3)$, $D(E)$)
- Angular velocity and change of frames

2. Rigid Body Kinematics

- Configuration and motion of a rigid body
- Velocity field of a rigid body
- Acceleration field

3. Rigid Body Kinetics

- Mass distribution, center of inertia
- Inertia tensor and inertia matrix
- Kinetic moment (momentum) and kinetic energy

4. Rigid Body Dynamics

- Dynamic wrench
- Relation between kinetic and dynamic moments
- Dynamic principle and inertial frames

5. Dynamics of Flying Objects

- Structure of dynamic equations
- Natural forces (gravity, aerodynamics)
- Control forces and modeling strategies

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
Unmanned Aerial Systems	3	Semestre 1	12	10	8				

Unmanned Aerial Systems

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 8

Directed study: 10

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Keywords:

National Airspace, UAV, challenges

Description du contenu de l'enseignement

Abstract

This course presents current and emerging UAV (Unmanned Aerial Vehicles) systems and the implications and opportunities of UAV in the 21st century. Students will learn how today's UAV systems operate, the challenges facing them, and the markets in which they are and could be used. Finally, attendees will be introduced to the future of UAV systems, how they will differ in capability from those in service today and the emerging technologies that will enable these capabilities.

Course outline

- Current UAV systems
- Emerging UAV systems and opportunities
- Integration into the national airspace
- Challenges.

Overall organisation

The course is provided through lectures, tutorials, and practical sessions.

The practical sessions are graded. The final grade for the module is calculated as follows:

Session 1: Continuous assessment grade: 30% practical work + 70% exam.

Session 2 (retake): 30% of the practical work grade from Session 1 + 70% retake exam.

Bibliography

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
Advanced artificial perception	3	Semestre 1	12	10	8				

Advanced artificial perception

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 8

Directed study: 10

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

Signal and image processing

Programme/contents

Course description:

Perception is one of the key processes in autonomous systems. It is based on the integration of perceptual information into a coherent description of the world. Perception consists of collecting, processing, as well as combining data that provide from embedded sensors in order to perform a given task (obstacle detection, scene reconstruction, object recognition, etc.). The objective of the course is to focus on the two main current challenges in perception: vision and fusion. First, the course discusses various sensors and sensor technologies relevant to intelligent and autonomous systems, modern industries and smart product. Then, the course will particularly focus on high level vision algorithms that are based on stereovision or motion analysis. Finally, it discusses the concept and techniques of multi sensor fusion.

Course contents:

General concepts about perception for autonomous systems

Human versus artificial perception.

Perception + decision + action paradigm.

Sensor and sensing. Sensor characteristics and technologies.

The role of sensors and categorization.

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
Energy-Efficient Mission Coordination	3.5	Semestre 1	12	10	12				

Energy-Efficient Mission Coordination

ECTS : 3.5

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 12

Directed study: 10

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

UAV dynamics, classical automatic control,
Linear estimation algorithms, Graph theory.

Programme/contents

Keywords

Multi-UAV-Multi-Robot Coordination- Control
Architecture- Mission coordination planner- Multi-
agents distributed estimation and control
architectures- Ros interface

Course description

Nowadays, multi UAV/UGV operate in partially or completely unknown environments. To achieve this complex task, they must under operational constraints coordinate their control actions and their trajectories to avoid damaging collisions while achieving their goal tasks.

The purpose of this course is to provide students with a broad overview of the related modeling and control challenges involved in the coordination of multiple UAV/UGVs. The aim of this course is to introduce key concepts in cooperative flight control, mission planning, and autonomous decision-making to ensure safe and efficient operation of UAV/UGV teams in complex and unpredicted environments.

Course content

1. Multi-UAV/UGV Kinematic and dynamical modeling
2. Multi-UAV/UGV mission planner.
3. Decentralized architecture for multi-robot

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
Embedded software and IoT	3	Semestre 1	12	10	8				

Embedded software and IoT

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 8

Directed study: 10

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

Algorithmic- C,C++, Micro-processor and micro control architecture- Digital signal processing. Digital signal processing algorithms.

Programme/contents

Keywords

Software, embedded systems, avionics specification, UAV, software architecture, embedded control, Digital signal filtering and processing, Embedded sensor data fusing.

Course description

The purpose of this course is to introduce different software architectures and their applications in real-world scenarios. The course will highlight and focus on the presentation of the different embedded software architectures particularly those developed for avionics specifications and Unmanned Aerial Vehicles (UAVs). Students will explore in this course fundamental principles of software design, embedded control system integration, signals filtering, sensors fusing data's communication protocols, and real-time processing in aeronautical systems. The course emphasizes different aspects such as safety, reliability, and scalability in UAV software architectures. Case studies including simulation exercises, and practical projects will be also handled by the students.

Course Outline

1. Specifying functional requirements of application software.
2. Classical software architectures and

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
Sustainable Navigation Planning and optimization	3.5	Semestre 1	12	12	12				

Sustainable Navigation Planning and optimization

ECTS : 3.5

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 12

Directed study: 12

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

Programming, Discrete mathematics, math model, probability.

Programme/contents

Keyword:

Autonomous aircraft, obstacle avoidance, Flight plan

Abstract

A basic problem which has to be solved by Aerial autonomous vehicles is the problem of planning. By planning we mean the generation and execution of a plan to move from one location to another location in space to accomplish a desired task. There are four principal tasks: Path planning (Determining an optimal path for vehicle to go while meeting certain objectives and constraints), avoiding obstacles and collision, Trajectory Generation (Determining an optimal control maneuver to take to follow a given path or to go from one location to another) and Task Allocation and Scheduling (Determining the optimal distribution of tasks amongst a group of agents, with time and equipment constraints). Moreover, it is desirable that the plan makes optimal use of the available resources to achieve the goal optimizing some 'cost' measure: the time required for the execution of the trajectory, its length, the deviation from a reference trajectory, control effort. In this course, we will focus on deterministic and probabilistic planning approaches.

Course outline

- Path planning

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
Advanced Control of Smart Systems	3.5	Semestre 1	12	6	8				

Advanced Control of Smart Systems

ECTS : 3.5

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 8

Directed study: 6

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

Linear Control.

Programme/contents

keywords

optimal control, Lyapunov, Linear control, back-stepping, Robust control

Description of the course content

Abstract

This course covers nonlinear control design and analysis methods used on Unmanned Aerial Systems. It covers robust stability analysis, optimal control and non-linear control theory used to project state feedback into output feedback. This part forms baseline control algorithms that are augmented with adaptive control in the second part. Lyapunov stability theory is followed by an introduction to the design and analysis of adaptive control systems. Key design points are discussed and illustrated through simulation examples. This course ends with an overview of open problems and future research directions.

Course outline

- Flight modes and Linear control
- Robust control
- Optimal control
- Lyapunov approach
- Back-stepping
- Adaptive control
- Open problems.

Overall organisation

The course is provided through lectures, tutorials, and practical sessions.

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
AI and Smart systems	3	Semestre 1	12	10	8				



AI and Smart systems

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 8

Directed study: 10

Language(s) of instruction

Anglais

Remote teaching

non

Programme/contents

Keyword: AI, Neural networks, learning, Aeronautics field

Contents

Artificial intelligence has recently found many applications in aerospace and remote sensing. The objective of this course is to present artificial intelligence algorithms and the needs of aeronautics in this field. How can AI bring improvement in target detection, identification, recognition and tracking, including efficiency assessment?

Content Outline :

- Overview of aerospace field
- Introduction to Artificial Intelligence
- AI application in aerospace
- Introduction to neural networks
- Supervised and unsupervised learning
- Embedded AI in aircraft

Overall organisation

The course is provided through lectures, tutorials, and practical sessions.

The practical sessions are graded. The final grade for the module is calculated as follows:

Session 1: Continuous assessment grade: 30% practical work + 70% exam.

Subjects	ECTS	Semester	Lecture	directed study	practical class	Lecture/directed study	Lecture/practical class	directed study/practical class	d
Sensor Fusion for Navigation and Control	3	Semestre 1	12	10	8				

Sensor Fusion for Navigation and Control

ECTS : 3

Semester: Semestre 1

Detail

Lecture: 12

Practical study : 8

Directed study: 10

Language(s) of instruction

Anglais

Remote teaching

non

Prerequisites

Basic knowledge of linear algebra, mathematical statistics, and calculus is required. Knowledge of signals and systems, estimation theory, and electronics.

Programme/contents

Contents:

- Definition and Components of Sensor Fusion
- Identification of multisensor data fusion principles, algorithms, and architectures
- Description of the advantages of multisensor data fusion for object discrimination and state estimation
- Identification of the differences between linear and nonlinear models and their implications on sensor fusion,
- Sensors and Least Squares Criterion
- The Filtering Problem and Kalman Filtering
- Formulate sensor and data fusion approaches for many practical applications :Aerospace, automotive.

Learning objectives

The goal of this course is to provide a strong introduction to the topic with an emphasis on methods that are useful for developing practical solutions to sensor fusion problems. It describes sensor and data fusion methods that improve the probability of correct target detection, classification, and identification. Sensor fusion refers to computational methodology which aims at combining the measurements from multiple sensors such that they jointly give more information on the measured system than any of

Teaching Location(s)

EVRY

Contact

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MCF

- **Mélodie KAMALANDUA**

Gestionnaire de scolarité pédagogique

<http://www.universite-paris-saclay.fr/formation/master/electronique-energie-electrique-automatique/m2-smart-aerospace-and-autonomous-systems>