



## 2<sup>ND</sup> AND 3<sup>RD</sup> YEAR PROJECT-BASED SPECIALISATION

# SMART POSITIONING AND SUSTAINABLE MOBILITY

[SMARTLOC]

Positioning is used whenever an object or a person is mobile. This data is ubiquitous in professional and personal contexts, but it consumes a significant amount of energy with data transfers via the Internet, terrestrial infrastructure, etc.

The objectives of the Smart Positioning and Sustainable Mobility project specialisation-based option are to:

- > create several Android applications according to usage from an existing application, incorporating and managing precise and autonomous positioning calculations directly from satellite data.
- > Produce codes and documents to familiarise a European audience with the science of geopositioning mechanisms



## COURSE CONTENTS

### Courses

- > Management and project management
- > Quality Design Modelling
- > Scrum Master Training
- > Object programming
- > Statistical data modelling
- > Positioning Methods
- > Mobile Application Development

### Project

- > Scoping, definition of application scope
- > Solution design
- > Mock-up, deliverables, promotion





## PROJECT PHASES

### 1. Courses to develop knowledge and skills

- > Project management and SCRUM method
- > Quality, Design, Modeling
- > Object programming and Android
- > Statistical data modelling
- > Understanding of satellite positioning methods
- > Deliverable for science outreach at European level
- > Sustainable mobility application project (scoping, design, development, qualification, training, deployment, exploitation)

### 2. Understanding of satellite positioning methods and science outreach

- > Work on the basis of the open source application GeolocPVT
- > Communication on the application, how it works and its use (production of a science outreach document)
- > Participation in an open science project
- > Capture and analysis of one's own tracks
- > Highlighting the societal issues inherent in geopositioning

### 3. Application development

- > Definition of the scope of the application
- > Define new functionalities and complete the existing application
- > Specifications (general and detailed)
- > Development (design, development, qualification, production, operation)

### 4. Promotion and dissemination

- > Dissemination and outreach materials
- > Presentation of the work to the European Commission (GNSS Raw Measurements Task Force in Prague)

## CONTEXT

With the launch of the European GNSS (Global Navigation Satellite System) constellation GALILEO, and the availability of raw satellite data on Android, EUSPA (the European Union Agency for the Space Programme) has led a working group since 2017 on the development of precise positioning on Android smartphones: "Raw GNSS measurements Task Force".

The project is part of this working group and is based on the open source application GeolocPVT developed by the GEOLOC laboratory at Gustave Eiffel University, partner of the project specialisation.

Each year, the working group meets in May in Prague, and the specialisation's students will be invited to participate.

## SKILLS DEVELOPED

- > Project engineering
- > Agile development: Scrum
- > Android programming
- > GNSS signal exploitation
- > Data qualification
- > Positioning algorithms
- > Science outreach
- > Teamwork
- > Time series processing using AI algorithms

## TEACHING STAFF

### HEAD OF SPECIALISATION:

Myriam Servières

### LECTURERS:

Valérie Renaudin, Céline Ragoin, Ni Zhu, Miguel Ortiz Vincent Tourre, Thomas Lechevallier, Éric Le Carpentier, Jean-Marie Normand,

### CONTACT:

myriam.servieres@ec-nantes.fr



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