# Electromagnetic diffraction analysis / Radar equipment

Component
École Nationale Supérieure d'Électrotechnique d'Électronique d'Informatique d'Hydraulique et des Télécommunications

## In brief

- **Ametys Code:** M34HOPD9
- **Open to exchange students:** Yes

# Presentation

## Objectives

Know how to calculate and physically interpret the electromagnetic field backscattered by an antenna – Understand the modes of electromagnetic propagation of antennas and structures – Understand the main techniques and technologies for electromagnetic stealth and deception

Know how to determine the electronic architecture of a radar to detect information about a radar target. Also know how to qualify the radar target. Know how to perform the necessary tests to qualify the radar or the target alone.

## Description

The electromagnetic field backscattered by any antenna will be analyzed using the antenna radiation pattern, then the electromagnetic backscatter of an antenna loaded with any impedance to arrive at the concept of the radar cross section of any antenna. The electromagnetic radiation pattern of antennas and structures will also be presented.

Several applications will be discussed: stealth and electromagnetic masking; electromagnetic deception. RFID tags will be discussed, as well as passive and wireless sensors. Perspectives in the field of electromagnetic diffraction analysis will be presented.

Once the object has been characterized. The operating principle of a radar is presented, as well as the electronic architectures used to characterize parameters such as distance, speed, or the Radar Equivalent Surface Area of the object in question. The principle of a radar target emulator is also discussed.

## Pre-requisites

The Electromagnetic Radiation and Antennas and Physical Analysis of Guiding Structures courses from Semester 8 of 2A.