Space antennas

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **Ametys Code:** N9EE13C
- **Open to exchange students:** Yes

Presentation

Objectives

At the end of this course, students will have:

· Knowledge of the principle of reflector antennas and reflector technology.

· Knowledge of a wide variety of horn antennas (ridged, multi-mode, corrugated, etc.).

· Knowledge of multi-beam coverage, its benefits, and how it works.

· Knowledge of active antennas.

· Knowledge of beamforming networks.

An overview of in-flight antenna solutions is presented for different types of applications (LEO, GEO, telemetry and remote control, GNSS, etc.).

The objective is to pre-dimension a reflector antenna for a telecommunications satellite, highlighting the key design parameters.

The goal is to create a directional antenna operating in circular single polarization with a small footprint in the horizontal plane. Axial radiation ("end-fire") helical antennas are excellent candidates for meeting this need. To design the helical antenna, we will rely on:

• A parametric model of a single-wire helix in HFSS (Monofilar_Helix_Antenna.aedt)

• A chart describing the radiation modes (radial, axial, conical, etc.) of the helix as a function of geometric characteristics (normalized to wavelength):

o Circumference C

o Pitch S

Description

This course presents different antennas used in the space sector.

Pre-requisites

Electromagnetic radiation

Antenna networking