Payload Sizing

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

In brief

- **Ametys Code:** M34HL9QI
- **Open to exchange students:** Yes

Presentation

Objectives

- Design a satellite architecture to meet mission requirements. Illustration using a case study from a Thales Alenia Space mission.
- Understand requirements in terms of data throughput, modulation schemes, information encoding, frequency band and frequency transposition.
- Describe the various satellite equipment and their functional constraints.
- Establish the various ground-to-space link budgets within the satellite: NF, power, C/I, C/I3.
- Design ground and on-board antenna requirements (concept of PIRE). Presentation of the various satellite antenna topologies.

Description

Lecture (M.F. Foulon – Thales Alenia Space): Description of the METOP 5G mission and sizing of the satellite system architecture based on satellite requirements analysis.

BE sizing:

· Extract the linearity characteristics of equipment (TWTA) from measured data (IP3, C/I, Psat, OBO, IBO, PAE, AM/AM characteristics, AM/PM characteristics, consumption, dissipation).

- Establish a non-linear equipment simulation model based on the extracted data.
- Understand the effects of noise and non-linearities on system performance.
- Design a frequency conversion chain architecture according to two distinct operating modes: FGM (Fixed Gain Mode) and ALC (Automatic Level Control)

Pre-requisites

N7EE06A - Active RF Circuits

N7EE06C – Advanced Design System Practical Work