



ICARO Project

NPC SPACEMIND's challenge

Technical card

Entity providing the challenge: NPC SPACEMIND

Contact point: EUROAVIA Forli-Bologna Local Board + Chiara Lughì

Title of the challenge: SPACE MISSION ANALYSIS

Background

The background against which the challenge of this Hackathon is set is one that characterizes everyday company operations. Indeed, consider the scenario for which the company receives a request for the design of a complete satellite platform, starting with a customer-provided Payload.

Challenge description

The challenge is to conduct a preliminary mission analysis, starting with orbital data and payload characteristics, in order to obtain all the data needed to perform the above mentioned design.

Consider the following orbit data:

- SSO orbit
- Altitude: 500 Km
- RAAN: 0°
- W: 0°
- θ : 0°

Consider the following payload data:

- Earth Observation Payload
- Payload dimension: 4U
- 80W peak power consumption
- Payload data: 50 to 100 MB

Objectives

The team should submit:

- Detailed list of subsystems to be included as part of the satellite platform, with description of main characteristics (eg: body mounted/deployable solar panels, S-Band/X-Band antenna...)
- Definition of orbital characteristics in terms of orbital period, eclipse time, sunlight time
- Preliminary power budget
- Definition of the ground station with which to exchange payload data, if possible implement a preliminary link budget

Skills required to face the challenge

Useful skills for the submitted challenge are:

- Good knowledge of the nanosatellite sector, especially CubeSats
- Good understanding of orbital mechanics
- Propensity for teamwork and organization of work by task
- Good skills in researching scientific material

Useful informations

Useful links are:

- <https://www.cubesat.org/cubesatinfo>
- https://www.nasa.gov/wp-content/uploads/2017/03/nasa_csli_cubesat_101_508.pdf
- NASA CubeSat HandBook
- Space Mission Analysis and Design, Authors: J.R. Wertz , Wiley J. Larson