

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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“FLY YOUR SATELLITE!”: APPROACH AND LESSONS LEARNED

Abstract

This paper describes the approach and the lessons learned from the first phases of the “Fly Your Satellite!” CubeSat programme (FYS) carried out by ESA’s Education Office.

Within the FYS framework, the ESA Education Office supports university teams to conduct the verification campaign of their CubeSat, introducing them to the verification methodology used in space programmes (tailored for university student projects). Support for the launch opportunity will be offered only to CubeSats which demonstrate their flight worthiness based on the review of their design, testing, and in general of their verification documentation.

The FYS programme has primarily educational objectives, offering the possibility to students’ teams to have their work supervised by ESA specialists (thus facilitating knowledge transfer from experienced professionals to students), and it also allows CubeSat teams to access state of the art test facilities for the vibrations and thermal vacuum environmental tests. It is hoped all this will be beneficial to help improving the chances of mission success of the participating CubeSats.

FYS is structured in 4 phases, which start from the FM integration, and go up to the mission operations. The participating teams are requested to provide to ESA their CubeSat design and testing documentation, for review by ESA specialists, and must comply with the international regulations applicable to spacecraft registration and space debris mitigation.

The first two phases of “Fly Your Satellite!” focus on the review of the design, and on the preparation and conduct of the functional and environmental test campaigns, in both laboratory and space representative conditions (vibrations and thermal vacuum).

Throughout the first two phases of the programme, a number of issues have been identified in many aspects of the CubeSat projects: project management, technical design (especially related to the testing campaigns) and compliance with international regulations. The experience gained during FYS Phases 1 and 2 enables the authors to indicate several lessons learned that are presented in this paper, with the aim of helping student/university teams which are considering to engage in small-satellite development projects. In particular it is aimed at those teams that are willing to develop their spacecraft taking into account aspects of “good engineering practice”, with the intention to include in the development, a suitable verification campaign of the project requirements.