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FUNCUBE, A LOW-COST SYSTEM TO TEACH ABOUT INTEGRATION AND TESTING PHASE

Abstract

Integration and Testing is one of complicated phases in Satellite Development, mainly based on experience, which cannot be earned easily and cheap. This will be in more concern in space emerging countries with limited budgets. Designing a hands-on to educate such an important phase would be a noteworthy subject. This paper is about Funcube, a cubesat model for self-training system with a user manual to set it up. Funcube provides cubesat subsystems in the simplest possible way, with use of typical COTS and not satisfying requirements to operate in orbit but to prepare a functional system with its interfaces, and the important note, to be Fun, not boring. So, using 3D printed elements with some electronics inside, forms a cubesat with Imaging mission that the trainees should assemble the elements, integrate the subsystems and form the 1U cubesat. The process shall be done both in hardware and software level and in order to train and avoid wrong integration there are two types of provisions. The first in hardware that presents unique attachment for each element and the next in software that guided through a pre-defined version of onboard software with a developed customized UI to help trainees change in the software but in a defined bunch of commands and actions. Funcube uses buzzers and LEDs, not usual in space systems, but used for more educational points and to make it more attractive. Funcube covers the educational requirements, derived by a team of educators with some years of experience in cubesat projects and organizing cubesat workshops and it is based on cubesat standards, owning its complete and helpful user manual, so it can be a very good hands-on for similar applications as easily and effective as possible. This capability enables Funcube to be used wide range and not only for education, but also for its fun to all.