

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)

Ignition - Primary Space Education (1)

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DEVELOPMENT OF THE CANSAT LAUNCHER FOR THE EUROPEAN CANSAT MARKET

Abstract

Developing and launching CanSats has seen a growing interest in Europe during the last five years. The concept of a CanSat project, employed earlier in Japan and the US, is to let a team of (high school) students develop a satellite-like system in the size of a soda can and launch it to a predefined altitude, after which it carries out its mission during its descent back to the atmosphere. A large variety of missions have been completed in the past, from measuring physical properties of the atmosphere to returning autonomously to the launch spot. The purpose of the CanSat project is to increase the interest of students for technical studies, and to educate them in the field of scientific research. Launching these CanSats can be done with various platforms: atmospheric balloons, light aircraft, UAV's or rockets have been used in the past. Of all these, the launch with rockets provides the best similarity with a real satellite launch. Next to that, the entertainment value for the CanSat teams is highest with this launch method, since the can experience a real rocket launch. To enable the launch of CanSats in a controlled, reliable and consistent way, the company T-Minus Engineering developed a dedicated launch vehicle: the T-Minus CanSat Launcher. The most important features of this vehicle are:

- Deployment of up to six CanSats at every launch.
- Non-pyrotechnic deployment system, to minimize the deployment loads on the CanSats and increase safety for the participants.
- Deployment altitude 1000 m above ground level.
- Operable in a safe, easy and quick manner, enabling a high number of launches per day.

Several high-tech technologies are used to accomplish this, including the use of composite materials and the implementation of a novel, non-pyrotechnic CanSat release system. An in-house developed and produced solid rocket motor provides the propulsive means to reach the target altitude. This motor uses a glass fiber composite casing, which is lightweight and cheap to manufacture. The propellant of this motor is produced in-house in order to enable good quality control. Since the rocket has the means of recovery by parachute, the rocket is fully reusable, thereby lowering its operational costs dramatically. The CanSat rocket was used by the ESA European CanSat competition 2013 and in the Belgian RIB campaign, launched in the Netherlands. This model and the modifications for the future 2015 model are within the paper.