

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
On Track - Undergraduate Space Education (3)

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REPLICABLE STUDENT ROCKET PROGRAM MODEL FOR UNIVERSITIES IN DEVELOPING COUNTRIES, THE CASE OF THE COSTA RICA INSTITUTE OF TECHNOLOGY.

Abstract

The advancement of rocket science and technology has generally been restricted to military efforts, big space agencies and, in broad terms, developed nations. In recent years, there has been a shift in the tendencies in which student groups have started to get involved in rocketry, mostly model rocketry. At the Costa Rica Institute of Technology, this program was started as a way to show that universities in developing countries can also invest on the development of their own rocket programs. The rocketry program is currently run as a cooperation of students and professors, its goal transcends the idea of an educational and demonstration tool, aspires to be the program that allows Costa Rica to have the capability of eventually placing cargo into LEO. The rocket program in the Costa Rica Institute of Technology is part of the next advancement phase in space systems since placing the first Central American satellite “Batsú CS-1”.

The objective of this paper is to communicate the detailed plan developed for a rocket program at a college of engineering in Costa Rica (Costa Rica Institute of Technology), it is presented as a

replicable model for other nations with similar characteristics. It includes all the failures, lessons learned, infrastructure, fund raising , and capabilities developed, as well as a recommended guide for establishing a healthy, functional, student run rocket program, which eventually accomplishes the goal previously mentioned.

The plan looks in detail at the process of developing a fleet of small solid rockets as an initial phase, for which all the infrastructure needs to be developed, namely, a static firing test bed, the launch pad, the technical capabilities and soft skills on the student workforce. Once this phase is completed, the program looks to expand its horizons and start delving into hybrid and liquid propulsion technologies, active control systems such as thrust vector control and moving aerodynamic features for stable atmospheric flights, long range telemetry navigation to enable larger missions and a launch site that enables repeated flights. As its core the program has a student training structure that will ensure long term success. In the hopes that this will prove to be an effective and replicable method for other academic entities in developing countries to kickstart their own space related endeavors.