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MODELING OF LAUNCH AND SPACE VEHICLES USING 3D PRINT WITH AN EDUCATIONAL APPROACH.

Abstract

Today, in Mexico, there are many students and teachers from universities, young professionals, and enthusiastic people interested in designing and building aerospace vehicles (ASV.), like rockets, launch vehicles (LV) and space vehicles (SV). like nanosatellites, for learning. So much so, that there are already national courses and contests focused on their launching. These activities support the increasing of aerospace knowledge in the educational sector.

In turn, this represents a great opportunity for us, both as young professionals and entrepreneurs in aerospace engineering to apply our knowledges and experience in the modeling of rockets and nanosatellites like CubeSats. All of this through developing workshops using 3D printers that we operate in our enterprise called Hadron Projects. These workshops are focused to students, teachers, professionals interested in making ASV.

Therefore, there are innovate ways for development ASV. One of these ways is by the knowledge of additive manufacturing (AM)., using a 3D printer as a tool. due to the conventional manufacturing (CM) of ASV models are more complexity and expensive. Since, it is very difficult to get some components or tools required to manufacture by CM. Besides, there are components that are needed to buy and bring from other country. So, using AM can support to obtain faster and cheaper.

3D printing technology is a powerful tool for learning AM that involves students and teachers of engineering, enthusiastic people, etc., to know how create a ASV in a simple, fast and innovate way. Besides, how works a mechanism or how to solve design problems related with aerospace applications by the using of a 3D printer machine.

Hence, the specific goals of the Hadron Projects' workshops are to create a 3D printed ASV, (for example a CubeSat nanosatellite structure) that fulfill with the main requirement as a model static; and, to have a model with moveable and separable parts that can be watched it in good details. So, in this paper we want to share the learning, experience and results obtained from the workshops of modeling of LV and SV by 3D printer that we have taught.

Our general purposes as teachers of these workshops are communicate and spread the knowledge about the importance of space research and exploration in a more didactic and above all understandable to inspire students and enthusiastic people to create their own ASV.