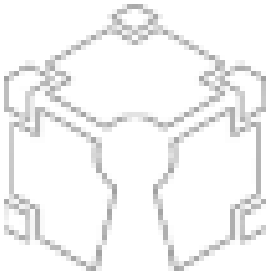

Contribution ID: **33** Type: **Poster**

Novel Design of the Functional Structure of an 8U CubeSat to be 3D printed in thermoplastic

Additive manufacturing is changing the way of designing structural parts. It offers the following benefits: design for need instead of design for manufacture paradigm, fast prototyping, reduced environmental impact, process optimization, mass reduction and applicability to new materials, among others.
In the space sector mass reduction is a major challenge. Structural components require the use of materials which have to resist very demanding conditions during launch and during operation in orbit. In addition, those materials shall have reduced mass in order to reduce launch costs. The introduction of new materials such as termoplastics with high resistance and low density can dramatically reduce the total mass of a spacecraft by fulfilling the requirements provided by launching authorities and by guaranteeing operability in the space environment.
In this work, a novel design of an 8U Cubesat structure is proposed to incorporate the benefits of additive manufacturing in thermoplastic polyetherimide (PEI) with the objective of qualifying it to be used in Low Earth Orbit. The design incorporates the lessons learned from the mechanical qualification tests and analysis of a previous structure in PEI proposed by the research team.
This study is being part of the H2020 European Project ReDSHIFT (Project ID 687500).

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Session Classification: Posters and Demos

Track Classification: CubeSat Subsystems