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ArgoMoon: design and development of a reliable and flexible SmallSat for deep space

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Abstract

Microsatellites represent a promising and affordable element to complement traditional probes missions for in space exploration, due to their small volumes and high capabilities. ArgoMoon is an innovative microsatellite designed for deep space missions by the Italian company Argotec, under the coordination of the Italian Space Agency. ArgoMoon will be launched in June 2020, during the maiden flight of the NASA Space Launch System (SLS) named Exploration Mission 1 EM1, and will be injected in a high elliptic – high apogee geocentric orbit. ArgoMoon will be the first microsatellite to be released by Interim Cryogenic Propulsion Stage (ICPS) and will be eye witnessing the last phase of the launcher mission. In fact, the main goal of ArgoMoon is the collection of significant pictures of the SLS secondary propulsion stage and the other piggy-back microsatellite that will be released from it. In order to achieve the mission objectives, ArgoMoon will perform proximity flight around the launcher stage by means of autonomous imaging and tracking subsystems, thus allowing the CubeSat to remain close to the target so that high resolution pictures can be captured, also with outreach purposes. After this first phase, orbital manoeuvres will move the satellite in a geocentric highly elliptic orbit, whose apogee is high enough to allow flybys and imaging of the Moon and of the surrounding environment. This second part of the mission will last up to the natural decay of the satellite, with an expected duration of six months. ArgoMoon mission will allow to test the platform in a severe environment and towards demanding performances like propulsive manoeuvres and long distance communications. The mission conditions led the choice of the design methodologies, which were driven by the freshest patterns and technologies accessible in the business space organizations, as well as by new strategies concentrated on lean structures and task improvement. While COTS parts were implemented in the design, some key frameworks were produced or customised by Argotec mutually with its suppliers, in order to expand their performances and reliability. The general outcome is a wide development in experience and legacy on miniaturized space equipment which will represent a milestone and a rule for the fate of space exploration dependent on small satellite platforms.

Introduction

1.1 Sub-section

2. An additional section

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Acknowledgements

References