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Small Spacecraft for Deep-Space Exploration (8)

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ARGOMOON: A NANO-EYEWITNESS FOR SPACE EXPLORATION

Abstract

ArgoMoon is a nanosatellite for deep space exploration and it will be designed and built by Argotec. The project is coordinated by the Italian Space Agency. ArgoMoon has been selected by NASA as the only European payload for the upcoming Exploration Mission 1 (EM-1). During the EM-1 mission, not only Orion will be released: the Space Launch System (SLS) second stage will carry 13 CubeSats as secondary payloads. Obtaining pictures of the releasing stage and of deployed payloads can provide operational information to further refine or validate mission operations concepts and hardware operability. Moreover, a visual record of the flight can prove to be as captivating and awe inspiring as the first pictures taken from the surface of the Moon. Indeed, a photo of ICPS with the Moon or with the Earth in the background, occupying much of the camera's field of view, would provide us with historically significant photography, making the missions public outreach impressive. The utilization of nanosatellites for public outreach is a crucial step towards unmanned low-cost missions. This can be of particular interest, especially considering

for example one of the last Space Shuttle missions (STS-134), which was photographed from a Soyuz and generated the first photographs of the Space Shuttle docked to the ISS. This was a manned mission that required both crew time and effort. The nanosats can provide the same inspiring photographs without the use of crew.

Furthermore, EM-1 will be the first occasion for CubeSats to operate in deep space. Size constraints will require miniaturization. Environmental conditions will require high quality components and will force the designers to implement solutions that prevent radiation damage. Argotec is attempting to push the boundaries by extending the lifetime of the ArgoMoon CubeSat an order of magnitude from months to years.

EM-1 represents a unique opportunity for technological research. Argotec looks at ArgoMoon as the perfect test bench for new concepts in the field of space structures and communications. Benefits from the EM-1 mission affect the entire space community: while exploring deep space, nanosatellites will serve the Orion program which is anticipated to take humans to asteroids, Mars, and beyond.