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VALIDATION OF THE LUNAR MISSION COLMENA-1 IN DEEP SPACE

**Abstract**

On January 8th 2024 the Peregrine lander, built and operated by Astrobotic, was launched onboard the Vulcan-Centaur rocket from ULA. Integrated on the lander was the Mexican payload Colmena-1. With a total mass of 608 grams, the payload comprised 5 deployable micro-rovers and a stationary system for telecommunications, data processing, rover containment during flight, and a catapult for deployment. Colmena-1 was the first of at least 3 lunar missions of the Colmena project, which has as objective the development of swarm micro-robotics for lunar and asteroidal operation in prospection and mining. Unfortunately, due to a problem with a valve on the Peregrine, an oxidizer tank developed a leak that made a Moon landing impossible. Nevertheless, the Peregrine was already on course to the Lunar orbit and Colmena operation team took advantage of the fact to validate up to 75% of the technological objectives of the in deep space at 400 thousand km from Earth. The project Colmena as whole, and the first mission Colmena-1, as well as the lessons learnt from its certification, launch and operation will be shown, stressing the impact of the latter on the development of the next mission of the series, Colmena-2, currently planned for 2027.