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Abstract

The O/OREOS (Organism/Organic Exposure to Orbital Stresses) nanosatellite is the first science demonstration spacecraft and flight mission of the NASA Astrobiology Small-Payloads Program (ASP). On November 19, 2010, O/OREOS was launched successfully to a high-inclination (72), 650-km Earth orbit aboard a US Air Force Minotaur IV rocket from Kodiak, Alaska. The free-flying satellite, with a nominal operational lifetime of six months, is a new exposure facility in low-Earth orbit (LEO) whose primary objective is to collect in-situ, real-time measurements of the survival, stability, and evolution of organic and biological materials in space environments. One of two O/OREOS science payloads, the Space Environment Survivability of Living Organisms (SELSO) experiment, focuses on the effects of the space environment on two different microorganisms. The second payload, the Space Environment Viability of Organics (SEVO) experiment, monitors the stability of important organic molecules and biomarkers. O/OREOS was built on a heritage of previous successful cubesat missions, such as GeneSat and PharmaSat, and benefited from other experiments flown in LEO and exposure facilities on the International Space Station (ISS). The science and technology rationale of O/OREOS is to support NASA's scientific exploration program by investigating the local space environment as well as space biology relevant to Moon and Mars missions. It also serves as a precursor for experiments on future free-flying small satellites, the ISS, and lunar surface exposure facilities. Ham radio operators from 20 nations have supported the O/OREOS mission operations team at Santa Clara University by collecting and forwarding data from the satellite's radio beacon. We will report on the flight assembly, payload integration, and the successful operational phase of the O/OREOS mission.

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