

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Small Space Science Missions (2)

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THE O/OREOS SAT MISSION: NEW SCIENCE AND TECHNOLOGIES FOR AUTONOMOUS
SMALL SATELLITE PAYLOADS

Abstract

The overall goal of the O/OREOS Sat mission is to develop and demonstrate autonomous, in-situ biological organism and organic specimen exposure-and-detection technologies aboard free-flying nanosatellites. The O/OREOS Sat mission is scheduled to launch in February 2010 from Kodiak, Alaska on a Minotaur IV rocket. Success criteria for this mission are to (1) demonstrate the opportunities available for small satellites in astrobiology/chemical science research programs, (2) measure the degradation of (bio)organic molecules in a variety of astrobologically relevant space environments, (3) demonstrate the capability to simulate a variety of space environments using small satellites, and (4) develop a robust and capable new small-sat in-situ measurement technology: UV-visible spectroscopy using the sun as light source. We will highlight the overall architecture and integration of fluidic, optical, sensor, thermal, and electronic technologies and subsystems to support and monitor the growth of microorganisms in

small autonomous space satellites, including tracking of their growth and metabolic activity. We will also summarize development of an integrated “single-cube” UV/visible/near-IR spectroscopy system for the in-situ study of the effects of the space environment on astrobiologically relevant materials. The science and technology represented by this mission constitutes a rapidly growing toolbox of miniaturized instrumentation now enabling a new generation of comparatively low-cost in-situ space biological and chemical experiments.

We acknowledge the contributions of the O/OREOS-Sat Engineering Team: Elwood Agasid, Chris Beasley, Nathan Bramall, Julie Chittenden, Greg Defouw, Charlie Friedericks, David Landis, Matthew Piccini, Bob Ricks et al.