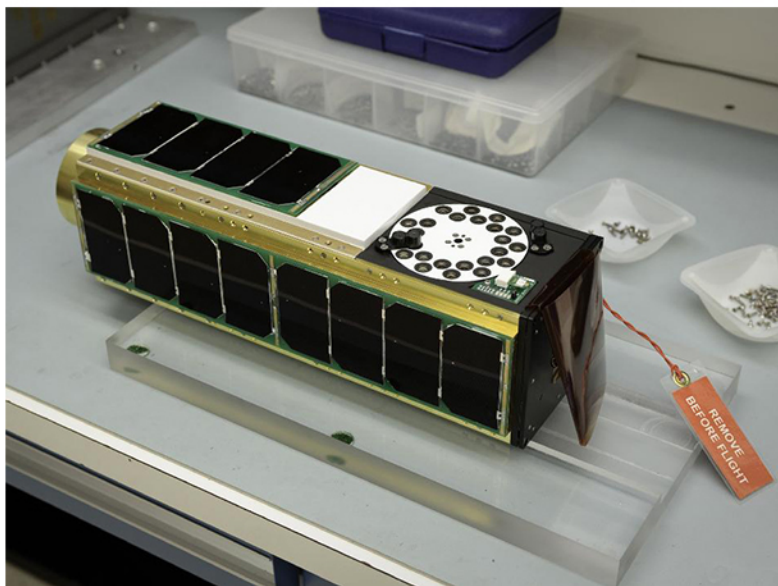


OOREOS Spacecraft



The O/OREOS (Organism/Organic Exposure to Orbital Stresses) is an automated CubeSat nanosatellite laboratory approximately the size of a loaf of bread that contains two separate astrobiology experiments onboard. Developed by the Small Spacecraft Division at NASA Ames Research Center, the spacecraft was successfully launched as a secondary payload on STP-S26 led by the Space Test Program of the United States Air Force on a Minotaur IV rocket from Kodiak Island, Alaska on November 19, 2010.

The O/OREOS satellite is NASA's first cubesat to demonstrate the capability to have two distinct, completely independent science experiments on an autonomous satellite. One experiment will test how microorganisms survive and adapt to the stresses of space; the other will monitor the stability of organic molecules in space.

The overall goal of the O/OREOS mission is to demonstrate the capability to do low-cost science experiments on autonomous nanosatellites in space in support of the 'Astrobiology Small Payloads' program under the Planetary Science Division of the Science Mission Directorate at NASA's Headquarters.

NASA's Ames Small Spacecraft Division manages the O/OREOS mission while all operations will be conducted by staff and students from the Robotic Systems Laboratory at Santa Clara University. Scientists will apply the knowledge they gain while investigating the space environment and studying how exposure to space changes organisms to help to answer astrobiology's fundamental questions on the origin, evolution, and distribution of life.

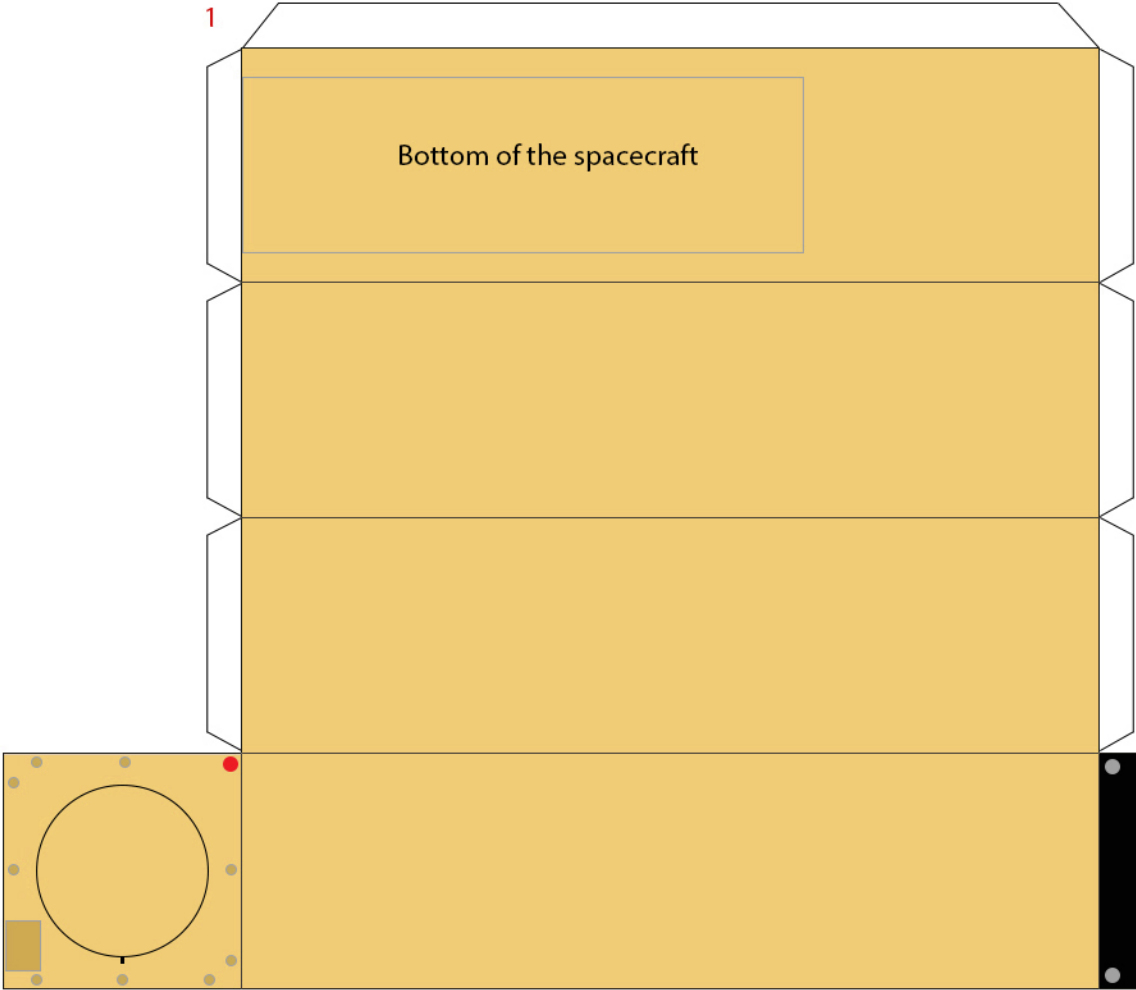
The technology developed in this mission enables a new generation of light-weight, low-cost payloads suitable for future secondary payload opportunities —"piggyback rides"— to the Moon, Mars, and beyond, where they can address evolutionary questions, identify human exploration risks, and study planetary protection concerns.

Continuing Ames' development of triple-cube nanosatellite technology and flight systems, which includes the successful GeneSat-1 and PharmaSat missions, O/OREOS is constructed from off-the-shelf commercial and NASA-designed parts to create a fully self-contained, automated, stable, light-weight space science laboratory with innovative environment and power-control techniques. The spacecraft is equipped with sensors to monitor the levels of internal pressure, temperature, humidity, radiation and acceleration while its communications system regularly transmits data back to Earth for scientific analysis.

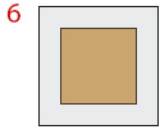
The organics payload will house 24 samples in four separate micro-environments to mimic space, lunar, Martian and "wet" planetary conditions. The samples are housed in a rotating carousel and are imaged regularly with UV/VIS spectroscopic instrumentation while being exposed to the space environment. The biological payload is a self-contained pressure vessel which provides life support (air pressure, humidity, growth media, and temperature control) for organisms as they are exposed to the radiation and weightless conditions in space for six months.

In addition to the experiments, the satellite is equipped with a passive magnetic attitude control system, solar panels to generate electric power, a UHF amateur band radiobeacon which broadcasts real-time telemetry, battery packs, and NASA's first propellant-less mechanism to ensure that once O/OREOS has completed its mission it will de-orbit and burn up as it re-enters Earth's atmosphere. Dimensions: around 10cm X 10cm X 34cm.

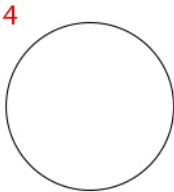
OOREOS Spacecraft



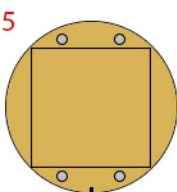
This end goes towards the front of the spacecraft.



Glue to another layer of cardstock.



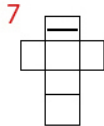
Fits inside the ring, glue to cardstock.



Outside



Glue to cardstock, color edges black



Glue to two layers of cardstock.

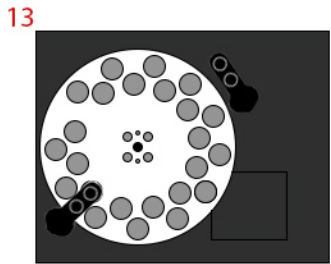
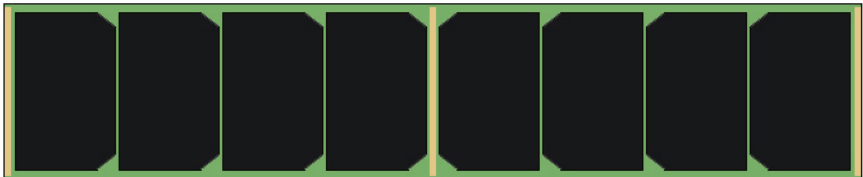
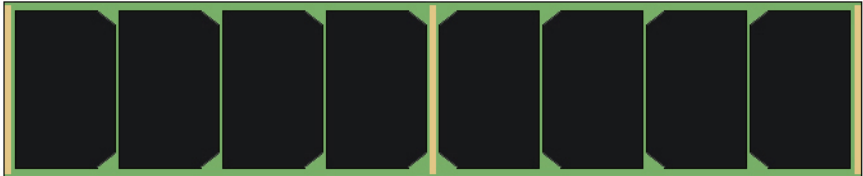
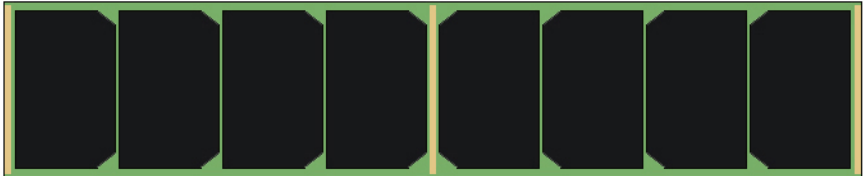


Fold in half and glue together



Fold in half, glue over the part above.

10 Glue all these to two layers of cardstock



Color edges black

Color edges black



Roll tight



Optional detail parts
Color edges black

