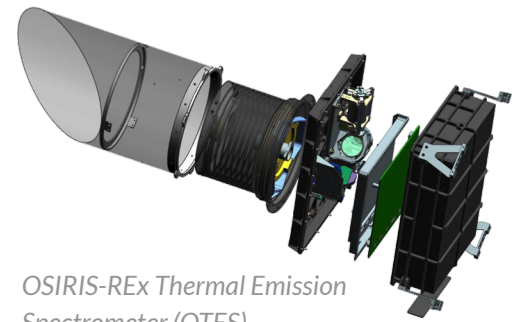


CHALLENGE

NASA's OSIRIS-REx mission will send a spacecraft in September 2016 to the asteroid Bennu in order to extract a sample and bring it back to earth. Bennu is a carbon-rich asteroid that records the earliest history of our Solar System, and by studying a piece of it we could discover the origin of life. Bennu also has a relatively high probability of impacting the Earth late in the 22nd century. OSIRIS-REx will determine Bennu's physical and chemical properties which will be critical for future scientists to know when developing an impact mitigation mission.

To meet mission objectives OSIRIS-REx will have a payload of scientific, navigation, and communication instruments on board. One of which is the OSIRIS-REx Thermal Emission Spectrometer (OTES). Thermal data from OTES will allow scientists to determine the mineral composition and temperature distribution of Bennu for global maps and local candidate sample-site areas. OTES is being developed and built at the School of Earth and Space Exploration at Arizona State University (ASU).



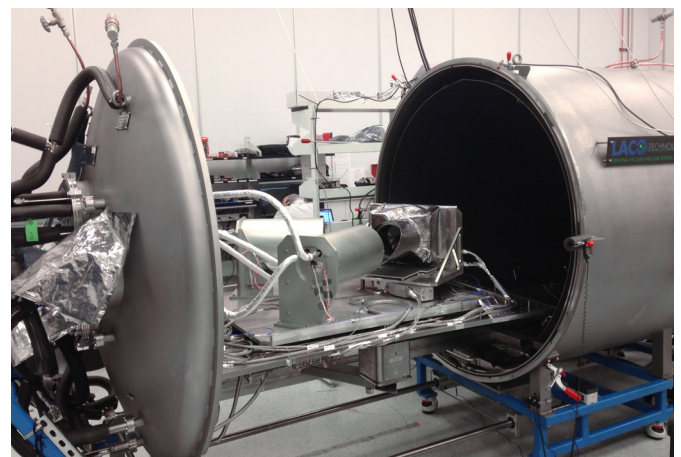
OSIRIS-REx Thermal Emission Spectrometer (OTES)

NASA's rules for testing flight instruments and other space hardware are detailed and thorough. Therefore, ASU's testing will include placing OTES in a LACO Thermal Vacuum Chamber where it will be subjected to the same conditions it will experience during the mission.

SOLUTION

The space simulation chamber which LACO Technologies built for ASU is 60" (152.4 cm) in diameter and 96" (243.8 cm) deep. It includes a vibration isolated platen with drilled and tapped holes for instrument mounting. The chamber also comes with full internal shrouds which are cooled with liquid Nitrogen.

The system includes a cryogenic vacuum pump for high vacuum and a complete control system for automatic and manual operation. It is designed to replicate the environment that the spacecraft will experience in space with pressures as low as 5×10^{-7} Torr and temperatures as low as -192°C , depending on how much LN2 is run through the shrouds.



LACO's large 60" x 96" (152.4 x 243.8 cm) chamber with floating platen, and high emissivity shrouds filled with LN2 to obtain the temperatures experienced by the spacecraft