



OSIRIS-REX

ASTEROID SAMPLE RETURN MISSION

Origins, Spectral Interpretation, Resource Identification, Security – Regolith Explorer

OSIRIS-REx is an acronym that incorporates the mission's major concepts and goals.

O – Origins

Return and analyze a sample of a pristine carbon-rich asteroid to study the nature, history, and distribution of its minerals and organic material.

SI – Spectral Interpretation

Define the global properties of a primitive carbon-rich asteroid to allow for direct comparison with existing ground-based telescopic data for all asteroids.

RI – Resource Identification

Map the global properties, chemistry, and mineralogy of a primitive carbon-rich asteroid to define its geologic and dynamic history and provide context for the returned sample.

S – Security

Measure the Yarkovsky effect* on a potentially hazardous asteroid and learn which asteroid properties contribute to this effect.

*a force caused by the emission of heat from a rotating asteroid that can change its orbit over time

REx – Regolith Explorer

Document the texture, morphology, geochemistry, and spectral properties of the regolith (surface material) at the sampling site.





OSIRIS-REx

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Lockheed Martin built the OSIRIS-REx spacecraft, including its asteroid sampling system and sample return capsule. The science instruments were provided by the following institutions:

OSIRIS-REx Camera Suite

– *University of Arizona*

OSIRIS-REx Laser Altimeter

– *Canadian Space Agency*

OSIRIS-REx Thermal Emission Spectrometer

– *Arizona State University*

OSIRIS-REx Visible and Infrared Spectrometer

– *NASA's Goddard Space Flight Center*

Regolith X-ray Imaging Spectrometer

– *MIT/Harvard College*

Spacecraft Specifications:

Length: 20.25 ft (6.2 m) with solar panels deployed

Width: 8 ft (2.4 m) x 8 ft (2.4 m)

Height: 10.33 ft (3.2 m)

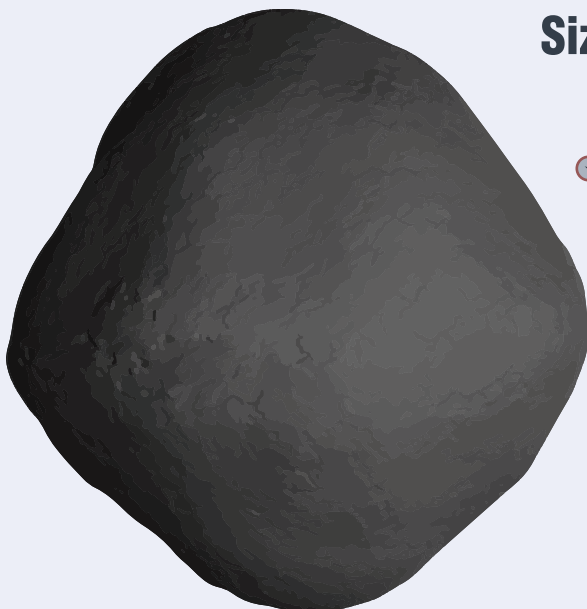
TAGSAM Length: 11 ft (3.4 m)

Dry Mass (unfueled): 1,940 lbs (880 kg)

Wet Mass (fueled): 4,650 lbs (2,110 kg)

Power: Two solar panels totaling 91 ft² (8.5 m²) generate between 1,226 and 3,000 watts, depending on the spacecraft's distance from the Sun.

Payload: Five science instruments, the TAGSAM, and the SRC allow the spacecraft to gather data, collect a sample, and safely return it to Earth.



Size Comparison of OSIRIS-REx and Bennu

