OSIRIS-REx Begins Journey Home With Significant Asteroid Sample

Bennu sample's return to Earth in 2023 to mark NASA's first mission to collect asteroid material

OSIRIS-REx's last look at Bennu during its final flyby in April. Credit: NASA/Goddard/University of Arizona

DENVER, May 10, 2021 – Scientists are now one step closer to learning more about how our solar system formed – and, potentially, the origins of life. Today, the OSIRIS-REx spacecraft, which was designed, built and flown by Lockheed Martin [NYSE: LMT] for NASA, departed asteroid Bennu and is headed back to Earth with a pristine asteroid sample.

After a two-year, 1.4-billion-mile return cruise that includes two revolutions around the sun, OSIRIS-REx will catch up with Earth in its orbit in 2023 and jettison its sample return capsule. This protective capsule contains what is estimated to be well over the required 60 grams of regolith needed for scientific study, or roughly the size of a candy bar.

"It's both exciting and bittersweet," said Sandy Freund, mission operations program manager of the Lockheed Martin Mission Support Area, where OSIRIS-REx is flown. "I can't wait to see what we learn from the sample when it returns to Earth. Yet, at the same time, we've now said goodbye to this asteroid that we've gotten to know so well over the past couple of years."

The Science Behind the Mission

Bennu is of keen interest for scientists because they believe it to be a well-preserved remnant from the beginnings of our solar system more than 4.5 billion years ago. It could contain clues about whether asteroids helped deliver ingredients for life to Earth and could also provide a glimpse into specific natural resources asteroids possess.

Once Bennu's sample lands in the Utah Test and Training Range on Sept. 24, 2023, it will be curated at NASA's Johnson Space Flight Center in Houston and shared with teams around the globe. With upcoming scientists and engineers in mind, NASA will save 75 percent of the sample for future generations to study.

The Long Journey Home

Today's departure maneuver was the mission's longest engine burn since arrival at Bennu in 2018. OSIRIS-REx's main engines fired for seven minutes, changing its velocity by 0.16 miles per second – about the cruising speed of a commercial airliner – and sending it on a trajectory to meet up with Earth in two and a half years.

OSIRIS-REx is the first NASA mission to collect material from an asteroid. It also represents the largest sample collected by a NASA mission since Apollo. This is NASA's third robotic sample return mission, and Lockheed Martin has built and operated all three of those spacecraft.

NASA's Goddard Space Flight Center in Greenbelt, Maryland, provides overall mission management, systems engineering, and the safety and mission assurance for OSIRIS-REx. Dante Lauretta of the University of Arizona, Tucson, is the principal investigator. The University of Arizona leads the science team and the mission's science observation planning and data processing. Lockheed Martin Space in Littleton, Colorado, built the spacecraft and provides flight operations. Goddard and KinetX Aerospace are responsible for navigating the OSIRIS-REx spacecraft. OSIRIS-REx is the third mission in NASA's New Frontiers Program, managed by NASA's Marshall Space Flight Center.

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