NASA's OSIRIS-REx ready for touchdown on asteroid Bennu

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This illustration shows NASA’s OSIRIS-REx spacecraft descending towards asteroid Bennu to collect a sample of the asteroid’s surface. Credit: NASA/Goddard/University of Arizona

NASA's first asteroid sample return mission is officially prepared for its long-awaited touchdown on asteroid Bennu's surface. The Origins, Spectral Interpretation, Resource Identification and Security—Regolith Explorer (OSIRIS-REx) mission has targeted Oct. 20 for its first sample collection attempt.

"The OSIRIS-REx mission has been demonstrating the very essence of exploration by persevering through unexpected challenges," said Thomas Zurbuchen, NASA's associate administrator for science. "That spirit has led them to the cusp of the prize we all are waiting for—securing a sample of an asteroid to bring home to Earth, and I'm very excited to follow them through the home stretch."

From discovering Bennu's surprisingly rugged and active surface, to entering the closest-ever orbit around a planetary body, OSIRIS-REx has overcome several challenges since arriving at the asteroid in December 2018. Last month, the mission brought the spacecraft 213 ft (65 m) from the asteroid's surface during its first sample collection rehearsal—successfully completing a practice run of the activities leading up to the sampling event.

Now that the mission is ready to collect a sample, the team is facing a different kind of challenge here on Earth. In response to COVID-19 constraints and after the intense preparation for the first rehearsal, the OSIRIS-REx mission has decided to provide its team with additional preparation time for both the final rehearsal and the sample collection event. Spacecraft activities require significant lead time for the development and testing of operations, and given the current requirements that limit in-person participation at the mission support area, the mission would benefit from giving the team additional time to complete these preparations in the new environment. As a result, both the second rehearsal and first sample collection attempt will have two extra months for planning.

"In planning the mission, we included robust schedule margin while at Bennu to provide the flexibility to address unexpected challenges," said Rich Burns, OSIRIS-REx project manager at NASA's Goddard Space Flight Center. "This flexibility has allowed us to adapt to the surprises that Bennu has thrown at us. It's now time to prioritize the health and

safety of both team members and the spacecraft."

The mission had originally planned to perform the first Touch-and-Go (TAG) sample collection event on Aug. 25 after completing a second rehearsal in June. This rehearsal, now scheduled for Aug. 11, will bring the spacecraft through the first three maneuvers of the sample collection sequence to an approximate altitude of 131 ft (40 m) over the surface of Bennu. The first sample collection attempt is now scheduled for Oct. 20, during which the spacecraft will descend to Bennu's surface and collect material from sample site Nightingale.

"This mission's incredible performance so far is a testament to the extraordinary skill and dedication of the OSIRIS-REx team," said Dante Lauretta, OSIRIS-REx principal investigator at the University of Arizona, Tucson. "I am confident that even in the face of the current challenge, this team will be successful in collecting our sample from Bennu."

During the TAG event, OSIRIS-REx's sampling mechanism will touch Bennu's surface for approximately five seconds, fire a charge of pressurized nitrogen to disturb the surface, and collect a sample before the spacecraft backs away. The mission has resources onboard for three sample collection opportunities. If the spacecraft successfully collects a sufficient sample on Oct. 20, no additional sampling attempts will be made. The spacecraft is scheduled to depart Bennu in mid-2021, and will return the sample to Earth on Sept. 24, 2023.

Provided by NASA's Goddard Space Flight Center