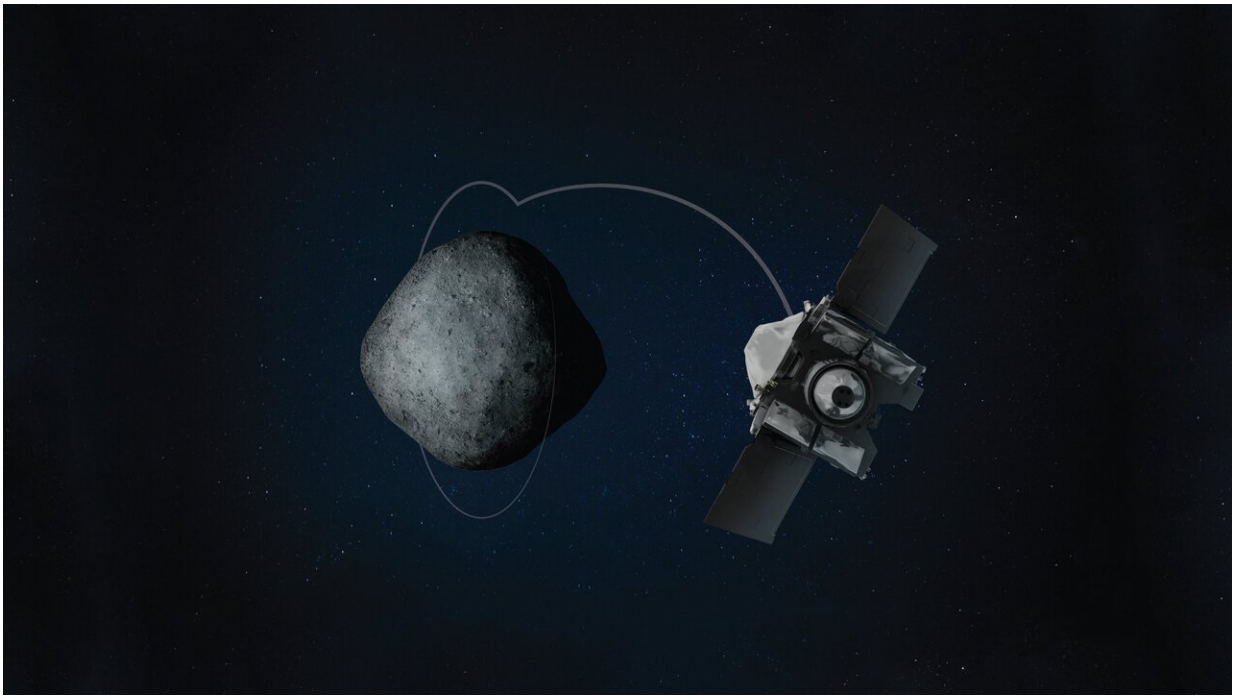
OSIRIS-REx breaks another orbit record

June 14 2019, by Nancy Neal Jones



On Jun. 12, 2019, NASA's OSIRIS-REx spacecraft went into orbit around asteroid Bennu for a second time — breaking its own record for the closest orbit of a planetary body by any spacecraft. Credit: University of Arizona

On June 12, NASA's OSIRIS-REx spacecraft performed another significant navigation maneuver—breaking its own world record for the closest orbit of a planetary body by a spacecraft.

The maneuver began the mission's new phase, known as Orbital B, and

placed the spacecraft in an orbit 680 meters (2,231 feet) above the surface of asteroid Bennu. The previous record—also set by the OSIRIS-REx spacecraft—was approximately 1.3 kilometers (0.8 miles) above the surface.

Upon arrival at Bennu, the team observed particles ejecting into space from the asteroid's surface. To better understand why this is occurring, the first two weeks of Orbital B will be devoted to observing these events by taking frequent images of the asteroid's horizon. For the remaining five weeks, the spacecraft will map the entire asteroid using most of its onboard science instruments: the OSIRIS-REx Laser Altimeter (OLA) will produce a full terrain map; PolyCam will form a high-resolution, global image mosaic; and the OSIRIS-REx Thermal Emission Spectrometer (OTES) and the REgolith X-ray Imaging Spectrometer (REXIS) will produce global maps in the infrared and X-ray bands. All of these measurements are essential for selecting the best sample collection site on Bennu's surface.

OSIRIS-REx will remain in Orbital B until the second week of August, when it will transition to the slightly higher Orbital C for additional particle observations. During Orbital C, the spacecraft will be approximately 1.3 kilometers (0.8 miles) above the asteroid's surface.

The OSIRIS-REx team will also use data collected from Orbital B phase to assess the safety and sample-ability (the likelihood that a sample can be collected) of each potential sample collection site. The team will then choose four possible sample sites to be thoroughly evaluated this fall during the Reconnaissance phase of the mission. Data from the Reconnaissance phase will be used to evaluate the candidate sites for further down-selection, as well as provide the closeup imaging required to map the features and landmarks necessary for the spacecraft's autonomous navigation to the asteroid's surface.

Several safety requirements must be considered before sample collection. For instance, any candidate site must be clear enough of large rocks or boulders so that the spacecraft can navigate to the surface without encountering dangerous terrain. Additionally, to keep OSIRIS-REx upright during sample collection, the chosen site can't be tilted too much compared to the sampling arm. Bennu's unexpectedly rocky surface has made it more challenging than originally predicted to identify sites that meet both of these safety requirements. In response, the team is evaluating both spacecraft and navigation performance capabilities, which will likely enable greater precision guidance to target more confined sites.

The OSIRIS-REx spacecraft is on a seven-year journey to study the asteroid Bennu and return a sample from its surface to Earth. This sample of a primitive asteroid will help scientists understand the formation of the Solar System over 4.5 billion years ago. Sample collection is scheduled for summer of 2020, and the spacecraft will deliver the sample to Earth in September 2023.

Provided by NASA's Goddard Space Flight Center