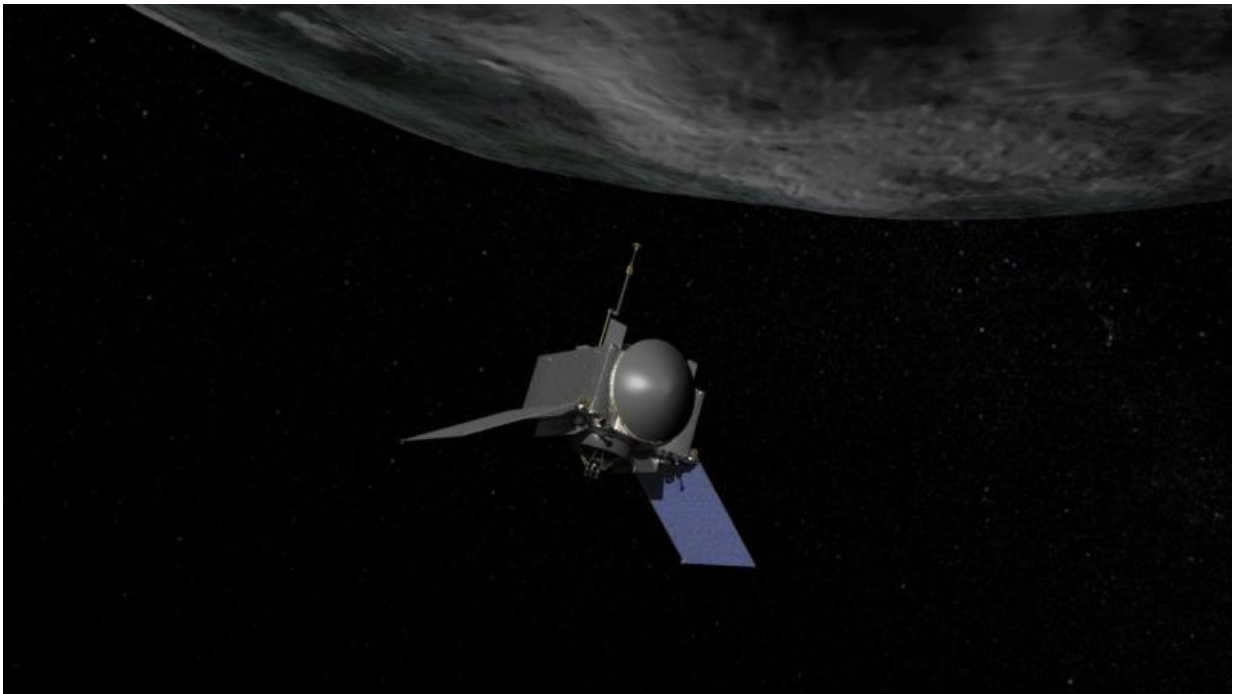


# NASA tests thrusters on journey to asteroid Bennu

October 12 2016, by Nancy Neal Jones

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Credit: NASA

NASA's OSIRIS-REx spacecraft fired its Trajectory Correction Maneuver (TCM) thrusters for the first time Friday in order to slightly adjust its trajectory on the outbound journey from Earth to the asteroid Bennu. The spacecraft's planned first Trajectory Correction Maneuver (TCM-1) began at 1 p.m. EDT and lasted for approximately 12 seconds. The maneuver changed the velocity of the spacecraft by 1.1 mile per

hour (50 centimeters per second) and used approximately 18 ounces (.5 kilogram) of fuel. The spacecraft is currently about 9 million miles (14.5 million kilometers) from Earth.

TCM-1 was originally included in the [spacecraft's](#) flight plan to fine-tune its trajectory if needed after the mission's Sept. 8 launch. The ULA Atlas V's launch performance was so accurate, however, that the spacecraft's orbit had no practical need for correction. Instead, the OSIRIS-REx mission team used the Oct. 7 maneuver to test the [TCM thrusters](#) and as practice to prepare for a much larger propulsive maneuver scheduled in December.

The mission had allocated approximately 388 ounces (11 kilograms) of propellant for TCM-1 to create a velocity change of up to 26 miles per hour (11.6 meters per second), had it been necessary. The unused propellant from this event provides more fuel margin for the spacecraft's asteroid proximity operations once OSIRIS-REx arrives at Bennu.

To track today's maneuver, the OSIRIS-REx mission's navigation team monitored the Doppler shift in radio signals between the spacecraft and the Deep Space Network antenna at the Goldstone Observatory in California. After 44 seconds—the current one-way light time delay between the spacecraft and Earth—the team received the first maneuver data from the spacecraft. Over the next week, the navigation team will process daily spacecraft tracking data to determine the precise effect of the burn.

The OSIRIS-REx spacecraft has four different kinds of thrusters providing considerable redundancy in its ability to maneuver on its way to the surface of Bennu and back. OSIRIS-REx began using its Attitude Control System (ACS) thrusters shortly after launch to keep the spacecraft oriented, so that its solar arrays point toward the sun and its communication antennas point toward Earth. Today was the first use of

its larger Trajectory Correction Maneuver (TCM) thrusters. In December OSIRIS-REx will use its largest thrusters, the Main Engine (ME) thrusters, to target the spacecraft for its Earth Gravity Assist scheduled for Sept. 22, 2017. Its smallest thrusters, the Low Thrust Reaction Engine Assembly (LTR) thrusters, will be used for the delicate maneuvers close to the surface of the asteroid Bennu.

Provided by NASA

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