Scientists to begin construction on NASA spacecraft that will visit asteroid in 2018

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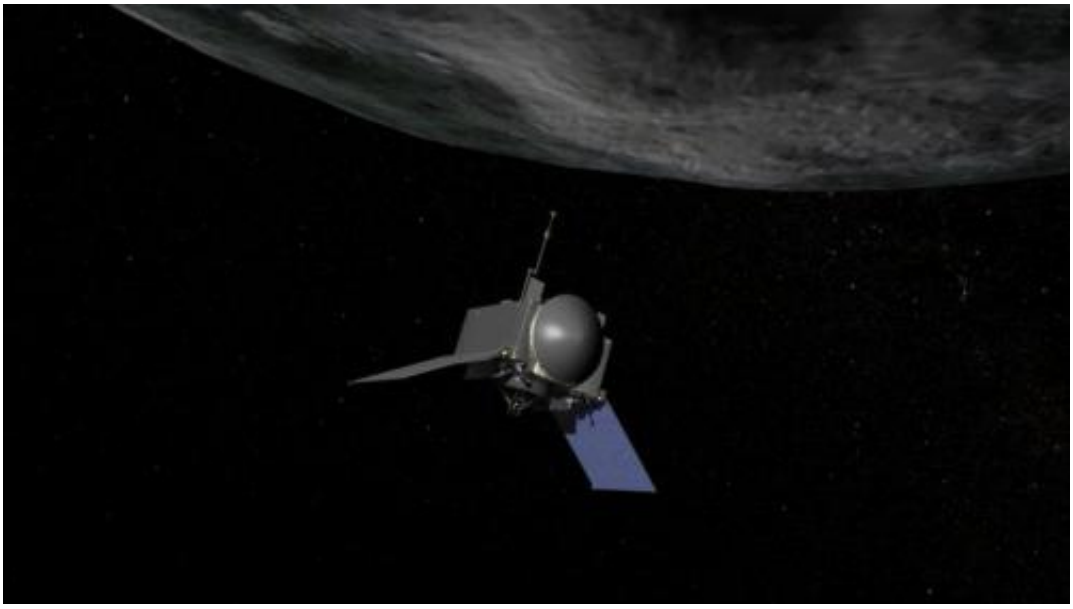

This is an artist's concept of NASA's OSIRIS-REx spacecraft preparing to take a sample from asteroid Bennu. Credit: NASA/Goddard

NASA has given the OSIRIS-REx mission, led by the University of Arizona, the go-ahead to begin building the spacecraft, flight instruments, ground system and launch support facilities. OSIRIS-REx is the first U.S. mission slated to send a spacecraft to a near-Earth asteroid and collect samples.

The mission will focus on finding answers to basic questions about the

composition of the very early solar system and the source of organic materials and water that made life possible on Earth. It will also aid NASA's asteroid initiative and support the agency's efforts to understand the population of potentially hazardous near-Earth objects and characterize those suitable for future asteroid exploration missions.

The UA got the thumbs up on April 9 after a successful Mission Critical Design Review (CDR) for NASA's Origins Spectral Interpretation Resource Identification Security Regolith Explorer (OSIRIS-REx). The review was held at the Lockheed Martin Space Systems Company in Littleton, Colo., April 1-9. An independent review board, comprised of experts from NASA and several external organizations, met to review the system design.

"Successfully passing mission CDR is a major accomplishment, but the hard part is still in front of us—building, integrating and testing the flight system to meet our tight launch window," said Mike Donnelly, OSIRIS-REx project manager at NASA's Goddard Space Flight Center in Greenbelt, Md.

"It marks a major shift in our mission," said Ed Beshore, a scientist at the UA Lunar and Planetary Laboratory and the Department of Astronomy and Steward Observatory, who is the mission's deputy principal investigator. "For all of us involved with OSIRIS-REx, it is a transition from designing the mission to implementing it. It means we are now cutting metal, building a spacecraft and writing software."

OSIRIS-REx is scheduled to launch in the fall of 2016, rendezvous with the asteroid Bennu in 2018 and spend a year studying the asteroid before collecting a sample of at least 2 ounces (60 grams) of surface material and returning it to Earth for scientists to study in 2023.

NASA's Goddard Space Flight Center will provide overall mission

management, systems engineering and safety and mission oversight for OSIRIS-REx. The UA will lead the effort, provide the camera system and science processing and operations center. Lockheed Martin Space Systems in Denver will build the spacecraft. OSIRIS-REx is the third mission in NASA's New Frontiers Program, which is managed by the Marshall Spaceflight Center.

"The OSIRIS-REx team has consistently demonstrated its ability to present a comprehensive mission design that meets all requirements within the resources provided by NASA," said principal investigator Dante Lauretta, a professor at the UA's Lunar and Planetary Laboratory. "Mission CDR was no exception. This is a great team. I know we will build a flight and ground system that is up to the challenges of this ambitious mission."

At the UA's Michael J. Drake building, staffing levels have ramped up to full capacity with the construction of the spacecraft's camera system and building the Science Processing Operations Center (SPOC). The Drake building is also where the office of the principal investigator (PI) is headquartered.

"The PI office is fully engaged in planning mission operations and ensuring the scientific integrity of the mission as well as overseeing the cost and schedule performance of the project," mission PI Lauretta said. "This office also will lead the analysis of the sample after the spacecraft returns it to the Earth in 2023."

"Missions like OSIRIS-REx consist of two major elements: the flight system—spacecraft and instruments—and the ground system," Beshore explained. "The CDR is as much an approval of our ground system as of the spacecraft."

Ground System Vital to Mission's Success

"Once the spacecraft flies, it is under the control of the ground system," Beshore explained.

Ground system operations include planning scientific observations, designing and implementing spacecraft navigation, verifying that the spacecraft is safe at all times during its journey, programming the commands that control the spacecraft and transmitting them over the Deep Space Network, and retrieving data from the spacecraft, processing and analyzing it.

"Many ground system activities will take place right here in Tucson," Beshore said. "We will decide where we want to go, what data we want to acquire, and how to process the data once it starts coming down from the spacecraft."

Along with activity on the ground, the mission already is delivering considerable economic benefits to Arizona's economy. The camera system engineering and fabrication teams are fully operational, and SPOC is close to planned staffing levels. KinetX, a company based in Tempe, Ariz., is tasked with navigating the spacecraft, while the thermal emission spectrometer, OTES, is being built by Arizona State University, also in Tempe.

The public can follow mission progress on the OSIRIS-REx website and the PI blog, as well as on Facebook and Twitter. As part of its public engagement effort, people around the world are invited to submit their names to be etched on a microchip and placed aboard the spacecraft. After signing up with the "Messages to Bennu" campaign, participants are able to download and print a certificate documenting their participation in the OSIRIS-REx mission.

OSIRIS-REx is the second NASA mission led by the UA. In May of 2008, the UA's Phoenix Mars lander touched down near the north pole

of Mars, in the first Mars mission ever led by a university. Phoenix confirmed and examined patches of the widespread deposits of underground water ice and found evidence suggesting occasional presence of thawed water. The UA also operates the HiRISE camera onboard NASA's Mars Reconnaissance Orbiter, which has photographed the surface of the red planet in stunning detail. Other NASA missions involving UA scientists include the Cassini spacecraft studying Saturn and its moon Titan, the JUNO mission to Jupiter and the MESSENGER spacecraft orbiting Mercury.

More information: OSIRIS-REx mission: www.asteroidmission.org/

Provided by University of Arizona

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