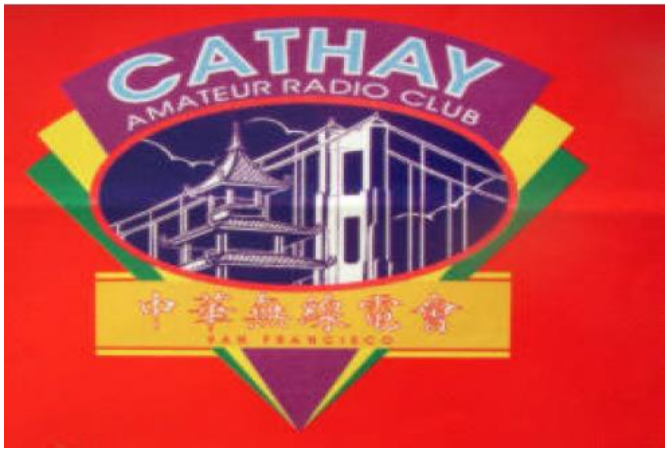


Cathay October 2023

www.cathayradio.org

President: George Chong, W6BUR **email:** *W6BUR@comcast.net*
Vice President North: Leonard Tom, *NX6E* **email:** nx6e@hotmail.com
Vice President South: Bill Fong, *W6BBA* - **email:** w6bba@arrl.net
Secretary/Membership: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com
Editor: Rodney Yee, *KJ6DZI* - **email:** rodyee2000@yahoo.com
Treasurer: Vince Chinn aka Mingie, *W6EE* - **email:** vince@vincechinncpa.com
Web Master: Edison Fong – *WB6IQN* - **email:** edison_fong@hotmail.com
Mission: The Cathay Amateur Radio Club is basically an active social club of Ham Radio Operators and their spouses. We support local community requests for HAM emergency communications. Several of us are trained in CPR/ First Aid and are involved with community disaster preparedness.

Monday Night Net Time: 9 PM Local Time/PST, As of 8/21/2023 we are switching over from using Repeater: WB6TCS to **Nick Carsion's Repeater: WA6GEL UHF 444.80000 Mhz, Offset +5Mhz, CTCCS/Tone PL 179.9 Hz on Monument Peak, Milpitas.**

If you cannot reach the fore-mentioned machine, please use WA6GEL UHF 448.8 Mhz Offset +5 Mhz, CTCCS/Tone PL173.8 which is on Mt. San Bruno.

The CARC Monday night net is the best way to find out the latest club news. All check-in are welcome.

Message from the President: George Chong, *W6BUR*

Hello CARC Members and Friends;

Many thanks to Nick Carsion for the use of repeater – WA6GEL for our CARC Monday Night Net.

I wish to thank our CARC members that set aside their valuable time to participate in our Monday night's nets.

Introduction Tech Article:

At 10:52 am ET, Sunday September 24, 2023, NASA completed a 7-year long mission to retrieve and return to earth a sample weighting 14 oz to 35.7 oz from the 1,640 feet wide asteroid named Bennu.

The retrieval space craft weighing 4,650 pounds is named: OSIRIS-Rex, it had traveled 1.2 billion miles to the target destination Bennu. It was launched on Thursday September 8, 2016 at 7:05 pm and arrived at Bennu on Monday December 3, 2018. It then spent nearly 2 years surveying the asteroid and helping to select several landing sites that are clear of boulders and relatively flat surface.

The OSIRIS-Rex ejected the Sample Return Capsule (SRC) containing the asteroid sample that made it final parachute touch down in the U.S. Army's Dugway Proving Ground, about 80 miles southwest of Salt Lake City in Utah.

2nd follow up article talks about the opening of Sample Return Capsule and the initial examination of the Bennu sample.

To learn more about OSIRIS-Rex mission please read the Tech Article.

Public Service Announcements

PACIFICON℠ 2023

October 20-22, 2023

San Ramon Marriott
2600 Bishop Drive
San Ramon, CA 94583

Pacificon℠ gives you three great days of activities for one low cost:

* A full slate of outstanding Forum presentations about a wide range of amateur radio topics
* An all-day Antenna Seminar (additional fee required)
* Gordon West, WB6NOA: Author, educator, speaker and irrepressible promoter of all things ham radio
* A large Vendor Expo filled with exciting products and exhibits

* An outdoor Swap Meet
* Youth Activities
* Electronics kit building and soldering instruction
* A One Day License Prep Class to prepare you to pass the amateur radio Technician license examination and get your first amateur radio license
* A One Day License Prep Class to prepare you to upgrade to the General Class level
* Two days of License Testing
* A Special Events Station where you can operate and contact other hams worldwide, even if you don't have a General or Extra Class license
* A wonderful Banquet with Keynote Speaker Steve Goodgame K5ATA, ARRL Education and Learning Department (additional fee required)
* Our annual Wouff Hong Initiation ceremony
* A chance to hear about and discuss important national amateur radio issues with top ARRL leaders
* A chance to win radios and other great prizes throughout the convention

And perhaps the best part - *a chance to interact and share information with lots of other amateur radio enthusiasts to further (or begin) your own knowledge and to advance the hobby.*

HAM CRAM / HAM Licensing

For upcoming HAM Licensing locations please refer to:
http://www.arrl.org/find-an-amateur-radio-license-exam-session

Auxiliary Communications Service (ACS)

The Auxiliary Communications Service (ACS) is a unit of trained professionals who supply communications support to the agencies of the City and County of San Francisco, particularly during major events/incidents. ACS goals are the support of gathering and distribution of information necessary to respond to and recover from a disaster.

The ACS Net begins at 1930 hours (7:30 p.m. PT) local time each Thursday evening, on the WA6GG repeater at 442.050 MHz, positive offset, tone 127.3 Hz. The purpose of this net is to practice Net Control skills, practice checking in with deployment status in a formal net, and to share information regarding upcoming ACS events. Guests are welcome to check in. ACS members perform Net Control duty on a regular basis. On the second Thursday of each month, the net is conducted in simplex mode on the output frequency of the WA6GG repeater, 442.050 MHz no offset, tone 127.3 Hz.

ACS holds its General Meetings on the third Tuesday of each month from 1900 hours to 2100 hours local time. Currently meetings are exclusively conducted over Zoom during the COVID-19 pandemic, ACS looks forward to meeting in person again as soon as possible.

Upcoming meeting dates in 2023 are:

- October 17, 2023
- November 21, 2023

Location of in person future ACS meetings are yet to be determined as the regular location is under reconstruction. All interested persons are welcome to attend. For further information, contact Corey Siegel KJ6LDJ <kj6ldj@gmail.com>.

For more information, please attend an ACS meeting, check in on the ACS radio net, or call 415-558-2717.

Free Disaster Preparedness Classes In San Francisco – NERT Taught by San Francisco Fire Department (SFFD).

https://sf-fire.org/nert/nert-calendar-meetings-trainings-events

NERT Full Training Oct 18-Nov 29
10/18/23 to 11/29/23 5:30pm - 9:00pm
2310 Folsom San Francisco, CA 94110
Registration

Volunteer as a Mock Triage Victim at NERT's October Drill !
October 21, 2023 8:30am - 2:30pm
St. Ignatius College Preparatory, 2007 37th Ave San Francisco, CA 94116
Registration

NERT Graduates: October Citywide Drill
October 21, 2023 8:30am - 2:30pm
St. Ignatius College Preparatory, 2007 37th Ave San Francisco, CA 94116
Registration

+ Recertifications

NERT Recertification Class: November 15th and 29th
11/15/23 to 11/29/23 5:30pm - 9:00pm
2310 Folsom San Francisco, CA 94110
Registration

***SFFD DOT** is the Fire Department Division of Training. All participants walking, biking or driving **enter through the driveway gate on 19th St.** between Folsom and Shotwell. Parking is allowed along the back toward the cinderblock wall.

Visit ***www.sfgov.org/sffdnert*** to learn more about the training, other locations, and register on line. Upcoming Special NERT Events.

San Francisco Police Department: Auxiliary Law Enforcement Response Team (ALERT)

The Auxiliary Law Enforcement Response Team (ALERT) is a citizen disaster preparedness program designed. The ALERT program is for volunteers 16 years of age or older, who live, work, or attend high school in San Francisco.

Graduates of the San Francisco Police Activities League (P.A.L) Law Enforcement Cadet Academy are also eligible to join.

ALERT volunteers will no longer need to complete the Fire Department's Neighborhood Emergency Response Team (NERT) (www.sfgov.org/sfnert) training and then graduate into two 8 hour Police Department course specifically designed for ALERT team members.

ALERT members will work closely with full-time and/or Reserve Police Officers in the event they are deployed after a disaster. The Basic ALERT volunteer will have no law enforcement powers other than those available to all citizens.

SFPD ALERT Training (New Members)

The next SFPD ALERT training class has been scheduled for: TBD

* Class date indicated are only for new members

IMPORTANT- All participants must complete the background interview process in order to be eligible to attend the ALERT training class.

Eligible ALERT participants may register for a training class by contacting the ALERT Program Coordinator, Marina at sfpdalert@sfgov.org, or by telephone at 415-401-4615.

SFPD ALERT Practice/Training Drill

All active/trained ALERT members are asked to join us for our next training drill, via scheduled for on TBD

For more information on the San Francisco Police Department ALERT Program, email us at sfpdalert@sfgov.org, or call Lt. Marina Chacon (SFPD Ret.), SFPD ALERT Program Coordinator, at (415) 401-4615.

For additional information on the web please refer to:
https://sfgov.org/policecommission/alert

Tech Article

OSIRIS-REx
In Depth

https://science.nasa.gov/mission/osiris-rex/in-depth/

Summary

The Origins, Spectral Interpretation, Resource Identification, and Security – Regolith Explorer (OSIRIS-REx) is the first U.S. spacecraft to collect a sample from an asteroid. OSIRIS-REx traveled to near-Earth asteroid Bennu and is bringing a sample from its surface to Earth for study. OSIRIS-REx will deliver the sample on Sept. 24, 2023.

After releasing the sample capsule for descent through Earth's atmosphere, OSIRIS-REx will go on to an extended mission that will take the spacecraft into orbit around near-Earth asteroid Apophis in 2029.

An artist's visualization of the OSIRIS-REx sample capsule descending to Earth. The OSIRIS-REx spacecraft will deliver a sample from asteroid Bennu to Earth on Sept. 24, 2023.

Credit: NASA's Goddard Space Flight Center Conceptual Image Lab.

Nation	United States of America (USA)
Objective(s)	Collect an asteroid sample and deliver it to Earth
Spacecraft	Origins, Spectral Interpretation, Resource Identification, and Security – Regolith Explorer (OSIRIS-REx) / OSIRIS-APophis EXplorer (OSIRIS-APEX)
Spacecraft Mass	4,650 pounds (2,110 kilograms)
Scientific Instruments	Camera Suite (PolyCam, MapCam, SamCam) (OCAMS OSIRIS-REx) Laser Altimeter (OLA OSIRIS-REx) Visible and IR Spectrometer (OVIRS OSIRIS-REx) Thermal Emission Spectrometer (OTES OSIRIS-REx) Regolith X-ray Imaging Spectrometer (REXIS OSIRIS-REx) Touch-And-Go Sample Acquisition Mechanism (TAGSAM)
Mission Design and Management	NASA GSFC / University of Arizona
Launch Vehicle	Atlas V 411 (no. AV-067)
Launch Date and Time	Sept. 8, 2016 / 23:05 UT
Launch Site	Cape Canaveral, Fla. / SLC-41

Key Dates

- **Sep. 8, 2016:** OSIRIS-REx launches
- **Dec. 3, 2018:** Arrives at asteroid Bennu
- **Oct. 20, 2020:** Collects a sample from Bennu
- **April 7, 2021:** Completes its last flyover of Bennu
- **May 10, 2021:** Begins its journey back to Earth
- **Sep. 24, 2023:** Sample capsule to be delivered to Earth
- **2029:** Spacecraft to enter orbit around asteroid Apophis

Firsts

OSIRIS-REx is the first U.S. mission to collect a sample from an asteroid.

In Depth

OSIRIS-REx is the third major planetary science mission for NASA's New Frontiers Program (after New Horizons launched in 2006 and Juno launched in 2011).

OSIRIS-REx is an acronym for "Origins, Spectral Interpretation, Resource Identification, and Security – Regolith Explorer" The goal of the mission was to collect a sample from near-Earth asteroid 101955 Bennu (formerly known as 1999 RQ36) and then bring the sample to Earth.

The mission, developed by scientists at the University of Arizona, will give us more information about how the early solar system formed and how life began. It will also help us better understand asteroids that could impact Earth in the future.

About 55 minutes after launch on Sept. 8, 2016, from Cape Canaveral, Florida, and after a boost by the Centaur upper stage, OSIRIS-REx separated from its Atlas V rocket and deployed its solar arrays.

At 17:30 UT on Sept. 9, 2016, the spacecraft crossed the orbital path of the Moon at a range of about 240,200 miles (386,500 kilometers). Three days later, it was in orbit around the Sun. Beginning Sept. 19, 2016, the mission team activated all of its scientific instruments.

The spacecraft's trajectory correction maneuver (TCM) thrusters were fired for 12 seconds for the first time on Oct. 7, 2016, for a course correction. The spacecraft also carries three other sets of thrusters—the attitude control system (ACS), the main engine (ME), and low thrust reaction engine assembly (LTR) thrusters—thus providing significant redundancy for maneuvers.

On Dec. 28, 2016, the spacecraft conducted its first deep-space maneuver (DSM-1), firing the main engine to position it properly for an Earth gravity-assist encounter in late 2017.

A second firing, the first to use the spacecraft's attitude control system ACS thrusters, on Aug. 25, 2017, further sharpened its trajectory by changing the velocity by about 19 inches (47.9 centimeters) per second.

About a month later, on Sept. 22, 2017, OSIRIS-REx passed Earth at a range of about 10,710 miles (17,237 kilometers) as part of a gravity-assist maneuver that tilted its orbit to match that of Bennu. During the encounter, the spacecraft took several high-resolution pictures of both Earth and the Moon.

The spacecraft got its first glimpse of Bennu in August 2018, sending back a grainy image taken at a distance of about 1.4 million miles (2.3 million kilometers). In early November 2018, OSIRIS-REx sent back detailed images showing the asteroid's shape and some surface features.

After arriving at Bennu on Dec. 3, 2018, OSIRIS-REx mapped the asteroid in detail while the mission team searched for a safe sample-collection site. One of the biggest challenges was that Bennu has an extremely rocky surface with hazardous boulders.

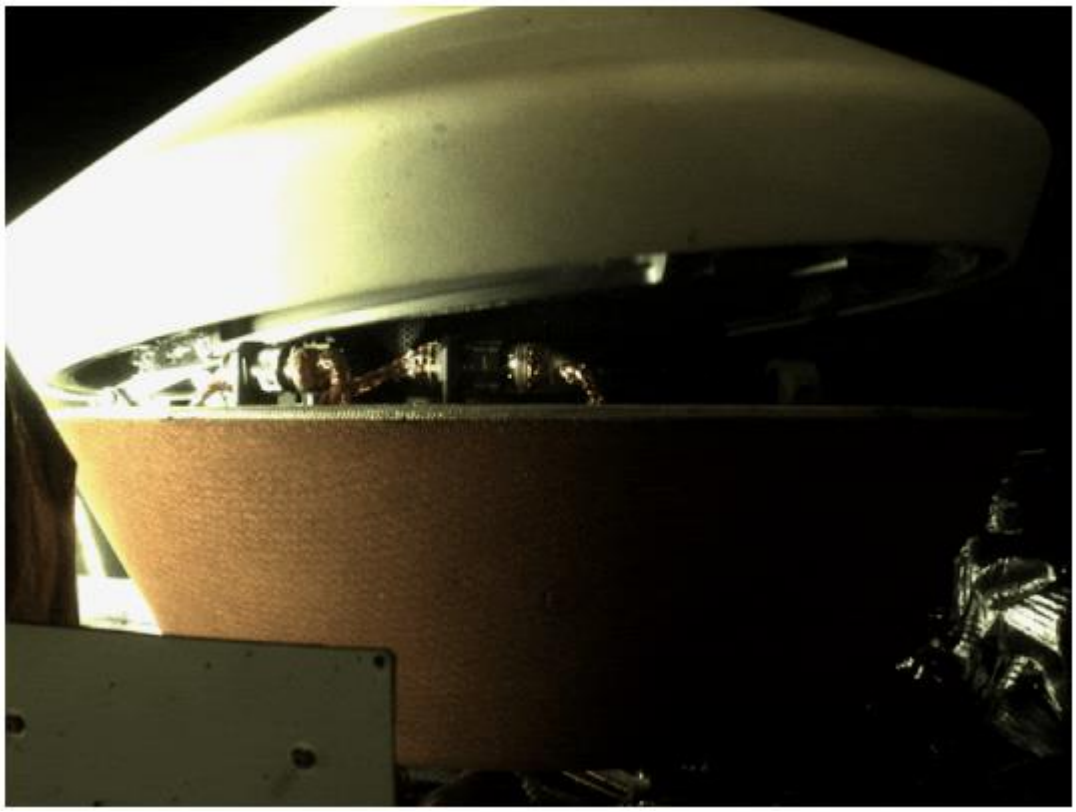
After a year, the mission team selected a sample site called "Nightingale" located in a northern crater 460 feet (140 meters) wide. The crater is thought to be relatively young, and the regolith, or rocks and dust, is freshly exposed. This means the site would likely allow for a pristine sample of the asteroid, giving the team insight into Bennu's history.

This series of images shows the SamCam imager's field of view as the OSIRIS-REx spacecraft approached asteroid Bennu's surface and tapped it to collect a sample. The images were taken on Oct. 20, 2020.

Credit: *NASA/Goddard/University of Arizona*

On Oct. 20, 2020, OSIRIS-REx unfurled its robotic arm and, in a first for NASA, briefly touched down on asteroid Bennu to collect dust and pebbles from its surface in a maneuver known as "Touch-And-Go" or TAG.

Two days later, the mission team received images that confirmed the spacecraft had collected more than enough material to meet one of its main mission requirements: acquiring at least 2 ounces (60 grams) of Bennu's surface material. On Oct. 28, 2020, the mission team sent commands to the spacecraft instructing it to close the Sample Return Capsule – marking the end of one of the most challenging phases of the mission.



This sequence of images shows OSIRIS-REx completing the final step of the sample stowage process: closing its Sample Return Capsule. The sample of asteroid Bennu is now ready for its journey to Earth.

Credit: NASA Goddard/University of Arizona/Lockheed Martin

On April 7, 2021, OSIRIS-REx completed its last flyover of Bennu and started slowly drifting away from the asteroid. During the flyby, OSIRIS-REx imaged Bennu for 5.9 hours, covering more than a full rotation of the asteroid. It flew within 2.1 miles (3.5 kilometers) of Bennu's surface – the closest since the TAG sample collection event.

Images taken during the flyover revealed the aftermath of its historic encounter with the asteroid.

On May 10 at 4:23 p.m. EDT, the spacecraft fired its main engines at full throttle for seven minutes – its most significant maneuver since it arrived at Bennu in 2018. This burn thrust the spacecraft away from the asteroid at 600 miles per hour (nearly 1,000 kilometers per hour), setting it on a 2.5-year cruise toward Earth.

After orbiting the Sun twice, OSIRIS-REx is due to reach Earth on Sept. 24, 2023. Upon return, the capsule containing pieces of Bennu will separate from the rest of the spacecraft and enter Earth's atmosphere. The capsule will parachute to the Department

of Defense's Utah Test and Training Range in Utah's West Desert, where scientists will be waiting to retrieve it.

After delivering the sample of asteroid Bennu to Earth, the main OSIRIS-REx spacecraft will have completed its primary mission. But it will continue on to a new mission. With a new name – OSIRIS-APEX (OSIRIS-APophis EXplorer) – the spacecraft will explore Apophis, an asteroid roughly 1,200 feet (roughly 370 meters) in diameter that will come within 20,000 miles (32,000 kilometers) of Earth in 2029.

What the Name Means

O – Origins
Return and analyze a sample of a pristine carbon-rich asteroid to study the nature, history, and distribution of its minerals and organic material.

SI - Spectral Interpretation
Define the global properties of a primitive carbon-rich asteroid to allow for direct comparison with existing ground-based telescopic data for all asteroids.

RI - Resource Identification
Map the global properties, chemistry, and mineralogy of a primitive carbon-rich asteroid to define its geologic and dynamic history and provide context for the returned sample.

S – Security
Measure the Yarkovsky Effect on Bennu and learn which asteroid properties contribute to this effect.

The Yarkovsky Effect is the force caused by the emission of heat from a rotating asteroid that can change its orbit over time.

REx - Regolith Explorer
Document the texture, morphology, geochemistry, and spectral properties of the regolith (surface material) at the sampling site.

Additional Resources
National Space Science Data Center Master Catalog: OSIRIS-REx

Key Source
Siddiqi, Asif A. Beyond Earth: A Chronicle of Deep Space Exploration, 1958-2016. NASA History Program Office, 2018.

https://www.nasa.gov/news-release/nasas-bennu-asteroid-sample-contains-carbon-water/

NASA's Bennu Asteroid Sample Contains Carbon, Water

By: Abbey A. Donaldson ! Date: Oct 11, 2023

A view of the outside of the OSIRIS-REx sample collector. Sample material from asteroid Bennu can be seen on the middle right. Scientists have found evidence of both carbon and water in initial analysis of this material. The bulk of the sample is located inside.

Photo: NASA/Erika Blumenfeld & Joseph Aebersold

Initial studies of the 4.5-billion-year-old asteroid Bennu sample collected in space and brought to Earth by NASA show evidence of high-carbon content and water, which together could indicate the building blocks of life on Earth may be found in the rock. NASA made the news Wednesday from its Johnson Space Center in Houston where leadership and scientists showed off the asteroid material for the first time since it landed in September.

This finding was part of a preliminary assessment of NASA's OSIRIS-REx (Origins, Spectral Interpretation, Resource Identification and Security – Regolith Explorer) science team.

“The OSIRIS-REx sample is the biggest carbon-rich asteroid sample ever delivered to Earth and will help scientists investigate the origins of life on our own planet for generations to come,” said NASA Administrator Bill Nelson. “Almost everything we do at NASA seeks to answer questions about who we are and where we come from. NASA missions like OSIRIS-REx will improve our understanding of asteroids that could threaten Earth while giving us a glimpse into what lies beyond. The sample has made it back to Earth, but there is still so much science to come – science like we’ve never seen before.”

Although more work is needed to understand the nature of the carbon compounds found, the initial discovery bodes well for future analyses of the asteroid sample. The secrets held within the rocks and dust from the asteroid will be studied for decades to come, offering insights into how our solar system was formed, how the precursor materials to life may have been seeded on Earth, and what precautions need to be taken to avoid asteroid collisions with our home planet.

Bonus sample material

The goal of the OSIRIS-REx sample collection was 60 grams of asteroid material. Curation experts at NASA Johnson, working in new clean rooms built especially for the mission, have spent 10 days so far carefully disassembling the sample return hardware to obtain a glimpse at the bulk sample within. When the science canister lid was first opened, scientists discovered bonus asteroid material covering the outside of the collector head, canister lid, and base. There was so much extra material it slowed down the careful process of collecting and containing the primary sample.

“Our labs were ready for whatever Bennu had in store for us,” said Vanessa Wyche, director, NASA Johnson. “We’ve had scientists and engineers working side-by-side for years to develop specialized gloveboxes and tools to keep the asteroid material pristine and to curate the samples so researchers now and decades from now can study this precious gift from the cosmos.”

Within the first two weeks, scientists performed “quick-look” analyses of that initial material, collecting images from a scanning electron microscope, infrared measurements, X-ray diffraction, and chemical element analysis. X-ray computed tomography was also used to produce a 3D computer model of one of the particles, highlighting its diverse interior. This early glimpse provided the evidence of abundant carbon and water in the sample.

“As we peer into the ancient secrets preserved within the dust and rocks of asteroid Bennu, we are unlocking a time capsule that offers us profound insights into the origins of our solar system,” said Dante Lauretta, OSIRIS-REx principal investigator, University of Arizona, Tucson. “The bounty of carbon-rich material and the abundant presence of water-bearing clay minerals are just the tip of the cosmic iceberg. These discoveries, made possible through years of dedicated collaboration and cutting-edge science, propel us on a journey to understand not only our celestial neighborhood but also the potential for life’s beginnings. With each revelation from Bennu, we draw closer to unraveling the mysteries of our cosmic heritage.”

For the next two years, the mission's science team will continue characterizing the samples and conduct the analysis needed to meet the mission's science goals. NASA will preserve at least 70% of the sample at Johnson for further research by scientists worldwide, including future generations of scientists. As part of OSIRIS-REx's science program, a cohort of more than 200 scientists around the world will explore the regolith's properties, including researchers from many U.S. institutions, NASA partners JAXA (Japan Aerospace Exploration Agency), CSA (Canadian Space Agency), and other scientists from around the world. Additional samples will also be loaned later this fall to the Smithsonian Institution, Space Center Houston, and the University of Arizona for public display.

NASA's Goddard Space Flight Center in Greenbelt, Maryland, provides overall mission management, systems engineering, and the safety and mission assurance for OSIRIS-REx. Lauretta, the principal investigator, leads the science team and the mission's science observation planning and data processing. Lockheed Martin Space in Littleton, Colorado, built the spacecraft, provided flight operations, and was responsible for capsule recovery. Goddard and KinetX Aerospace were responsible for navigating the OSIRIS-REx spacecraft. Curation for OSIRIS-REx, including processing the sample when it arrived on Earth, is taking place at NASA Johnson.

OSIRIS-REx is the third mission in NASA's New Frontiers Program, managed by NASA's Marshall Space Flight Center in Huntsville, Alabama, for the Science Mission Directorate at NASA Headquarters in Washington.

Find more information about NASA's OSIRIS-REx mission at:

https://www.nasa.gov/osiris-rex

-end-

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