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OSIRIS-REx Encounters Bennu: Initial Assessment from the Approach Phase

Dante S Lauretta¹, Olivier S Barnouin², Kris Becker³, Carina A. Bennett⁴, Beau Bierhaus⁵, William V Boynton⁶, Keara N. Burke⁷, Philip R Christensen⁸, Beth Clark⁹, Harold C Connolly Jr, Mary Crombie¹¹, Michael G Daly¹², Daniella N DellaGiustina¹, Jason P. Dworkin¹³, Joshua P Emery¹⁴, Heather L Enos¹, Dathon R Golish¹, Victoria E Hamilton¹⁵, Carl Hergenrother¹⁶, Lucille Le Corre¹⁷, Lucy F Lim¹⁸, Patrick Michel¹⁹, Michael C Nolan¹, Maurizio Pajola²⁰, Mark E Perry²¹, Dennis Reuter¹⁸, Bashar Rizk¹, Daniel Jay Scheeres²², Stephen R Schwartz¹⁶, Amy A Simon¹⁸, Kevin John Walsh²³ and The OSIRIS-REx Team, (1)University of Arizona, Lunar and Planetary Laboratory, Tucson, AZ, United States, (2)JHU Applied Physics Lab, Laurel, MD, United States, (3)University of Arizona, Tucson, United States, (4)Austin, TX, United States, (5)Lockheed Martin, Denver, CO, United States, (6)Univ Arizona, Tucson, AZ, United States, (7)University of Arizona, Lunar and Planetary Lab, Tucson, AZ, United States, (8)Arizona State University, Tempe, AZ, United States, (9)Ithaca College, Ithaca, NY, United States, (10)Indigo Information Services, LLC, Tucson, AZ, United States, (11)York University, Centre for Research in Earth and Space Science, Toronto, ON, Canada, (12)NASA Goddard Space Flight Center, Solar System Exploration Division, Greenbelt, MD, United States, (13)Univ of Tennessee-EPS, Knoxville, TN, United States, (14)Southwest Research Institute Boulder, Boulder, CO, United States, (15)University of Arizona, Tucson, AZ, United States, (16)Planetary Science Institute Tucson, Tucson, AZ, United States, (17)NASA Goddard Space Flight Center, Greenbelt, MD, United States, (18)UNS-CNRS-Observatoire de la Cote d'Azur, Laboratoire Lagrange, Nice, France, (19)CISAS-Center for Studies and Activities for Space, Padova, Italy, (20)JHU/APL--Space Dept, Laurel, MD, United States, (21)University of Colorado Boulder, Ann and H.J. Smead Department of Aerospace Engineering Sciences, Boulder, CO, United States, (22)University of Melbourne, Parkville, Australia

Abstract Text:

The OSIRIS-REx spacecraft launched on September 8, 2016, on a seven-year journey to return samples from asteroid (101955) Bennu. This presentation summarizes the scientific results from the Approach and Preliminary Survey phases. Bennu observations are set to begin on August 17, 2018,

when the asteroid is bright enough for detection by the PolyCam. PolyCam and MapCam collect data to survey the asteroid environment for any hazards and characterize the asteroid point-source photometric properties. Resolved images acquired during final approach, starting in late October 2018, allow the creation of a shape model using stereophotoclinometry (SPC), needed by both the navigation team and science planners. The OVIRS and OTES spectrometers characterize the point-source spectral properties over a full rotation period, providing a first look at any features and thermophysical properties. TAGSAM is released from the launch container and deployed into the sampling configuration then returned to the stow position.

Preliminary Survey follows the Approach Phase in early December 2018. This phase consists of a series of hyperbolic trajectories that cross over the North and South poles and the equator of Bennu at a close-approach distance of 7 km. Images from these Preliminary Survey passes provide data to complete the 75-cm resolution SPC global shape model and solve for the rotation state. Once the shape model is complete, the asteroid coordinate system is defined for co-registration of all data products. These higher-resolution images also constrain the photometric properties and allow for an initial assessment of the geology.

In Preliminary Survey the team also obtains the first OLA data, providing a measure of the surface topography. OVIRS and OTES collect data as “ride-along” instruments, with the spacecraft pointing driven by imaging constraints. These data provide a first look at the spectral variation across the surface of Bennu. Radio science measurements, combined with altimetry and imagery, determine Bennu’s mass, a prerequisite to placing the spacecraft into orbit in late December 2018. Together, data from the Approach and Preliminary Survey phases set the stage for the extensive mapping planned for 2019. These dates are the baseline plan. Any contingency or unexpected discovery may change this mission profile.

Plain-Language Summary:

This presentation will summarize the scientific results from the initial phases of the OSIRIS-REx spacecraft encounter with asteroid (101955) Bennu

Session Selection:

A first look at 162173 Ryugu and 101955 Bennu: Hayabusa 2 and OSIRIS-REx arrive at their respective target asteroids.

Invited Author?:

Yes

Submitter's E-mail Address:

lauretta@lpl.arizona.edu

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First Presenting Author

Presenting Author

Dante S Lauretta

Primary Email: lauretta@lpl.arizona.edu

Affiliation(s):

University of Arizona
Lunar and Planetary Laboratory
Tucson AZ (United States)

Second Author

Olivier S Barnouin

Primary Email: Olivier.Barnouin@jhuapl.edu

Affiliation(s):

JHU Applied Physics Lab
Laurel MD 20723-6099 (United States)

Third Author

Kris Becker

Primary Email: kbecker@orex.lpl.arizona.edu

Affiliation(s):

University of Arizona
Tucson (United States)

Fourth Author

Carina A. Bennett

Primary Email: carinaj@orex.lpl.arizona.edu

Affiliation(s):

Austin TX 78731-0000 (United States)

Fifth Author

Beau Bierhaus

Primary Email: edward.b.bierhaus@lmco.com

Phone: ARRAY(0xe33d390)

Affiliation(s):

Lockheed Martin

Denver CO 80201-0000 (United States)

Sixth Author

William V Boynton

Primary Email: wboynton@lpl.arizona.edu

Affiliation(s):

Univ Arizona

Tucson AZ 85721-0000 (United States)

Seventh Author

Keara N. Burke

Primary Email: knburke@orex.lpl.arizona.edu

Affiliation(s):

University of Arizona

Lunar and Planetary Lab

Tucson AZ (United States)

Eighth Author

Philip R Christensen

Primary Email: phil.christensen@asu.edu

Affiliation(s):

Arizona State University
Tempe AZ 85287 (United States)

Ninth Author

Beth Clark

Primary Email: bclark@ithaca.edu

Affiliation(s):

Ithaca College
Ithaca NY (United States)

Tenth Author

Harold C Connolly Jr

Primary Email: chondrule@haroldconnolly.com

Affiliation(s):

Eleventh Author

Mary Crombie

Primary Email: crombie@indigoinfos.com

Affiliation(s):

Indigo Information Services, LLC
Tucson AZ 85745 (United States)

Twelfth Author

Michael G Daly

Primary Email: dalym@yorku.ca

Affiliation(s):

York University
Centre for Research in Earth and Space Science
Toronto ON M5S 3B1 (Canada)

Thirteenth Author

Daniella N DellaGiustina

Primary Email: danidg@orex.lpl.arizona.edu

Affiliation(s):

University of Arizona
Lunar and Planetary Laboratory
Tucson AZ (United States)

Fourteenth Author

Jason P. Dworkin

Primary Email: Jason.P.Dworkin@nasa.gov

Affiliation(s):

NASA Goddard Space Flight Center
Solar System Exploration Division
Greenbelt MD (United States)

Fifteenth Author

Joshua P Emery

Primary Email: jemery2@utk.edu

Affiliation(s):

Univ of Tennessee-EPSC
Knoxville TN 37996-1410 (United States)

Sixteenth Author

Heather L Enos

Primary Email: heather@orex.lpl.arizona.edu

Affiliation(s):

University of Arizona
Lunar and Planetary Laboratory
Tucson AZ (United States)

Seventeenth Author

Dathon R Golish

Primary Email: dgolish@orex.lpl.arizona.edu

Affiliation(s):

University of Arizona
Lunar and Planetary Laboratory
Tucson AZ (United States)

Eighteenth Author

Victoria E Hamilton

Primary Email: hamilton@boulder.swri.edu

Affiliation(s):

Southwest Research Institute Boulder
Boulder CO 80302 (United States)

Nineteenth Author

Carl Hergenrother

Primary Email: chergen@lpl.arizona.edu

Affiliation(s):

University of Arizona
Tucson AZ (United States)

Twentieth Author

Lucille Le Corre

Primary Email: lecorre@psi.edu

Affiliation(s):

Planetary Science Institute Tucson
Tucson AZ (United States)

Twenty-first Author

Lucy F Lim

Primary Email: lucy.f.lim@nasa.gov

Affiliation(s):

NASA Goddard Space Flight Center
Greenbelt MD (United States)

Twenty-second Author

Patrick Michel

Primary Email: michelp@oca.eu

Affiliation(s):

UNS-CNRS-Observatoire de la Cote d'Azur
Laboratoire Lagrange
Nice (France)

Twenty-third Author

Michael C Nolan

Primary Email: nolan@lpl.arizona.edu

Affiliation(s):

University of Arizona
Lunar and Planetary Laboratory
Tucson AZ (United States)

Twenty-fourth Author

Maurizio Pajola

Primary Email: maurizio.pajola@gmail.com

Affiliation(s):

CISAS-Center for Studies and Activities for Space
Padova (Italy)

Twenty-fifth Author

Mark E Perry

Primary Email: mark.perry@jhuapl.edu

Affiliation(s):

JHU/APL--Space Dept
Laurel MD 20723-0000 (United States)

Twenty-sixth Author

Dennis Reuter

Primary Email: Dennis.C.Reuter@mail.nasa.gov

Affiliation(s):

NASA Goddard Space Flight Center
Greenbelt MD (United States)

Twenty-seventh Author

Bashar Rizk

Primary Email: bashar@lpl.arizona.edu

Affiliation(s):

University of Arizona
Lunar and Planetary Laboratory
Tucson AZ (United States)

Twenty-eighth Author

Daniel Jay Scheeres

Primary Email: scheeres@colorado.edu

Phone: 720-544-1260

Affiliation(s):

University of Colorado Boulder
Ann and H.J. Smead Department of Aerospace Engineering
Sciences
Boulder CO 80309-0429 (United States)

Twenty-ninth Author

Stephen R Schwartz

Primary Email: srs@lpl.arizona.edu

Affiliation(s):

University of Arizona
Tucson AZ (United States)

Thirtieth Author

Amy A Simon

Primary Email: Amy.Simon@nasa.gov

Affiliation(s):

NASA Goddard Space Flight Center
Greenbelt MD (United States)

Thirty-first Author

Kevin John Walsh

Primary Email: kwalsh@boulder.swri.edu

Affiliation(s):

University of Melbourne
Parkville (Australia)

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