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

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*For non-students only: I do not want to be involved in OSPA or the mentoring program.*

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